SEP 28 2012

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act (NEPA), we enclose for your review the Final Environmental Impact Statement (FEIS) for Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan (PCGFMP), RIN 0648-BB57.

This FEIS is prepared pursuant to NEPA to assess the environmental impacts associated with NOAA proceeding with the upcoming decision on the harvest specifications and management measures for the 2013-2014 Pacific Coast groundfish fishery and approval of Amendment 21-2. The 2013-2014 groundfish harvest specifications and management measures set fishery specifications for all 90+ groundfish species, including overfished species. The harvest specifications revise rebuilding plan parameters for two overfished species, Pacific Ocean Perch (POP) and canary rockfish. The proposed management measures revise the existing regulations such that the catch of groundfish are projected to stay within the annual specifications while allowing for harvest of the healthy stocks that co-occur with overfished species. Amendment 21-2 would revise catch accounting provisions for clarity and reinstate provisions that were inadvertently deleted with Amendment 21.

Additional copies of the FEIS may be obtained from the Responsible Program Official identified below. The document is also accessible electronically through the National Marine Fishery Service, Northwest Region website at www.nwr.noaa.gov.

NOAA is not required to respond to comments received during the agency's 30 day as a result of the issuance of the FEIS. However, comments received **within 30 days of publication of the notice of availability** in the Federal Register will be reviewed and considered for their impact on issuance of a record of decision (ROD). Please send comments to the responsible official identified below. The ROD will be made available publicly.

Responsible Program Official:

William W. Stelle, Jr.
Regional Administrator
NMFS Northwest region
National Oceanic and Atmospheric Administration
7600 Sandpoint Way NE
Seattle, WA 98115
Phone: 206-526-6150
Fax: 206-526-6426
E-Mail: GroundfishSpex2013-14@noaa.gov

Sincerely,

for Patricia A. Montanio
NOAA NEPA Coordinator

Enclosure

PROPOSED HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES FOR THE 2013-2014 PACIFIC COAST GROUNDFISH FISHERY

AND

AMENDMENT 21-2 TO THE PACIFIC COAST FISHERY MANAGEMENT PLAN

Final Environmental Impact Statement

PREPARED BY
THE PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 101
PORTLAND, OR 97220
503-820-2280
WWW.PCOUNCIL.ORG

AND THE

NATIONAL MARINE FISHERIES SERVICE
7600 SAND POINT WAY NE, BIN C15700
SEATTLE, WA 98115-0070
206-526-6150

SEPTEMBER 2012

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COVER SHEET

1. Responsible agencies including the lead agency and any cooperating agencies: National Marine Fisheries Service, NOAA, Department of Commerce

2. Title and location of the proposed action that is the subject of the statement: Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Environmental Impact Statement. The proposed action occurs in Federal waters off the coasts of Washington, Oregon, and California.

3. Name, address, and telephone number for further information:

Ms. Becky Renko becky.renko@noaa.gov (206) 526-6110
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way
Seattle, WA 98115

4. Type of statement (draft, final, or supplement): Final

5. 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. The proposed action establishes the overfishing limit, allowable biological catch, and annual catch limit for 32 management units (stocks, stock complexes, and geographic subdivisions of stocks). For overfished species the annual catch limit is based on the rebuilding plan, intended to rebuild the stock in as short a time as possible taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the overfished stock with the marine ecosystem. Accountability measures are proposed to prevent catch from exceeding the annual limits set for management units. These include set asides and allocations of fishing opportunity, the adjustment of measures already in Federal regulation, and incorporating new measures into Federal regulations. Fisheries subject to accountability measures include at-sea fisheries targeting Pacific whiting, the shoreside individual fishing quota (IFQ) fishery, limited entry fixed gear (pot and longline) fisheries, and a variety of other fisheries catching groundfish, either as target species or incidentally, but not license limited under the management framework established in the Groundfish FMP.

6. Date by which comments must be received: 30 days from the date the Notice of Availability is published in the Federal Register.

Executive Summary

The Pacific Fishery Management Council (Council) develops and recommends harvest specifications and management measures to the National Marine Fisheries Service (NMFS). Examples of a harvest specification include annual catch limits (ACLs) for a species or species complex. Examples of management measures include trip limits for commercial fisheries, rockfish conservation area (RCA) boundary adjustments, bag limits, and seasons. The biennial management process was implemented in 2003 through Amendment 17 to the groundfish Fishery Management Plan (FMP). Under this biennial cycle, management measures are implemented for a two-year period, with the expectation that the measures will likely be adjusted within the biennium to attain, but not exceed, the ACLs. Adjustments during the biennium are, in part, based on catch estimate updates and the latest information from the West Coast Groundfish Observer Program. Separate harvest specifications (including acceptable biological catches and annual catch limits) are identified for each year in the two-year period by groundfish species or species complexes. This cycle provides more time for the Council and NMFS to work on other critical groundfish issues, and more time for public comment. This document provides information about, and analyses of, alternatives for the 2013–14 biennial harvest specifications and management measures, for fisheries covered by the Pacific Coast Groundfish FMP (PFMC 2011b). These alternatives were developed by the Council in collaboration with NMFS.

The Proposed Action

Using the "best available scientific information," the proposed action is to implement harvest specifications for calendar years 2013 and 2014 for 39 "management units"[1] managed under the Groundfish FMP and to implement new or revised management measures to address resource conservation concerns, habitat conservation concerns, socioeconomic objectives, and other purposes as described in the sections 2.1 and 6.2 of the FMP (PFMC 2011b). The specifications must be consistent with requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), particularly the 10 National Standards enumerated in §301(a) of the MSA and other applicable law. Seven Pacific Coast groundfish species are currently "overfished" and managed under rebuilding plans implemented by secretarial amendment (bocaccio rockfish south of 40°10' N. latitude, canary rockfish, south of 40°10' N. latitude, cowcod south of 40°10' N. latitude, darkblotched rockfish, Pacific ocean perch north of 40°10' N. latitude or POP, petrale sole, and yelloweye rockfish). Within the rebuilding plans, T_{TARGET} is the key rebuilding parameter. T_{TARGET} is the projected year that an overfished species will be rebuilt with at least a 50 percent probability. Any change to T_{TARGET} must be demonstrated by the need to rebuild the stock as soon as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock within the marine ecosystem. The intent is that 2014 harvest specifications will remain in place until replaced by the 2015 harvest specifications and management measures. The proposed action also includes an amendment to the Pacific Coast Groundfish FMP (Amendment 21-2) to reinstate a provision that was inadvertently deleted in a previous FMP amendment.

The purpose of the proposed action is to conserve and manage Pacific Coast groundfish fishery resources to prevent overfishing, to rebuild overfished stocks, to ensure conservation, to facilitate long-term protection of essential fish habitats (EFH), and to realize the full potential of the Nation's fishery resources (MSA §2(a)(6)). The need for this proposed action is to set catch limit specifications for 2013-

[1] The count of management units is the number of individual ACLs. These are stocks occurring throughout the west coast EEZ ("coastwide"), geographic subdivisions of stocks in the EEZ, and geographically subdivided stock complexes composed of more than one managed species (see Table ES-2).

2014 that are consistent with existing or revised overfished species target years and harvest control rules for all stocks. These harvest specifications are set consistent with the optimum yield (OY) harvest management framework described in Chapter 4 of the Groundfish FMP.

The Alternatives

This Environmental Impact Statement (EIS) evaluates 10 "integrated" alternatives (including the alternative of No Action). The action alternatives incorporate the best available scientific information from current stock assessments to estimate stock status and harvestable yield projections, while the No Action Alternative harvest specifications and management measures are those specified in regulation for 2012. The No Action Alternative is a required element of the EIS that allows the action alternatives to be compared to "'no change' from current management direction or level of management intensity."[2] The integrated alternatives include the following elements:

- **Setting harvest specifications** for the 39 groundfish management units. Harvest specifications are developed consistent with the OY harvest management framework described in Chapter 4 of the Groundfish FMP (PFMC 2011b). Harvest specifications include maximum sustainable yield (MSY or proxy), a long-term objective, the overfishing limit (OFL), acceptable biological catch (ABC), and the ACL. Identification of the OFL is intended to meet the primary management objective of preventing overfishing, which occurs when this level of harvest is exceeded. The ABC is a downward adjustment of the OFL to account for scientific uncertainty surrounding the scientific estimates of the OFL. The ACL is the limit for total fishing mortality, addressed by management measures intended to keep catch below this level. The ACL is usually set equal to the ABC unless a further reduction is deemed appropriate. One noteworthy special case is overfished stocks managed under rebuilding plans. There are seven such stocks in the groundfish fishery. The ACLs for these stocks are set according to rebuilding analyses (based on information from the most recent stock assessment) that estimate the short-term harvest level (ACL) needed to meet the rebuilding plan objective expressed by the target year for when the stock is expected to rebuild to its MSY biomass. The No Action Alternative employs the 2012 ACLs specified in Federal regulations, applied in both years of the 2013-14 cycle. The No Action Alternative does not employ harvest specifications based on the best available science represented by stock assessments and rebuilding analyses completed since 2010, when stock assessment were adopted by the Council to set 2011-12 harvest specifications. But for 22 management units the No Action ACLs are equal to or less than the Preferred Alternative 2013 ACL (see Table ES-1; in 2014 the sablefish N of 36° ACL is less than No Action so the total becomes 23), and therefore the reapplication of these ACLs would not have adverse biological consequences. Conversely, the No Action ACLs greater than action alternative ACLs are inconsistent with stock conservation objectives identified in the Groundfish FMP.
- **Applying deductions to the ACLs** to account for activities not directly managed through this action. These activities include fisheries conducted by Indian tribes pursuant to treaties with the U.S. government, research catches, fishing under exempted fishing permits (EFPs) (which allow fishing otherwise prohibited in regulations), and incidental catch in fisheries targeting species other than groundfish. The quantity once these deductions are made is referred to as the fishery harvest guideline (HG).
- **Allocating fishing opportunity** to different groundfish fisheries based on the fishery HG. For the 2013-14 biennium allocations between trawl and nontrawl portions of the fishery for 21 management units are based on pre-specified proportions enumerated in the allocation

[2] Question 3, *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, 46 FR 18026 (March 23, 1981) and 51 FR 15618 (April 25, 1986).

scheme described in the Groundfish FMP (PFMC 2011b, Section 6.3).[3] Another eight allocations are determined as part of this biennial decision process, when a fixed allocation is suspended because a stock is overfished, for example. Within the trawl fishery, Pacific whiting is allocated between shoreside and at-sea components of the fishery along with "set asides" of certain overfished species, to account for catches in the at-sea whiting fishery. Allocations are particularly important for IFQ and co-op management since harvesters receive individual allocations of harvest opportunity based on the allocation to the sector, but for some sectors and stocks they are adjusted biennially. The Council considered alternate allocation schemes for these management units and sectors but in all but one case a single, preferred allocation scheme is carried forward into the integrated alternatives. The exception is the allocation scheme for the nearshore fishery where there are sub-alternatives that explore alternative allocations between Oregon and California.

- **Identifying accountability measures** used to prevent harvest from exceeding the ACLs adopted for each stock and achieve other conservation and management objectives described in the groundfish FMP. These measures are described in more detail below.

While incorporating these elements, the action alternatives apply status quo harvest management policies in most cases, but the best available scientific information (more recent stock assessments) is used to determine ACL values. For five of the seven overfished species new information confirms that the harvest rate in the current rebuilding plan will result in the stock being rebuilt by the target year and no changes in their rebuilding plans are proposed. For two overfished species, canary rockfish and POP, the most recent scientific information reveals that it is unlikely that they can rebuild by the current target year even if all catch of these stocks was prohibited beginning in 2013. For these two stocks the harvest rate in the rebuilding plan is maintained, resulting in a revision in the target rebuilding year. Experience in managing groundfish fisheries provides evidence that it is extremely difficult, if not impossible, for harvesters to avoid all catch of these stocks (even when retention is prohibited) so a "zero harvest" scenario (resulting in the fastest possible rebuilding time) would likely involve severely restricting or closing many groundfish fisheries, with significant adverse socioeconomic impacts. Therefore, the rebuilding times for these two stocks should be adjusted consistent with the need to consider the status and biology of the stocks and the impacts of different policies on harvesters and coastal communities. Applying the rebuilding plan harvest rate, canary rockfish is projected to rebuild in 2030 rather than the rebuilding plan target year of 2027, while POP is projected to rebuild by 2051 rather than the current rebuilding plan target year of 2020.

The integrated alternatives are built around these needed changes to the rebuilding plans for canary rockfish and POP north of 40°10 N. latitude. Canary rockfish and POP ACLs are strategically arrayed in the integrated alternatives 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 (see Table ES-2). The analysis of the integrated alternatives illuminates the tradeoffs between MSA conservation and socioeconomic objectives in terms of alternative ACLs for overfished species (specifically, canary rockfish and POP).

In November 2011 and April 2012 the Council identified a Preferred Alternative for analysis in this EIS, labeled Alternative 1. At the June 2012 meeting the Council modified Alternative 1 slightly. The June Council meeting occurred during the 45-day public comment period on the DEIS so in this FEIS the modification of Alternative 1 is described separately as the Preferred Alternative. Where there are differences in the impacts between Alternative 1 and the Preferred Alternative they are described in this

[3] Sablefish, because of its value in both trawl and fixed gear fisheries, has a different, more complicated allocation scheme.

Final EIS (FEIS). Since these modifications and the differences in the impacts between Alternative 1 and the Preferred Alternative were not determined to be substnatial, the DEIS was not recirculated.[4]

[4] Council on Environmental Quality (CEQ) regulations (40 CFR 1502.9) state that if the "agency makes substantial changes in the proposed action that are relevant to environmental concerns" the DEIS must be recirculated or supplemented.

Table ES-1. Comparison of No Action and Preferred Alternative ACLs.

Stock	No Action (2012 ACL)	Preferred Alternative ACLs		No Action ACL less than/equal Preferred 2013 ACL?
		2013	2014	
OVERFISHED STOCKS				
Bocaccio S. of 40^{0}10'	274	320	337	Yes
Canary a/	107	116	119	Yes
Cowcod S. of 40^{0}10'	3	3	3	Yes
Darkblotched	296	317	330	Yes
Pacific Ocean Perch a/	183	150	153	**No**
Petrale Sole	1,160	2,592	2,652	Yes
Yelloweye	17	18	18	Yes
NONOVERFISHED STOCKS				
Arrowtooth Flounder	12,049	6,157	5,758	**No**
Black Rockfish (OR-CA)	1,000	1,000	1,000	Yes
Black Rockfish (WA)	415	411	409	**No**
Cabezon (CA)	168	163	158	**No**
Cabezon (OR)	48	47	47	**No**
California scorpionfish	126	120	117	**No**
Chilipepper S. of 40^{0}10'	1,789	1,690	1,647	**No**
Dover Sole	25,000	25,000	25,000	Yes
English Sole	10,151	6,815	5,646	**No**
Lingcod N. of 40º10' b/	N/A	3,036	2,878	N/A
Lingcod S. of 40º10' b/	N/A	1,111	1,063	N/A
Longnose skate	1,349	2,000	2,000	Yes
Longspine Thornyhead (coastwide)	N/A	N/A	N/A	N/A
Longspine Thornyhead N. of 34°27'	2,064	2,009	1,958	**No**
Longspine Thornyhead S. of 34°27'	366	356	347	**No**
Pacific Cod	1,600	1,600	1,600	Yes
Sablefish (coastwide)	NA	NA	NA	N/A
Sablefish N. of 36°	5,347	4,012	4,349	**No**
Sablefish S. of 36°	1,298	1,439	1,560	Yes
Shortbelly	50	50	50	Yes
Shortspine Thornyhead (coastwide)	NA	NA	NA	Yes
Shortspine Thornyhead N. of 34°27'	1,556	1,540	1,525	**No**
Shortspine Thornyhead S. of 34°27'	401	397	393	**No**
Splitnose S. of 40^{0}10'	1,538	1,610	1,670	Yes
Starry Flounder	1,360	1,520	1,528	Yes
Widow c/	600	1,500	1,500	Yes
Yellowtail N. of 40^{0}10'	4,371	4,378	4,382	Yes
STOCK COMPLEXES				
Minor Nearshore Rockfish North	99	94	94	**No**
Minor Shelf Rockfish North	968	968	968	Yes
Minor Slope Rockfish North	1,160	1,160	1,160	Yes

Stock	No Action (2012 ACL)	Preferred Alternative ACLs		No Action ACL less than/equal Preferred 2013 ACL?
Minor Nearshore Rockfish South	990	990	990	Yes
Minor Shelf Rockfish South	714	714	714	Yes
Minor Slope Rockfish South	626	618	622	**No**
Other Flatfish	4,884	4,884	4,884	Yes
Other Fish d/	5,575	2,286	2,265	**No**

a/ A range of alternatives is considered for these stocks; see Table ES-2.
b/ Under the Action Alternatives the lingcod management line is shifted from the OR-CA border at 42° N. latitude to 40°10’ N. latitude. The ACLs for the new management line cannot be compared to No Action.
c/ Alternative ACLs for widow are evaluated, but are not included in the integrated alternatives.
d/ Values for these specifications are the sum of known contributions of component stocks.

TableES-2. 2013-14 ACLs for overfished species (mt) under the integrated alternatives.

Species	No Action		Alt. 1/Pref. Alt.		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7		Alt. 8	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Bocaccio	274	274	320	337	320	337	320	337	320	337	320	337	320	337	320	337	320	337
Canary	**107**	**107**	**116**	**119**	**101**	**104**	**116**	**119**	**48**	**49**	**216**	**220**	**101**	**104**	**147**	**151**	**147**	**151**
Cowcod	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Darkblotched	296	296	317	330	317	330	317	330	317	330	317	330	317	330	317	330	317	330
POP a/	**183**	**183**	**150**	**153**	**150**	**153**	**74**	**76**	**247**	**251**	**74**	**76**	**222**	**226**	**222**	**226**	**150**	**153**
Petrale	1,160	1,160	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652
Yelloweye	17	17	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt annual catch target (ACT) is implemented.

Accountability Measures

Accountability measures applied under the integrated alternatives are summarized in Table ES-3. Existing measures are described under the No Action Alternative in Chapter 2 and would be reapplied in 2013-14 with any necessary adjustments. The proposed action also includes proposed new accountability measures not yet included in Federal groundfish regulations. Existing and new measures are summarized below.

Existing Accountability Measures

The groundfish fishery is managed using an array of measures that vary by different user groups or what fishery managers refer to as “sectors.” These sectors and the management approach used are:

- The shorebased IFQ fishery is managed with individual fishing quotas for most management units and cumulative landing limits (“trip limits”) for some non-target species. All vessels must carry observers to monitor catch and discards.
- At-sea Pacific whiting with cooperative (co-op) fisheries include the mothership-catcher vessel sector managed by co-op participation established in Federal regulation and the catcher-processor managed by a single voluntary co-op. The mothership-catcher vessel

sector must organize as one or more co-ops, or a vessel could participate in the non-co-op fishery. For 2013-14, it is expected that there will be a single mothership-catcher vessel co-op. Mothership-catcher vessel co-op(s) receive a Pacific whiting catch allocation based on the catch history of participants. The catcher-processer sector receives an allocation for the single voluntary co-op. Observers monitor catch aboard the processing vessel. Allocations for those overfished groundfish normally caught in these fisheries are also assigned to the co-ops.

- Limited entry fixed gear (longline and pot): A gear-endorsed limited entry permit is required to participate; vessels may receive an allocation of sablefish to harvest during the "primary or tier fishery" (which is open April to October) based on the permits "stacked" on their vessel. Outside the primary season, vessels fish under daily trip limits. Observers monitor catch and discards on about a fifth of the fleet. These data are used to estimate total mortality of overfished species.
- The "directed open access" sector describes vessels that do not possess a Federal groundfish limited entry permit and target groundfish, principally with fixed gear. These vessels may target sablefish in the "non-nearshore" fishery (i.e., seaward of the RCA) or rockfish in the nearshore fishery. Like the limited entry fixed gear sector this fishery is subject to partial observer coverage, which varies annually between 4 and 15 percent.
- Other vessels catch groundfish incidentally while targeting species not managed under the groundfish FMP. In general, this incidental catch is estimated as part of the effort to track total catch against ACLs.

Groundfish conservation areas are also used to manage bycatch in commercial and recreational groundfish fisheries. These closed areas include gear-specific, depth-based time/area closures—most notably, RCAs—intended to reduce bycatch of overfished rockfish, and other closed areas for bycatch reduction and habitat protection. Section 6.8 in the Groundfish FMP (PFMC 2011b) describes these areas.

Several Washington Coast Indian tribes have treaty rights to fish for groundfish in their usual and accustomed fishing grounds. The Federal government has accommodated these fisheries through a regulatory process described at 50 CFR 660.50. The Council works through the tribes' representative on the Council to set aside a portion of the ACLs or establish a formal allocation for groundfish to account for tribal harvests.

Recreational fisheries are managed by the states, with their management proposals coordinated through the Council process to ensure these measures are consistent with harvest policies and other elements of the Groundfish FMP. Management measures include seasonal closures by state marine region, bag and size limits, time-area closures, and other closed areas. These measures are used to manage catch of recreational target species but are particularly aimed at limiting the catch of overfished species, most often yelloweye and canary rockfish. State representatives on the Council develop their recreational management proposals consistent with the ACLs and HGs discussed above.

The states have primary management responsibility for managing fisheries in state waters (generally, within 3 miles of shore). California and Oregon limit entry to the nearshore groundfish fishery by requiring a state limited entry permit to take commercial quantities of nearshore groundfish species. Washington does not allow a nearshore commercial fishery. State harvest targets or guidelines are lower than those specified in Federal regulations for most nearshore species, and state trip limits take precedence over Federal limits in these cases. State trip limits are designed to keep fishing mortality within nearshore species limits while providing year-round fishing opportunity, if possible. Federal management measures for west coast nearshore commercial groundfish fisheries are typically stratified north and south of 40°10' north latitude (near Cape Mendocino, California).

New Accountability Measures

The Council considered several new accountability measures, adopting a subset to recommend for implementation, as indicated below. These measures are primarily intended to improve program performance. For the purpose of evaluating their environmental impacts, the preferred measures are considered to be part of all the action alternatives while under the No Action Alternative none of these measures would be implemented. Appendix C contains more detailed evaluations of these measures. The measures considered by the Council are:

- Modifications to the boundaries defining RCAs (preferred)
- Allowing unused amounts of the ACL set aside for certain purposes to be allocated to commercial fisheries (preferred)
- Sorting requirements for aurora, shortraker, and rougheye rockfish north of 40°10’ N. latitude
- A technical correction for catch accounting between limited entry and open access portions of the fishery (preferred)
- Revising requirements for vessel offloading (preferred)
- Revising within-trawl allocations of widow rockfish
- Revising accumulation limits for the shorebased IFQ fishery (preferred)
- Specifying a process for determining the carryover of surplus quota pounds from one year to the next in the shorebased IFQ fishery (preferred)
- Removing the lingcod length limit in the shorebased IFQ fishery (preferred; to be available to implement inseason)
- Allowing recreational shelf rockfish retention in the Cowcod Conservation Area (preferred)
- Removing the California recreational bocaccio size limit (preferred)
- Correction to regulations for vessels switching from the primary sablefish fishery to the daily trip limit fishery (preferred)

Table ES-3. Summary description of accountability measures in the integrated alternatives

No Action – Section 2.4.1		
2012 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-67	
Canary rockfish and POP ACLs (mt)	107	183
Accountability Measures	In place January 1, 2012	
ACL deductions and allocations	See Table 2-70– Table 2-76	
Routine management measures	Sections 2.4.12 – 2.4.1.6	
New management measures	N/A	
Preferred Alternative – Section 2.4.2		
2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-48 and Table 2-49	
Canary rockfish and POP ACLs (mt)	116/119	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in section 2.2; overfished species allocations in Table 2-82; change to trawl-nontrawl cowcod allocation; change to deductions for tribal fisheries	

Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery off Oregon 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 1 – Section 2.4.3		
2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-48 and Table 2-49	
Canary rockfish and POP ACLs (mt)	116/119	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in section 2.2; overfished species allocations in Table 2-86; option to change trawl-nontrawl cowcod allocation	
Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery off Oregon 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 2 – Section 2.4.4		
2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-46 and 2-47 except for canary and POP (see Table 2-67 and Table 2-68)	
Canary rockfish and POP ACLs (mt)	101/104	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in section 2.2; overfished species allocations in Table 2-80 except canary and POP allocations in Table 2-88	
Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery with options for Oregon and California, 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 3 – Section 2.4.5		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	116/119	74/76
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-90	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 4 – Section 2.4.6		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	48/49	247/251

Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-92	
Routine management measures	Changes needed mainly because of the low canary rockfish ACL; adjustments to RCAs for the shorebased IFQ fishery and nonnearshore fixed gear fishery; changes to Oregon and California recreational fisheries; various suboptions included for these management measure changes	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 5– Section 2.4.7		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	216/220	74/76
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-96	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 6 – Section 2.4.8		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	101/104	222/226
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-97	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 7 – Section 2.4.9		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	147/151	222/226
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-100	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 8 – Section 2.4.10		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	147/151	150/153
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-102	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	

Impacts of the Alternatives

Groundfish Species

Table ES–1 compares the groundfish ACLs between No Action and the action alternatives. As discussed above, in terms of biological impact, No Action ACLs that are less than the action alternatives ACLs would also have a less adverse biological impact, although they could result in less socioeconomic benefit. In Table ES–1, there are 15 cases where the No Action ACL exceeds the action alternative ACL, which is inconsistent with the harvest management framework and could result in greater adverse impacts. Pacific whiting is not included in Table ES–1 because this species is assessed annually and the harvest limit is set based on the terms of the Agreement with Canada on Pacific Hake/Whiting (discussed further below). For the purposes of analysis, the 2011 value is used along with a discussion of potential impacts if the actual total allowable catch (TAC) in 2013-14 differs from that level.

Overfished Species

Only the ACLs for canary rockfish and POP vary both between the No Action and the action alternatives and among the action alternatives. Thus, comparing biological impacts of the alternatives focuses on these two overfished stocks. The ACLs can be compared to rank the alternatives. ACLs represent a short-term biological impact in terms of the potential fishing mortality that would be authorized. In addition, since the ACLs are determined from the harvest rate that would be incorporated into the revised rebuilding plan they can serve as a proxy for the long-term rebuilding objective. Comparing the action alternatives to No Action is problematic since the No Action ACL for these two stocks is based on different assumptions about the status of these stocks, using information on older stock assessments. But for comparison only, these No Action ACLs may be associated with a harvest rate that, if applied for the duration of the rebuilding period, would result in a corresponding target rebuilding year earlier than a target year associated with a higher ACL. Using this logic, Figure ES-1 shows how the alternatives rank in terms of the canary rockfish and POP ACLs. A lower rank value corresponds to a lower ACL and presumed less adverse biological impact. One way to compare the alternatives with respect to both ACLs is to simply re-rank them based on the individual rankings for the two species. Using that approach, Alternative 2 has the least adverse biological impact while the Preferred Alternative / Alternative 1 ranks third after Alternative 3 and tied with No Action, Alternative 4, and Alternative 6.

Table ES-4 and ES-5 show estimates of the projected catch of overfished species under the alternatives and these estimates as a percentage of the ACL. It can be seen that for many of the overfished species this attainment rate is well below 100 percent. Over time, if actual catches stay proportionately below the implemented ACL, the overfished species are likely to rebuild earlier than predicted based on the ACLs.

Species	No Action	Pref. Alt. / Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Canary	3	4	2	4	1	6	2	5	5
POP	3	2	2	1	5	1	4	4	2

Figure ES–1. Rank of canary rockfish and POP ACLs across the integrated alternatives. 1=lowest ACL/least adverse impact.

Table ES–4. Projected 2013 mortalities (landings plus discard mortalities in mt) of overfished west coast groundfish stocks under the integrated alternatives.

Species		No Action Alt.	Pref. Alt. / Alt. 1b	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Bocaccio	mt	67.9	59.2	59.2	59.2	30.8	59.2	59.2	59.2	59.2
	% of ACL	24.8%	18.5%	18.5%	18.5%	9.6%	18.5%	18.5%	18.5%	18.5%
Canary	mt	53.6	54.6	52.6	54.3	37.7	67.1	52.6	58.5	58.5
	% of ACL	50.1%	47.1%	45.4%	46.8%	32.5%	57.8%	45.4%	50.5%	50.5%
Cowcod	mt	0.6	0.3	0.3	0.3	0.1	0.3	0.3	0.3	0.3
	% of ACL	20.6%	11.2%	11.2%	11.2%	4.6%	11.2%	11.2%	11.2%	11.2%
Darkblotched	mt	92.5	86.6	86.6	76.4	81.5	76.4	86.6	86.6	86.6
	% of ACL	31.3%	27.3%	27.3%	24.1%	25.7%	24.1%	27.3%	27.3%	27.3%
POP	mt	62.3	57.6	57.6	47.9	57.8	47.9	59.8	59.8	57.6
	% of ACL	34.1%	38.4%	38.4%	31.9%	38.5%	31.9%	39.9%	39.9%	38.4%
Petrale	mt	675.9	618.7	618.7	546.7	550.0	546.7	618.9	618.9	618.7
	% of ACL	58.3%	23.9%	23.9%	21.1%	21.2%	21.1%	23.9%	23.9%	23.9%
Yelloweye	mt	15.8	15.9	15.9	15.9	13.8	15.9	15.9	15.9	15.9
	% of ACL	93.2%	88.6%	88.6%	88.5%	76.4%	88.5%	88.6%	88.6%	88.6%

Table ES-5. Projected 2014 mortalities (landings plus discard mortalities in mt) of overfished west coast groundfish stocks under the integrated alternatives.

Species		No Action	Pref. Alt. / Alt. 1b	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Bocaccio	mt	67.9	59.2	59.2	59.2	33.8	59.2	59.2	59.2	59.2
	% of ACL	24.8%	17.6%	17.6%	17.6%	10.0%	17.6%	17.6%	17.6%	17.6%
Canary	mt	53.6	55.1	53.1	54.4	38.3	67.7	53.1	59.2	59.2
	% of ACL	50.1%	46.3%	44.6%	45.7%	32.2%	56.9%	44.6%	49.8%	49.8%
Cowcod	mt	0.6	0.3	0.3	0.3	0.1	0.3	0.3	0.3	0.3
	% of ACL	20.6%	11.2%	11.2%	11.2%	4.6%	11.2%	11.2%	11.2%	11.2%
Darkblotched	mt	92.5	87.4	87.5	77.3	82.6	77.3	87.5	87.5	87.4
	% of ACL	31.3%	26.5%	26.5%	23.4%	25.0%	23.4%	26.5%	26.5%	26.5%
POP	mt	62.3	57.4	57.6	47.9	58.1	47.9	60.2	60.0	60.0
	% of ACL	34.1%	37.5%	37.7%	31.3%	37.9%	31.3%	39.4%	39.2%	39.2%
Petrale	mt	675.9	616.3	618.7	546.7	550.0	546.7	618.9	618.9	616.3
	% of ACL	58.3%	23.2%	23.3%	20.6%	20.7%	20.6%	23.3%	23.3%	23.2%
Yelloweye	mt	15.8	16.0	16.0	16.0	13.7	16.0	16.0	16.0	16.0
	% of ACL	93.2%	89.1%	89.1%	89.1%	75.8%	89.1%	89.1%	89.1%	89.1%

Change in the Target Year for Canary Rockfish and POP

Applying the current rebuilding plan SPR harvest under the Preferred Alternative using information in the latest stock assessments and rebuilding analyses results in increasing the canary rockfish ACL by 9 mt while the POP ACL is reduced by 30 mt compared to No Action.[5] As discussed above, the target year for canary rockfish changes by 3 years, from 2027 to 2030 and the target year for POP changes by 31 years, from 2020 to 2051.

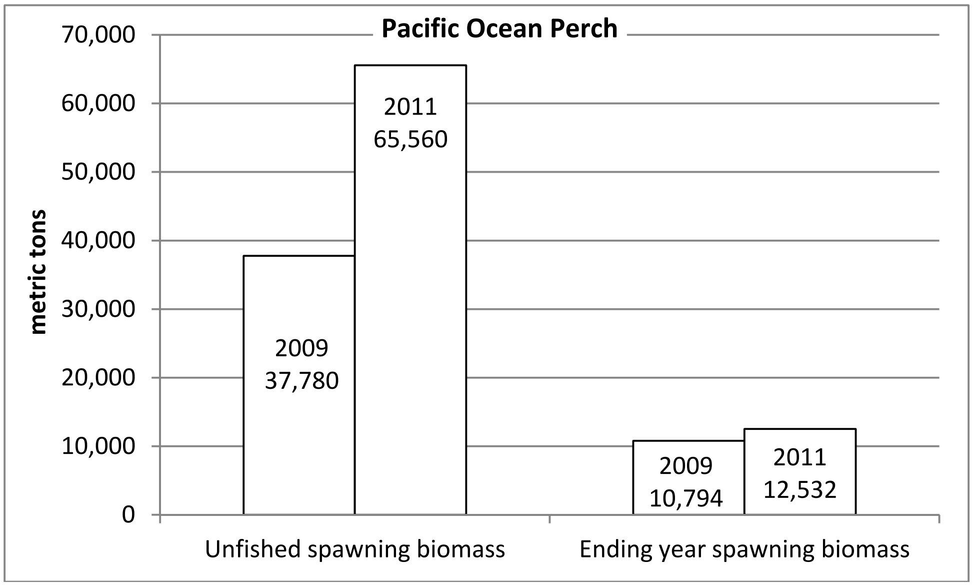
The current rebuilding plan harvest rate produces different results for POP compared to canary rockfish because of revised estimates of certain stock parameters. Figure ES-2 depicts estimates for unfished spawning biomass and current spawning biomass from 2009 and 2011. For both stocks the estimate of terminal year (i.e., the last year modeled in each respective assessment) spawning biomass increased slightly between 2009 and 2011: by 16 percent for POP and 5 percent for canary rockfish. The estimate of POP unfished spawning biomass increased dramatically, with a 74 percent higher estimate than that estimated in 2009. Since depletion, the metric used to gauge stock status expresses the ratio of current to unfished spawning biomass; this change resulted in the estimate of depletion declining from 27 percent in 2009 to 16 percent in 2011 (i.e., in 2011 the stock was slightly less than about one-sixth the size it would be if no fishing had occurred).[6] The resetting of the depletion level, because of the re-estimation of unfished biomass, means that POP has "farther to go" to get to the rebuilt target biomass. Also, new information indicates POP is a less productive stock than previously thought, as measured by the steepness of the stock-recruitment relationship. This means that—other things being equal—the rate of natural increase in the population is slower than previously thought. Even if no POP were caught in fisheries the estimated time to rebuild the stock changed from 2018 based on information available in 2009 to 2043 using the most recent, 2011, information.

For canary rockfish estimated unfished spawning biomass increased by only 7 percent resulting in a small change in the depletion estimate (from 23.7 to 23.2 percent). In contrast to POP, applying the current SPR harvest rate results in small increases in the canary ACLs for 2013-14, because there was no change to the assumed steepness value in the most recent canary stock assessment model—the estimated productivity or rate of natural increase remained the same. Therefore the estimated increase in population size translates directly into an increase in the ACL. Furthermore, different assumptions were used in the most recent canary rockfish rebuilding analysis about the relative catch by different gear types so that the portion of the biomass vulnerable to the fishery was determined to be higher, affecting the computation of the ACLs.

5 Harvest rates are presented in terms of the spawning potential ratio (SPR). This is a percent value indicating an effective harvest rate that would return the population to a given level of spawning potential (reproductive output) in relation to the spawning potential of the unfished population. A *higher* SPR harvest rate value corresponds to a *lower* effective fishing mortality rate. (An SPR harvest rate of 100%, for example, corresponds to the zero harvest level.) Expressing the harvest policy in terms of an SPR rate allows more straightforward comparison across a range of species and policy choices.

6 Under the groundfish FMP a rockfish stock is considered overfished when the current biomass falls to one-quarter of its estimated unfished biomass.

a.



b.

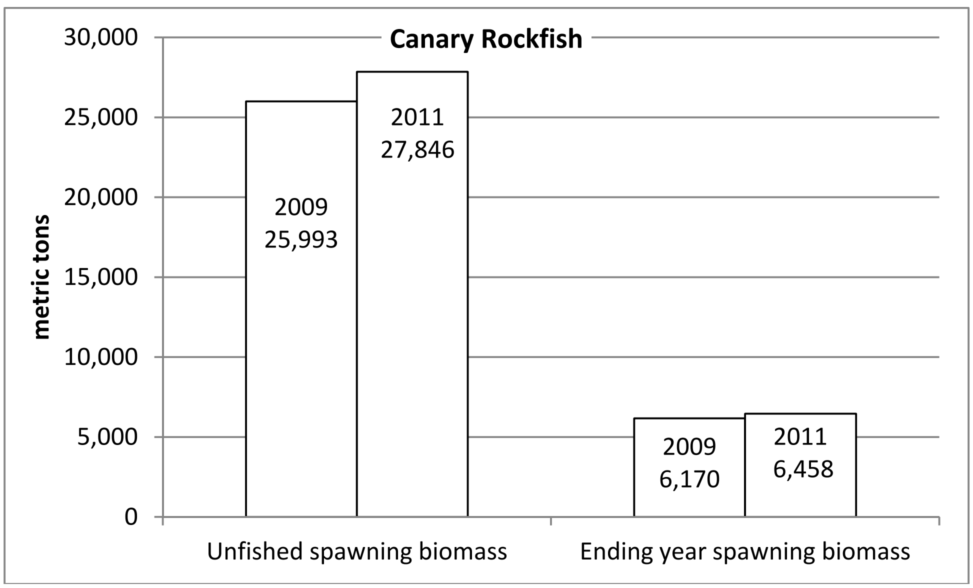


Figure ES-2. Estimates of unfished spawning biomass and current year spawning biomass from 2009 and 2011 for a.) Pacific ocean perch and b.) canary rockfish.

The Council is recommending keeping to a constant harvest rate because, as stock biomass increases, the ACL increases correspondingly (essentially, a constant fraction of the population, rather than quantity, is removed from the population). Maintaining the No Action ACL of 107 mt would imply a constant catch policy in which the ACL would be set at a fixed value for the duration of the rebuilding period. This strategy is problematic if, as the stock becomes more abundant, harvesters have a harder time avoiding incidental catch. Fishery managers would then have to impose even more restrictive measures to prevent the ACL from being exceeded. Furthermore it is not clear that a harvest rate associated with this lower ACL would rebuild the stock any faster than the Preferred Alternative since decreasing the SPR harvest rate from the default 88.7 percent to 90 percent—an ACL of 101 mt in 2013—shortens rebuilding by only one year.

Slight absolute changes in the canary rockfish ACL (such as the 9 metric tons referenced above) can disproportionately affect performance of the fishery because this species is distributed across a wide depth range, increasing the risk of catching them across a variety of groundfish fisheries. The shoreside IFQ fishery offers an example of how the canary rockfish ACL can affect fishing. The IFQ fishery caught 17 percent of their canary rockfish allocation in 2011, which likely reflects a high level of risk aversion, because of the unpredictability and potentially high cost of a tow containing a large amount of canary rockfish that would have to be covered by purchased quota pounds (Holland and Jannot 2012). Since canary rockfish are more likely to be caught in shallower depths on the continental shelf, IFQ fishery participants avoided fishing in these areas, also foregoing some target species catch, such as flatfish, that are also more abundant on the continental shelf. This is reflected in the 21 percent reduction from 2010 to 2011in flatfish landings during the months of June to August.[7] Flatfish are caught almost exclusively on the continental shelf during these months.

Widow Rockfish and Pacific Whiting

In addition to the variation in the canary rockfish and POP ACLs that form the basis of the integrated alternatives, this EIS also evaluates alternate ACLs for widow rockfish and Pacific whiting. Widow rockfish, a previously overfished species, was determined to be rebuilt to the target biomass in 2011. The widow rockfish ACL included in the No Action Alternative (600 mt) represents a continuation of the current harvest policy. However, this stock could sustain higher harvest levels, which could allow limited target fishing opportunities to develop. Conversely, given scientific uncertainty about its status, the Council wants to proceed cautiously in recommending higher harvest limits. To this end, the action alternatives include an ACL of 1,500 mt and a 2,500 mt ACL is evaluated outside the integrated alternatives.[8] A directed fishery could yield additional ex-vessel revenue of $1.2 to 4.2 million. Pacific whiting is managed consistent with the Agreement with Canada on Pacific Hake/Whiting (the Agreement) and the Pacific Whiting Act (the Act). The Joint Management Committee established pursuant to the Agreement and the Act recommends the coastwide TAC and corresponding U.S. TAC for Pacific whiting no later than March 25 of each year. Therefore, the actual U.S. TACs for 2013 and 2014 were not known when this EIS was prepared. Instead, for the purpose of analysis, the 2011 harvest level is used in the integrated alternatives. The effects of higher and lower TACs are then analyzed outside the integrated alternatives. Potential revenues, if 2013 or 2014 TACs varied from the 2011 harvest level in this range, could be between $12.1 and $98.1 million compared to 2011 ex-vessel revenue of $53.3 million.

Groundfish Fisheries

Table ES–6 shows the change in projected ex-vessel revenue from No Action across the integrated alternatives by fishery sector. All sectors, except for the open access nearshore fishery under Alternatives 1-3 and 5-8, show a decline in ex-vessel revenue compared to the No Action alternative.

- The Preferred Alternative is very similar to Alternative 1 except that the fishery harvest guideline is lower for petrale sole, yellowtail rockfish, and to a lesser extent, shortspine thornyheads, to accommodate tribal fisheries set asides. Increased allowances for research and at-sea whiting sector catch of arrowtooth flounder also reduce the fishery harvest guideline for these stocks. These changes reduce the fishery harvest guideline (allocations) for commercial fisheries for those four species accordingly. It is uncertain what, if any, effect these changes will have on

[7] Based on a query of PacFIN data, May 16, 2012.

[8] The socioeconomic impacts of projected landings (ex-vessel revenue, personal income, employment) are estimated for the integrated alternatives. These "outside" variations in ACLs are evaluated with respect to potential ex-vessel revenue but personal income impact estimates were not made, since such estimates require modeling coastwide fisheries for each different ACL.

commercial and tribal fisheries landings and revenue under the Preferred Alternative. The differences between Alternative 1 and the Preferred Alternative are summarized below.

- The shoreside IFQ fishery (shoreside whiting and nonwithing trawl) shows the smallest decline from No Action under Alternatives 6 and 7 followed by Alternatives 1, 2, and 8. Alternatives 3 and 5 show the largest decline from No Action.
- Limited entry fixed gear shows the same decline in ex-vessel revenue of $3.8 million across all the alternatives. This change is mainly due to the lower ACL for sablefish, which is the most valuable species coastwide.
- Nearshore open access fixed gear ex-vessel revenue changes depending on the two sub-alternatives considered. Under sub-alternative A, revenue increases by $733,000 under Alternatives 1-3 and 5-8 and decreases by $698,000 under Alternative 4. Under sub-alternative B, revenue increases by $539,000 under Alternatives 1-3 and 5-8 and decreases by $1.5 million under Alternative 4.
- Non-nearshore open access fixed gear shows the same decline in revenue across all the alternatives of $1.5 million and tribal fisheries show a decline of $1 million across all the alternatives.
- Across all groundfish fishery sectors Alternative 4 would result in the largest decline in ex-vessel revenue of between $14.70 and $15.53 million while Preferred Alternative 1 shows a decline of between $8.98 and $9.17 million.

West Coast Fishing Communities Engaged in Groundfish Fisheries

Table ES–7 summarizes the impacts of the alternatives on fishing communities expressed as the change in personal income from No Action. Summarizing this information still further at the state level, in absolute terms Oregon shows the largest absolute decline in revenue, ranging between $5.0 and $11.8 million depending on the alternative, followed by Washington ($2.5-$3.6 million) and California ($1.3-$8.9 million). Similar to the change in ex-vessel revenue, the largest decline in personal income would be experienced under Alternative 4 ($16.8-$23.9 million depending on sub-alternative). Changes in coastwide personal income from No Action under Preferred Alternative 1 declines between $9.0 to $9.2 million (depending on sub-alternative), the second lowest decline behind Alternatives 6 and 7. Income impacts are not separately estimated for the Preferred Alternative but are assumed to be the same as the estimates for Alternative 1. Increases in set asides for tribal fisheries under the Preferred Alternative could shift some portion of coastwide income to Washington Coast communities where tribal fisheries occur.

Table ES-6. Change in groundfish ex-vessel revenues from No Action by groundfish harvest sector under the 2013-14 integrated alternatives ($1,000).

Alternative:	No Action	Pref. Alt. / Alt. 1*	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Shoreside Sectors:									
Whiting	*23,650*	-278	-278	-2,296	-2,584	-2,296	-110	-110	-278
Nonwhiting Trawl	*26,912*	-3,175	-3,175	-6,238	-5,157	-6,238	-3,162	-3,162	-3,175
Limited Entry Fixed Gear	*19,068*	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782
Nearshore Open Access (A)	*4,218*	733	733	733	-698	733	733	733	733
Nearshore Open Access (B)		539	539	539	-1,531	539	539	539	539
Non-nearshore Open Access	*7,687*	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436
Incidental Open Access	*151*	-	-	-	-	-	-	-	-
Tribal (incl. whiting)	*11,825*	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042
At-Sea Sectors:									
Non Tribal Whiting	*30,890*	-	-	-	-	-	-	-	-
Tribal Whiting	*9,675*	-	-	-	-	-	-	-	-
TOTAL CHANGE IN SHORESIDE REVENUES ($1,000)	*93,512*								
Nearshore Sub-alternative A		**-8,980**	**-8,980**	**-14,061**	**-14,698**	-14,061	-8,798	-8,798	**-8,980**
Nearshore Sub-alternative B		**-9,174**	**-9,174**	**-14,255**	**-15,531**	-14,255	-8,992	-8,992	**-9,174**

*Under the Preferred Alternative the distribution of ex-vessel revenue may differ slightly from Alternative 1 due increased set asides for tribal fisheries.

Table ES-7. Change in combined commercial plus recreational fishery income impacts (from No Action) by community group ($1,000).*

Community Groups	*No Action*	Alternative 1A	Alternative 2A	Alternative 3A	Alternative 4A	Alternative 5A	Alternative 6A	Alternative 7A	Alternative 8A
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*16,905*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*27,877*	-1,888	-1,888	-5,540	-5,826	-5,540	-1,700	-1,700	-1,888
Newport	*16,025*	-1,558	-1,558	-1,937	-2,180	-1,937	-1,526	-1,526	-1,558
Coos Bay-Brookings	*13,881*	-1,810	-1,810	-2,026	-2,453	-2,026	-1,810	-1,810	-1,810
Crescent City-Eureka	*7,937*	-902	-902	-1,735	-907	-1,735	-889	-889	-902
Fort Bragg - Bodega Bay	*5,786*	-600	-600	-629	-496	-629	-600	-600	-600
San Francisco Area	*7,616*	-299	-299	-302	-624	-302	-299	-299	-299
SC – Mo - MB	*13,948*	+453	+453	+431	-1,120	+431	+453	+453	+453
SB – LA - SB	*52,167*	+69	+69	+69	+25	+69	+69	+69	+69
Coastwide Total	*164,518*	-8,996	-8,996	-15,297	-16,830	-15,297	-8,761	-8,761	-8,996

Community Groups	*No Action*	Pref. Alt. / Alternative 1B[†]	Alternative 2B	Alternative 3B	Alternative 4B	Alternative 5B	Alternative 6B	Alternative 7B	Alternative 8B
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*16,905*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*27,877*	-1,909	-1,909	-5,561	-5,941	-5,561	-1,721	-1,721	-1,909
Newport	*16,025*	-1,564	-1,564	-1,943	-3,197	-1,943	-1,532	-1,532	-1,564
Coos Bay-Brookings	*13,881*	-1,925	-1,925	-2,140	-2,650	-2,140	-1,924	-1,924	-1,925
Crescent City-Eureka	*7,937*	-902	-902	-1,735	-1,401	-1,735	-889	-889	-902
Fort Bragg - Bodega Bay	*5,786*	-600	-600	-629	-1,406	-629	-600	-600	-600
San Francisco Area	*7,616*	-299	-299	-302	-2,642	-302	-299	-299	-299
SC – Mo - MB	*13,948*	+453	+453	+431	-3,387	+431	+453	+453	+453
SB – LA - SB	*52,167*	+69	+69	+69	-28	+69	+69	+69	+69
Coastwide Total	*164,518*	-9,138	-9,138	-15,439	-23,901	-15,439	-8,903	-8,903	-9,138

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.

* Although strictly speaking, the two measures are not directly additive due to the slightly different estimation procedures used, combined income impacts generated by commercial and recreational fishing activities are displayed here in order to facilitate comparison of the alternatives.

[†]Under the Preferred Alternative the distribution of income impacts may differ slightly from Alternative 1 because of increased tribal set asides.

Comparison of the Socioeconomic Impacts of the Preferred Alternative and Alternative 1

Compared with Alternative 1B, potential additional impacts under the Preferred Alternative include the following:

1. There may be an increase in tribal landings of petrale sole under the Preferred Alternative since projected tribal petrale sole landings under No Action are slightly higher than the Alternative 1 set aside. If the full amount of the tribal petrale sole set aside were landed under the Preferred Alternative, the upper bound on possible additional tribal revenue impact is on the order of +$0.25 million. All of these additional landings would be made in Puget Sound and Washington Coast ports.
2. Any increase in tribal yellowtail rockfish landings under the Preferred Alternative is less certain since projected tribal yellowtail rockfish landings under No Action are well below the Alternative 1 set aside amount.
3. There is no expected decrease in commercial trawl (IFQ) fisheries revenue impacts under the Preferred Alternative because projected landings of petrale sole and yellowtail rockfish under Alternative 1B are both well below the Preferred Alternative’s shorebased trawl sector harvest guideline.
4. There is no expected decrease in non-trawl sectors’ revenue impacts under the Preferred Alternative because the affected species either aren't taken (arrowtooth flounder, petrale sole), or projected landings under Alternative 1B are well below the Preferred Alternative’s non-trawl sector harvest guideline (shortspine thornyheads, yellowtail rockfish).

Comparison of the Socioeconomic Impacts of Alternative 1 and Alternative 8

At the April 2012 meeting, the Council added Alternative 8 to the analysis to evaluate the effect of proceeding with the Preferred Alternative (Alternative 1) but substituting a higher canary rockfish ACL of 147 mt in 2013 and 151 mt in 2014. These ACLs are associated with a higher SPR harvest rate (85.9 percent versus 88.7 percent) but the estimated target rebuilding year of 2030 does not differ from the Preferred Alternative. (A higher harvest rate assumes a slightly higher risk of not rebuilding by the target year.) The evaluation of socioeconomic impacts in terms of projected ex-vessel revenue and personal income does not differ between Alternatives 1 and 8, however, even with the higher ACL. This lack of contrast is likely a limitation of the models used to project landings and resulting revenue and income.

Target species catch in fixed gear fisheries is affected the most by management controls needed to limit yelloweye rockfish catch so model projections for these fisheries are less sensitive to changes in the canary rockfish ACL. The shoreside trawl (IFQ) fishery has historically accounted for almost 45 percent of coastwide groundfish ex-vessel revenue (see Table 3-23) so modeling of this fishery has a big effect on overall revenue projections. In addition, trawl gear, especially when used on the continental shelf, does not catch yelloweye rockfish as frequently (because this species lives in rocky habitat inaccessible to trawl gear) but does catch canary rockfish. Catch projection for this fishery is based on catch in 2011—the first year under IFQ management—which may not accurately characterize the future performance of this dynamic fishery. Furthermore, because of the scheduling of this EIS process, data for the last months of 2011 were not yet available at the time catch projection modeling was conducted. As a result fishing patterns in late 2011 had to be inferred from the seasonal distribution in prior years. However as it turned out, catch rose dramatically in December 2011, likely because harvesters were more assured that their quota pound (QP) holdings were sufficient to last the year. Once fishermen have gained more experience with IFQ fishery management, behavior in the future is likely to be different than 2011. For example, an increase in the diversity of species caught is already evident from comparing the first three months of 2012 to 2011 (Sean Matson, NMFS NWR, pers. comm., April 2012). Under IFQ management, where harvesters are individually accountable for covering their catch with matching quota pounds, rebuilding stocks function like performance standards.

Model projections of landings and revenue may not therefore capture the actual benefit of a higher canary rockfish ACL in terms of resulting catch of target species. While the direct revenue realized from landing the small amounts of available rebuilding species stocks is negligible, these stocks leverage access to much higher levels of target species landings. Consequently a higher allocation of canary rockfish to the shoreside IFQ fishery may generate more actual revenue than is forecast using the current catch projection models. As discussed above, the ACL and allocation to the shoreside IFQ fishery dictates the amount of QP available to the fleet based on quota share holdings. Smaller canary rockfish QP holdings in relation to potential unavoidable high bycatch events (so called "disaster tows") increase risk aversion, affecting fishing behavior (Holland and Jannot 2012). The higher ACL under Alternative 8 could reduce perceived risk, affecting behavior and resulting fleetwide landings and revenue from higher target species landings. These effects are not captured in the catch projection models.

Other Environmental Components

The EIS also evaluates impacts to nongroundfish species, the California current large marine ecosystem, essential fish habitat, and protected species. No models have been developed to predict effects on these environmental components as a result of changes to harvest specifications and management measures established under the proposed action. General inferences may be based on an assumed positive correlation between catch limits and fishing effort and the size and configuration of area closures (e.g., RCAs) that differ under the alternatives. However, given that only ACLs for canary rockfish and POP vary among the action alternatives, and the management measures are similar across the alternatives it is difficult to differentiate between the alternatives in terms of effects to these resources. Because the proposed changes to management are slight in comparison to No Action it is likely that effects of similar type and magnitude would be experienced during the 2013-14 management period as have occurred in previous years. These resources and the effects of fishing on them are described in Chapter 3. Potentially different impacts among the alternatives are as follows:

- **Ecosystem and habitat**: Because a larger RCA would be implemented under Alternative 4 effects may be reduced under this alternative
- **Nongroundfish species**: the Preferred Alternative, Alternative 1, 3, 5, and 8 would have greater effects on inshore species while Alternatives 4 and 6 would have greater effects on offshore species. Alternative 7 would affect nongroundfish species equally in both areas.
- **Protected species**: Effects cannot be distinguished among the alternatives. NMFS NWR Sustainable Fisheries Division is consulting with the Protected Resources Division on the likelihood that groundfish fisheries in 2013 and beyond would jeopardize the continued existence of any species listed under the Endangered Species Act pursuant to section 7 of the Act. Any jeopardy finding would be addressed through mandatory or discretionary measures to avoid jeopardy.

Summary Ranking of the Alternatives

Figure ES–3 provides a summary ranking of the alternatives using the ACLs for canary rockfish and POP and the projected coastwide personal income under the alternatives as metrics. The alternatives are ranked for each of these metrics. To arrive at the overall ranking the individual rank values were summed and the alternatives re-ranked. This approach assigns equal weight to the rebuilding decisions for canary rockfish and POP and the associated personal income estimated to result. This approach relates to the tradeoff established in MSA §304(e)(4) between rebuilding in a time "as short as possible" while, among other things, taking into account the "needs of fishing communities." The rebuilding rankings can be compared to socioeconomic costs ("needs of fishing communities"). From a policy or legal perspective equal weighting of these metrics may not be appropriate but there is no clear guidance on an alternative weighting.

Metric	No Action	Pref. Alt. / Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Canary	3	4	2	4	1	6	2	5	5
POP	3	2	2	1	5	1	4	4	2
Income	1	3	3	4	5	4	2	2	3
Overall	**1**	**3**	**1**	**3**	**5**	**5**	**2**	**5**	**4**

Figure ES–3. Rank of canary rockfish and POP ACLs (from Figure ES–1) and coastwide personal income (from Table ES–7). Overall score sums individual metric scores and re-ranks the alternatives. 1=lowest impact/highest benefit.

Changes from the DEIS in the FEIS

In response to Council action at its June 2012 meeting, which modified Alternative 1 slightly for the Preferred Alternative, and public comments the following changes to the content of the draft EIS (DEIS) were made in this final EIS (FEIS):

- A description of the Preferred Alternative was added at Section 2.4.2. As discussed above, the Preferred Alternative is based on Alternative 1 with modifications to set-aside amounts to account for catches in tribal, research, incidental open access, and exempted fishing permit fisheries. Most updates were small, except the tribal set-asides for petrale sole (from 45.4 to 220 mt) and yellowtail rockfish (490 to 677 mt). These changes in the set-aside amounts resulted in slight changes to the trawl and non-trawl allocations. A higher two-year cowcod non-trawl allocation was recommended to increase the likelihood that mortality would stay within the allocation. The Council also recommended additional accountability measures for catch accounting between sectors, increased limits on quota pounds for lingcod that may be assigned to a vessel in the IFQ fishery, changes to the shorebased IFQ carry-over program, and inseason adjustments to lingcod length limit for commercial and recreational fisheries. In addition, the RCA configuration for trawl fisheries was changed from being the same as the configuration in place on January 1, 2012, to June 2012.
- Chapter 4 was updated with qualitative assessments of the impact of the Preferred Alternative on environmental components. In most cases no difference in impacts could be discerned between Alternative 1 and the Preferred Alternative or the differences were negligible.
- Minor technical and copy corrections were made throughout the document.

Areas of Controversy

Controversy is assessed through the Council's deliberations on issues and related public comment. The following topics prompted particular comment and discussion.

- <u>Canary rockfish ACL</u>: As discussed above, catch limits for canary rockfish influence fishing opportunity across groundfish fisheries, because of the distribution of the species and the small ACL implemented to meet stock rebuilding objectives. Comment was received recommending that the Council maintain the 2012 ACL of 107 mt to facilitate rebuilding. The Council also considered the harvest rate that produces a 2013 ACL of 147 mt (Alternatives 7 and 8) because the target year is the same as the Preferred Alternative.

- Widow rockfish within-trawl allocation: The Council considered alternative widow rockfish ACLs and within trawl allocation schemes in response to the change in stock status from rebuilding plan management to healthy stock status. Widow rockfish is principally a bycatch species in fisheries targeting Pacific whiting but historically there was a target fishery on this stock. The Council had to consider the tradeoff of the need for allocations to the whiting fisheries, especially at higher whiting ACLs, and the economic benefits of a target fishery.
- Harvest rate for elasmobranchs: Commenters expressed concern that the default harvest rate for elasmobranchs was too high given the low productivity of this group of fish. Based on advice from the Scientific and Statistical Committee, the Council elected to pursue consideration of a harvest rate change once further information is available.
- Restructuring stock complexes: The rockfish stock complexes are currently structured based on latitude and depth. The Other Fish complex groups a variety of nontarget species, most of which are not assessed and comprise a small share of overall catch. As part of 2013-14 harvest specifications, the Council considered restructuring these complexes so that they better represent the status and biology (including vulnerability) of component species so as to better address the criteria described in National Standard 1 guidelines (50 CFR 600.310(d)). Restructuring stock complexes is expected to be implemented for the 2015-16 biennial cycle once additional analysis and further management consideration can be completed.

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LIST OF ACRONYMS USED IN THIS DOCUMENT

ABC	Acceptable biological catch
ACL	Annual catch limit
ACT	Annual catch target
AM	Accountability measure
B_{MSY}	Biomass that allows maximum sustainable yield to be taken
BRD	Bycatch reduction device
CC	
CCA	Cowcod Conservation Area
CCLME	California Current Large Marine Ecosystem
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPS	Coastal pelagic species
CPUE	Catch per unit of effort
CRFS	California Recreational Fisheries Survey
CWT	Coded-wire tag
DBSRA	Depletion-based stock reduction analysis
DCAC	Depletion-corrected average catch
DPS	Distinct population segment
DTL	Daily trip limit
EC	Ecosystem component
EEZ	Exclusive Economic Zone
EFH	Essential fish habitat
EFP	Exempted fishing permit
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESU	Evolutionarily significant unit
F_{MSY}	Fishing mortality rate that maximizes catch biomass in the long term
FMP	Fishery management plan
GMT	Groundfish Management Team
HAPC	Habitat areas of particular concern
HG	Harvest guideline
IBQ	Individual bycatch quota
IFQ	Individual fishing quota
JMC	Joint Management Committee
JTWG	Joint Technical Whiting Group
MBTA	Migratory Bird Treaty Act
MFMT	Maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MPA	Marine protected areas
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	Minimum stock size threshold
MSY	Maximum sustainable yield
NAO	NOAA Administrative Order
NEPA	National Environmental Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS1	National Standard 1

NWFSC	Northwest Fisheries Science Center
ODFW	Oregon Department of Fish and Wildlife
OFL	Overfishing limit
ORBS	Oregon Recreational Boat Survey
OSP	Optimum sustainable production
P*	Probability of overfishing
POP	Pacific ocean perch
QP	Quota pounds
QS	Quota shares
RecFIN	Recreational Fishery Information Network
RCA	Rockfish Conservation Area
RCG	Rockfish-cabezon-greenling
SPR	Spawning biomass per recruit; or spawning potential ratio
SS	Stock Synthesis
SSC	Scientific and Statistical Committee
STAR	Stock assessment review
STAT	Stock Assessment Team
TAC	Total allowable catch
TCEY	Total catch exploitation yield
TINSS	This Is Not Stock Synthesis
TOR	Terms of Reference
UA	Usual and accustomed
USFWS	United States Fish and Wildlife Service
WCGOP	West Coast Groundfish Observers Program
WOC	Washington, Oregon, and California
YRCA	Yelloweye Rockfish Conservation Area

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Chapter 1 Introduction

1.1 How This Document Is Organized

This document provides information about, and analyses of, alternatives for the 2013–14 biennial harvest specifications, including 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). Groundfish harvest specifications are set every 2 years for a 2-year period. 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. The states manage their fisheries, including nearshore rockfish fisheries in the territorial sea, in a manner consistent with, or more restrictive than, the Groundfish FMP and Federal implementing regulations.

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. This document is organized so that it contains the analyses required under NEPA. The proposed action must also comply with other applicable laws, which are enumerated in Chapter 6. While this EIS provides supporting information, the procedural and analytical requirements of these mandates (including findings made by NMFS) may be addressed separately from the NEPA process of which this document is a part (see Chapter 6).

The EIS is organized in the following chapters and appendices:

- Chapter 1 explains why the action is being considered for the groundfish fisheries in 2013–14, including revisions to established groundfish rebuilding plans. The purpose and need statement defines the scope of the subsequent analysis.

- Chapter 2 outlines the No Action and action alternatives that have been considered to address the defined purpose and need. The Council recommended the Preferred Alternative from among these alternatives, which provides the basis for establishing or revising the harvest specifications and management measure regulations governing groundfish fisheries in 2013–14.

- Chapter 3 describes the environmental components affected by the proposed action, which are groundfish and other marine fish, fishery sectors, fishing communities, protected species, essential fish habitat (EFH), and the marine ecosystem.

- Chapter 4 describes the direct, indirect, and cumulative effects of the proposed action, including the No Action Alternative and the Preferred Alternative, on the environmental components described in Chapter 3.

- Chapter 5 details how this action meets 10 National Standards set forth in the MSA (Section 301(a)) and groundfish FMP goals and objectives, as well as MSA-related scoping requirements and public meeting opportunities afforded through the Council process.

- Chapter 6 provides information on those laws and executive orders, in addition to the MSA, with which an action must be consistent. This chapter also describes in greater detail the NEPA process for this action, including all of the steps (Notice of Intent, scoping process under NEPA, etc.) required by the Council on Environmental Quality (CEQ) and NOAA Administrative Order (NAO) 216-6.

- Chapter 7 is the bibliography.

- Appendix A, Model Documentation, documents the models and methods used to estimate potential catches (harvest impacts) under the alternatives, and related effects on personal income and employment in fishing communities.

- Appendix B, Supplementary Evaluation of the Integrated Alternatives, Including No Action, provides additional evaluation of the integrated alternatives described in Chapter 2.

- Appendix C, New Management Measures, describes new management measures that may be implemented during the 2013-2014 period, also summarized in Chapter 2 and analyzed as components of the "integrated alternatives" (see below).

- Appendix D, Groundfish FMP Excerpts of Revisions Associated with Amendment 21-2, provides the modifications to the FMP that are part of the action under Amendment 21-2.

- Appendix E, Comment Letters Received on the DEIS, provides the formal comments received on the DEIS by the public comment deadline.

When implemented, the 2013-14 harvest specifications and management measures will succeed those established for the 2011-2012 biennial period.

1.2 Proposed Action, Purpose and Need

1.2.1 The Proposed Action

Using the "best available scientific information," the proposed action is to implement harvest specifications for calendar years 2013 and 2014 for "management units"[9] managed under the Groundfish FMP and to implement new management measures to address conservation concerns, and other objectives as identified in the FMP. The specifications must be consistent with requirements of the MSA, particularly the 10 National Standards enumerated in §301(a) of the MSA and other applicable law. Eight Pacific Coast groundfish species are currently "overfished" and managed under rebuilding plans implemented by secretarial amendment. Within the rebuilding plans, T_{TARGET} is the key rebuilding parameter. T_{TARGET} is the projected year that an overfished species will be rebuilt. Any change to T_{TARGET} must be demonstrated by the need to rebuild the stock as soon as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock within the marine ecosystem. The intent is that 2014 harvest specifications will remain in place until replaced by the 2015 specifications and management measures. The proposed action also includes an amendment to the Pacific Coast Groundfish FMP (Amendment 21-2) to reinstate a provision that was inadvertently deleted in a previous FMP amendment.

[9] Management units are stocks occurring throughout the west coast EEZ ("coastwide"), geographic subdivisions of stocks in the EEZ, and geographically subdivided stock complexes composed of more than one managed species (see Table 2-10, Table 2-18, and Table 2-40 thorugh Table 2-47).

1.2.2 Purpose of and Need for the Proposed Action

The purpose of the proposed action is to conserve and manage Pacific Coast groundfish fishery resources to prevent overfishing, to rebuild overfished stocks, to ensure conservation, to facilitate long-term protection of EFH, and to realize the full potential of the Nation's fishery resources (MSA §2(a)(6)). The intent is to remain consistent with the goals and objectives of the MSA described above, while making minimal changes to the harvest management objectives from the previous period (2011-2012). The need for this proposed action is to set catch limit specifications for 2013-2014 that are consistent with overfished species target years and harvest control rules for all stocks, to revise overfished species target years when information about the status of the stock indicates that rebuilding is unlikely to occur by the existing target year, and to respond to new information.

The specification of catch limits must be consistent with requirements of the MSA, and particularly the 10 National Standards enumerated in §301(a) of the MSA and related advisory guidelines established pursuant to §301(b). The proposed action needs to be consistent with to the OY harvest management framework described in Chapter 4 of the groundfish FMP which complies with National Standard 1 guidelines as revised. [10] Annual catch limits (ACLs) are amounts of fish catch that should not be exceeded in a year and must be set at a level that prevents overfishing, according to the best available science. For stocks whose biomass is below the MSY level, ACLs will be set appropriately to return stock biomass to that level.

Section 304(e) of the MSA describes how the Council must respond to overfishing and rebuild overfished stocks. Seven groundfish stocks (bocaccio, canary rockfish, cowcod, darkblotched rockfish, Pacific ocean perch (POP), petrale sole, and yelloweye rockfish) are currently being managed under rebuilding plans. In 2011 an eighth stock, widow rockfish, was determined to be rebuilt to the target biomass, based on the most recent stock assessment. For the first time since it was declared overfished in 2001, widow rockfish will be managed as a healthy stock. As part of the proposed action, adopted rebuilding plans need to be evaluated and adjusted, if appropriate, based on the most recent stock assessments for these stocks. ACLs must be set consistent with these rebuilding plans and MSA §304(e), which requires overfished stocks to be rebuilt to the maximum sustainable yield (MSY) biomass in a time period (defined by the target year, or T_{TARGET}) that is as short as possible, taking into account the status and biology of the overfished stocks, the needs of fishing communities, and the interaction of the overfished stock within the marine ecosystem.

1.3 The Action Area

Federally-managed Pacific groundfish fisheries occurring within the EEZ off the coasts of Washington, Oregon, and California (WOC) establish the geographic context for the proposed action. West coast communities engaged in these fisheries are also part of the context (see Figure 1-1). Although this is the Federal action area, the states manage the fisheries in the territorial sea to meet the goals and objectives of the Pacific Groundfish FMP.

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[10] On January 16, 2009, NMFS issued final revised guidelines for National Standard 1 of the MSA (74 FR 3178, 50 CFR Subpart D, 600.310). The final rule provides guidance on how to comply with annual catch limit (ACL) and accountability measure requirements for ending overfishing of fisheries managed by Federal FMPs. The revised National Standard 1 Guidelines require ACLs for all stocks in a fishery; the ACL is a limit that should not be exceeded. Exceeding the ACL triggers accountability measures intended to ensure that ACLs are not exceeded in future fishery management periods.

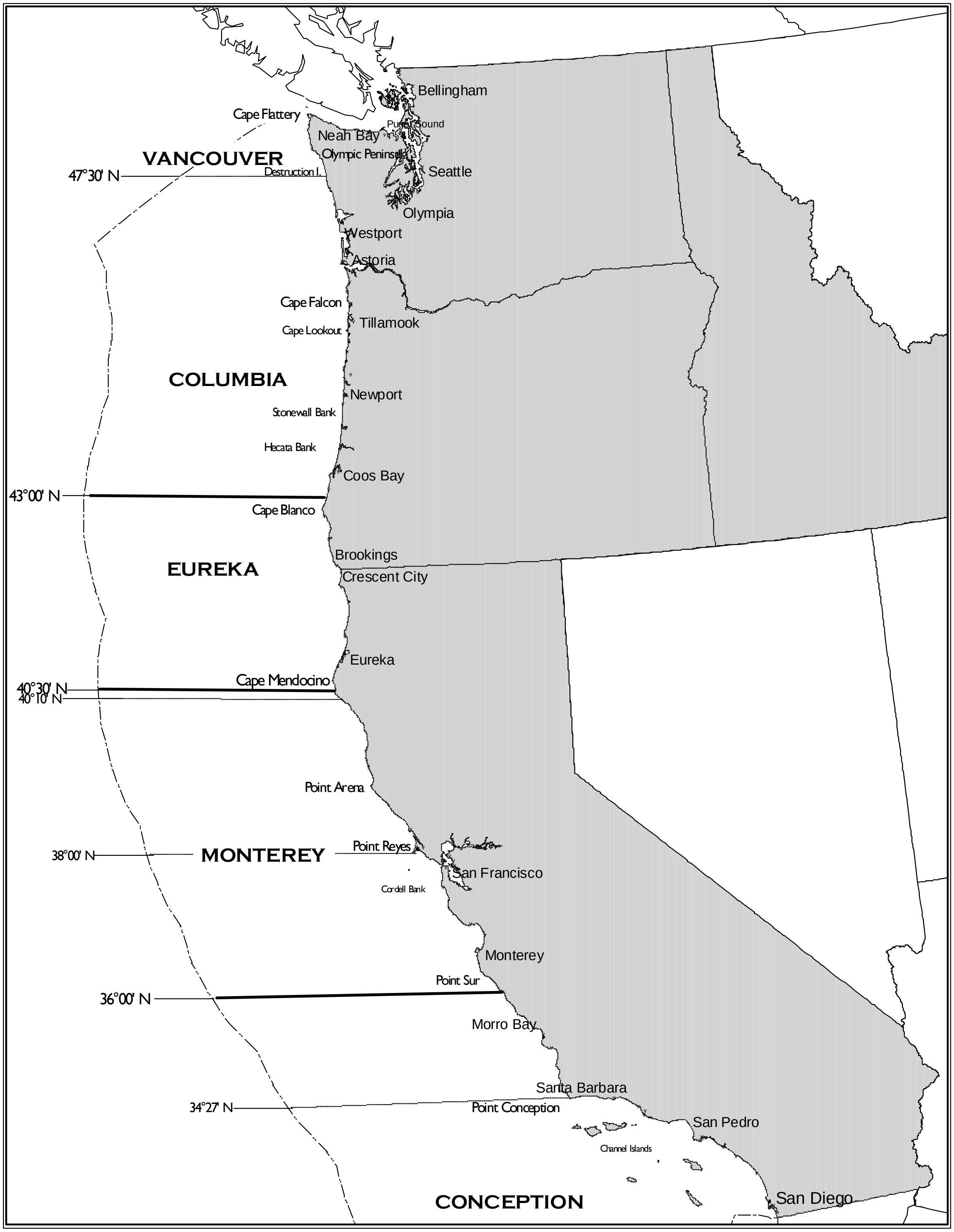

Figure 1-1.The action area, showing major coastal communities and groundfish management areas.

1.4 Issues of Note for the 2013-2014 Cycle

1.4.1 New Stock Assessments

Groundfish stocks are periodically assessed. The assessment results are vetted through a peer-review process and adopted by the Council for use in management decision-making. For the 2013-14 biennial period, the following groundfish stocks were assessed:

- Bocaccio south of 40°10’ N latitude (an overfished stock)
- Canary rockfish (an overfished stock)
- Darkblotched rockfish (an overfished stock)
- Pacific ocean perch (an overfished stock)
- Petrale sole (an overfished stock)
- Yelloweye rockfish (an overfished stock)
- Dover sole
- Sablefish
- Widow rockfish (a newly-rebuilt stock)
- Greenspotted rockfish (managed as part of the Minor Shelf Rockfish North and South complexes)
- Blackgill rockfish (managed as part of the Minor Slope Rockfish South complex)
- Spiny dogfish (managed as part of the Other Fish complex)

In addition to stock assessments, rebuilding analyses are prepared for overfished species when assessed. The rebuilding analyses are used to predict likely rebuilding periods under different harvest scenarios. Typically, overfished species are reassessed in advance of each biennial cycle; however, for the 2013-14 period cowcod was not reassessed, because there is not enough new information on which to base an assessment.

1.4.2 Rebuilding Plan Revisions

As part of decision-making for the 2007-08 biennial period, the Council revised overfished species rebuilding plans and incorporated the changes into the FMP as Amendment 16-4, which was partially approved by NMFS in 2006. This amendment also revised the FMP to specify that rebuilding periods will be as short as possible, taking into account the status and biology of the stocks, the needs of fishing communities, and interactions of overfished stocks with the marine ecosystem. The Council again recommended rebuilding plan revisions as part of the 2011-12 biennial period, but the FMP amendment, labeled 16-5, was disapproved by NMFS in December 2010. NMFS developed a Secretarial FMP Amendment (per MSA Section 304(c)) to replace the rebuilding plan provisions of Council Amendment 16-5; regulations implementing the Secretarial FMP Amendment became effective on January 1, 2012, applicable until any subsequent rebuilding plan revisions are approved by NMFS. Based on the best available scientific information, rebuilding plans for canary rockfish and POP must be revised as part of decision-making for the 2013-14 harvest specifications. However, these changes can be accomplished through regulatory actions rather than an FMP amendment as outlined in the Groundfish FMP (Section 4.6.3.4).

1.4.3 Changes to the Groundfish Trawl Fishery Management Program and Related Allocations

The Council's trawl rationalization program, which applied individual fishing quota (IFQ) management to the shorebased groundfish limited entry trawl fishery and co-operatives in the at-sea fisheries for Pacific whiting, was implemented at the beginning of 2011. Subsequent to initial program implementation, the Council and NMFS have been working on various program enhancements through trailing regulatory actions. The effect of these actions in relation to the proposed action is considered in the cumulative effects analysis (see Section 4.4). Fixed allocations to the trawl sector are used for species and stocks managed with IFQs; for that reason these trailing actions involve some adjustments to the allocation scheme used to determine harvest opportunity among different fishery sectors and user groups and related accounting mechanisms to prevent harvest limits from being exceeded. Furthermore, the Federal district court in San Francisco, California recently held that the National Oceanic and Atmospheric Administration (NOAA) failed to adequately consider current harvests in establishing initial allocations of catch shares of Pacific whiting in the shorebased IFQ program and in the at-sea mothership/catcher vessel sector, Pacific Dawn, LLC, v. Bryson, Case No. C10-4829 TEH (N.D. Cal. Dec. 22, 2011). On February 21, 2012, the court issued an order on remedy requiring reconsideration of the initial allocation of whiting to the affected sectors that could result in changes to whiting allocations effective at the start of the 2013 fishing year.

Chapter 2 Description of the Alternatives

This chapter describes 9 "integrated" alternatives (including the alternative of No Action) and the Preferred Alternative, which are evaluated for their impacts to the human environment in Chapter 4. These integrated alternatives are described in section 2.4. Each integrated alternative represents a complete management program for the 2013-14 biennial period by including harvest specifications (described in Section 2.1), the reapplication of existing accountability measures (Section 2.2), and the implementation of new accountability measures (Section 2.3). Harvest specifications include annual catch limits for all stocks managed under the Pacific Coast Groundfish FMP (PFMC 2011b); accountability measures are to keep the total catch mortality for these stocks at or below the catch limits.

Many Pacific Coast groundfish stocks are caught together in the fishery, and the MSA requires the Council and NMFS to rebuild overfished stocks in a time period "as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities … and the interaction of the overfished stock of fish within the marine ecosystem…" (MSA, sec. 304(e)(4)(A)). Given the nature of the fishery and this mandate it is inappropriate to evaluate impacts to each stock separately. This is the reason why the integrated alternatives are used for impact evaluation.

Harvest specifications comprise three metrics applied to all groundfish stocks and stock complexes using the best available scientific information:

- The overfishing limit (OFL), indicating a level of catch mortality above which overfishing is occurring (Section 2.1.1);
- The acceptable biological catch (ABC) a reduction from the OFL to account for scientific uncertainty in estimates, based on Scientific and Statistical Committee (SSC) recommendations (Section 2.1.2); and
- The annual catch limit (ACL) set at or below the ABC and the basis for managing catch mortality (Section 2.1.3).

Existing accountability measures include deductions from the ACLs to account for fishing activities not subject to standard management measures (Section 2.2.1), allocation of fishing opportunity to various components or "sectors" of the fishery (Section 2.2.2), and various "routine" management measures that may be adjusted through regulatory action (described as part of No Action, see Section 2.4.1). The Council is also proposing several new accountability measures to improve catch accounting, program performance, and fishing opportunity among other purposes (Section 2.3).

The management programs represented by each of the integrated alternatives are assembled in step-wise fashion. The Council and NMFS first decide the harvest specifications for the nonoverfished species and a range of ACLs for those overfished species where modfrications to rebuilding plans are contemplated. Overfished species' ACLs are then strategically ranged between the integrated alternatives (the preferred ACLs for nonoverfished species are assumed for each alternative). Management measures are then adjusted to keep total catch mortality within the ACLs specified for each alternative. The analysis of the integrated alternatives provides a better understanding of how the amount of allowable harvest of overfished species affects different fisheries and coastal fishing communities.

The main difference among the integrated alternatives is the ACLs for two overfished species, canary rockfish and Pacific ocean perch, resulting in some variation in the management measures proposed under the alternatives. Table 2-1 summarizes the integrated alternatives based on the descriptions in Section 2.4. The Preferred Alternative is a slight variation of Alternative 1 based on a change in the deductions from the ACL for tribal fisheries and the set of new management measures recommended by the Council. The descriptive titles for the other action alternatives refer to the canary rockfish and POP ACLs relative to the Preferred Alternative. Various suboptions are included in the action alternatives in order to evaluate different management strategies for particular fisheries. These suboptions are detailed in Section 2.4.

Table 2-1. Summary description of the integrated alternatives.

No Action – Section 2.4.1		
2012 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-67	
Canary rockfish and POP ACLs (mt)	107	183
Accountability Measures	In place January 1, 2012	
ACL deductions and allocations	See Table 2-70– Table 2-76	
Routine management measures	Sections 2.4.12 – 2.4.1.6	
New management measures	N/A	
Preferred Alternative – Section 2.4.2		
2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in Sections 2.1.1 and 2.1.2, respectively; ACLs listed in	
Canary rockfish and POP ACLs (mt)	116/119	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in Section 2.2; overfished species allocations in Table 2-82; change to trawl-nontrawl cowcod allocation; change to deduction for tribal fisheries and resulting commercial fishery allocations	
Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery off Oregon 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in Section 2.3; apply across all the action alternatives	
Alternative 1 – Section 2.4.3		
2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in Sections 2.1.1 and 2.1.2, respectively; ACLs listed in Table and Tabl	
Canary rockfish and POP ACLs (mt)	116/119	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in Section 2.2; overfished species allocations in Table 2-82; option to change trawl-nontrawl cowcod allocation	
Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery off Oregon 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in Section 2.3; apply across all the action alternatives	
Alternative 2 (lower canary ACL) – Section 2.4.4		

2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in Sections 2.1.1 and 2.1.2, respectively; ACLs listed in Table and Tabl except for canary and POP (see Table 2-67 and Table 2-68)	
Canary rockfish and POP ACLs (mt)	101/104	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in section 2.2; overfished species allocations in Table 2-80 except canary and POP allocations in Table 2-88	
Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery with options for Oregon and California, 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 3 (lowest POP ACL) – Section 2.4.5		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	116/119	74/76
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-90	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 4 (lowest canary ACL, highest POP ACL) – Section 2.4.6		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	48/49	247/251
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-92	
Routine management measures	Changes needed mainly because of the low canary rockfish ACL; adjustments to RCAs for the shorebased IFQ fishery and nonnearshore fixed gear fishery; changes to Oregon and California recreational fisheries; various suboptions included for these management measure changes	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 5 (highest canary ACL, lowest POP ACL) – Section 2.4.7		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	216/220	74/76
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-96	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	

Alternative 6 (lower canary ACL, highest POP ACL) – Section 2.4.8		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	101/104	222/226
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-97	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 7 (higher canary ACL, highest POP ACL) – Section 2.4.9		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	147/151	222/226
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-100	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 8 (higher canary ACL) – Section 2.4.10		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	147/151	150/153
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-102	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	

2.1 Alternative Harvest Specifications

2.1.1 Overfishing Limits (OFLs)

The OFL is the MSY harvest level associated with the current stock abundance and is the estimated or proxy MSY harvest level, which is the harvest threshold above which overfishing occurs. The methods for determining OFL are based on the best available science and the recommendation of the SSC; therefore, alternatives are not developed for this reference point.

Amendment 23, which was adopted in December 2010, revised the descriptions of species categories used in the development of harvest specifications. The first category (category 1) includes those species with relatively data-rich quantitative stock assessments that are developed on the basis of catch-at-age, catch-at-length, or other data. Recruitments are estimated for category 1 stocks. OFLs and overfished/rebuilding thresholds can generally be calculated for these species. The second category (category 2) includes species for which some biological indicators are available, including a relatively data-poor quantitative assessment or non-quantitative assessments. The third category (category 3) includes minor species which are caught and where the only available information is generally catch-based data. When setting the 2011 and 2012 OFLs for category 1 species, the F_{MSY} harvest rate or a proxy was applied to the estimated exploitable biomass. A policy of using a default harvest rate as a proxy for the fishing mortality rate that is expected to achieve MSY is also referred to as the F_{MSY} control rule or maximum fishing mortality threshold (MFMT) harvest rate. For category 2 species, OFLs are typically set at a constant level and monitoring is necessary to determine if this level of catch is causing a slow decline in stock abundance. It is difficult to estimate overfished and overfishing thresholds for the category 2 species a priori (unless the stock has a relatively data-poor assessment informing status), but indicators of long-term, potential overfishing can be identified. Catch-based methods are generally used to determine the OFL for category 3 species.

New stock assessments, stock assessment updates and rebuilding analyses recommended by the SSC as the "best available science" and suitable for use in setting biennial harvest specifications were approved by the Council for setting the 2013 and 2014 biennial harvest specifications. Eight stock assessments and four stock assessment updates were prepared to inform the 2013 and 2014 harvest specifications. Full stock assessments, those that consider the appropriateness of the assessment model and that revise the model as necessary, were prepared for the following stocks: POP, petrale sole, widow rockfish, spiny dogfish, sablefish, Dover sole, greenspotted rockfish, and blackgill rockfish. Stock assessment updates, those that run new data through existing models without changing the model, were prepared for bocaccio, canary rockfish, darkblotched rockfish, and yelloweye rockfish. Of these four stock assessment updates, two assessments (bocaccio and darkblotched rockfish) were further reviewed at the September "mop-up" panel. Based on that review, final versions of these two assessments were recommended and adopted that departed from the Terms of Reference (TOR) for stock assessment updates. Although these two final assessments fell somewhere in between stock assessment updates and new full assessments, the SSC recommended them as the "best available science" and suitable for use in setting biennial harvest specifications. For species that did not have new stock assessments or updates prepared, the Council considered an OFL derived from the most recent stock assessment or update, the results of rudimentary stock assessments, or historical landings data.

One 2011 stock assessment review (STAR) panel meeting was devoted to a more rigorous review of data-poor methods for determining OFLs for unassessed stocks. The data-poor methods workshop was conducted in April 2011, and the report with recommendations for using data-poor methods for determining harvest specifications for unassessed stocks can be found at http://www.pcouncil.org/resources/archives/briefing-books/june-2011-briefing-book/#groundfish/Agenda Item E.2.a, Attachment 6. Two data-poor methods, depletion-corrected average catch (DCAC) and depletion-based stock reduction analysis (DBSRA), used to determine 2011 and 2012 OFLs were recommended for use in determining 2013 and 2014 OFLs for unassessed stocks, where there was enough harvest data to use these methods. Additionally, OFLs were determined for four stocks managed in the Other Fish complex using survey biomass estimates and MSY harvest rates (see Section 4.1.1.5 for more details on this method). Average historical catch was used to determine OFLs for stocks where the historical catches were too sparse to use DCAC or DBSRA methods. The DCAC and DBSRA estimates were developed by stock assessment scientists from the Northwest Fisheries Science Center (NWFSC) and the Southwest Fisheries Science Center. The DCAC provides an estimate of sustainable yield (the OFL) for data-poor stocks of uncertain status. DCAC adjusts historical average catch to account for one-time "windfall" catches that are the result of stock depletion, producing an estimate of yield that was likely to be sustainable over the same time period. Advantages of the DCAC approach to determining sustainable yield for data-poor stocks include: 1) minimal data requirements, 2) biologically-based adjustment to catch-based yield proxies with transparent assumptions about relative changes in abundance, and 3) simplicity in computing. The DBSRA extends the DCAC by 1) restoring the temporal link between production and biomass, and 2) evaluating and integrating alternative hypotheses regarding changes in abundance during the historical catch period. This method combines DCAC's distributional assumptions regarding life history characteristics and stock status with the dynamic models and simulation approach of stochastic stock reduction analysis. The participants in the April 2011 data-poor methods workshop and the SSC endorsed application of DCAC and DBSRA to derive the OFL for unassessed groundfish stocks.

For 2013 and 2014, the default harvest rates were used as a proxy for the fishing mortality rate that is expected to achieve the MSY (F_{MSY}). A proxy is used because there is insufficient information for most Pacific Coast groundfish stocks to establish a species-specific F_{MSY}. In 2013 and 2014, the following default harvest rate proxies, based on SSC recommendations, were used: $F_{30\%}$ for assessed flatfish, $F_{40\%}$ for Pacific whiting, $F_{50\%}$ for rockfish (including thornyheads), and $F_{45\%}$ for other groundfish such as sablefish and lingcod. The FMP allows default harvest rate proxies to be modified as scientific knowledge improves for a particular species.

Table 2-2 compares the 2013 and 2014 OFLs with the 2012 OFLs (No Action Alternative) for stocks managed with stock-specific harvest specifications. The OFLs are specified for all the stocks and stock complexes actively managed in the fishery, as required by the FMP. The 2012 OFLs in Table 2-2 were projected from stock assessments done in 2009 or earlier. The 2013 and 2014 OFLs in Table 2-2 include the results of stock assessments done in 2011. The OFL contributions for the cowcod stock south of 40°10' N. latitude are shown as area-specific OFL contributions because they were derived using different methodologies. The Conception area OFLs were projected from the 2009 assessment (Dick, *et al.* 2009) and the Monterey area OFLs were derived using DBSRA. Although the area-specific OFL contributions for cowcod are displayed in Table 2-2, the OFL is specified for the entire stock south of 40°10' N. latitude and not for each area. The Council is recommending changing the management line for lingcod from 42º N. latitude at the Oregon-California border to the 40º10' N. latitude management line. Therefore, the 2012 lingcod OFLs depict a different management line than those preferred for 2013 and 2014. The 2012 OFL and 2013 and 2014 OFL contributions of individual stocks within the Minor Rockfish, Other Flatfish and Other Fish complexes are shown in italics in Table 2-3. The OFL contributions for the individual stocks were summed to derive the complex OFLs.

The preferred 2013 and 2014 OFLs for west coast groundfish stocks and stock complexes used the same policies (e.g., F_{MSY} harvest rates and methodologies) used to determine the 2012 OFLs (i.e., No Action) with the following exceptions:

- The 2013 and 2014 lingcod OFLs are based on a stratification of the relative biomass north and south of 40º10' N. latitude rather than north and south of the Oregon-California border at 42º N. latitude as was done to determine 2012 lingcod OFLs. The proposed change to the lingcod management line is to avoid disruption of the trawl IFQ fishery, where there is a requirement to fish within a single management area on each trip. Northern California and southern Oregon trawl fishermen frequently transit the border within a trip or tow, a practice that would not be allowed with a management line specified at 42º N. latitude. Average 2003-2010 swept area biomass estimates of lingcod north of 40º10' N. latitude were used to estimate 48 percent of the stock south of 42º N. latitude occurred north of 40º10' N. latitude. Lingcod OFL estimates were apportioned accordingly;

- DCAC and DBSRA estimates of OFL for component stocks managed in complexes were slightly modified to address a bias determined at the April 2011 data-poor methods workshop (see Section 2.1.1 for more details);

- Greenspotted rockfish off California was assessed for the first time in 2011 (Dick, *et al.* 2011). Based on that assessment, the portion of the stock off California was upgraded from stock category 3 where the OFL was informed using DBSRA to a category 2 stock where the OFL is informed directly by the assessment. This change affected the greenspotted rockfish contribution to the Minor Shelf Rockfish South complex OFL and, for that portion of the stock between 40º10' N. latitude and 42º N. latitude, the greenspotted rockfish contribution to the Minor Shelf Rockfish North complex OFL;

- OFL estimates for California skate, big skate, Pacific grenadier, and ratfish were derived using survey biomass and MSY harvest rate estimates in a new methodology developed by scientists from the Southwest and Northwest Fisheries Science Centers. This methodology was reviewed and endorsed by the SSC at their March 2012 meeting (see Section 4.1.1.5 for more details on the methodology).

- Spiny dogfish was assessed for the first time in 2011 (Gertseva and Taylor 2011). Based on that assessment, the stock category was upgraded from stock category 3 where the OFL was informed using DBSRA to a category 2 stock where the OFL is informed directly by the assessment;
- The preferred 2013 and 2014 OFLs for the Other Fish complex are based on the sum of the known contribution of component stocks. The 2012 OFL for the Other Fish complex was based on a reduction of the 2010 ABC (MSY harvest level prior to the adoption of FMP Amendment 23) to account for removal of the newly-assessed cabezon stock off Oregon.

Table 2-2. Specified 2012 OFLs (i.e., No Action alternative) (mt) and preferred 2013 and 2014 OFLs (mt) for stocks managed with stock-specific harvest specifications (overfished stocks in CAPS, stocks with new assessments in bold, substock contributions to a stock OFL in italics (i.e., cowcod)).

Stock	2012 OFL	2013 OFL	2014 OFL
OVERFISHED STOCKS			
BOCACCIO S. of 40^{0}10' N. latitude	732	**884**	**881**
CANARY	622	**752**	**741**
COWCOD S. of 40^{0}10' N. latitude	13	11	12
COWCOD (Conception)	*6*	7	7
COWCOD (Monterey)	*7*	5	5
DARKBLOTCHED	497	**541**	**553**
PACIFIC OCEAN PERCH	1,007	**844**	**838**
PETRALE SOLE	1,279	**2,711**	**2,774**
YELLOWEYE	48	**51**	**51**
NONOVERFISHED STOCKS			
Arrowtooth Flounder	14,460	7,391	6,912
Black Rockfish (OR-CA)	1,169	1,159	1,166
Black Rockfish (WA)	435	430	428
Cabezon (CA)	176	170	165
Cabezon (OR)	50	49	49
California scorpionfish	132	126	122
Chilipepper S. of 40^{0}10' N. latitude	1,872	1,768	1,722
Dover Sole	44,826	**92,955**	**77,774**
English Sole	10,620	7,129	5,906
Lingcod N. of 42º N. latitude (OR & WA)	2,251	NA	NA
Lingcod S. of 42º N. latitude (CA)	2,597	NA	NA
Lingcod N. of 40º10' N. latitude	NA	3,334	3,162
Lingcod S. of 40º10' N. latitude	NA	1,334	1,276
Longnose skate	3,006	2,902	2,816
Longspine Thornyhead (coastwide)	3,483	3,391	3,304
Pacific Cod	3,200	3,200	3,200
Sablefish (coastwide)	8,623	**6,621**	**7,158**
Shortbelly	6,950	6,950	6,950
Shortspine Thornyhead (coastwide)	2,358	2,333	2,310
Splitnose S. of 40^{0}10' N. latitude	1,610	1,684	1,747
Starry Flounder	1,813	1,825	1,834
WIDOW	4,923	**4,841**	**4,435**
Yellowtail N. of 40^{0}10' N. latitude	4,573	4,579	4,584

Table 2-3. Specified 2012 OFLs (i.e., No Action alternative) (mt) and preferred 2013 and 2014 OFLs (mt) for stock complexes (species contributions to a stock complex specification in italics, stocks with new assessments in bold).

Stock	2012 OFL	2013 OFL	2014 OFL
STOCK COMPLEXES			
Minor Nearshore Rockfish North	116	110	110
Black and yellow	*a/*	*a/*	*a/*
Blue (CA)	*27.5*	*27.4*	*27.4*
Blue (OR & WA)	*33.1*	*32.3*	*32.3*
Brown	*5.3*	*5.5*	*5.5*
Calico	*a/*	*a/*	*a/*
China	*11.7*	*9.8*	*9.8*
Copper	*28.6*	*26.0*	*26.0*
Gopher	*a/*	*a/*	*a/*
Grass	*0.6*	*0.7*	*0.7*
Kelp	*a/*	*a/*	*a/*
Olive	*0.3*	*0.3*	*0.3*
Quillback	*8.7*	*7.4*	*7.4*
Treefish	*0.2*	*0.2*	*0.2*
Minor Shelf Rockfish North	2,197	2,183	2,195
Bronzespotted	*a/*	*a/*	*a/*
Bocaccio	*268.2*	*284.0*	*284.0*
Chameleon	*a/*	*a/*	*a/*
Chilipepper	*140.9*	*133.1*	*129.6*
Cowcod	*a/*	*a/*	*a/*
Dusky	*b/*	*b/*	*b/*
Dwarf-red	*b/*	*b/*	*b/*
Flag	*0.1*	*0.1*	*0.1*
Freckled	*a/*	*a/*	*a/*
Greenblotched	*1.4*	*1.3*	*1.3*
Greenspotted 40°10' to 42° N. latitude	*20.9*	***9.4***	***9.4***
Greenspotted N. of 42° N. latitude (OR & WA)		*6.1*	*6.1*
Greenstriped	*1,232.0*	*1,252.3*	*1,268.3*
Halfbanded	*a/*	*a/*	*a/*
Harlequin	*a/*	*a/*	*a/*
Honeycomb	*a/*	*a/*	*a/*
Mexican	*a/*	*a/*	*a/*
Pink	*a/*	*a/*	*a/*
Pinkrose	*a/*	*a/*	*a/*
Puget Sound	*a/*	*a/*	*a/*
Pygmy	*a/*	*a/*	*a/*
Redstripe	*288.3*	*269.9*	*269.9*
Rosethorn	*15.2*	*12.9*	*12.9*
Rosy	*2.5*	*3.0*	*3.0*
Silvergray	*180.0*	*159.4*	*159.4*
Speckled	*0.2*	*0.2*	*0.2*
Squarespot	*0.1*	*0.2*	*0.2*
Starry	*a/*	*a/*	*a/*
Stripetail	*35.3*	*40.4*	*40.4*
Swordspine	*a/*	*a/*	*a/*

Stock	2012 OFL	2013 OFL	2014 OFL
Tiger	*1.1*	*1.0*	*1.0*
Vermilion	*11.1*	*9.7*	*9.7*
Minor Slope Rockfish North	1,507	1,518	1,553
Aurora	*17*	*15.4*	*15.4*
Bank	*20*	*17.2*	*17.2*
Blackgill	*5*	*4.7*	*4.7*
Redbanded	*52*	*45.3*	*45.3*
Rougheye	*78*	*71.1*	*71.1*
Sharpchin	*232*	*214.5*	*214.5*
Shortraker	*22*	*18.7*	*18.7*
Splitnose	*897*	*939.0*	*974.1*
Yellowmouth	*185*	*192.4*	*192.4*
Minor Nearshore Rockfish South	1,145	1,164	1,160
Shallow Nearshore Species	NA	NA	NA
Black and yellow	*26.8*	*27.5*	*27.5*
China	*19.8*	*16.6*	*16.6*
Gopher (N. of Point Conception)	*165.0*	*157.0*	*153.0*
Gopher (S. of Point Conception)	*26.0*	*25.6*	*25.6*
Grass	*55.6*	*59.6*	*59.6*
Kelp	*25.9*	*27.7*	*27.7*
Deeper Nearshore Species	NA	NA	NA
Blue (assessed area)	*190*	*187.8*	*187.8*
Blue (S. of 34°27' N. latitude)	*74.0*	*72.9*	*72.9*
Brown	*197.4*	*204.6*	*204.6*
Calico	*a/*	*a/*	*a/*
Copper	*156.0*	*141.5*	*141.5*
Olive	*189.5*	*224.6*	*224.6*
Quillback	*6.3*	*5.4*	*5.4*
Treefish	*12.9*	*13.2*	*13.2*
Minor Shelf Rockfish South	2,243	1,910	1,913
Bronzespotted	*6.7*	*3.6*	*3.6*
Chameleon	*a/*	*a/*	*a/*
Dusky	*b/*	*b/*	*b/*
Dwarf-red	*b/*	*b/*	*b/*
Flag	*26.6*	*23.4*	*23.4*
Freckled	*a/*	*a/*	*a/*
Greenblotched	*24.6*	*23.1*	*23.1*
Greenspotted	*195.3*	***80.3***	***80.3***
Greenstriped	*226.0*	*229.7*	*232.7*
Halfbanded	*a/*	*a/*	*a/*
Harlequin	*a/*	*a/*	*a/*
Honeycomb	*7.8*	*9.9*	*9.9*
Mexican	*2.8*	*5.1*	*5.1*
Pink	*2.8*	*2.5*	*2.5*
Pinkrose	*a/*	*a/*	*a/*
Pygmy	*a/*	*a/*	*a/*
Redstripe	*0.5*	*0.5*	*0.5*
Rosethorn	*2.5*	*2.1*	*2.1*
Rosy	*36.9*	*44.5*	*44.5*
Silvergray	*0.6*	*0.5*	*0.5*

Stock	2012 OFL	2013 OFL	2014 OFL
Speckled	*42.9*	*39.4*	*39.4*
Squarespot	*5.8*	*11.1*	*11.1*
Starry	*70.5*	*62.6*	*62.6*
Stripetail	*20.6*	*23.6*	*23.6*
Swordspine	*12.9*	*14.2*	*14.2*
Tiger	*a/*	*a/*	*a/*
Vermilion	*308.4*	*269.3*	*269.3*
Yellowtail	*1,249*	*1,064*	*1,064*
Minor Slope Rockfish South	903	681	685
Aurora	*29.4*	*26.1*	*26.1*
Bank	*574.8*	*503.2*	*503.2*
Blackgill	*275.0*	***130.0***	***134.0***
Pacific ocean perch	*a/*	*a/*	*a/*
Redbanded	*11.9*	*10.4*	*10.4*
Rougheye	*0.5*	*0.4*	*0.4*
Sharpchin	*10.6*	*9.8*	*9.8*
Shortraker	*0.1*	*0.1*	*0.1*
Yellowmouth	*0.8*	*0.8*	*0.8*
Other Flatfish	10,146	10,060	10,060
Butter sole	*4.6*	*4.6*	*4.6*
Curlfin sole	*8.2*	*8.2*	*8.2*
Flathead sole	*35.0*	*35.0*	*35.0*
Pacific sanddab	*4,942.5*	*4,801.0*	*4,801.0*
Rex sole	*4,308.6*	*4,371.5*	*4,371.5*
Rock sole	*66.0*	*66.7*	*66.7*
Sand sole	*780.8*	*773.2*	*773.2*
Other Fish c/	11,150	6,832	6,802
Big skate		*458.0*	*458.0*
Cabezon (WA)		*d/*	*d/*
California skate		*86.0*	*86.0*
Finescale codling		*d/*	*d/*
Kelp greenling (CA)	*110.6*	*118.9*	*118.9*
Kelp greenling (OR & WA)		*d/*	*d/*
Leopard shark	*164.0*	*167.1*	*167.1*
Pacific grenadier		*1,519.0*	*1,519.0*
Ratfish		*1,441.0*	*1,441.0*
Soupfin shark	*62.4*	*61.6*	*61.6*
Spiny dogfish	*2,200.2*	***2,980.0***	***2,950.0***

a/ Trace amount caught; i.e., the average catch does not round to 0.1 mt.
b/ The SSC did not recommend an OFL contribution for these stocks.
c/ Values for these specifications in 2013 and 2014 are the sum of known contributions of component stocks.
d/ No OFL contribution for these stocks given the lack of an approved method for estimating the OFL.

2.1.2 Acceptable Biological Catches

The 2012, 2013, and 2014 ABCs are annual catch specifications that are the stock or stock complex's OFL reduced by an amount associated with the scientific uncertainty in estimating the OFL. Under the FMP harvest specification framework, scientific advice that is relatively uncertain will result in ABCs that are relatively lower, all other things being equal (i.e., a precautionary reduction in catch will occur due purely to scientific uncertainty in estimating the OFL). The ABC is the catch level that ACLs may not exceed. As explained in more detail below, the SSC recommended a two-step approach referred to as the P* approach for determining ABCs. In the P* approach, the SSC determines the amount of scientific uncertainty associated with estimating the OFL in stock assessments, referred to as the sigma (σ) value. Since the OFL is estimated by applying the harvest rate estimated or assumed to produce MSY (i.e., F_{MSY}) to the exploitable biomass and since assumed proxy F_{MSY} harvest rates by taxa are currently used to estimate the OFL, the variance in estimating biomass is the metric used for determining sigma. The Council chooses its preferred level of risk of overfishing, which is designated as the overfishing probability[11] (P*). The scientists then apply the P* value to the sigma value to determine the amount by which the OFL is reduced to establish the ABC.

The SSC assigned each species in the groundfish fishery to one of three categories based on the level of information available about the species. Table 2-4 shows the criteria used by the SSC to categorize stocks. The SSC's recommended sigma value for category 1 stocks is based on a statistical analysis of the variance within and among stock assessments. The meta-analysis used stock assessments from 17 data-rich stocks to determine the proxy sigma value for category 1 stocks. The general methodology used by the SSC subcommittees to assess among-assessment uncertainty was to compare previous stock assessments and stock assessment updates[12], and consider the logarithms of the ratios of the biomass estimates for each pair of assessments and their reciprocals using the last 20 years from an assessment. This provides a distribution of stock size differences in log-space and, if this variation is averaged over species, provides a general view of total biomass variation (represented as sigma - σ) that emerges among repeat assessments of stocks, while embracing a wide range of factors that affect variability in results. The SSC indicated that biomass is most likely the dominant source of uncertainty; however, it is anticipated that other factors will need to be considered in the future. The SSC intends to update the meta-analysis used to determine sigmas for different stocks/stock categories for the 2015-2016 management cycle. The other factors contributing to uncertainty in estimating OFLs will be considered at that time.

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11 The overfishing probability (P*) is the probability of overfishing a stock or stock complex (i.e., exceeding the specified OFL) based solely on the scientific uncertainty in estimating the OFL.

12 Stock assessment updates were excluded from the meta-analysis unless they were the most recent assessment conducted (in which case the original full assessment upon which the update was based was excluded from the meta-analysis) because of constraints imposed by the Terms of Reference for groundfish stock assessments on how much update assessments could change from the last full assessment.

Table 2-4. Criteria used by the SSC to categorize stocks based on the quantity and quality of data informing the estimate of OFL. Stock categories are used in deciding 2013 and 2014 ABCs that accommodate the uncertainty in estimating OFLs.

Category	Sub-category	Criteria
Category 1 - Data rich stocks. OFL based on F_{MSY} or F_{MSY} proxy from model output. ABC based on P* buffer.		
1	a	Reliable compositional (age and/or size) data sufficient to resolve year-class strength and growth characteristics. Only fishery-dependent trend information available. Age/size structured assessment model.
1	b	As in 3a, but trend information also available from surveys. Age/size structured assessment model.
1	c	Age/size structured assessment model with reliable estimation of the stock-recruit relationship.
Category 2 - Data moderate. OFL derived from model output (or natural mortality).		
2	a	M*survey biomass assessment (as in Rogers 1996).
2	b	Historical catches, fishery-dependent trend information only. An aggregate population model is fit to the available information.
2	c	Historical catches, survey trend information, or at least one absolute abundance estimate. An aggregate population model is fit to the available information.
2	d	Full age-structured assessment, but results are substantially more uncertain than assessments used in the calculation of the P* buffer. The SSC will provide a rationale for each stock placed in this category. Reasons could include that assessment results are very sensitive to model and data assumptions, or that the assessment has not been updated for many years.
Category 3 - Data poor. OFL derived from data-poor methods using historical catch.		
3	a	No reliable catch history. No basis for establishing OFL.
3	b	Reliable catch estimates only for recent years. OFL is average catch during a period when stock is considered to be stable and close to B_{MSY} equilibrium on the basis of expert judgment.
3	c	Reliable aggregate catches during period of fishery development and approximate values for natural mortality. Default analytical approach DCAC.
3	d	Reliable annual historical catches and approximate values for natural mortality and age at 50% maturity. Default analytical approach DBSRA.

Based on this analysis, the SSC recommended using the biomass variance statistic of $\sigma = 0.36$ for category 1 stocks. In cases where the stock biomass estimated in the most recent assessment has a variance greater than the variance estimated for that stock's category, the assessment's estimated biomass variance is used instead. The stock biomass estimated in the 2011 widow rockfish assessment was judged to have a greater variance than the sigma of 0.36 used for other category 1 stocks. In this case, the SSC recommended using a sigma value of 0.41 for deciding the widow rockfish ABC. Each P* is mapped to its corresponding buffer fraction. The Council then recommends an appropriate P* value. When the P* approach is used, the upper limit of P* allowed by the FMP is 0.45.

The Council selected a P* value of 0.45 for most category 1 stocks. With a P* value of 0.45, a sigma value of 0.36 corresponds with a reduction of 4.4 percent from the OFL when deriving the ABC. For sablefish, the Council selected a P* value of 0.4, which corresponds with a reduction of 8.7 percent from the OFL when deriving the ABC. The preferred 2013 and 2014 ABCs for stocks managed with stock-specific harvest specifications used the same policies (i.e., stock categories, sigma and P* values) used to determine the 2012 No Action ABCs with the following exceptions:

- Yelloweye rockfish was changed from a category 1 to a category 2 stock upon the realization that recruitment deviations (i.e., the relative strength of individual year classes) were not estimated in the most recent (2009) full assessment (Stewart, *et al.* 2009) and the most recent (2011) update assessment (Taylor and Wetzel 2011). Therefore, the sigma of 0.36 for category 1 stocks was used to determine the 2012 ABC and the sigma of 0.72 for category 2 stocks was used to determine the 2013 and 2014 ABCs. The P* of 0.40 was used to determine 2013-2014 ABCs;
- The 2013 and 2014 lingcod ABCs are based on a stratification of the relative biomass north and south of 40º10' N. latitude rather than north and south of the Oregon-California border at 42º N. latitude as was done to determine 2012 lingcod ABC. The same sigma and P* values were used to determine the 2012 and 2013-2014 lingcod ABCs; however, these sigmas were applied north and south of 42º N. latitude before the ABCs were apportioned north and south of 40º10' N. latitude using the estimated 48 percent biomass apportionment methodology described in sections 2.1.1 and 2.1.3 as recommended by the SSC. This is why the lingcod stock north of 40º10' N. latitude is categorized as stock categories 1 and 2 in Table 2-6, Table 2-7, and Table 2-8;
- The sablefish ABC was based on a P* of 0.45 in 2012 and on a P* of 0.4 in 2013 and 2014; and
- The sigma for widow rockfish, a category 1 stock, used the default category 1 sigma value of 0.36 for determining the 2012 ABC and a sigma of 0.41 for determining the 2013 and 2014 ABCs due to a greater variance in the estimate of biomass in the 2011 assessment (He, *et al.* 2011). The same P* value of 0.45 was used to determine the 2012 and 2013-2014 ABCs.

Since there is greater scientific uncertainty for category 2 and 3 stocks relative to category 1 stocks, the scientific uncertainty buffer is generally greater than that recommended for category 1 stocks. The SSC recommended sigma values for category 2 and 3 stocks of 0.72 and 1.44, respectively (i.e., two and four times the sigma for category 1 stocks). The specific values of 0.72 and 1.44 were recommended by the SSC and considered to be the best available scientific information; however, the values are not based on a formal analysis of assessment outcomes and could change substantially when the SSC reviews additional analyses in future management cycles.

Table 2-5 shows the relationship between the proposed values for sigma and the buffer for a range of values for P*. The ABCs for actively-managed stock complexes were determined by summing ABC values of the component stocks. Table 2-6 and Table 2-7 depict the potential alternative 2013 and 2014 ABCs, respectively for stocks and stock complexes across a range of P* values from 0.10 to 0.45. Table 2-8 shows the No Action 2012 ABCs and preferred 2013 and 2014 ABCs for stocks managed with stock-specific harvest specifications. The proposed management line shift for lingcod is reflected in Table 2-8 with the 42º N. latitude line shown for the 2012 lingcod ABCs and the 40º10' N. latitude line shown for 2013 and 2014 lingcod ABCs.

Table 2-9 shows the SSC stock categorizations and preferred ABCs for those stocks managed in stock complexes. The ABC contributions of the stocks comprising the complexes are shown in Table 2-9 in italics and are not specified in regulations. The six minor rockfish complexes (i.e., Minor Nearshore, Shelf, and Slope Rockfish north and south of 40º10' N. latitude) are comprised of assessed and unassessed stocks assigned to all three categories. The SSC identified the appropriate species category for each component species (Table 2-9) and the appropriate sigma value was assigned. The ABCs for the component rockfish stocks managed in these complexes are calculated using a P* value of 0.45.

In 2012, the Other Fish and Other Flatfish complexes consisted entirely of category 3 stocks. A P* of 0.4 and a sigma value of 1.44 was applied to derive the ABC values for each component stock. For 2013-2014, the Council maintained the general policy of using a P* of 0.4 for the component stocks in these two complexes. However, for spiny dogfish, a newly-assessed category 2 stock managed within the Other Fish complex, for 2013-2014, the Council selected a P* of 0.3 due to the greater uncertainty in estimating the total catch (mostly discarded bycatch) of this species.

The preferred 2013 and 2014 ABC contributions for stocks managed in stock complexes used the same basis (i.e., stock categories, sigma values, and P* values) used to determine the 2012 No Action ABC contributions with the following exceptions:

- Greenspotted rockfish was upgraded from a category 3 stock to a category 2 stock based on the new 2011 assessment (Dick, *et al.* 2011). Therefore, a sigma of 0.72 was used to determine 2013-2014 ABC contributions for greenspotted rockfish in waters off California, while a sigma of 1.44 was used to determine the No Action 2012 ABC for this stock. The same P* value of 0.45 was used to determine 2012 and 2013-2014 ABC contributions;
- Blackgill rockfish south of 40º10' N. latitude was downgraded from a category 1 stock to a category 2 stock based on the 2011 assessment (Field and Pearson 2011) because recruitment deviations were not estimated. Therefore, a sigma of 0.72 was used to determine 2013-2014 ABC contributions for blackgill rockfish south of 40º10' N. latitude, while a sigma of 0.36 was used to determine the No Action 2012 ABC contribution for this stock. The same P* value of 0.45 was used to determine 2012 and 2013-2014 ABC contributions;
- Spiny dogfish was upgraded from a category 3 stock to a category 2 stock based on the new 2011 assessment (Gertseva and Taylor 2011). Therefore, a sigma of 0.72 was used to determine 2013-2014 ABC contributions for spiny dogfish, while a sigma of 1.44 was used to determine the No Action 2012 ABC contribution for this stock to the complex. The P* for spiny dogfish was changed from 0.4, which informed the 2012 ABC contribution, to 0.3 to inform the 2013 and 2014 ABC contributions; and
- The preferred 2013 and 2014 ABCs for the Other Fish complex are based on the sum of the known contribution of component stocks. The 2012 ABC for the Other Fish complex was based on a reduction of the 2010 ABC (MSY harvest level prior to the adoption of FMP Amendment 23, which is now defined as the OFL).

Table 2-5. Relationship between P* and the percent reduction of the OFL for deciding the 2013 and 2014 ABCs for category 1, widow rockfish, category 2, and category 3 stocks based on σ values of 0.36, 0.41, 0.72, and 1.44, respectively.

P*	Assessment Uncertainty (σ)			
	Cat. 1 0.36	Widow 0.41	Cat. 2 0.72	Cat. 3 1.44
0.5	0	0	0	0
0.45	4.4%	5.0%	8.7%	16.6%
0.44	5.3%	6.0%	10.3%	19.5%
0.43	6.2%	7.0%	11.9%	22.4%
0.42	7.0%	7.9%	13.5%	25.2%
0.41	7.9%	8.9%	15.1%	27.9%
0.4	8.7%	9.9%	16.7%	30.6%
0.39	9.6%	10.8%	18.2%	33.1%
0.38	10.4%	11.8%	19.7%	35.6%
0.37	11.3%	12.7%	21.3%	38.0%
0.36	12.1%	13.7%	22.7%	40.3%
0.35	13.0%	14.6%	24.2%	42.6%
0.34	13.8%	15.6%	25.7%	44.8%
0.33	14.6%	16.5%	27.1%	46.9%
0.32	15.5%	17.4%	28.6%	49.0%
0.31	16.3%	18.4%	30.0%	51.0%
0.3	17.2%	19.3%	31.4%	53.0%
0.29	18.1%	20.3%	32.9%	54.9%
0.28	18.9%	21.3%	34.3%	56.8%
0.27	19.8%	22.2%	35.7%	58.6%
0.26	20.7%	23.2%	37.1%	60.4%
0.25	21.6%	24.2%	38.5%	62.1%
0.24	22.5%	25.1%	39.9%	63.8%
0.23	23.4%	26.1%	41.3%	65.5%
0.22	24.3%	27.1%	42.6%	67.1%
0.21	25.2%	28.2%	44.0%	68.7%
0.2	26.1%	29.2%	45.4%	70.2%
0.19	27.1%	30.2%	46.9%	71.8%
0.18	28.1%	31.3%	48.3%	73.2%
0.17	29.1%	32.4%	49.7%	74.7%
0.16	30.1%	33.5%	51.1%	76.1%
0.15	31.1%	34.6%	52.6%	77.5%
0.14	32.2%	35.8%	54.1%	78.9%
0.13	33.3%	37.0%	55.6%	80.2%
0.12	34.5%	38.2%	57.1%	81.6%
0.11	35.7%	39.5%	58.7%	82.9%
0.1	37.0%	40.9%	60.3%	84.2%
0.09	38.3%	42.3%	61.9%	85.5%
0.08	39.7%	43.8%	63.6%	86.8%
0.07	41.2%	45.4%	65.4%	88.1%
0.06	42.9%	47.1%	67.4%	89.3%
0.05	44.7%	49.1%	69.4%	90.6%

Table 2-6. 2013 OFLs (mt) and a range of alternative 2013 ABCs (mt) varied by the probability of overfishing (P*) for west coast groundfish stocks (overfished stocks in CAPS; stocks with new assessments in bold; component stocks in stock complexes in italics).

Stock	2013 OFL	Category	Range of Alternative 2013 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
OVERFISHED STOCKS										
BOCACCIO S. of 40^{0}10’ N. latitude	**884**	1	**845**	**807**	**769**	**732**	**693**	**653**	**609**	**557**
CANARY	**752**	1	**719**	**686**	**654**	**622**	**589**	**556**	**518**	**474**
COWCOD S. of 40^{0}10’ N. latitude	11		10	9	8	7	6	5	4	3
COWCOD (Conception)	7	2	6	5	5	5	4	4	3	3
COWCOD (Monterey)	5	3	4	3	3	2	2	1	1	1
DARKBLOTCHED	**541**	1	**517**	**494**	**471**	**448**	**424**	**400**	**373**	**341**
PACIFIC OCEAN PERCH	**844**	1	**807**	**771**	**734**	**699**	**662**	**624**	**582**	**532**
PETRALE SOLE	**2,711**	1	**2,592**	**2,475**	**2,359**	**2,245**	**2,125**	**2,003**	**1,868**	**1,708**
YELLOWEYE	**51**	2	**47**	**43**	**39**	**35**	**31**	**28**	**24**	**20**
NONOVERFISHED STOCKS										
Arrowtooth Flounder	7,391	2	6,748	6,157	5,602	5,070	4,545	4,035	3,503	2,934
Black Rockfish (OR-CA)	1,159	1	1,108	1,058	1,009	960	909	857	799	730
Black Rockfish (WA)	430	1	411	392	374	356	337	318	296	271
Cabezon (CA)	170	1	163	155	148	141	133	126	117	107
Cabezon (OR)	49	1	47	45	43	41	38	36	34	31
California scorpionfish	126	1	120	115	110	104	99	93	87	79
Chilipepper S. of 40^{0}10’ N. latitude	1,768	1	1,690	1,614	1,538	1,464	1,386	1,307	1,218	1,114
Dover Sole	**92,955**	1	**88,865**	**84,868**	**80,871**	**76,967**	**72,877**	**68,694**	**64,046**	**58,562**
English Sole	7,129	1	6,815	6,509	6,202	5,903	5,589	5,268	4,912	4,491
Lingcod N. of 42º N. latitude (OR & WA)	2,102	1	2,010	1,919	1,829	1,740	1,648	1,553	1,448	1,324
Lingcod S. of 42º N. latitude (CA)	2,566	2	2,343	2,137	1,945	1,760	1,578	1,401	1,216	1,019
Lingcod N. of 40º10’ N. latitude	3,334	1 & 2	NA	NA	NA	NA	NA	NA	NA	NA
Lingcod S. of 40º10’ N. latitude	1,334	2	1,218	1,111	1,011	915	821	729	632	530
Longnose skate	2,902	1	2,774	2,650	2,525	2,403	2,275	2,145	1,999	1,828
Longspine Thornyhead (coastwide)	3,391	2	3,096	2,825	2,570	2,326	2,085	1,851	1,607	1,346
Pacific Cod	3,200	3	2,669	2,221	1,837	1,504	1,213	954	720	506
Sablefish (coastwide)	**6,621**	1	**6,330**	**6,045**	**5,760**	**5,482**	**5,191**	**4,893**	**4,562**	**4,171**
Shortbelly	6,950	2	6,345	5,789	5,268	4,768	4,274	3,795	3,294	2,759
Shortspine Thornyhead (coastwide)	2,333	1	2,230	2,130	2,030	1,932	1,829	1,724	1,607	1,470
Splitnose S. of 40^{0}10’ N. latitude	1,684	1	1,610	1,537	1,465	1,394	1,320	1,244	1,160	1,061

Stock	2013 OFL	Category	Range of Alternative 2013 ABCs Overfishing Probability (P*)							
			0.45	**0.40**	**0.35**	**0.30**	**0.25**	**0.20**	**0.15**	**0.10**
Starry Flounder	1,825	2	1,666	1,520	1,383	1,252	1,122	996	865	725
Widow	**4,841**	1	**4,598**	**4,363**	**4,134**	**3,904**	**3,671**	**3,428**	**3,165**	**2,862**
Yellowtail N. of 40^{0}10' N. latitude	4,579	1	4,378	4,181	3,984	3,791	3,590	3,384	3,155	2,885
STOCK COMPLEXES										
Minor Nearshore Rockfish North	110		94	80	68	57	48	39	31	24
Black and yellow	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Blue (CA)	*27.4*	2	*25.0*	*22.9*	*20.8*	*18.8*	*16.9*	*15.0*	*13.0*	*10.9*
Blue (OR & WA)	*32.3*	3	*26.9*	*22.4*	*18.5*	*15.2*	*12.2*	*9.6*	*7.3*	*5.1*
Brown	*5.5*	3	*4.6*	*3.8*	*3.2*	*2.6*	*2.1*	*1.6*	*1.2*	*0.9*
Calico	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
China	*9.8*	3	*8.2*	*6.8*	*5.6*	*4.6*	*3.7*	*2.9*	*2.2*	*1.6*
Copper	*26.0*	3	*21.6*	*18.0*	*14.9*	*12.2*	*9.8*	*7.7*	*5.8*	*4.1*
Gopher	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Grass	*0.7*	3	*0.5*	*0.5*	*0.4*	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*
Kelp	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Olive	*0.3*	3	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.0*
Quillback	*7.4*	3	*6.2*	*5.1*	*4.2*	*3.5*	*2.8*	*2.2*	*1.7*	*1.2*
Treefish	*0.2*	3	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*a/*	*a/*
Minor Shelf Rockfish North	2,183		1,920	1,690	1,485	1,298	1,125	963	805	646
Bronzespotted	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Bocaccio	*284.0*	3	*236.9*	*197.1*	*163.0*	*133.5*	*107.6*	*84.6*	*63.9*	*44.9*
Chameleon	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Chilipepper	*133.1*	3	*111.0*	*92.4*	*76.4*	*62.5*	*50.4*	*39.7*	*29.9*	*21.0*
Cowcod	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Dusky	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Dwarf-red	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Flag	*0.1*	3	*0.1*	*0.1*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Freckled	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Greenblotched	*1.3*	3	*1.1*	*0.9*	*0.7*	*0.6*	*0.5*	*0.4*	*0.3*	*0.2*
Greenspotted 40°10' to 42° N. latitude	***9.4***	2	***8.6***	***7.8***	***7.1***	***6.4***	***5.8***	***5.1***	***4.4***	***3.7***
Greenspotted N. of 42 N. latitude (OR & WA)	*6.1*	3	*5.1*	*4.2*	*3.5*	*2.9*	*2.3*	*1.8*	*1.4*	*1.0*
Greenstriped	*1,252.3*	2	*1,143.3*	*1,043.2*	*949.2*	*859.1*	*770.2*	*683.8*	*593.6*	*497.2*
Halfbanded	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Harlequin	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*

Stock	2013 OFL	Category	Range of Alternative 2013 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
Honeycomb	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Mexican	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pink	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pinkrose	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Puget Sound	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pygmy	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Redstripe	*269.9*	3	*225.1*	*187.3*	*154.9*	*126.9*	*102.3*	*80.4*	*60.7*	*42.6*
Rosethorn	*12.9*	3	*10.8*	*9.0*	*7.4*	*6.1*	*4.9*	*3.8*	*2.9*	*2.0*
Rosy	*3.0*	3	*2.5*	*2.1*	*1.7*	*1.4*	*1.1*	*0.9*	*0.7*	*0.5*
Silvergray	*159.4*	3	*133.0*	*110.6*	*91.5*	*74.9*	*60.4*	*47.5*	*35.9*	*25.2*
Speckled	*0.2*	3	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*a/*	*a/*
Squarespot	*0.2*	3	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*a/*	*a/*
Starry	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Stripetail	*40.4*	3	*33.7*	*28.0*	*23.2*	*19.0*	*15.3*	*12.0*	*9.1*	*6.4*
Swordspine	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Tiger	*1.0*	3	*0.8*	*0.7*	*0.6*	*0.5*	*0.4*	*0.3*	*0.2*	*0.2*
Vermilion	*9.7*	3	*8.1*	*6.7*	*5.6*	*4.6*	*3.7*	*2.9*	*2.2*	*1.5*
Minor Slope Rockfish North	1,518		1,381	1,259	1,149	1,050	956	867	777	683
Aurora	*15.4*	3	*12.8*	*10.7*	*8.8*	*7.2*	*5.8*	*4.6*	*3.5*	*2.4*
Bank	*17.2*	3	*14.4*	*12.0*	*9.9*	*8.1*	*6.5*	*5.1*	*3.9*	*2.7*
Blackgill	*4.7*	3	*3.9*	*3.3*	*2.7*	*2.2*	*1.8*	*1.4*	*1.1*	*0.7*
Redbanded	*45.3*	3	*37.7*	*31.4*	*26.0*	*21.3*	*17.2*	*13.5*	*10.2*	*7.2*
Rougheye	*71.1*	3	*59.3*	*49.3*	*40.8*	*33.4*	*26.9*	*21.2*	*16.0*	*11.2*
Sharpchin	*214.5*	3	*178.9*	*148.9*	*123.1*	*100.8*	*81.3*	*63.9*	*48.3*	*33.9*
Shortraker	*18.7*	3	*15.6*	*13.0*	*10.7*	*8.8*	*7.1*	*5.6*	*4.2*	*3.0*
Splitnose	*939.0*	1	*897.7*	*857.3*	*817.0*	*777.5*	*736.2*	*693.9*	*647.0*	*591.6*
Yellowmouth	*192.4*	3	*160.5*	*133.6*	*110.5*	*90.4*	*72.9*	*57.3*	*43.3*	*30.4*
Minor Nearshore Rockfish South	1,164		1,005	868	749	644	549	463	382	303
Shallow Nearshore Species	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Black and yellow	*27.5*	3	*23.0*	*19.1*	*15.8*	*12.9*	*10.4*	*8.2*	*6.2*	*4.4*
China	*16.6*	3	*13.8*	*11.5*	*9.5*	*7.8*	*6.3*	*4.9*	*3.7*	*2.6*
Gopher (N of Pt. Conception)	*157.0*	1	*150.1*	*143.3*	*136.6*	*130.0*	*123.1*	*116.0*	*108.2*	*98.9*
Gopher (S of Pt. Conception)	*25.6*	3	*21.4*	*17.8*	*14.7*	*12.0*	*9.7*	*7.6*	*5.8*	*4.0*
Grass	*59.6*	3	*49.7*	*41.4*	*34.2*	*28.0*	*22.6*	*17.8*	*13.4*	*9.4*

Stock	2013 OFL	Category	Range of Alternative 2013 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
Kelp	*27.7*	3	*23.1*	*19.2*	*15.9*	*13.0*	*10.5*	*8.2*	*6.2*	*4.4*
Deeper Nearshore Species	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blue (assessed area)	*187.8*	2	*171.4*	*156.4*	*142.3*	*128.8*	*115.5*	*102.5*	*89.0*	*74.5*
Blue (S of 34^{o}27' N. latitude)	*72.9*	3	*60.8*	*50.6*	*41.8*	*34.3*	*27.6*	*21.7*	*16.4*	*11.5*
Brown	*204.6*	3	*170.6*	*142.0*	*117.4*	*96.2*	*77.5*	*61.0*	*46.0*	*32.3*
Calico	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Copper	*141.5*	3	*118.0*	*98.2*	*81.2*	*66.5*	*53.6*	*42.2*	*31.8*	*22.4*
Olive	*224.6*	3	*187.4*	*155.9*	*128.9*	*105.6*	*85.1*	*66.9*	*50.5*	*35.5*
Quillback	*5.4*	3	*4.5*	*3.7*	*3.1*	*2.5*	*2.0*	*1.6*	*1.2*	*0.9*
Treefish	*13.2*	3	*11.0*	*9.2*	*7.6*	*6.2*	*5.0*	*3.9*	*3.0*	*2.1*
Minor Shelf Rockfish South	1,910		1,617	1,369	1,153	965	797	646	507	376
Bronzespotted	*3.6*	3	*3.0*	*2.5*	*2.1*	*1.7*	*1.4*	*1.1*	*0.8*	*0.6*
Chameleon	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Dusky	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Dwarf-red	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Flag	*23.4*	3	*19.5*	*16.3*	*13.4*	*11.0*	*8.9*	*7.0*	*5.3*	*3.7*
Freckled	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Greenblotched	*23.1*	3	*19.3*	*16.1*	*13.3*	*10.9*	*8.8*	*6.9*	*5.2*	*3.7*
Greenspotted	***80.3***	2	***73.3***	***66.9***	***60.9***	***55.1***	***49.4***	***43.9***	***38.1***	***31.9***
Greenstriped	*229.7*	2	*209.7*	*191.3*	*174.1*	*157.6*	*141.3*	*125.4*	*108.9*	*91.2*
Halfbanded	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Harlequin	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Honeycomb	*9.9*	3	*8.2*	*6.8*	*5.7*	*4.6*	*3.7*	*2.9*	*2.2*	*1.6*
Mexican	*5.1*	3	*4.2*	*3.5*	*2.9*	*2.4*	*1.9*	*1.5*	*1.1*	*0.8*
Pink	*2.5*	3	*2.1*	*1.8*	*1.5*	*1.2*	*1.0*	*0.8*	*0.6*	*0.4*
Pinkrose	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pygmy	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Redstripe	*0.5*	3	*0.4*	*0.3*	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
Rosethorn	*2.1*	3	*1.8*	*1.5*	*1.2*	*1.0*	*0.8*	*0.6*	*0.5*	*0.3*
Rosy	*44.5*	3	*37.1*	*30.9*	*25.5*	*20.9*	*16.9*	*13.3*	*10.0*	*7.0*
Silvergray	*0.5*	3	*0.4*	*0.4*	*0.3*	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*
Speckled	*39.4*	3	*32.8*	*27.3*	*22.6*	*18.5*	*14.9*	*11.7*	*8.9*	*6.2*
Squarespot	*11.1*	3	*9.2*	*7.7*	*6.4*	*5.2*	*4.2*	*3.3*	*2.5*	*1.8*
Starry	*62.6*	3	*52.2*	*43.4*	*35.9*	*29.4*	*23.7*	*18.6*	*14.1*	*9.9*

Stock	2013 OFL	Category	Range of Alternative 2013 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
Stripetail	*23.6*	3	*19.7*	*16.4*	*13.6*	*11.1*	*9.0*	*7.0*	*5.3*	*3.7*
Swordspine	*14.2*	3	*11.9*	*9.9*	*8.2*	*6.7*	*5.4*	*4.2*	*3.2*	*2.2*
Tiger	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Vermilion	*269.3*	3	*224.6*	*186.9*	*154.6*	*126.6*	*102.1*	*80.2*	*60.6*	*42.5*
Yellowtail	*1,064.4*	3	*887.7*	*738.7*	*611.0*	*500.3*	*403.4*	*317.2*	*239.5*	*168.2*
Minor Slope Rockfish South	681		618	561	507	457	408	360	311	259
Aurora	*26.1*	3	*21.7*	*18.1*	*15.0*	*12.3*	*9.9*	*7.8*	*5.9*	*4.1*
Bank	*503.2*	2	*459.4*	*419.2*	*381.4*	*345.2*	*309.5*	*274.8*	*238.5*	*199.8*
Blackgill	***130.0***	2	***118.7***	***108.3***	***98.5***	***89.2***	***80.0***	***71.0***	***61.6***	***51.6***
Pacific ocean perch	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Redbanded	*10.4*	3	*8.7*	*7.2*	*6.0*	*4.9*	*3.9*	*3.1*	*2.3*	*1.6*
Rougheye	*0.4*	3	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
Sharpchin	*9.8*	3	*8.2*	*6.8*	*5.7*	*4.6*	*3.7*	*2.9*	*2.2*	*1.6*
Shortraker	*0.1*	3	*0.1*	*0.1*	*0.1*	*a/*	*a/*	*a/*	*a/*	*a/*
Yellowmouth	*0.8*	3	*0.7*	*0.6*	*0.5*	*0.4*	*0.3*	*0.3*	*0.2*	*0.1*
Other Flatfish	10,060		8,390	6,982	5,775	4,728	3,813	2,998	2,264	1,590
Butter sole	*4.6*	3	*3.9*	*3.2*	*2.7*	*2.2*	*1.8*	*1.4*	*1.0*	*0.7*
Curlfin sole	*8.2*	3	*6.9*	*5.7*	*4.7*	*3.9*	*3.1*	*2.5*	*1.9*	*1.3*
Flathead sole	*35.0*	3	*29.2*	*24.3*	*20.1*	*16.5*	*13.3*	*10.4*	*7.9*	*5.5*
Pacific sanddab	*4,801.0*	3	*4,004.0*	*3,331.9*	*2,755.8*	*2,256.5*	*1,819.6*	*1,430.7*	*1,080.2*	*758.6*
Rex sole	*4,371.5*	3	*3,645.8*	*3,033.8*	*2,509.2*	*2,054.6*	*1,656.8*	*1,302.7*	*983.6*	*690.7*
Rock sole	*66.7*	3	*55.6*	*46.3*	*38.3*	*31.3*	*25.3*	*19.9*	*15.0*	*10.5*
Sand sole	*773.2*	3	*644.8*	*536.6*	*443.8*	*363.4*	*293.0*	*230.4*	*174.0*	*122.2*
Other Fish	6,832	3	5,933	5,155	4,470	3,855	3,292	2,775	2,279	1,792
Big skate	*458.0*	3	*382.0*	*317.9*	*262.9*	*215.3*	*173.6*	*136.5*	*103.1*	*72.4*
Cabezon (WA)	*c/*	3	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*
California skate	*86.0*	3	*71.7*	*59.7*	*49.4*	*40.4*	*32.6*	*25.6*	*19.4*	*13.6*
Finescale codling	*c/*	3	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*
Kelp greenling (CA)	*118.9*	3	*99.2*	*82.5*	*68.2*	*55.9*	*45.1*	*35.4*	*26.8*	*18.8*
Kelp greenling (OR & WA)	*c/*	3	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*
Leopard shark	*167.1*	3	*139.4*	*116.0*	*95.9*	*78.5*	*63.3*	*49.8*	*37.6*	*26.4*
Pacific grenadier	*1,519.0*	3	*1,266.8*	*1,054.2*	*871.9*	*713.9*	*575.7*	*452.7*	*341.8*	*240.0*
Ratfish	*1,441.0*	3	*1,201.8*	*1,000.1*	*827.1*	*677.3*	*546.1*	*429.4*	*324.2*	*227.7*
Soupfin shark	*61.6*	3	*51.4*	*42.8*	*35.4*	*29.0*	*23.3*	*18.4*	*13.9*	*9.7*

Stock	2013 OFL	Category	Range of Alternative 2013 ABCs Overfishing Probability (P*)							
			0.45	**0.40**	**0.35**	**0.30**	**0.25**	**0.20**	**0.15**	**0.10**
Spiny dogfish	***2,980.0***	2	***2,720.7***	***2,482.3***	***2,258.8***	***2,044.3***	***1,832.7***	***1,627.1***	***1,412.5***	***1,183.1***

a/ Trace amount caught; i.e., the average catch does not round to 0.1 mt.
b/ The SSC did not recommend an ABC contribution for these stocks.
c/ No ABC contribution for these stocks given the lack of an approved method for estimating the OFL.

Table 2-7. 2014 OFLs (mt) and a range of alternative 2014 ABCs (mt) varied by the probability of overfishing (P*) for west coast groundfish stocks (overfished stocks in CAPS; stocks with new assessments in bold; component stocks in stock complexes in italics).

Stock	**2014 OFL**	**Category**	**Range of Alternative 2014 ABCs Overfishing Probability (P*)**							
			0.45	**0.40**	**0.35**	**0.30**	**0.25**	**0.20**	**0.15**	**0.10**
OVERFISHED STOCKS										
BOCACCIO S. of 40⁰10' N. latitude	**881**	1	**842**	**804**	**766**	**729**	**691**	**651**	**607**	**555**
CANARY	**741**	1	**709**	**677**	**645**	**614**	**581**	**548**	**511**	**467**
COWCOD S. of 40⁰10' N. latitude	12		10	9	8	7	6	5	4	3
COWCOD (Conception)	7	2	6	6	5	5	4	4	3	3
COWCOD (Monterey)	5	3	4	3	3	2	2	1	1	1
DARKBLOTCHED	**553**	1	**529**	**505**	**481**	**458**	**434**	**409**	**381**	**348**
PACIFIC OCEAN PERCH	**838**	1	**801**	**765**	**729**	**694**	**657**	**619**	**577**	**528**
PETRALE SOLE	**2,774**	1	**2,652**	**2,533**	**2,413**	**2,297**	**2,175**	**2,050**	**1,911**	**1,748**
YELLOWEYE	**51**	2	**47**	**43**	**39**	**35**	**31**	**28**	**24**	**20**
NONOVERFISHED STOCKS										
Arrowtooth Flounder	6,912	2	6,311	5,758	5,239	4,742	4,251	3,774	3,276	2,744
Black Rockfish (OR-CA)	1,166	1	1,115	1,065	1,015	966	914	862	804	735
Black Rockfish (WA)	428	1	409	391	372	354	335	316	295	269
Cabezon (CA)	165	1	158	151	144	137	129	122	114	104
Cabezon (OR)	49	1	47	45	43	41	38	36	34	31
California scorpionfish	122	1	117	111	106	101	96	90	84	77
Chilipepper S. of 40⁰10' N. latitude	1,722	1	1,647	1,573	1,498	1,426	1,350	1,273	1,187	1,085
Dover Sole	**77,774**	1	**74,352**	**71,008**	**67,663**	**64,397**	**60,975**	**57,475**	**53,586**	**48,998**
English Sole	5,906	1	5,646	5,392	5,138	4,890	4,630	4,365	4,069	3,721
Lingcod N. of 42º N. latitude (OR & WA)	1,984	1	1,897	1,811	1,726	1,643	1,555	1,466	1,367	1,250
Lingcod S. of 42º N. latitude (CA)	2,454	2	2,241	2,044	1,860	1,683	1,509	1,340	1,163	974
Lingcod N. of 40º10' N. latitude	3,162	1 & 2	NA	NA	NA	NA	NA	NA	NA	NA
Lingcod S. of 40º10' N. latitude	1,276	2	1,165	1,063	967	875	785	697	605	507
Longnose skate	2,816	1	2,692	2,571	2,450	2,332	2,208	2,081	1,940	1,774
Longspine Thornyhead (coastwide)	3,304	2	3,017	2,752	2,504	2,267	2,032	1,804	1,566	1,312
Pacific Cod	3,200	3	2,669	2,221	1,837	1,504	1,213	954	720	506
Sablefish (coastwide)	**7,158**	1	**6,843**	**6,535**	**6,227**	**5,927**	**5,612**	**5,290**	**4,932**	**4,510**
Shortbelly	6,950	2	6,345	5,789	5,268	4,768	4,274	3,795	3,294	2,759
Shortspine Thornyhead (coastwide)	2,310	1	2,208	2,109	2,010	1,913	1,811	1,707	1,592	1,455
Splitnose S. of 40⁰10' N. latitude	1,747	1	1,670	1,595	1,520	1,446	1,370	1,291	1,204	1,101
Starry Flounder	1,834	2	1,674	1,528	1,390	1,258	1,128	1,001	869	728

Stock	2014 OFL	Category	Range of Alternative 2014 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
WIDOW	**4,435**	1	**4,212**	**3,997**	**3,787**	**3,577**	**3,364**	**3,141**	**2,900**	**2,622**
Yellowtail N. of 40⁰10’ N. latitude	4,584	1	4,382	4,185	3,988	3,796	3,594	3,388	3,158	2,888
STOCK COMPLEXES										
Minor Nearshore Rockfish North	110		94	80	68	57	48	39	31	24
Black and yellow	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Blue (CA)	*27.4*	2	*25.0*	*22.9*	*20.8*	*18.8*	*16.9*	*15.0*	*13.0*	*10.9*
Blue (OR & WA)	*32.3*	3	*26.9*	*22.4*	*18.5*	*15.2*	*12.2*	*9.6*	*7.3*	*5.1*
Brown	*5.5*	3	*4.6*	*3.8*	*3.2*	*2.6*	*2.1*	*1.6*	*1.2*	*0.9*
Calico	*0.0*	3	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
China	*9.8*	3	*8.2*	*6.8*	*5.6*	*4.6*	*3.7*	*2.9*	*2.2*	*1.6*
Copper	*26.0*	3	*21.6*	*18.0*	*14.9*	*12.2*	*9.8*	*7.7*	*5.8*	*4.1*
Gopher	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Grass	*0.7*	3	*0.5*	*0.5*	*0.4*	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*
Kelp	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Olive	*0.3*	3	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*a/*
Quillback	*7.4*	3	*6.2*	*5.1*	*4.2*	*3.5*	*2.8*	*2.2*	*1.7*	*1.2*
Treefish	*0.2*	3	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*a/*	*a/*
Minor Shelf Rockfish North	2,195		1,932	1,701	1,495	1,308	1,134	971	812	652
Bronzespotted	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Bocaccio	*284.0*	3	*236.9*	*197.1*	*163.0*	*133.5*	*107.6*	*84.6*	*63.9*	*44.9*
Chameleon	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Chilipepper	*129.6*	3	*108.1*	*90.0*	*74.4*	*60.9*	*49.1*	*38.6*	*29.2*	*20.5*
Cowcod	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Dusky	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Dwarf-red	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Flag	*0.1*	3	*0.1*	*0.1*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Freckled	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Greenblotched	*1.3*	3	*1.1*	*0.9*	*0.7*	*0.6*	*0.5*	*0.4*	*0.3*	*0.2*
Greenspotted 40°10’ to 42° N. latitude	***9.4***	2	***8.6***	***7.8***	***7.1***	***6.4***	***5.8***	***5.1***	***4.4***	***3.7***
Greenspotted N. of 42 N. latitude (OR & WA)	*6.1*	3	*5.1*	*4.2*	*3.5*	*2.9*	*2.3*	*1.8*	*1.4*	*1.0*
Greenstriped	*1,268.3*	2	*1,158.0*	*1,056.5*	*961.4*	*870.1*	*780.0*	*692.5*	*601.2*	*503.5*
Halfbanded	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Harlequin	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Honeycomb	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*

Stock	2014 OFL	Category	Range of Alternative 2014 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
Mexican	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pink	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pinkrose	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Puget Sound	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pygmy	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Redstripe	*269.9*	3	*225.1*	*187.3*	*154.9*	*126.9*	*102.3*	*80.4*	*60.7*	*42.6*
Rosethorn	*12.9*	3	*10.8*	*9.0*	*7.4*	*6.1*	*4.9*	*3.8*	*2.9*	*2.0*
Rosy	*3.0*	3	*2.5*	*2.1*	*1.7*	*1.4*	*1.1*	*0.9*	*0.7*	*0.5*
Silvergray	*159.4*	3	*133.0*	*110.6*	*91.5*	*74.9*	*60.4*	*47.5*	*35.9*	*25.2*
Speckled	*0.2*	3	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*a/*	*a/*
Squarespot	*0.2*	3	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*a/*	*a/*
Starry	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Stripetail	*40.4*	3	*33.7*	*28.0*	*23.2*	*19.0*	*15.3*	*12.0*	*9.1*	*6.4*
Swordspine	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Tiger	*1.0*	3	*0.8*	*0.7*	*0.6*	*0.5*	*0.4*	*0.3*	*0.2*	*0.2*
Vermilion	*9.7*	3	*8.1*	*6.7*	*5.6*	*4.6*	*3.7*	*2.9*	*2.2*	*1.5*
Minor Slope Rockfish North	1,553		1,414	1,291	1,180	1,079	983	893	802	705
Aurora	*15.4*	3	*12.8*	*10.7*	*8.8*	*7.2*	*5.8*	*4.6*	*3.5*	*2.4*
Bank	*17.2*	3	*14.4*	*12.0*	*9.9*	*8.1*	*6.5*	*5.1*	*3.9*	*2.7*
Blackgill	*4.7*	3	*3.9*	*3.3*	*2.7*	*2.2*	*1.8*	*1.4*	*1.1*	*0.7*
Redbanded	*45.3*	3	*37.7*	*31.4*	*26.0*	*21.3*	*17.2*	*13.5*	*10.2*	*7.2*
Rougheye	*71.1*	3	*59.3*	*49.3*	*40.8*	*33.4*	*26.9*	*21.2*	*16.0*	*11.2*
Sharpchin	*214.5*	3	*178.9*	*148.9*	*123.1*	*100.8*	*81.3*	*63.9*	*48.3*	*33.9*
Shortraker	*18.7*	3	*15.6*	*13.0*	*10.7*	*8.8*	*7.1*	*5.6*	*4.2*	*3.0*
Splitnose	*974.1*	1	*931.3*	*889.4*	*847.5*	*806.6*	*763.7*	*719.9*	*671.2*	*613.7*
Yellowmouth	*192.4*	3	*160.5*	*133.6*	*110.5*	*90.4*	*72.9*	*57.3*	*43.3*	*30.4*
Minor Nearshore Rockfish South	1,160		1,001	865	746	641	546	460	379	300
Shallow Nearshore Species	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Black and yellow	*27.5*	3	*23.0*	*19.1*	*15.8*	*12.9*	*10.4*	*8.2*	*6.2*	*4.4*
China	*16.6*	3	*13.8*	*11.5*	*9.5*	*7.8*	*6.3*	*4.9*	*3.7*	*2.6*
Gopher (N of Pt. Conception)	*153.0*	1	*146.3*	*139.7*	*133.1*	*126.7*	*120.0*	*113.1*	*105.4*	*96.4*
Gopher (S of Pt. Conception)	*25.6*	3	*21.4*	*17.8*	*14.7*	*12.0*	*9.7*	*7.6*	*5.8*	*4.0*
Grass	*59.6*	3	*49.7*	*41.4*	*34.2*	*28.0*	*22.6*	*17.8*	*13.4*	*9.4*
Kelp	*27.7*	3	*23.1*	*19.2*	*15.9*	*13.0*	*10.5*	*8.2*	*6.2*	*4.4*

Stock	2014 OFL	Category	Range of Alternative 2014 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
Deeper Nearshore Species	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blue (assessed area)	*187.8*	2	*171.4*	*156.4*	*142.3*	*128.8*	*115.5*	*102.5*	*89.0*	*74.5*
Blue (S of 34°27' N. latitude)	*72.9*	3	*60.8*	*50.6*	*41.8*	*34.3*	*27.6*	*21.7*	*16.4*	*11.5*
Brown	*204.6*	3	*170.6*	*142.0*	*117.4*	*96.2*	*77.5*	*61.0*	*46.0*	*32.3*
Calico	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Copper	*141.5*	3	*118.0*	*98.2*	*81.2*	*66.5*	*53.6*	*42.2*	*31.8*	*22.4*
Olive	*224.6*	3	*187.4*	*155.9*	*128.9*	*105.6*	*85.1*	*66.9*	*50.5*	*35.5*
Quillback	*5.4*	3	*4.5*	*3.7*	*3.1*	*2.5*	*2.0*	*1.6*	*1.2*	*0.9*
Treefish	*13.2*	3	*11.0*	*9.2*	*7.6*	*6.2*	*5.0*	*3.9*	*3.0*	*2.1*
Minor Shelf Rockfish South	1,913		1,620	1,371	1,156	967	799	648	508	377
Bronzespotted	*3.6*	3	*3.0*	*2.5*	*2.1*	*1.7*	*1.4*	*1.1*	*0.8*	*0.6*
Chameleon	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Dusky	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Dwarf-red	*b/*	3	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*	*b/*
Flag	*23.4*	3	*19.5*	*16.3*	*13.4*	*11.0*	*8.9*	*7.0*	*5.3*	*3.7*
Freckled	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Greenblotched	*23.1*	3	*19.3*	*16.1*	*13.3*	*10.9*	*8.8*	*6.9*	*5.2*	*3.7*
Greenspotted	***80.3***	2	***73.3***	***66.9***	***60.9***	***55.1***	***49.4***	***43.9***	***38.1***	***31.9***
Greenstriped	*232.7*	2	*212.4*	*193.8*	*176.4*	*159.6*	*143.1*	*127.0*	*110.3*	*92.4*
Halfbanded	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Harlequin	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Honeycomb	*9.9*	3	*8.2*	*6.8*	*5.7*	*4.6*	*3.7*	*2.9*	*2.2*	*1.6*
Mexican	*5.1*	3	*4.2*	*3.5*	*2.9*	*2.4*	*1.9*	*1.5*	*1.1*	*0.8*
Pink	*2.5*	3	*2.1*	*1.8*	*1.5*	*1.2*	*1.0*	*0.8*	*0.6*	*0.4*
Pinkrose	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Pygmy	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Redstripe	*0.5*	3	*0.4*	*0.3*	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
Rosethorn	*2.1*	3	*1.8*	*1.5*	*1.2*	*1.0*	*0.8*	*0.6*	*0.5*	*0.3*
Rosy	*44.5*	3	*37.1*	*30.9*	*25.5*	*20.9*	*16.9*	*13.3*	*10.0*	*7.0*
Silvergray	*0.5*	3	*0.4*	*0.4*	*0.3*	*0.3*	*0.2*	*0.2*	*0.1*	*0.1*
Speckled	*39.4*	3	*32.8*	*27.3*	*22.6*	*18.5*	*14.9*	*11.7*	*8.9*	*6.2*
Squarespot	*11.1*	3	*9.2*	*7.7*	*6.4*	*5.2*	*4.2*	*3.3*	*2.5*	*1.8*
Starry	*62.6*	3	*52.2*	*43.4*	*35.9*	*29.4*	*23.7*	*18.6*	*14.1*	*9.9*
Stripetail	*23.6*	3	*19.7*	*16.4*	*13.6*	*11.1*	*9.0*	*7.0*	*5.3*	*3.7*

Stock	2014 OFL	Category	Range of Alternative 2014 ABCs Overfishing Probability (P*) 0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
Swordspine	*14.2*	3	*11.9*	*9.9*	*8.2*	*6.7*	*5.4*	*4.2*	*3.2*	*2.2*
Tiger	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Vermilion	*269.3*	3	*224.6*	*186.9*	*154.6*	*126.6*	*102.1*	*80.2*	*60.6*	*42.5*
Yellowtail	*1,064.4*	3	*887.7*	*738.7*	*611.0*	*500.3*	*403.4*	*317.2*	*239.5*	*168.2*
Minor Slope Rockfish South	685		622	564	510	460	410	362	313	261
Aurora	*26.1*	3	*21.7*	*18.1*	*15.0*	*12.3*	*9.9*	*7.8*	*5.9*	*4.1*
Bank	*503.2*	2	*459.4*	*419.2*	*381.4*	*345.2*	*309.5*	*274.8*	*238.5*	*199.8*
Blackgill	***134.0***	2	***122.3***	***111.6***	***101.6***	***91.9***	***82.4***	***73.2***	***63.5***	***53.2***
Pacific ocean perch	*a/*	3	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*	*a/*
Redbanded	*10.4*	3	*8.7*	*7.2*	*6.0*	*4.9*	*3.9*	*3.1*	*2.3*	*1.6*
Rougheye	*0.4*	3	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
Sharpchin	*9.8*	3	*8.2*	*6.8*	*5.7*	*4.6*	*3.7*	*2.9*	*2.2*	*1.6*
Shortraker	*0.1*	3	*0.1*	*0.1*	*0.1*	*a/*	*a/*	*a/*	*a/*	*a/*
Yellowmouth	*0.8*	3	*0.7*	*0.6*	*0.5*	*0.4*	*0.3*	*0.3*	*0.2*	*0.1*
Other Flatfish	10,060		8,390	6,982	5,775	4,728	3,813	2,998	2,264	1,590
Butter sole	*4.6*	3	*3.9*	*3.2*	*2.7*	*2.2*	*1.8*	*1.4*	*1.0*	*0.7*
Curlfin sole	*8.2*	3	*6.9*	*5.7*	*4.7*	*3.9*	*3.1*	*2.5*	*1.9*	*1.3*
Flathead sole	*35.0*	3	*29.2*	*24.3*	*20.1*	*16.5*	*13.3*	*10.4*	*7.9*	*5.5*
Pacific sanddab	*4,801.0*	3	*4,004.0*	*3,331.9*	*2,755.8*	*2,256.5*	*1,819.6*	*1,430.7*	*1,080.2*	*758.6*
Rex sole	*4,371.5*	3	*3,645.8*	*3,033.8*	*2,509.2*	*2,054.6*	*1,656.8*	*1,302.7*	*983.6*	*690.7*
Rock sole	*66.7*	3	*55.6*	*46.3*	*38.3*	*31.3*	*25.3*	*19.9*	*15.0*	*10.5*
Sand sole	*773.2*	3	*644.8*	*536.6*	*443.8*	*363.4*	*293.0*	*230.4*	*174.0*	*122.2*
Other Fish	6,802	3	5,906	5,130	4,447	3,834	3,274	2,758	2,265	1,780
Big skate	*458.0*	3	*382.0*	*317.9*	*262.9*	*215.3*	*173.6*	*136.5*	*103.1*	*72.4*
Cabezon (WA)	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*
California skate	*86.0*	3	*71.7*	*59.7*	*49.4*	*40.4*	*32.6*	*25.6*	*19.4*	*13.6*
Finescale codling	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*
Kelp greenling (CA)	*118.9*	3	*99.2*	*82.5*	*68.2*	*55.9*	*45.1*	*35.4*	*26.8*	*18.8*
Kelp greenling (OR & WA)	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*	*c/*
Leopard shark	*167.1*	3	*139.4*	*116.0*	*95.9*	*78.5*	*63.3*	*49.8*	*37.6*	*26.4*
Pacific grenadier	*1,519.0*	3	*1,266.8*	*1,054.2*	*871.9*	*713.9*	*575.7*	*452.7*	*341.8*	*240.0*
Ratfish	*1,441.0*	3	*1,201.8*	*1,000.1*	*827.1*	*677.3*	*546.1*	*429.4*	*324.2*	*227.7*
Soupfin shark	*61.6*	3	*51.4*	*42.8*	*35.4*	*29.0*	*23.3*	*18.4*	*13.9*	*9.7*
Spiny dogfish	***2,950.0***	2	***2,693.4***	***2,457.4***	***2,236.1***	***2,023.7***	***1,814.3***	***1,610.7***	***1,398.3***	***1,171.2***

Stock	2014 OFL	Category	Range of Alternative 2014 ABCs Overfishing Probability (P*)							
			0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10

a/ Trace amount caught; i.e., the average catch does not round to 0.1 mt.
b/ The SSC did not recommend an ABC contribution for these stocks.
c/ No ABC contribution for these stocks given the lack of an approved method for estimating the OFL.

Table 2-8. 2012 ABCs (i.e., No Action alternative) (mt) and preferred 2013 and 2014 ABCs (mt) and stock category values for west coast groundfish stocks (overfished stocks in CAPS; stocks with new assessments in bold).

Stock	2012 ABC	Category for 2013-2014	Sub-category	2013 ABC	2014 ABC
OVERFISHED STOCKS					
BOCACCIO S. of 40°10' N. latitude	700	1		**845**	**842**
CANARY	594	1		**719**	**709**
COWCOD S. of 40°10' N. latitude	10			9	9
COWCOD (Conception)	*5*	2	c	5	6
COWCOD (Monterey)	*5*	3	d	3	3
DARKBLOTCHED	475	1		**517**	**529**
PACIFIC OCEAN PERCH	962	1		**807**	**801**
PETRALE SOLE	1,222	1		**2,592**	**2,652**
YELLOWEYE	46	2		**43**	**43**
NONOVERFISHED STOCKS					
Arrowtooth Flounder	12,049	2	d	6,157	5,758
Black Rockfish (OR-CA)	1,117	1		1,108	1,115
Black Rockfish (WA)	415	1		411	409
Cabezon (CA)	168	1		163	158
Cabezon (OR)	48	1		47	47
California scorpionfish	126	1		120	117
Chilipepper S. of 40°10' N. latitude	1,789	1		1,690	1,647
Dover Sole	42,843	1		**88,865**	**74,352**
English Sole	10,151	1		6,815	5,646
Lingcod N. of 42º N. latitude (OR & WA)	2,151	1		NA	NA
Lingcod S. of 42º N. latitude (CA)	2,164	2	d	NA	NA
Lingcod N. of 40º10' N. latitude	NA	1 & 2		3,036	2,878
Lingcod S. of 40º10' N. latitude	NA	2	d	1,111	1,063
Longnose skate	2,873	1		2,774	2,692
Longspine Thornyhead (coastwide)	2,902	2	d	2,825	2,752
Pacific Cod	2,222	3	b	2,221	2,221
Sablefish (coastwide)	8,242	1		**6,045**	**6,535**
Shortbelly	5,789	2	d	5,789	5,789
Shortspine Thornyhead (coastwide)	2,254	1		2,230	2,208
Splitnose S. of 40°10' N. latitude	1,538	1		1,610	1,670
Starry Flounder	1,511	2	d	1,520	1,528
Widow a/	4,705	1		**4,598**	**4,212**
Yellowtail N. of 40°10' N. latitude	4,371	1		4,378	4,382

a/ Widow rockfish has been overfished and managed under a rebuilding plan since the stock was declared overfished in 2001. However, based on the new 2011 assessment, the stock has reached the biomass target and is now considered successfully rebuilt.

Table 2-9. 2012 ABCs (i.e., No Action alternative) (mt) and preferred 2013 and 2014 ABCs (mt) and stock category values for west coast groundfish stocks managed in stock complexes (stocks with new assessments in bold; component stocks in stock complexes in italics).

Stock	2012 ABC	Category for 2013-2014	Sub-category	2013 ABC	2014 ABC
STOCK COMPLEXES					
Minor Nearshore Rockfish North	99			94	94
Black and yellow	*0.0*	3	d	*a/*	*a/*
Blue (CA)	*25.1*	2	d	*25.0*	*25.0*
Blue (OR & WA)	*27.6*	3	d	*26.9*	*26.9*
Brown	*4.5*	3	d	*4.6*	*4.6*
Calico	*0.0*	3	a	*a/*	*a/*
China	*9.8*	3	d	*8.2*	*8.2*
Copper	*23.9*	3	d	*21.6*	*21.6*
Gopher	*0.0*	3	a	*a/*	*a/*
Grass	*0.5*	3	d	*0.5*	*0.5*
Kelp	*0.0*	3	d	*a/*	*a/*
Olive	*0.2*	3	d	*0.3*	*0.3*
Quillback	*7.3*	3	d	*6.2*	*6.2*
Treefish	*0.2*	3	d	*0.2*	*0.2*
Minor Shelf Rockfish North	1,948			1,920	1,932
Bronzespotted	*0.0*	3	d	*a/*	*a/*
Bocaccio	*223.8*	3	d	*236.9*	*236.9*
Chameleon	*0.0*	3	a	*0.0*	*0.0*
Chilipepper	*134.7*	3	d	*111.0*	*108.1*
Cowcod	*0.0*	3	a	*a/*	*a/*
Dusky	*b/*	3		*b/*	*b/*
Dwarf-red	*b/*	3		*b/*	*b/*
Flag	*0.1*	3	d	*0.1*	*0.1*
Freckled	*0.0*	3	a	*0.0*	*0.0*
Greenblotched	*1.1*	3	c	*1.1*	*1.1*
Greenspotted 40°10' to 42° N latitude	*17.4*	2	d	9	9
Greenspotted N. of 42 N latitude (OR & WA)		3		*5.1*	*5.1*
Greenstriped	*1,125.4*	2	d	*1,143*	*1,158*
Halfbanded	*0.0*	3	b	*a/*	*a/*
Harlequin	*0.0*	3	a	*a/*	*a/*
Honeycomb	*0.0*	3	c	*a/*	*a/*
Mexican	*0.0*	3	c	*a/*	*a/*
Pink	*0.0*	3	d	*a/*	*a/*
Pinkrose	*0.0*	3	b	*a/*	*a/*
Puget Sound	*0.0*	3	a	*a/*	*a/*
Pygmy	*0.0*	3	a	*a/*	*a/*
Redstripe	*240.6*	3	d	*225.1*	*225.1*
Rosethorn	*12.7*	3	d	*10.8*	*10.8*
Rosy	*2.1*	3	d	*2.5*	*2.5*
Silvergray	*150.2*	3	d	*133.0*	*133.0*
Speckled	*0.2*	3	d	*0.1*	*0.1*
Squarespot	*0.1*	3	c	*0.1*	*0.1*
Starry	*0.0*	3	d	*a/*	*a/*
Stripetail	*29.4*	3	d	*33.7*	*33.7*
Swordspine	*0.0*	3	d	*a/*	*a/*

Stock	2012 ABC	Category for 2013-2014	Sub-category	2013 ABC	2014 ABC
Tiger	*0.9*	3	d	*0.8*	*0.8*
Vermilion	*9.3*	3	c	*8.1*	*8.1*
Minor Slope Rockfish North	1,367			1,381	1,414
Aurora	*14.5*	3	d	*12.8*	*12.8*
Bank	*16.4*	3	d	*14.4*	*14.4*
Blackgill	*3.9*	3	c	*3.9*	*3.9*
Redbanded	*43.1*	3	d	*37.7*	*37.7*
Rougheye	*65.3*	3	d	*59.3*	*59.3*
Sharpchin	*193.5*	3	d	*178.9*	*178.9*
Shortraker	*18.2*	3	d	*15.6*	*15.6*
Splitnose	*857.6*	1		*897.7*	*931.3*
Yellowmouth	*154.1*	3	d	*160.5*	*160.5*
Minor Nearshore Rockfish South	990			1,005	1,001
Shallow Nearshore Species	NA	NA	NA	*NA*	*NA*
Black and yellow	*22.3*	3	c	*23.0*	*23.0*
China	*16.5*	3	c	*13.8*	*13.8*
Gopher (N of Point Conception)	*157.7*	1		*150.1*	*146.3*
Gopher (S of Point Conception)	*21.7*	3	c	*21.4*	*21.4*
Grass	*46.4*	3	d	*49.7*	*49.7*
Kelp	*21.6*	3	d	*23.1*	*23.1*
Deeper Nearshore Species	NA	NA	NA	*NA*	*NA*
Blue (assessed area)	*173.1*	2	d	*171.4*	*171.4*
Blue (S of 34° 27' N latitude)	*61.8*	3	c	*60.8*	*60.8*
Brown	*164.7*	3	d	*170.6*	*170.6*
Calico	*0.0*	3	b	*a/*	*a/*
Copper	*130.1*	3	d	*118.0*	*118.0*
Olive	*158.1*	3	d	*187.4*	*187.4*
Quillback	*5.3*	3	d	*4.5*	*4.5*
Treefish	*10.8*	3	d	*11.0*	*11.0*
Minor Shelf Rockfish South	1,890			1,617	1,620
Bronzespotted	*5.6*	3	c	*3.0*	*3.0*
Chameleon	*0.0*	3	a	*a/*	*a/*
Dusky	*b/*	3		*b/*	*b/*
Dwarf-red	*b/*	3		*b/*	*b/*
Flag	*22.2*	3	c	*19.5*	*19.5*
Freckled	*0.0*	3	a	*a/*	*a/*
Greenblotched	*20.5*	3	d	*19.3*	*19.3*
Greenspotted	*163.0*	2	d	*73.3*	*73.3*
Greenstriped	*206.5*	2	d	*209.7*	*212.4*
Halfbanded	*0.0*	3	b	*a/*	*a/*
Harlequin	*0.0*	3	a	*a/*	*a/*
Honeycomb	*6.5*	3	c	*8.2*	*8.2*
Mexican	*2.4*	3	c	*4.2*	*4.2*
Pink	*2.3*	3	d	*2.1*	*2.1*
Pinkrose	*0.0*	3	a	*a/*	*a/*
Pygmy	*0.0*	3	a	*a/*	*a/*
Redstripe	*0.4*	3	d	*0.4*	*0.4*
Rosethorn	*2.1*	3	d	*1.8*	*1.8*
Rosy	*30.8*	3	d	*37.1*	*37.1*

Stock	2012 ABC	Category for 2013-2014	Sub-category	2013 ABC	2014 ABC
Silvergray	*0.5*	3	d	*0.4*	*0.4*
Speckled	*35.8*	3	d	*32.8*	*32.8*
Squarespot	*4.8*	3	c	*9.2*	*9.2*
Starry	*58.9*	3	d	*52.2*	*52.2*
Stripetail	*17.2*	3	d	*19.7*	*19.7*
Swordspine	*10.8*	3	d	*11.9*	*11.9*
Tiger	*0.0*	3	d	*a/*	*a/*
Vermilion	*257.3*	3	d	*224.6*	*224.6*
Yellowtail	*1,042.2*	3	d	*887.7*	*887.7*
Minor Slope Rockfish South	832			618	622
Aurora	*24.5*	3	c	*21.7*	*21.7*
Bank	*525.1*	2	a	*459.4*	*459.4*
Blackgill	*262.8*	2	d	***118.7***	***122.3***
Pacific ocean perch	*0.0*	3	a	*a/*	*a/*
Redbanded	*9.9*	3	d	*8.7*	*8.7*
Rougheye	*0.4*	3	d	*0.3*	*0.3*
Sharpchin	*8.9*	3	d	*8.2*	*8.2*
Shortraker	*0.1*	3	d	*0.1*	*0.1*
Yellowmouth	*0.7*	3	d	*0.7*	*0.7*
Other Flatfish	7,044			6,982	6,982
Butter sole	*3.2*	3	b	*3.2*	*3.2*
Curlfin sole	*5.7*	3	b	*5.7*	*5.7*
Flathead sole	*24.3*	3	b	*24.3*	*24.3*
Pacific sanddab	*3,431.7*	3	d	*3,331.9*	*3,331.9*
Rex sole	*2,991.6*	3	d	*3,033.8*	*3,033.8*
Rock sole	*45.8*	3	c	*46.3*	*46.3*
Sand sole	*542.1*	3	c	*536.6*	*536.6*
Other Fish c/	7,742	3		4,717	4,697
Big skate		3		*317.9*	*317.9*
Cabezon (WA)		3		*d/*	*d/*
California skate		3		*59.7*	*59.7*
Finescale codling		3		*d/*	*d/*
Kelp greenling (CA)		3	d	*82.5*	*82.5*
Kelp greenling (OR & WA)		3		*d/*	*d/*
Leopard shark		3	d	*116.0*	*116.0*
Pacific grenadier		3	c	*1,054.2*	*1,054.2*
Ratfish		3		*1,000.1*	*1,000.1*
Soupfin shark		3	c	*42.8*	*42.8*
Spiny dogfish		2	d	***2,044***	***2,024***

a/ Trace amount caught; i.e., the average catch does not round to 0.1 mt.
b/ The SSC did not recommend an ABC contribution for these stocks.

c/ 2013 and 2014 ABC values for the Other Fish complex are the sum of known contributions of component stocks. The 2012 ABC for the Other Fish complex was based on a reduction of the 2010 MSY harvest level.
d/ No ABC contribution for these stocks given the lack of an approved method for estimating the OFL.

2.1.3 Annual Catch Limits

Annual catch limits (ACLs) are specified for each stock and stock complex that is "in the fishery" as specified under the FMP framework. An ACL is a harvest specification set equal to the ABC or below the ABC in consideration of conservation objectives, management uncertainty, socioeconomic considerations, ecological considerations, and other factors (e.g. rebuilding considerations) needed to meet management objectives. Sector-specific ACLs may be specified in cases where a sector has a formal, long-term allocation of the harvestable surplus of a stock or stock complex. The ACL counts all sources of fishing-related mortality including landed catch, discard mortalities, research catches, and set-asides for exempted fishing permits (EFPs).

Under the FMP, the biomass level that produces MSY (B_{MSY}) is defined as the precautionary threshold. When the biomass for an assessed category 1 or 2 stock falls below the precautionary threshold, the harvest rate will be reduced to help the stock return to the B_{MSY} level, which is the management target for groundfish stocks. If a stock biomass is larger than B_{MSY}, the ACL may be set equal to or less than ABC. Because B_{MSY} is a long-term average, the true biomass could be below B_{MSY} in some years and above B_{MSY} in other years. Even in the absence of overfishing, biomass may decline to levels below B_{MSY} due to natural fluctuations in recruitment. The minimum stock size threshold (MSST) is the biomass threshold for declaring a stock overfished. When spawning stock biomass falls below the MSST, a rebuilding plan must be developed that determines the strategy for rebuilding the stock in the shortest time possible while considering impacts to fishing-dependent communities and other factors. When spawning stock biomass is below B_{MSY} yet above the MSST, the stock is considered to be in the precautionary zone. The current proxy B_{MSY} and MSST reference points for west coast groundfish stocks are as follows:

- Assessed flatfish stocks: B_{MSY} = 25 percent of initial biomass or $B_{25\%}$; MSST = 12.5 percent of initial biomass or $B_{12.5\%}$ (PFMC and NMFS 2011); and
- All other assessed groundfish stocks: B_{MSY} = 40 percent of initial biomass or $B_{40\%}$; MSST = 25 percent of initial biomass or $B_{25\%}$.

These reference points are only used to manage assessed stocks since they require estimates of spawning stock biomass.

West coast groundfish stocks are managed with harvest control rules that calculate ACLs below the ABCs when spawning biomass is estimated to be in the precautionary zone. These harvest control rules are designed to prevent a stock from becoming overfished. The FMP defines the 40-10 harvest control rule for stocks with a B_{MSY} proxy of $B_{40\%}$ that are in the precautionary zone. The analogous harvest control rule for assessed flatfish stocks is the 25-5 harvest control rule. Both ACL harvest control rules are applied after the ABC deduction is made. The further the stock biomass is below the precautionary threshold, the greater the reduction in ACL relative to the ABC, until at $B_{10\%}$ for a stock with a B_{MSY} proxy of $B_{40\%}$ or $B_{5\%}$ for a stock with a B_{MSY} proxy of $B_{25\%}$, the ACL would be set at zero (Figure 2-1). These harvest policies foster a quicker return to the B_{MSY} level and serve as an interim rebuilding policy for stocks that are below the MSST. The Council may recommend setting the ACL higher than what the default ACL harvest control rule specifies as long as the ACL does not exceed the ABC, complies with the requirements of the MSA, and is consistent with the FMP and National Standard Guidelines. Additional precautionary adjustments may be made to an ACL if necessary to address management uncertainty, conservation concerns, socioeconomic concerns, ecological considerations, and the other factors that are considered when setting ACLs.

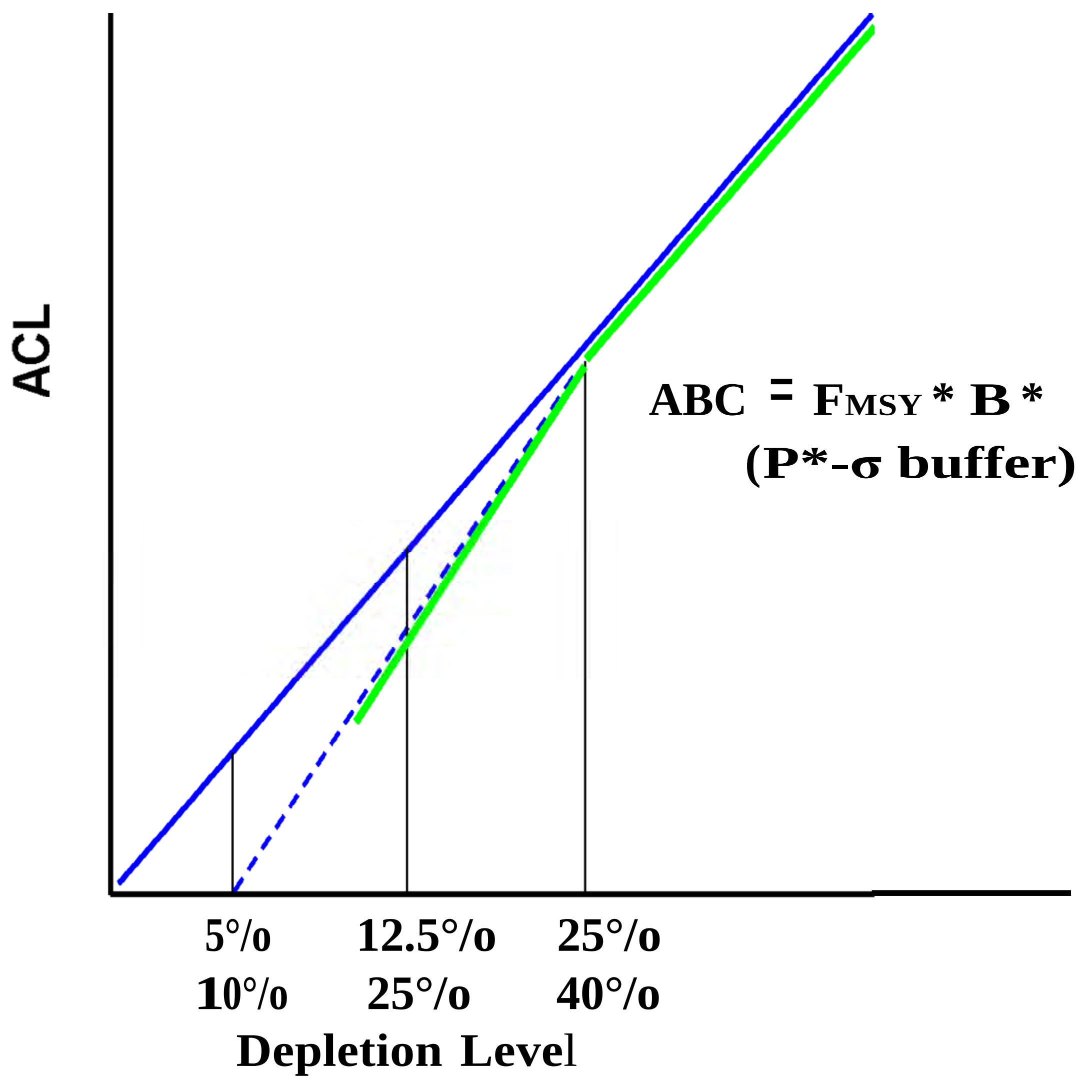


Figure 2-1. Conceptual diagram of the 25-5 and 40-10 ACL harvest control rules used to manage assessed west coast flatfish and other groundfish species, respectively, that are in the precautionary zone.

The ACL serves as the basis for invoking AMs, which are mechanisms used to address any management uncertainty that may result in exceeding an ACL. If ACLs are exceeded more often than 1 in 4 years, then AMs, such as catch monitoring and inseason adjustments to fisheries, need to improve or additional AMs may need to be implemented. Additional AMs may include setting an annual catch target (ACT), which is a specified level of harvest below the ACL. The use of ACTs may be especially important for a stock subject to highly uncertain inseason catch monitoring. A sector-specific ACT may serve as a harvest guideline (HG) for a sector or may be used strategically in a rebuilding plan to attempt to reduce mortality of an overfished stock more than the rebuilding plan limits prescribe.

The Council has the discretion to adjust the ACLs for uncertainty on a case-by-case basis. In cases where there is a high degree of uncertainty about the condition of the stock or stocks, the ACL may be reduced accordingly. Most category 3 species are managed in a stock complex (such as the minor rockfish complexes, Other Flatfish, and Other Fish) where harvest specifications are set for the complex in its entirety. For stock complexes, the ACL will be less than or equal to the sum of the individual component ABCs. The ACL may be adjusted below the sum of component ABCs as appropriate.

For most stocks and stock complexes, the Council elected to use the same general policies for deciding 2013 and 2014 ACLs as were used for deciding the 2012 ACLs (No Action). The No Action ACLs are the 2012 ACLs specified in Federal regulations.

The ACLs for some of the overfished species vary between the integrated alternatives, which link the harvest specifications decisions to the management measures necessary to keep catch within the ACLs for both nonoverfished and overfished species, as well as achieve other management objectives specified in the FMP. The overfished species ACLs are strategically arrayed in the integrated alternatives to illuminate how each species might differentially affect fishing opportunities by sector (or gear type) and region along the west coast, depending on the amount of allowable harvest of each species. The analysis of the integrated alternatives is designed to show how changes in rebuilding plan parameters (e.g., the harvest control rule) for those overfished species where rebuilding plan modifications are proposed affect the time to rebuild stocks while considering the needs of fishing communities and the other MSA conservation and socioeconomic objectives.

The ACL alternatives for stocks and stock complexes that were analyzed in addition to the No Action preferred alternatives are denoted with an alpha label (e.g., alt. a and b). This differs from the nomenclature used to designate the integrated alternatives, which are denoted with a numerical label (e.g., alt. 1, 2, 3, etc.). This labeling nomenclature is designed to reduce confusion between harvest specification alternatives and the integrated alternatives.

2.1.3.1 Annual Catch Limits for Overfished Species and Rebuilding Concerns

Section 4.6.3 of the FMP states the Council's general policies on rebuilding overfished stocks. Section 4.6.3.1 of the FMP specifies the overall goals of rebuilding programs are to (1) achieve the population size and structure that will support the MSY within a specified time period that is as short as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem; (2) minimize, to the extent practicable, the adverse social and economic impacts associated with rebuilding, including adverse impacts on fishing communities; (3) fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational, and charter fishing sectors; (4) protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future; and (5) promote widespread public awareness, understanding and support for the rebuilding program. These overall goals are derived from and consistent with the requirements of the MSA. The first goal embodies MSA National Standard 1 (NS1) and the requirements for rebuilding overfished stocks found at MSA section 304(e)(4)(A). The third goal is required by MSA section 304(e)(4)(B). The fourth and fifth goals represent additional policy preferences of the Council that recognize the importance of habitat protection to the rebuilding of some fish stocks and the desire for public outreach and education on the complexities—biological, economic, and social issues—involved with rebuilding overfished stocks. Overfished groundfish species are those with spawning biomasses that have dropped below the Council's MSST (i.e., 25 percent of initial spawning biomass or $B_{25\%}$ for all groundfish species other than flatfish where the MSST is $B_{12.5\%}$). The FMP requires these stocks to be rebuilt to a target biomass that supports MSY (i.e., B_{MSY} or $B_{40\%}$ for all groundfish species other than flatfish where the target is $B_{25\%}$).

Rebuilding plans are in place for seven overfished rockfish species where assessments have indicated spawning biomass has declined to below the MSST. Extant rebuilding plans were modified in the 2011-2012 biennial specifications process and a new rebuilding plan was adopted for petrale sole under FMP

Amendment 16-5.[13] New full and updated assessments and rebuilding analyses done in 2011 inform the 2013 and 2014 harvest specifications for overfished species, except for cowcod where the 2009 update assessment and rebuilding analysis inform preferred harvest specifications. Six rockfish species (bocaccio south of 40°10' N. latitude, canary rockfish, cowcod south of 40°10' N. latitude, darkblotched rockfish, POP, and yelloweye rockfish) and one flatfish species (petrale sole) are considered overfished in the 2013-2014 management cycle. Widow rockfish, which has been managed under a rebuilding plan since the stock was declared overfished in 2001, is now successfully rebuilt based on the results of the new 2011 full assessment (see Section 2.1.3.1).

Progress towards rebuilding for the seven overfished species was reviewed in relation to the current target year to rebuild (T_{TARGET}) and the spawning potential ratio (SPR) harvest rate specified in the respective rebuilding plans (Table 2-10). Rebuilding is occurring for all overfished species based on relative depletion trends (Figure 2-2 and Figure 2-3).

The No Action alternative for overfished stocks is the 2012 ACLs specified in regulation. This differs from the policies in adopted rebuilding plans that specify a T_{TARGET} based on forward probabilistic projections of stock biomass and depletion that assume continued application of an adopted harvest control rule such as a constant SPR harvest rate in the case of the overfished rockfish species or the default 25-5 harvest control rule in the case of petrale sole. The Preferred Alternative for five of the seven overfished stocks is to continue management under their respective rebuilding plans with no modification of the SPR harvest rate or the T_{TARGET}. Two stocks (i.e., canary rockfish and POP) are very unlikely to rebuild by the current T_{TARGET} as specified in their respective rebuilding plans. Canary rockfish is now estimated to have a median time to rebuild under the existing SPR rate that is three years later than the current T_{TARGET}. Although this deviation is relatively minor due to the sensitivity in the estimated median time to rebuild at different SPR rates, results indicate that even if all harvest is eliminated from 2013 onwards, there is slightly less than 50 percent probability that the stock will rebuild by the current T_{TARGET} (2027). For POP, if the current SPR rate in the rebuilding plan (86.4 percent) is maintained, the stock would not rebuild with a 50 percent probability until 2051, which is 31 years later than the current T_{TARGET}. The change is primarily due to a revised estimate of initial unfished biomass (B_0) and depletion, rather than the current biomass level. This represents a fundamental revision to our understanding of the status of this species, which in turn warrants revisions to T_{TARGET}. Because POP and canary rockfish cannot be rebuilt by T_{TARGET} with at least a 50 percent probability even in the absence of fishing (F=0), the integrated alternatives include modifications to the canary rockfish and POP rebuilding plans that change SPR rates and the associated T_{TARGET} years.

The discussion that follows details the basis for the overfished species ACL alternatives recommended for development of integrated alternatives. Alternatives for the seven overfished stocks managed under rebuilding plans are contrasted with the No Action alternative, and against $T_{F=0}$ (absence of fishing beginning in 2013), which is the shortest time to rebuild the stock at this point (i.e., SPR harvest rate is specified as 100 percent). Estimated probabilities for each ACL alternative to rebuild by the current T_{TARGET} specified in rebuilding plans as well as the probability to rebuild in the maximum time allowable under the NS1 guidelines (T_{MAX}) are also shown in Table 2-10 to compare and contrast ACL alternatives for overfished species.

[13] Amendment 16-5 concerned modifications to seven overfished rockfish rebuilding plans, a new rebuilding plan for petrale sole, and a modification of proxy management reference points (i.e., F_{MSY}, B_{MSY}, MSST) for assessed flatfish species. Amendment 16-5 evolved into Secretarial Amendment 1 when the Council in June 2011 declined to take final action with respect to a partial disapproval of Amendment 16-5 by the Secretary of Commerce. This lack of Council action was done specifically to avoid a delay in implementing the 2012 regulations and modified rebuilding plans and led directly to a more expedited Secretarial amendment process as specified in section 304(c) of the Magnuson-Stevens Act.

Table 2-10. Estimated time to rebuild and spawning potential ratio (SPR) harvest rate relative to alternative 2013-2014 ACLs for overfished west coast groundfish stocks (lettered alternatives are those that were decided for detailed analysis in the EIS).

Stock	Current T_{TARGET}	Current SPR or Harvest Control Rule	Pref. T_{TARGET}	ACL Alt.	ACLs (mt) 2013	ACLs (mt) 2014	SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	Prob. of Rebuilding by T_{TARGET}	Prob. of Rebuilding by T_{MAX}	Current T_{MAX}	Re-est. T_{MAX}
Bocaccio S of 40°10' N lat. a/	2022	77.7%	2022		0	0	100%	2019	0	88.0%	99.0%	2031	2031
					133	143	90.0%	2019	0	77.0%	97.0%		
					248	263	82.3%	2020	1	67.6%	93.0%		
				a, Pref.	320	337	77.7%	2021	2	60.0%	90.0%		
					453	471	70.0%	2023	4	49.0%	70.0%		
					691	705	60.0%	2027	8	33.0%	63.0%		
					837	843	53.9%	2031	12	23.0%	51.0%		
Canary	2027	88.7%	2030	a	0	0	100%	2028	0	48.2%	75.0%	2046	2050
				b	48	49	95.1%	2028	0	41.2%	75.0%		
				c	101	104	90.0%	2029	1	36.4%	75.0%		
				d, Pref.	116	119	88.7%	2030	2	34.4%	75.0%		
				e	147	151	85.9%	2030	2	31.7%	75.0%		
					184	187	82.9%	2031	3	29.9%	75.0%		
				f	216	220	80.3%	2032	4	27.9%	74.9%		
					302	306	74.0%	2035	7	26.1%	73.6%		
					394	397	67.9%	2040	12	25.1%	66.3%		
					449	451	64.7%	2045	17	25.0%	59.4%		
					752	753	62.2%	2050	22	25.0%	50.0%		
Cowcod[b/]	2068	82.7%	2068		0	0	100%	2060	0	NA	78.4%	2098	2097
					2	2	90.0%	2064	4	NA	72.4%		
				a, Pref.	3	3	82.7%	2068	8	50.0%	66.2%		
					4	4	79.0%	2071	11	NA	66.2%		
					5	5	74.2%	2074	14	NA	66.2%		
					9	9	59.7%	2097	37	NA	53.3%		

Stock	Current T_{TARGET}	Current SPR or Harvest Control Rule	Pref. T_{TARGET}	ACL Alt.	ACLs (mt) 2013	ACLs (mt) 2014	SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	Prob. of Rebuilding by T_{TARGET}	Prob. of Rebuilding by T_{MAX}	Current T_{MAX}	Re-est. T_{MAX}
Darkblotched	2025	64.9%	2025		0	0	100.0%	2016	0	100.0%	100.0%	2037	2037
				a, Pref.	317	330	64.9%	2017	1	100.0%	100.0%		
					347	360	62.6%	2017	1	100.0%	100.0%		
					353	366	62.1%	2018	2	100.0%	100.0%		
					372	385	60.7%	2018	2	100.0%	100.0%		
					423	437	57.1%	2018	2	100.0%	100.0%		
					488	501	53.0%	2020	4	72.8%	91.0%		
					553	565	49.0%	2025	9	50.0%	77.0%		
					676	685	43.0%	2037	21	23.0%	50.0%		
POP	2020	86.4%	2051	a	0	0	100%	2043	0	25.0%	85.5%	2045	2071
					16	17	98.4%	2043	0	25.0%	84.0%		
					35	36	96.5%	2044	1	25.0%	83.0%		
					58	60	94.3%	2045	2	25.0%	81.0%		
				b	74	76	92.9%	2046	3	25.0%	79.0%		
					89	91	91.6%	2047	4	25.0%	78.0%		
					106	108	90.1%	2048	5	25.0%	77.0%		
					122	124	88.8%	2049	6	25.0%	76.0%		
					131	134	88.0%	2050	7	25.0%	75.0%		
					136	139	87.6%	2050	7	25.0%	75.0%		
				c, Pref.	150	153	86.4%	2051	8	25.0%	73.0%		
					158	161	85.8%	2052	9	25.0%	72.6%		
					163	167	85.4%	2052	9	25.0%	72.0%		
					175	178	84.5%	2053	10	25.0%	71.0%		
					182	186	83.9%	2054	11	25.0%	70.1%		
					199	203	82.6%	2055	12	25.0%	68.0%		
					209	213	81.9%	2056	13	25.0%	66.2%		
				d	222	226	80.9%	2057	14	25.0%	65.0%		
				e	247	251	79.2%	2060	17	25.0%	62.0%		
					291	295	76.2%	2065	22	25.0%	55.8%		
					328	333	73.8%	2071	28	25.0%	50.0%		

Stock	Current T_{TARGET}	Current SPR or Harvest Control Rule	Pref. T_{TARGET}	ACL Alt.	ACLs (mt) 2013	ACLs (mt) 2014	SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	Prob. of Rebuilding by T_{TARGET}	Prob. of Rebuilding by T_{MAX}	Current T_{MAX}	Re-est. T_{MAX}
Petrale	2016	25-5 Rule	2016		0	0	100%	2013	0	100.0%	100.0%	2021	2021
					867	1,008	60%	2013	0	100.0%	100.0%		
					1,265	1,432	50%	2013	0	100.0%	100.0%		
					1,831	1,994	40%	2013	0	100.0%	100.0%		
				a, Pref.	2,592	2,652	25-5 Rule (=ABC @ 28% depletion in 2013)	2013	0	100.0%	100.0%		
Yelloweye	2074	76.0%	2074		0	0	100%	2045	0	99.2%	99.9%	2089	2083
					9	9	86.4%	2053	8	85.3%	93.7%		
					14	14	80.5%	2060	15	75.1%	82.8%		
					15	15	79.5%	2061	16	73.2%	81.0%		
					17	18	76.5%	2066	21	64.1%	73.9%		
				a, Pref.	18	18	76.0%	2067	22	62.1%	72.9%		
					21	21	72.7%	2074	29	50.0%	61.3%		
					24	25	69.7%	2083	38	37.2%	50.0%		

a/ All bocaccio alternatives have been reduced from the rebuilding analysis results by 6% to represent the portion of the stock south of 40°10' N lat.
b/ All cowcod alternatives have been doubled from the rebuilding analysis to account for the Monterey contribution.

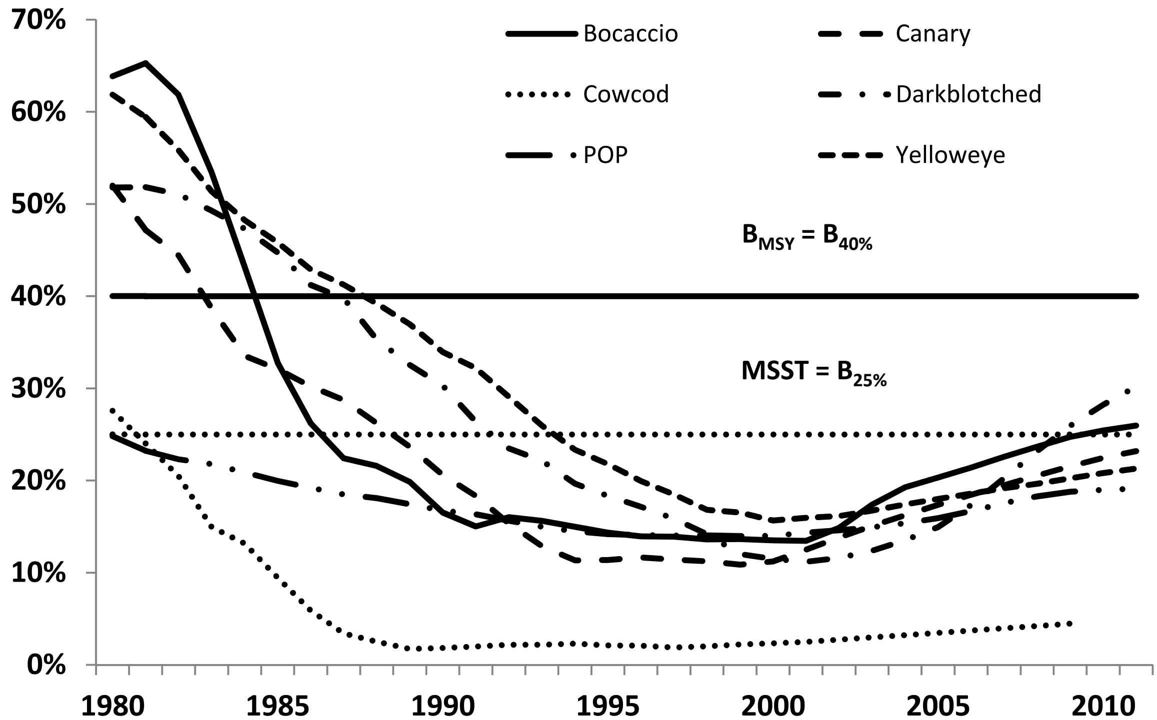


Figure 2-2. Relative depletion trends from 1980 to present for the six overfished west coast rockfish species in relation to the MSST of $B_{25\%}$ and the B_{MSY} target of $B_{40\%}$.

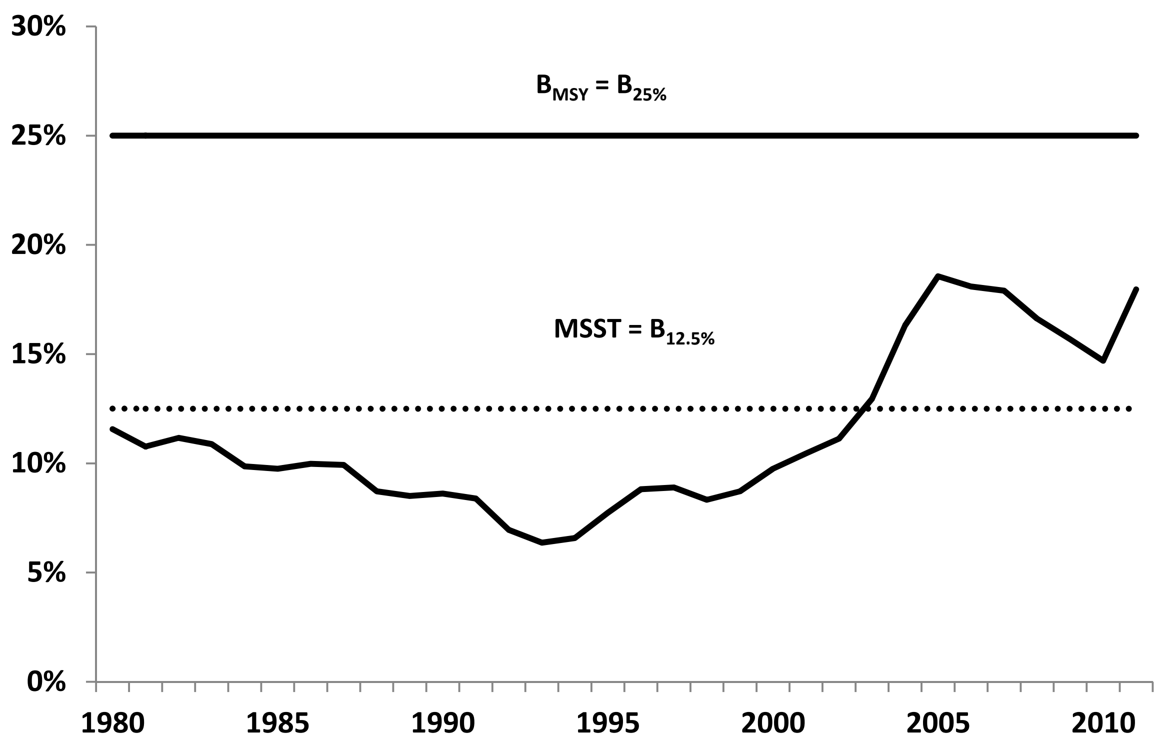


Figure 2-3. Relative depletion trend from 1980 to present for petrale sole in relation to the MSST of $B_{12.5\%}$ and the B_{MSY} target of $B_{25\%}$.

Bocaccio South of 40°10' N. Latitude

The 2013 and 2014 harvest specification alternatives for bocaccio south of 40º10' N. latitude are based on a new assessment (Field 2011a) and rebuilding analysis (Field 2011b) conducted in 2011. The revised update assessment estimates that depletion in spawning output was 26 percent at the start of 2011.

The 2013 and 2014 OFLs were projected from the 2011 bocaccio rebuilding analysis by applying the proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass projected in the 2011 assessment. The 2009 bocaccio assessment extended the stock assessment north of 40°10' N. latitude to Cape Blanco, Oregon at approximately 43° N. latitude. It was decided in the 2011-2012 biennial harvest specifications process to continue to manage bocaccio rebuilding south of 40°10' N. latitude based on SSC and Groundfish Management Team (GMT) advice that extending the rebuilding plan further north would not aid stock recovery and would only complicate current management. The bocaccio Stock Assessment Team (STAT) determined that six percent of the assessed biomass occurs north of 40°10' N. latitude based on the proportion of historical catches in each area, and the projected OFLs from the assessment were adjusted accordingly. The 2013 and 2014 OFLs for bocaccio are 884 and 881 mt, respectively (Table 2-11). The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 320 mt and 337 mt, respectively are based on applying the SPR harvest rate of 77.7 percent specified in the current rebuilding plan, which was the basis for setting the 2012 ACL. There was no recommended change to the T_{TARGET} of 2022 specified in the current rebuilding plan. There is a 60 percent probability of rebuilding by the current T_{TARGET} under the preferred rebuilding plan (Table 2-10). No other ACL alternatives were decided for detailed analysis since progress towards rebuilding the stock under the current rebuilding plan is considered adequate.

Table 2-11. Preferred harvest specifications (mt) for bocaccio occurring south of 40º10' N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	884	881	845	842	320	337	ACL based on applying the SPR harvest rate of 77.7% specified in the adopted rebuilding plan. No change to the T_{TARGET} of 2022.

Canary Rockfish

The 2013 and 2014 harvest specification alternatives for canary rockfish are based on an update assessment (Wallace and Cope 2011) and rebuilding analysis (Wallace 2011) conducted in 2011. If the harvest rate currently in the canary rockfish rebuilding plan were applied going forward, using the best available science, the stock is projected to rebuild in 2030 rather than 2027, three years later than the target year in the current rebuilding plan. Although this deviation is relatively minor due to the sensitivity in the estimated median time to rebuild at different SPR rates, results indicate that even if all harvest is eliminated from 2013 onwards (i.e., the shortest time to rebuild or $T_{F=0}$), there is slightly less than a 50 percent probability that the stock will rebuild by the current T_{TARGET} of 2027 (Table 2-10). This result compelled a modification of the current rebuilding plan. Therefore, the Council decided six canary rockfish ACL/rebuilding alternatives for detailed analysis (Table 2-12).

The 2013 and 2014 canary rockfish OFLs of 752 mt and 741 mt, respectively were projected from the 2011 rebuilding analysis by applying the proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass projected in the 2011 assessment. The 2013 and 2014 ABCs of 719 mt and 709 mt, respectively are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 116 mt and 119 mt, respectively (ACL alt. d in Table 2-12) are based on applying the SPR harvest rate of 88.7 percent specified in the current rebuilding plan, which was the basis for setting the 2012 ACL. The new preferred T_{TARGET} of 2030 is the median time to rebuild the stock under the No Action SPR harvest rate. This is two years longer than the shortest time to rebuild the stock if all fishing-related mortalities were eliminated beginning in 2013 (i.e., $T_{F=0}$; ACL alternative a in Table 2-12).

Four additional canary ACL alternatives were adopted for detailed analysis and development of the integrated alternatives (Table 2-12). All ACL alternatives contemplate a change in the median time to rebuild the stock greater than the current T_{TARGET} of 2027. ACL alternative b, 48 mt and 49 mt for 2013 and 2014, respectively applies an SPR harvest rate of 95.1 percent and has a predicted median time to rebuild of 2028, which is equal to $T_{F=0}$. ACL alternative c, 101 mt and 104 mt for 2013 and 2014, respectively applies an SPR harvest rate of 90 percent and has a predicted median time to rebuild of 2029, which is one year longer than $T_{F=0}$. ACL alternative e, 147 mt and 151 mt for 2013 and 2014, respectively applies an SPR harvest rate of 85.9 percent and has a predicted median time to rebuild of 2030, which is two years longer than $T_{F=0}$ and equal to the preferred T_{TARGET} under ACL alternative d. ACL alternative f, 216 mt and 220 mt for 2013 and 2014, respectively applies an SPR harvest rate of 80.3 percent and has a predicted median time to rebuild of 2032, which is four years longer than $T_{F=0}$. The six ACL alternatives are predicted to rebuild the stock 1, 1, 2, 3, 3, and 4 years longer, respectively than the T_{TARGET} of 2027 specified in the current rebuilding plan (Table 2-10). The SSC recommended modifying the rebuilding plan out of the necessity to extend the current T_{TARGET} based on our changed understanding of stock status and productivity.

Table 2-12. Alternative canary rockfish harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
a	752	741	719	709	0	0	Shortest time to rebuild ($T_{F=0}$). SPR harvest rate of 100%. Median time to rebuild is 2028.
b					48	49	SPR harvest rate of 95.1%. Median time to rebuild is 2028 (same as $T_{F=0}$).
c					101	104	SPR harvest rate of 90%. Median time to rebuild is 2029 (1 year longer than $T_{F=0}$).
d, Preferred Alt.					116	119	SPR harvest rate of 88.7% specified in the current rebuilding plan. Median time to rebuild is 2030 (2 years longer than $T_{F=0}$).
e					147	151	SPR harvest rate of 85.9%. Median time to rebuild is 2030 (2 years longer than $T_{F=0}$).
f					216	220	SPR harvest rate of 80.3%. Median time to rebuild is 2032 (4 years longer than $T_{F=0}$).

Cowcod South of 40°10' N. Latitude

The 2013 and 2014 harvest specification alternatives for cowcod south of 40º10' N. latitude are based on the 2009 assessment (Dick, *et al.* 2009) and 2009 rebuilding analysis (Dick and Ralston 2009). A new 2011 cowcod assessment was not recommended by the SSC since there was no new information available to inform the stock assessment or rebuilding analysis.

The 2013 and 2014 cowcod OFLs were determined from the 2009 assessment by applying the F_{MSY} proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass for the assessed portion of the stock in the Conception area. The OFLs for the Monterey area portion of the stock were determined using a DBSRA approach. The OFLs for the Conception and the Monterey areas were summed to determine 2013 and 2014 OFLs of 11 mt and 12 mt, respectively for the entire stock south of 40°10' N. latitude (Table 2-3 and Table 2-13).

The SSC categorized the assessed portion of the stock (Conception area) as category 2 and recommended the sigma value of 0.72 be used to determine the ABC following a P* approach. The Council decided a P* of 0.4 for determining the Conception area contribution to the ABC (5 mt and 6 mt, respectively in 2013 and 2014), which is a 16.7 percent reduction from the projected 2013-2014 Conception area OFL. The Monterey portion of the stock was categorized as a category 3 stock since a catch-based approach was used to determine the OFL contribution. The Monterey area contribution to the ABC (3 mt) was determined by applying a P* of 0.4 to the category 3 sigma of 1.44, resulting in a 30.6 percent reduction in the OFL. These ABC contributions were summed to determine an ABC of 9 mt for cowcod south of 40°10' N. latitude (Table 2-8 and Table 2-13). The preferred 2013 and 2014 cowcod ABC of 9 mt (annual ABCs were rounded to the nearest metric ton) was determined using the same basis used to determine the No Action 2012 ABC.

The preferred 2013 and 2014 ACL of 3 mt is based on applying the SPR harvest rate of 82.7 percent specified in the current rebuilding plan, which was the basis for setting the 2012 ACL. There was no recommended change to the T_{TARGET} of 2068 specified in the current rebuilding plan. There is a 50 percent probability of rebuilding by the current T_{TARGET} under the rebuilding plan (Table 2-10). No other ACL alternatives were decided for detailed analysis since there was no new information available to consider alternative ACLs or rebuilding plans.

Table 2-13. Preferred harvest specifications (mt) for cowcod occurring south of 40º10' N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	11	12	9	9	3	3	ACL is set equal to the No Action 2012 ACL and is based on applying the SPR harvest rate of 82.7% specified in the adopted rebuilding plan. No change to the T_{TARGET} of 2068.

Darkblotched Rockfish

The 2013 and 2014 harvest specification alternatives for darkblotched rockfish are based on a new assessment (Stephens, *et al.* 2011) and rebuilding analysis (Stephens 2011) conducted in 2011.

The 2013 and 2014 darkblotched rockfish OFLs of 541 mt and 553 mt, respectively were projected from the 2011 rebuilding analysis by applying the proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass projected in the 2011 assessment. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs (Table 2-14). The preferred 2013 and 2014 ACLs of 317 mt and 330 mt, respectively are based on applying the SPR harvest rate of 64.9 percent specified in the current rebuilding plan, which was the basis for setting the 2012 ACL. There was no recommended change to the T_{TARGET} of 2025 specified in the current rebuilding plan. There is a 100 percent probability of rebuilding by the current T_{TARGET} under the preferred rebuilding plan (Table 2-10). No other ACL alternatives were decided for detailed analysis since the Council and the Council's SSC considers progress towards rebuilding the stock under the current rebuilding plan adequate.

Table 2-14. Preferred darkblotched rockfish harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	541	553	517	529	317	330	ACL based on applying the SPR harvest rate of 64.9% specified in the adopted rebuilding plan. No change to the T_{TARGET} of 2025.

Pacific Ocean Perch North of 40º10’ N. Latitude

The 2013 and 2014 harvest specification alternatives for POP are based on a new full assessment (Hamel and Ono 2011) and rebuilding analysis (Hamel 2011) conducted in 2011. These analyses indicated that if the current SPR harvest rate of 86.4 percent in the POP rebuilding plan is maintained, the stock would not rebuild with a 50 percent probability until 2051, which is 31 years later than the current T_{TARGET} of 2020 (Table 2-10). The change is primarily due to a revised estimate of initial unfished spawning biomass (B_0) and depletion, rather than the current biomass level. This represents a fundamental revision to our understanding of the status of this species. This result compelled a modification of the current rebuilding plan; therefore, the Council decided five POP ACL/rebuilding alternatives for detailed analysis (Table 2-15).

The 2013 and 2014 POP OFLs of 844 mt and 838 mt, respectively were projected from the 2011 rebuilding analysis by applying the proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass projected in the 2011 assessment. The 2013 and 2014 ABCs of 807 mt and 801 mt, respectively are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs.

The preferred 2013 and 2014 ACLs of 150 mt and 153 mt, respectively (ACL alt. c in Table 2-15) are based on applying the SPR harvest rate of 86.4 percent specified in the current rebuilding plan, which was the basis for setting the 2012 ACL. These preferred ACLs also approximate the No Action 2012 ACT specified for POP of 157 mt. The median time to rebuild the stock under the No Action SPR harvest rate is 2051. This is eight years longer than the shortest time to rebuild the stock if all fishing-related mortalities were eliminated beginning in 2013. $T_{F=0}$ is shown as ACL alternative a in Table 2-15. In addition to the preferred POP ACL three other alternatives were adopted for detailed analysis and development of the integrated alternatives (Table 2-15). All ACL alternatives contemplate an increase in the median time to rebuild the stock from the current T_{TARGET} of 2020. ACL alternative b, 74 mt and 76 mt for 2013 and 2014, respectively applies an SPR harvest rate of 92.9 percent and has a predicted median time to rebuild of 2046, which is three years longer than $T_{F=0}$. ACL alternative d, 222 mt and 226 mt for 2013 and 2014, respectively applies an SPR harvest rate of 80.9 percent and has a predicted median time to rebuild of 2057, which is 14 years longer than $T_{F=0}$. ACL alternative e, 247 mt and 251 mt for 2013 and 2014, respectively applies an SPR harvest rate of 79.2 percent and has a predicted median time to rebuild of 2060, which is 17 years longer than $T_{F=0}$. The five ACL alternatives are predicted to rebuild the stock 23, 26, 31, 37, and 40 years longer, respectively than the T_{TARGET} of 2020 specified in the current rebuilding plan (Table 2-10). The SSC recommended modifying the rebuilding plan out of the necessity to extend the current T_{TARGET} based on our changed understanding of stock status and productivity.

Table 2-15. Alternative Pacific ocean perch harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
a	844	838	807	801	0	0	Shortest time to rebuild ($T_{F=0}$). SPR harvest rate of 100%. Median time to rebuild is 2043.
b					74	76	SPR harvest rate of 92.9%. Median time to rebuild is 2046 (3 years longer than $T_{F=0}$).
c, Preferred Alt.					150	153	SPR harvest rate of 86.4% specified in the current rebuilding plan. Median time to rebuild is 2051 (8 years longer than $T_{F=0}$).
d					222	226	SPR harvest rate of 80.9%. Median time to rebuild is 2057 (14 years longer than $T_{F=0}$).
e					247	251	SPR harvest rate of 79.2%. Median time to rebuild is 2060 (17 years longer than $T_{F=0}$).

Petrale Sole

The 2013 and 2014 harvest specification alternatives for petrale sole are based on a new assessment (Haltuch, *et al.* 2011) and rebuilding analysis (Haltuch 2011) conducted in 2011. The estimate of spawning biomass depletion is 18 percent at the start of 2011, above the 12.5 percent MSST for flatfish but below the 25 percent B_{MSY} management target.

The 2013 and 2014 petrale sole OFLs of 2,711 mt and 2,774 mt, respectively were projected from the 2011 rebuilding analysis by applying the proxy harvest rate of $F_{30\%}$ recommended by the SSC to the estimated exploitable biomass projected in the 2011 assessment (Table 2-16). The 2013 and 2014 ABCs of 2,592 mt and 2,652 mt, respectively are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs are based on applying the 25-5 ACL harvest control rule (Figure 2-1) specified in the current rebuilding plan, which was the basis for setting the 2012 ACL. The 2013 and 2014 ACLs equal the preferred ABCs since the petrale sole stock is projected to be above the B_{MSY} target of $B_{25\%}$ by 2013 (the 2011 assessment projects stock depletion rates of 28 percent and 29.6 percent in 2013 and 2014, respectively under the current rebuilding plan). There was no recommended change to the T_{TARGET} of 2016 specified in the current rebuilding plan. There is a 100 percent probability of rebuilding by the current T_{TARGET} under the preferred rebuilding plan (Table 2-10). No other ACL alternatives were decided for detailed analysis since the Council and the Council's SSC considers progress towards rebuilding the petrale sole stock under the current rebuilding plan adequate.

Table 2-16. Preferred petrale sole harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	2,711	2,774	2,592	2,652	2,592	2,652	ACL based on applying the 25-5 ACL harvest control rule specified in the adopted rebuilding plan. The ACLs equal the ABCs since the stock is projected to be above the B_{MSY} target by 2013. No change to the T_{TARGET} of 2016.

Yelloweye Rockfish

The 2013 and 2014 harvest specification alternatives for yelloweye rockfish are based on an update assessment (Taylor and Wetzel 2011) and rebuilding analysis (Taylor 2011) conducted in 2011.

The 2013 and 2014 yelloweye rockfish OFL of 51 mt was projected from the 2011 rebuilding analysis by applying the proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass projected in the 2011 assessment. The 2013 and 2014 ABC of 43 mt is based on applying a P* of 0.4 to the sigma of 0.72 derived for category 2 stocks, resulting in a 16.7 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. This is a different basis than used for determining the No Action 2012 ABC for yelloweye rockfish since it was determined the stock was mistakenly categorized as a category 1 stock during the 2011-2012 biennial specifications process. The SSC recommended yelloweye rockfish be categorized as a category 2 stock after it was realized the assessment did not estimate annual recruitments. This changed the sigma value used to determine the ABC. The Council also changed the P* from 0.45 to 0.4 to determine the preferred 2013 and 2014 yelloweye rockfish ABC. The preferred 2013 and 2014 ACL of 18 mt is based on applying the SPR harvest rate of 76 percent specified in the current rebuilding plan (Table 2-17), which was the basis for setting the 2012 ACL. There was no recommended change to the T_{TARGET} of 2074 specified in the current rebuilding plan. There is a 62.1 percent probability of rebuilding by the current T_{TARGET} under the preferred rebuilding plan (Table 2-10). No other ACL alternatives were decided for detailed analysis since the Council and the Council's SSC considers progress towards rebuilding the stock under the current rebuilding plan adequate.

Table 2-17. Preferred yelloweye rockfish harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	51	51	43	43	18	18	ACL based on applying the SPR harvest rate of 76% specified in the adopted rebuilding plan. No change to the T_{TARGET} of 2074.

2.1.3.2 Annual Catch Limits for Nonoverfished Species Managed With Stock-Specific Harvest Specifications

The following section presents the alternative ACLs that were considered for nonoverfished species managed with stock-specific harvest specifications. The 2013 and 2014 ACL alternatives adopted for more detailed analysis, including the No Action and preferred alternatives are shown in Table 2-18. For most of these species where there was no new scientific information including stock assessments or a management guidance change in the harvest strategy, the Council considered only one ACL alternative for 2013 and 2014 using the same basis as was used to decide the 2012 ACL. These species include arrowtooth flounder, black rockfish off Oregon and California, black rockfish off Washington, cabezon off California, cabezon off Oregon, California scorpionfish, chilipepper rockfish south of 40º10’ N. latitude, English sole, longspine thornyheads north of 34º27’ N. latitude, longspine thornyheads south of 34º27’ N. latitude, Pacific cod, shortbelly rockfish, shortspine thornyheads north of 34º27’ N. latitude, shortspine thornyheads south of 34º27’ N. latitude, splitnose rockfish south of 40º10’ N. latitude, starry flounder, and yellowtail rockfish north of 40º10’ N. latitude. New stock assessments were used to decide a single ACL alternative for Dover sole, sablefish north of 36º N. latitude, and sablefish south of 36º N. latitude. A new policy for managing lingcod north and south of 40º10’ N. latitude rather than north and south of 42º N. latitude at the California-Oregon border is the basis for the preferred 2013 and 2014 lingcod ACLs. There are two 2013 and 2014 ACL alternatives, including the No Action alternative, analyzed for longnose skate. There are two 2013 and 2014 ACL alternatives, in addition to the No Action alternative, analyzed for widow rockfish.

The basis for the preferred ACLs for nonoverfished stocks managed with stock-specific harvest specifications follows. Because Pacific whiting is assessed annually and is managed under the tenets of the Agreement with Canada on Pacific Hake/Whiting, this EIS explores a range of Pacific whiting TACs to better understand resulting impacts and to consider management measures for 2013 and 2014 Pacific whiting fisheries.

Table 2-18. 2012 ACLs (i.e., the No Action ACL alternative) and preferred 2013 and 2014 ACLs for nonoverfished west coast groundfish stocks.

Stock	2012 ACL	Preferred Alt. ACLs		2013-14 ACL Range for Analysis a/	
		2013	2014	Alt. a	Alt. b
NONOVERFISHED STOCKS					
Arrowtooth Flounder	12,049	6,157	5,758		
Black Rockfish (OR-CA)	1,000	1,000	1,000		
Black Rockfish (WA)	415	411	409		
Cabezon (CA)	168	163	158		
Cabezon (OR)	48	47	47		
California scorpionfish	126	120	117		
Chilipepper S. of 40°10’	1,789	1,690	1,647		
Dover Sole	25,000	**25,000**	**25,000**		
English Sole	10,151	6,815	5,646		
Lingcod N. of 42º (OR & WA) b/	2,151	2,010	1,897		
Lingcod S. of 42º (CA) b/	2,164	2,137	2,044		
Lingcod N. of 40º10' b/	NA	3,036	2,878		
Lingcod S. of 40º10' b/	NA	1,111	1,063		
Longnose skate	1,349	2,000	2,000	2,000	
Longspine Thornyhead (coastwide)	NA	NA	NA		
Longspine Thornyhead N. of 34°27'	2,064	2,009	1,958		
Longspine Thornyhead S. of 34°27'	366	356	347		
Pacific Cod	1,600	1,600	1,600		
Sablefish (coastwide)	NA	**NA**	**NA**		
Sablefish N. of 36°	5,347	**4,012**	**4,349**		
Sablefish S. of 36°	1,298	**1,439**	**1,560**		
Shortbelly	50	50	50		
Shortspine Thornyhead (coastwide)	NA	NA	NA		
Shortspine Thornyhead N. of 34°27'	1,556	1,540	1,525		
Shortspine Thornyhead S. of 34°27'	401	397	393		
Splitnose S. of 40°10’	1,538	1,610	1,670		
Starry Flounder	1,360	1,520	1,528		
Widow	600	**1,500**	**1,500**	**1,500**	**2,500**
Yellowtail N. of 40°10’	4,371	4,378	4,382		

a/ The 2012 ACLs are also analyzed in the EIS.

b/ The Council requested analysis of shifting the lingcod management line from the OR-CA border at 42° N. latitude to 40°10’ N. latitude. An analysis using swept area biomass estimates of lingcod derived from the NWFSC trawl survey indicates 48% of the biomass south of 42° N. latitude occurs north of 40°10' N. latitude. The 40°10' N. latitude management line for lingcod is the preferred alternative for lingcod specifications analyzed in the EIS.

Arrowtooth Flounder

The most recent stock assessment of arrowtooth flounder was done in 2007 (Kaplan and Helser 2008). The spawning biomass at the beginning of 2007 was estimated to be at 79 percent of the estimated unfished spawning biomass.

One 2013 and 2014 arrowtooth flounder ACL alternative is analyzed in this EIS (Table 2-19). The OFLs are projected from the assessment using the $F_{30\%}$ F_{MSY} proxy harvest rate used for assessed flatfish species. The ABCs are based on applying a P* of 0.4 to a sigma of 0.72 for a category 2 stock, resulting in a 16.7 percent reduction of the projected OFLs to account for scientific uncertainty in estimating the OFLs. The preferred 2013 and 2014 ACLs of 6,157 mt and 5,758 mt, respectively are based on setting ACLs equal to the ABCs, which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-19. Preferred arrowtooth flounder harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	7,391	6,912	6,157	5,758	6,157	5,758	ACL is set equal to the ABC.

Black Rockfish off California and Oregon

The most recent southern black rockfish assessment was done in 2007 for the area south of Cape Falcon, Oregon to the southern limit of the stock's distribution off central California (Sampson 2008). The assessment indicated that black rockfish off California and Oregon are in a healthy status estimated to be at 70 percent of its initial, unfished biomass at the start of 2007.

Black rockfish in the southern area have been managed with separate harvest specifications than those used to manage the northern portion of the stock in waters off Washington (see next section). The 2013 and 2014 southern black rockfish OFLs are projected from the 2007 assessment using the proxy $F_{50\%}$ harvest rate used to estimate the MSY harvest level for rockfish. Projected OFLs were increased by 3 percent of the northern OFL, based on the estimated relative proportion of catch by area, to account for the portion of the assessed northern stock occurring in waters off Oregon north of Cape Falcon. The 2013 and 2014 ABCs of 1,108 mt and 1,115 mt, respectively are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACL of 1,000 mt continues the constant catch strategy in place for this stock since 2009 (Table 2-20). The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-20. Preferred harvest specifications (mt) for black rockfish off California and Oregon.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	1,159	1,166	1,108	1,115	1,000	1,000	ACL continues the constant catch strategy in place since 2009.

Black Rockfish off Washington

The most recent northern black rockfish assessment was done in 2007 for the area north of Cape Falcon, Oregon, to the U.S.-Canada border (Wallace, *et al.* 2008). The assessment indicated northern black rockfish are in a healthy status estimated to be at 53.4 percent of its initial, unfished biomass at the start of 2007.

Black rockfish in waters off Washington have been managed with separate harvest specifications than those used to manage the southern portion of the stock in waters off Oregon and California (see previous section). The 2013 and 2014 northern black rockfish OFLs are projected from the 2007 assessment using the proxy $F_{50\%}$ harvest rate used to estimate the MSY harvest level for rockfish. Projected OFLs were decreased by 3 percent (and applied to the southern black rockfish OFL), based on the estimated relative proportion of catch by area, to account for the portion of the assessed northern stock occurring in waters off Oregon north of Cape Falcon. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 411 mt and 409 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-21), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-21. Preferred harvest specifications (mt) for black rockfish off Washington.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	430	428	411	409	411	409	ACL is set equal to the ABC.

Cabezon off California

The most recent cabezon assessment was done in 2009 for stocks occurring in waters off California and Oregon (Cope and Key 2009). The 2009 assessment separately modeled two California sub-stocks north and south of Point Conception and also evaluated the population as a coastwide California stock. The assessment also modeled a third cabezon sub-stock in the waters off of Oregon. The SSC recommended combining the results of the area models for the two California sub-stocks of cabezon for use in deciding statewide harvest specifications. The assessment estimates a healthy spawning biomass of cabezon off California at the start of 2009 of 48.3 percent of unfished biomass.

The 2013 and 2014 OFLs for cabezon occurring in waters off California are projected from the 2009 assessment by applying the proxy $F_{45\%}$ MSY harvest rate to the projected exploitable biomass for each California substock in each year and then summing the OFL contribution of each substock. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 163 mt and 158 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-22), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-22. Preferred harvest specifications (mt) for cabezon occurring in waters off California.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	170	165	163	158	163	158	ACL is set equal to the ABC.

Cabezon off Oregon

The 2009 assessment of cabezon in waters off Oregon was used to set harvest specifications for this stock (Cope and Key 2009). The 2009 assessment estimates a healthy spawning biomass of cabezon off Oregon at the start of 2009 of 52.4 percent of unfished biomass.

The 2013 and 2014 OFLs for cabezon occurring in waters off Oregon are projected from the 2009 assessment by applying the proxy $F_{45\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACL of 47 mt is based on setting ACLs equal to the ABCs (Table 2-23), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-23. Preferred harvest specifications (mt) for cabezon occurring in waters off Oregon.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	49	49	47	47	47	47	ACL is set equal to the ABC.

California Scorpionfish

California scorpionfish were assessed in 2005 (Maunder, *et al.* 2006). In most years, 99 percent or more of the landings occur in the southern California ports. Therefore, only the stock off of southern California south of Point Conception at 34°27' N. latitude to the U.S.-Mexico border was assessed. This assessment indicated the California scorpionfish stock was healthy with an estimated spawning stock biomass of 79.8 percent of its initial, unfished biomass in 2005.

The 2013 and 2014 OFLs for California scorpionfish are projected from the 2005 assessment by applying the proxy $F_{50\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 120 mt and 117 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-24), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-24. Preferred California scorpionfish harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	126	122	120	117	120	117	ACL is set equal to the ABC.

Chilipepper Rockfish South of 40º10' N. Latitude

The last full assessment of chilipepper rockfish was conducted in 2007 (Field 2008). The 2007 assessment indicated the stock was healthy with a spawning stock biomass estimated at 70 percent of its initial, unfished biomass in 2006.

The 2007 assessment was first used in 2008 to decide 2009 and 2010 chilipepper harvest specifications. The Council consideration for 2011 and 2012 was whether or not to remove chilipepper rockfish from the Minor Shelf Rockfish North complex and manage it coastwide. Chilipepper rockfish are predominantly found south of 40°10' N. latitude. Prior to 2007 they were only assessed in the area south of 40°10' N. latitude (Ralston, *et al.* 1998). To date, chilipepper rockfish has been managed with stock-specific harvest specifications south of 40°10' N. latitude and within the Minor Shelf Rockfish North complex north of 40°10' N. latitude. When the stock assessment area was extended for the 2007 chilipepper stock assessment, it was extended to the stock's entire west coast range through waters off Oregon (chilipepper rockfish are not believed to occur in waters off Washington). However, the Council and NMFS elected to continue to manage chilipepper rockfish south of 40º10' N. latitude with stock-specific harvest specifications and as part of the Minor Shelf Rockfish North complex north of 40°10' N. latitude.

The 2013 and 2014 OFLs for chilipepper rockfish are projected from the 2007 assessment by applying the proxy $F_{50\%}$ MSY harvest rate to the projected exploitable biomass for the stock. These projected OFLs are stratified north and south of 40º10' N. latitude based on the average 1998-2008 assessed area catch, which is 93 percent for the area south of 40°10' N. latitude and 7 percent for the area north of 40°10' N. latitude. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 1,690 mt and 1,647 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-25), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-25. Preferred harvest specifications (mt) for chilipepper rockfish occurring south of 40º10' N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	1,768	1,722	1,690	1,647	1,690	1,647	ACL is set equal to the ABC.

Dover Sole

A new Dover sole assessment was done in 2011 (Hicks and Wetzel 2011), which indicated the stock was healthy with a 2011 spawning stock biomass depletion of 83.7 percent of unfished biomass.

The 2013 and 2014 OFLs for Dover sole are projected from the 2011 assessment by applying the proxy $F_{30\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACL of 25,000 mt is a re-specification of the No Action 2012 ACL (Table 2-26). The stock is projected to remain healthy while accommodating the current level of catch. Lower sablefish ACLs are proposed for 2013 and 2014 and, given that the trawl sablefish allocation can dictate the amount of Dover sole that can be accessed in the IFQ fishery, higher Dover sole ACLs were not requested or considered.

Table 2-26. Preferred Dover sole harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	92,955	77,774	88,865	74,352	25,000	25,000	ACL is set equal to the No Action 2012 ACL.

English Sole

The last assessment of English sole was done in 2007 (Stewart 2008). The 2007 assessment was an update of the full assessment done in 2005 (Stewart 2006), which modeled a single coastwide stock. The spawning biomass at the beginning of 2007 was estimated to be at 116 percent of the exploited equilibrium level.

The 2013 and 2014 OFLs for English sole are projected from the 2007 assessment by applying the proxy $F_{30\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 6,815 mt and 5,646 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-27), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-27. Preferred English sole harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	7,129	5,906	6,815	5,646	6,815	5,646	ACL is set equal to the ABC.

Lingcod North and South of 40°10’ N. Latitude

Lingcod are distributed coastwide with harvest specifications based on two area stock assessments that were conducted in 2009 for the areas north and south of the California-Oregon border at 42° N. latitude (Hamel, *et al.* 2009). The stock assessments indicate west coast lingcod stocks are healthy with the stock depletion estimated for lingcod off of Washington and Oregon to be at 62 percent of its unfished biomass, and lingcod off of California estimated to be at 74 percent of its unfished biomass at the start of 2009.

In contrast to the No Action Alternative, the Council recommended establishing ACLs north and south of the current 40º10’ N. latitude management line rather than north and south of the California-Oregon border at 42º N. latitude. The lingcod STAT was asked to calculate the relative biomass of lingcod north and south of 40º10’ N. latitude to enable the management line shift for the stock. Swept area biomass estimates calculated annually (2003-2010) from the NMFS NWFSC trawl survey indicated that 48 percent of the lingcod biomass for the stock south of 42º N. latitude occurred between 40º10’ N. latitude and 42º N. latitude. Therefore, 48 percent of the 2013 and 2014 OFLs projected in the 2009 lingcod assessment for the southern lingcod stock were added to OFLs proposed for the stock north of 40º10’ N. latitude. Likewise, 48 percent of the projected OFLs for the southern stock were subtracted from the OFLs proposed for the stock south of 40º10’ N. latitude.

The 2013 and 2014 OFLs for lingcod are projected from the 2009 assessment by applying the proxy $F_{45\%}$ MSY harvest rate to the projected exploitable biomass for the stocks north and south of 42º N. latitude. The 48 percent adjustments of the northern and southern OFLs described above were made to specify lingcod OFLs north and south of 40º10’ N. latitude. The 2013 and 2014 ABCs for the lingcod stock north of 40º10’ N. latitude are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The 2013 and 2014 ABCs for the lingcod stock south of 40º10’ N. latitude are based on applying a P* of 0.4 to the sigma of 0.72 derived for category 2 stocks, resulting in a 16.7 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 lingcod ACLs of 3,187 mt and 3,023 mt, respectively for the stock north of 40º10’ N. latitude and 1,111 mt and 1,063 mt, respectively for the stock south of 40º10’ N. latitude are based on setting ACLs equal to the ABCs (Table 2-28), which was the basis for setting the 2012 ACLs. Both lingcod stocks are projected to remain healthy while accommodating the current level of catch.

Table 2-28. Preferred harvest specifications (mt) for lingcod occurring north and south of 40º10’ N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
North of 40º10’ N. latitude Preferred Alt.	3,334	3,162	3,187	3,023	3,187	3,023	ACL is set equal to the ABC.
South of 40º10’ N. latitude Preferred Alt.	1,334	1,276	1,111	1,063	1,111	1,063	ACL is set equal to the ABC.

Longnose Skate

The west coast longnose skate stock was assessed in 2007 (Gertseva and Schirripa 2008). The spawning stock biomass was estimated to be at 66 percent of its unfished biomass at the start of 2007.

The 2013 and 2014 OFLs for longnose skate are projected from the 2007 assessment by applying the proxy $F_{45\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. Two 2013 and 2014 longnose skate ACL alternatives are analyzed in this EIS (Table 2-29). The No Action (2012) ACL of 1,349 mt is based on a 50 percent increase in the average 2004-2006 landings and discard mortality. The ACL Alternative a of 2,000 mt is the preferred ACL alternative and sets the ACL higher than the No Action ACL to provide greater access to the stock and to limit disruption of current fisheries. Both ACL alternatives for longnose skate are within a level of harvest projected to maintain the population at a healthy level as projected in the 10-year forecast for longnose skate in the 2007 assessment by Gertseva and Schirripa (2007).

Table 2-29. Alternative longnose skate harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
No Action	2,902	2,816	2,774	2,692	1,349	1,349	ACL is set equal to the 2012 ACL.
Alt. a; Preferred Alt.					2,000	2,000	ACL is set higher than the No Action ACL to provide greater access to the stock.

Longspine Thornyhead

The most recent assessment of longspine thornyhead was done in 2005 (Fay 2006). The results of the 2005 coastwide assessment indicated the longspine thornyhead stock was healthy with an estimated spawning stock biomass at 71 percent of its initial, unfished biomass in 2005.

The 2013 and 2014 OFLs for longspine thornyhead are projected from the 2005 assessment by applying the proxy $F_{50\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.4 to the sigma of 0.72 derived for category 2 stocks, resulting in a 16.7 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. Longspine thornyhead has been managed with separate OYs/ACLs north and south of Point Conception at 34°27’ N. latitude since 2007. The preferred 2013 and 2014 ACLs for longspine thornyhead are based on the same area stratification strategy used to manage the stock since 2007 and use the same basis for calculating the ACLs as was used to determine the No Action 2012 ACLs (Table 2-30). The apportionment methodology assumes constant density throughout the Conception area and estimated 79 percent of the assessed coastwide biomass occurs north of Point Conception. The SSC has recommended coastwide OFLs and ABCs for longspine thornyhead since the 2005 assessment presents a coastwide model. However, the Council and NMFS have decided to apply differential scientific uncertainty buffers in the ACLs specified north and south of Point Conception. The preferred 2013 and 2014 ACLs of 2,009 mt and 1,958 mt, respectively for the stock north of 34º27’ N. latitude are calculated as 79 percent of the projected OFLs with a further 25 percent reduction to account for scientific uncertainty. The preferred 2013 and 2014 ACLs of 356 mt and 347 mt, respectively for the stock south of 34º27’ N. latitude are calculated as 21 percent of the projected OFLs with a further 50 percent reduction to account for scientific uncertainty. The greater assessment uncertainty for the portion of the stock south of Point Conception is largely due to the fact that a small proportion of the Conception area is surveyed in the NMFS trawl survey given the high proportion of untrawlable habitat and the prohibition of bottom trawling in the Cowcod Conservation Areas (CCAs). While higher scientific uncertainty would conceptually be accommodated in specifying the ABC, the higher scientific uncertainty south of Point Conception is accommodated in consideration of the ACL for the longspine thornyhead stock south of 34°27’ N. latitude since the SSC recommended a coastwide OFL and ABC. This is the same basis as was used to determine the No Action 2012 ACLs for longspine thornyhead north and south of 34º27’ N. latitude. The 2013 and 2014 longspine thornyhead ACLs are within a level of harvest projected to maintain the population at a healthy level.

Table 2-30. Preferred harvest specifications (mt) for longspine thornyhead occurring north and south of 34º27' N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Coastwide	3,391	3,304	2,825	2,752	NA	NA	NA: No coastwide ACL.
North of 34º27' N. latitude Preferred Alt.	NA	NA	NA	NA	2,009	1,958	79% of the coastwide OFL with a 25% scientific uncertainty reduction.
South of 34º27' N. latitude Preferred Alt.	NA	NA	NA	NA	356	347	21% of the coastwide OFL with a 50% scientific uncertainty reduction.

Pacific Cod

The west coast population of Pacific cod has never been formally assessed. Targetable amounts of Pacific cod occur off northern Washington infrequently since the west coast EEZ is at the southern limit of their distribution. The 2013 and 2014 Pacific cod OFL is set at the highest annual historical catch observed for the stock. The 2013 and 2014 ABC is based on applying a P* of 0.4 to the sigma of 1.44 derived for category 3 stocks, resulting in a 30.6 percent reduction of the OFL to account for the greater scientific uncertainty estimating the OFL for this unassessed stock. The 2013 and 2014 ACL for Pacific cod is 1,600 mt, which is 50 percent of the OFL (28 percent less than the ABC) and equal to the 2012 ACL (Table 2-31). Total catch estimates of Pacific cod in recent years were well below the Council preferred ACL. An ACL of 1,600 mt provides for variation in catch between years and could provide northern fishermen with an opportunity for targeting, while being sufficiently precautionary.

Table 2-31. Preferred Pacific cod harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	3,200	3,200	2,221	2,221	1,600	1,600	ACL is set equal to the 2012 ACL.

Pacific Whiting

Pacific whiting is managed consistent with the Agreement with Canada on Pacific Hake/Whiting. OYs, now called TACs (total allowable catches), for Pacific whiting are adopted on an annual basis after a stock assessment is completed just prior to the Council's March meeting[14]. The most recent assessment was conducted in 2011 (Stewart, *et al.* 2011a) and was used to determine stock status and 2011 harvest specifications. The assessment, conducted in a collaborative effort by Canadian and U.S. scientists, was

14 Given that Pacific whiting are managed under the tenets of the Agreement with Canada on Pacific Hake/Whiting, the stock was exempted from the harvest specification framework adopted under FMP Amendment 23, which incorporated the OFL, ABC, and ACL specifications. Currently, the ABC defines the Pacific whiting MSY harvest level and the TAC defines the annual total allowable harvest. The Pacific Whiting Commission may define a different harvest management framework or nomenclature in the future.

based on two models, SS (Stock Synthesis) and TINSS (This Is Not Stock Synthesis).[15] The SSC recommended both model results were equally plausible and recommended key management quantities such as the MSY harvest level and stock depletion in 2011 (126 percent of virgin biomass) be derived using model-averaging with equal weight.

The Council adopted a coastwide (U.S. plus Canada) ABC of 973,700 mt for 2011 fisheries using the model-averaged results as recommended by the SSC. A coastwide OY (now denoted TAC) of 393,751 mt was adopted for 2011 fisheries. The U.S. allocation of Pacific whiting is 73.88 percent of the coastwide OY/TAC resulting in a 2011 U.S. OY of 290,903 mt. Of this amount 66,908 mt was allocated to treaty Indian fisheries and 3,000 mt was set aside to accommodate incidental bycatch in nonwhiting fisheries and catch in research activities. The 2011 fishery HG for non-tribal whiting fisheries was therefore 220,995 mt. The HG was allocated to trawl whiting sectors using the formal allocation of 24 percent to motherships, 34 percent to catcher-processors, and 42 percent to shoreside whiting. These values are used in the analysis of impacts in this EIS.

The 2013 and 2014 Pacific whiting harvest specifications are based on annual assessments and are analyzed in this EIS to understand the biological consequences of setting harvest limits for the stock, including potential bycatch implications of future whiting fisheries and potential socioeconomic effects. The analysis and discussion of the bycatch implications of future whiting fisheries in this EIS will serve to better understand effective management strategies to consider for future whiting fisheries. The primary bycatch species in the EIS analysis of 2013-2014 whiting fisheries are canary and widow rockfish. There is a need to allocate canary rockfish to whiting sectors in 2013 and 2014 since the stock is managed with IFQs and total catch limits in whiting fisheries and, of the bycatch stocks actively managed in whiting fisheries (i.e., canary, darkblotched, POP, and widow), canary is the only stock without a formal trawl sector allocation prescribed in the FMP. Trawl sector allocations of widow rockfish are also contemplated to change in this action and, unlike canary rockfish, will require an FMP amendment to do so (the Council did not recommend changing the within-trawl allocation of widow rockfish as their preferred alternative). The bycatch implications of alternative Pacific whiting harvest limits are explored in Chapter 4.

Under the auspices of the international Pacific whiting treaty process used to set whiting harvest limits for the U.S. and Canada, the annual harvest limit is called a TAC. Therefore, the alternative Pacific whiting harvest limits analyzed are alternative U.S. TACs (Table 2-32). The alternative Pacific whiting TACs analyzed range from the lowest U.S. OY specified in the 2005-2011 period (2009) minus 50 percent of the OY (TAC Alt. 1) to the highest U.S. OY during that period (2011) plus a 50 percent increase in the OY (TAC Alt. 4).

Table 2-32. Pacific whiting U.S. TAC alternatives (in mt) for analysis of potential impacts in 2013-2014 fisheries.

Whiting TAC Alternative	U.S. TAC (mt)	Basis for TAC Alternative
1	67,970	Min. U.S. OY in 2005-11 minus 50%
2	135,939	Min. U.S. OY in 2005-11 (2009)
3	290,903	Max. U.S. OY in 2005-11 (2011)
4	436,355	Max. U.S. OY in 2005-11 plus 50%

[15] A 2012 assessment was approved in the international whiting treaty process since the drafting of the EIS that was conducted in Stock Synthesis.

Sablefish

A new coastwide sablefish stock assessment was conducted in 2011 (Stewart, *et al.* 2011b). The spawning stock biomass was estimated to be at 33 percent of its unfished biomass at the beginning of 2011.

The 2013 and 2014 OFLs for sablefish are projected from the 2011 assessment by applying the proxy $F_{45\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.4 to the sigma of 0.36 derived for category 1 stocks, resulting in an 8.7 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. Preferred OFLs and ABCs recommended by the SSC are coastwide since the assessment models a coastwide population. However, the convention is to set two area-specific ACLs north and south of 36º N. latitude since formal commercial allocations of the harvestable surplus of sablefish have been adopted for sablefish north and south of 36º N. latitude. The sablefish STAT was asked to provide an estimate of the relative coastwide biomass north and south of 36º N. latitude to provide a scientific basis for apportioning the ACLs. The STAT examined annual (2003-2010) swept area biomass estimates derived from the NMFS NWFSC trawl survey to determine that 26.4 percent of the coastwide sablefish biomass occurred south of 36º N. latitude. Therefore, 2013 and 2014 sablefish ABCs were apportioned north and south of 36º N. latitude assuming 73.6 percent of the biomass occurred in the north and 26.4 percent occurred in the south. Since the sablefish stock is in the precautionary zone with a stock biomass below target MSY biomass (i.e., < $B_{40\%}$), the 40-10 harvest control rule specified in the FMP is also applied to determine ACLs (Figure 2-1). Table 2-33 presents the preferred harvest specifications for sablefish consistent with the area apportionment methodology described above and application of the 40-10 control rule to the ABC. The apportionments used to determine 2013 and 2014 sablefish ACLs differ slightly from those used to apportion the No Action 2012 ACLs. Alternative apportionments were analyzed to determine the No Action ACLs; whereas, the STAT was asked to present the best apportionment they could within the new assessment. The 2013 and 2014 sablefish ACLs for the portion of the stock south of 36º N. latitude also differ slightly from the southern No Action ACL in that a further 50 percent scientific uncertainty reduction was not applied to determine these ACLs. The STAT believed that a fuller time series of trawl survey and catch data informing stock biomass in the Conception area reduced the scientific uncertainty in estimating biomass in that area in the 2011 assessment.

Table 2-33. Preferred sablefish harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Coastwide	6,621	7,158	6,045	6,535	NA	NA	NA: No coastwide ACL.
North of 36º N. latitude Preferred Alt.	NA	NA	NA	NA	4,012	4,349	73.6% of coastwide ABC with the 40-10 ACL adjustment.
South of 36º N. latitude Preferred Alt.	NA	NA	NA	NA	1,439	1,560	26.4% of coastwide ABC with the 40-10 ACL adjustment.

Shortbelly Rockfish

A shortbelly rockfish assessment was done as an academic exercise in 2007 to understand the potential environmental determinants of fluctuations in the recruitment and abundance of an unexploited rockfish population in the California Current ecosystem (Field, *et al.* 2008). The results of the assessment indicated the shortbelly stock was healthy with an estimated spawning stock biomass of 67 percent of its unfished biomass in 2005.

Shortbelly rockfish is an abundant species that is not targeted in any commercial or recreational fisheries or caught in substantial amounts. However, shortbelly rockfish is a valuable forage fish species in the California Current ecosystem with fluctuations in stock recruitment and biomass driven by environmental conditions. The consequence of fisheries, including high and low estimates of plausible discards, were estimated to be negligible ($P<0.01$) in all years with the exception of the foreign fisheries of the mid-1960s (Field, *et al.* 2008). Shortbelly rockfish were initially considered for an Ecosystem Component (EC) species[16] categorization under Amendment 23. Rather than classifying shortbelly rockfish as an EC species, the Council chose to recommend a very restrictive ACL for 2011 and beyond.

The 2007 shortbelly assessment was not used to decide 2013 and 2014 harvest specifications since these estimates were not produced in the assessment. The No Action OFL of 6,950 mt is 50 percent of the 2008 shortbelly OY. The STAT advised the Council in 2008 that the harvest rate predicting a 6,950 mt level of harvest would be expected to keep the stock in its current equilibrium. Given that MSY estimates were not produced in the 2007 assessment, the SSC recommended re-specifying the No Action OFL of 6,950 mt as the 2013 and 2014 OFL for shortbelly rockfish. The 2013 and 2014 ABCs are based on applying a P* of 0.4 to the sigma of 0.72 derived for category 2 stocks, resulting in a 16.7 percent reduction of the OFL to account for scientific uncertainty. The preferred 2013 and 2014 ACL of 50 mt is the same as the No Action 2012 ACL and is a level of harvest meant to accommodate unavoidable incidental bycatch of shortbelly rockfish while allowing most of the harvestable surplus of the stock to be available as forage for species in the California Current ecosystem. Such ecological considerations are made when setting ACLs for west coast groundfish species.

Table 2-34. Preferred shortbelly rockfish harvest specifications (mt).

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	6,950	6,950	5,789	5,789	50	50	ACL is set equal to the 2012 ACL as a de minimis amount to accommodate incidental bycatch and preserve harvestable surplus to accommodate ecosystem considerations.

Shortspine Thornyhead

The most recent assessment of shortspine thornyhead was done in 2005 (Hamel 2006b). The results of the 2005 coastwide assessment indicated the shortspine thornyhead stock was healthy with an estimated spawning stock biomass of 62.9 percent of its initial, unfished biomass in 2005.

16 The EC species are designated as such in the FMP and are those species that are not considered to be "in the fishery" or targeted in any fishery. EC species are not typically retained for sale or personal use. The EC species are not actively managed. The EC species are determined to not be subject to overfishing, approaching an overfished condition, or overfished, nor are they likely to become subject to overfishing or overfished in the absence of conservation and management measures.

The 2013 and 2014 OFLs for shortspine thornyhead are projected from the 2005 assessment by applying the proxy $F_{50\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. Shortspine thornyhead has been managed with separate OYs/ACLs north and south of Point Conception at 34°27' N. latitude since 2007. The preferred 2013 and 2014 ACLs for shortspine thornyhead are based on the same area stratification strategy used to manage the stock since 2007 and use the same basis for calculating the ACLs as was used to determine the No Action 2012 ACLs (Table 2-35). The apportionment methodology assumes constant density throughout the Conception area and estimated 66 percent of the assessed coastwide biomass occurs north of Point Conception and 34 percent of the biomass south of Point Conception. The SSC has recommended coastwide OFLs and ABCs for shortspine thornyhead since the 2005 assessment presents a coastwide model. However, the Council and NMFS have decided to apply a differential scientific uncertainty buffer in the ACL specified south of Point Conception. The preferred 2013 and 2014 ACLs of 1,540 mt and 1,525 mt, respectively for the stock north of 34º27' N. latitude are calculated as 66 percent of the projected OFLs. The preferred 2013 and 2014 ACLs of 397 mt and 393 mt, respectively for the stock south of 34º27' N. latitude are calculated as 34 percent of the projected OFLs with a further 50 percent reduction to account for scientific uncertainty. The greater assessment uncertainty for the portion of the stock south of Point Conception is largely due to the fact that a small proportion of the Conception area is surveyed in the NMFS trawl survey given the high proportion of untrawlable habitat and the prohibition of bottom trawling in the CCAs. While higher scientific uncertainty would conceptually be accommodated in specifying the ABC, the higher scientific uncertainty south of Point Conception is accommodated in consideration of the ACL for the shortspine thornyhead stock south of 34°27' N. latitude since the SSC recommended a coastwide OFL and ABC. This is the same basis as was used to determine the No Action 2012 ACLs for shortspine thornyhead north and south of 34º27' N. latitude. The 2013 and 2014 shortspine thornyhead ACLs are within a level of harvest projected to maintain the population at a healthy level.

Table 2-35. Preferred harvest specifications (mt) for shortspine thornyhead occurring north and south of 34º27' N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Coastwide	2,333	2,310	2,230	2,208	NA	NA	NA: No coastwide ACL.
North of 34º27' N. latitude Preferred Alt.	NA	NA	NA	NA	1,540	1,525	66% of the coastwide OFL.
South of 34º27' N. latitude Preferred Alt.	NA	NA	NA	NA	397	393	34% of the coastwide OFL with a 50% scientific uncertainty reduction.

Splitnose Rockfish South of 40°10' N. Latitude

The splitnose rockfish assessment was done in 2009 (Gertseva, *et al.* 2009). Splitnose rockfish is a healthy stock with spawning depletion estimated at 66 percent of its unexploited level at the beginning of 2009. Splitnose rockfish have been taken incidentally in fisheries such as the trawl fisheries targeting POP, mixed slope rockfish, and other deepwater targets, but have not been a commercial target species.

It was decided to continue management of splitnose rockfish with stock-specific specifications south of 40°10’ N. latitude and under the Minor Slope Rockfish complex north of 40°10’ N. latitude when the coastwide splitnose rockfish assessment was first used to inform management in 2011. A north-south apportionment based on the average 1916-2008 assessed area catch resulting in 64.2 percent stock-specific specification in the southern area and 35.8 percent for the contribution of splitnose rockfish to the Minor Slope Rockfish North complex was used to apportion harvest specifications in 2011 and 2012. The Council recommended continuing this management strategy largely due to the implications of determining the uncertain catch history by trawl permit to initially allocate trawl splitnose quota shares (QS) under Amendment 20. Since splitnose rockfish are not targeted and predominantly discarded at sea, little data would be available to determine catch history.

The 2013 and 2014 OFLs for splitnose are projected from the 2009 assessment by applying the proxy $F_{50\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The OFLs were stratified according to the apportionment methodology described above with 64.2 percent of the projected OFLs used to determine the OFLs for the portion of the stock occurring south of 40°10’ N. latitude. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFLs to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 1,610 mt and 1,670 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-36), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-36. Preferred harvest specifications (mt) for splitnose rockfish occurring south of 40°10’ N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	1,684	1,747	1,610	1,670	1,610	1,670	ACL is set equal to the ABC.

Starry Flounder

Starry flounder was assessed in 2005 (Ralston 2006). Both the northern and southern populations were estimated to be above the target level of 40 percent of unfished spawning biomass (44 percent of B_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.

The 2013 and 2014 OFLs for starry flounder are projected from the 2005 assessment by applying the proxy $F_{30\%}$ MSY harvest rate to the projected exploitable biomass for the stock. There is relatively higher scientific uncertainty in the estimation of the biomass of starry flounder than for many of the assessed groundfish stocks on the west coast. The SSC therefore categorized starry flounder as a category 2 stock due to a very uncertain catch history, a lack of age or size composition data, and poor tracking in the NMFS trawl survey. The 2013 and 2014 ABCs are based on applying a P* of 0.4 to the sigma of 0.72 derived for category 2 stocks, resulting in a 16.7 percent reduction of the OFLs to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 1,520 mt and 1,528 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-37), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-37. Preferred starry flounder harvest specifications (mt).

<table>
<tr><th rowspan="2">Alternative Harvest Specifications</th><th colspan="2">OFL</th><th colspan="2">ABC</th><th colspan="2">ACL</th><th rowspan="2">Basis for ACL</th></tr>
<tr><th>2013</th><th>2014</th><th>2013</th><th>2014</th><th>2013</th><th>2014</th></tr>
<tr><td>Preferred Alt.</td><td>1,825</td><td>1,834</td><td>1,520</td><td>1,528</td><td>1,520</td><td>1,528</td><td>ACL is set equal to the ABC.</td></tr>
</table>

Widow Rockfish

A new full assessment of widow rockfish was conducted in 2011 (He, *et al.* 2011), which indicated the spawning stock biomass was successfully rebuilt with a depletion of 51 percent at the start of 2011. However, there is considerable uncertainty regarding the new stock assessment's finding that the stock has rebuilt. Productivity and status of this stock are highly uncertain because the available biomass indices are not informative. Nonetheless, the SSC considered the base model of the new widow rockfish assessment to be the best available science.

The 2013 and 2014 OFLs for widow rockfish are projected from the 2011 assessment by applying the proxy $F_{50\%}$ MSY harvest rate to the projected exploitable biomass for the stock. The SSC categorized widow rockfish as a category 1 stock. However, the SSC also evaluated the estimated biomass variance in the 2011 widow assessment and determined that the variance is higher than the 0.36 sigma derived for other category 1 stocks. Therefore, the SSC recommended using a sigma of 0.41 derived by comparing the base model results with those for the low state of nature model in the decision table in the 2011 widow assessment. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.41 derived for widow rockfish, resulting in a 5.0 percent reduction of the OFLs to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACL of 1,500 mt is projected to maintain spawning stock biomass above the target $B_{40\%}$ level in the next 10 years and, assuming the more pessimistic low state of nature model in the decision table is correct, above the MSST of $B_{25\%}$ in the next 10 years (Table 2-38). The Alternative b ACL of 2,500 mt is projected to maintain spawning stock biomass above the $B_{40\%}$ target in the next 10 years assuming the base model, but is projected to decline below the $B_{25\%}$ MSST within the next 10 years assuming the low state of nature model.

Table 2-38. Alternative widow rockfish harvest specifications (mt).

<table>
<tr><th rowspan="2">Alternative Harvest Specifications</th><th colspan="2">OFL</th><th colspan="2">ABC</th><th colspan="2">ACL</th><th rowspan="2">Basis for ACL</th></tr>
<tr><th>2013</th><th>2014</th><th>2013</th><th>2014</th><th>2013</th><th>2014</th></tr>
<tr><td>Alt. a; Preferred Alt.</td><td rowspan="2">4,841</td><td rowspan="2">4,435</td><td rowspan="2">4,598</td><td rowspan="2">4,212</td><td>1,500</td><td>1,500</td><td>Constant catch projected to keep the stock above target biomass under the base model and above the MSST under the pessimistic low state of nature model.</td></tr>
<tr><td>Alt. b</td><td>2,500</td><td>2,500</td><td>Constant catch projected to keep the stock above target biomass under the base model.</td></tr>
</table>

Yellowtail Rockfish North of 40º10' N. Latitude

The most recent yellowtail rockfish assessment was done in 2005 for the area north of 40°10' N. latitude to the U.S.-Canada border (Wallace and Lai 2006). The assessment indicated yellowtail rockfish are in a healthy status with an estimated depletion of 55 percent of its initial, unfished biomass at the start of 2005.

The 2013 and 2014 yellowtail rockfish OFLs are projected from the 2005 assessment using the proxy $F_{50\%}$ harvest rate used to estimate the MSY harvest level for rockfish. The 2013 and 2014 ABCs are based on applying a P* of 0.45 to the sigma of 0.36 derived for category 1 stocks, resulting in a 4.4 percent reduction of the OFL to account for the scientific uncertainty in estimating these OFLs. The preferred 2013 and 2014 ACLs of 4,378 mt and 4,382 mt, respectively are based on setting ACLs equal to the ABCs (Table 2-39), which was the basis for setting the 2012 ACL. The stock is projected to remain healthy while accommodating the current level of catch.

Table 2-39. Preferred harvest specifications (mt) for yellowtail rockfish occurring north of 40°10’ N. latitude.

Alternative Harvest Specifications	OFL		ABC		ACL		Basis for ACL
	2013	2014	2013	2014	2013	2014	
Preferred Alt.	4,579	4,584	4,378	4,382	4,378	4,382	ACL is set equal to the ABC.

2.1.3.3 Annual Catch Limits for Stock Complexes

There are eight stock complexes for which 2012 ACLs are specified under the No Action Alternative and under the preferred 2013 and 2014 ACL alternative. These complexes are the Minor Nearshore, Shelf, and Slope Rockfish complexes north and south of 40°10’ N. latitude, the Other Flatfish, and the Other Fish complexes.

Most of the component stocks comprising the stock complexes are unassessed category 3 stocks with OFLs that are determined using data-poor methods such as DBSRA, DCAC, or average historical catch (see Section 2.1.1). While OFL estimates should not vary from year to year for these stocks, a bias in the DBSRA and DCAC estimates used to inform the 2011 and 2012 OFLs for many of the category 3 stocks was discovered at the April 2011 Data-Limited Methods Review workshop (see “Assessment Methods for Data-limited Stocks – Report of the Review Panel Meeting” available at http://www.pcouncil.org/resources/archives/briefing-books/june-2011-briefing-book/#groundfish/Agenda Item E.2.a, Attachment 6). The bias was corrected in the 2013 and 2014 OFL estimates derived using DBSRA and DCAC, and these OFLs tended to be lower than those used to inform the No Action 2012 OFLs (Table 2-3). In cases where assessments were used to inform OFLs for component stocks managed in stock complexes, the OFLs were projected from those assessments using proxy F_{MSY} harvest rates. Preferred 2013 and 2014 OFLs for stock complexes were derived as the summed contribution of OFLs of component stocks. Preferred 2013 and 2014 ABCs for stock complexes were derived as the summed contribution of ABCs of component stocks using the sigmas and stock categories recommended by the SSC and the P* values recommended by the Council. The preferred 2013 and 2014 ACLs are less than or equal to the summed ABC contribution of each component stock in each complex. Only one ACL alternative is analyzed for the stock complexes with no difference in 2013-2014 ACLs relative to the No Action 2012 ACLs for the Minor Shelf Rockfish North, Minor Slope Rockfish North, Minor Nearshore Rockfish South, Minor Shelf Rockfish South, and Other Flatfish complexes. Minor differences between the No Action 2012 ACLs and the preferred 2013-2014 ACLs exist for the Minor Nearshore Rockfish North and Minor Slope Rockfish South complexes. A reduction in the Other Fish complex ACL is proposed due to a change in policy for setting harvest specifications for this complex.

The following sections describe each complex, the component stocks for each complex, and the basis for preferred ACLs.

Minor Nearshore Rockfish North of 40°10' N. Latitude

The Minor Nearshore Rockfish complex north of 40°10' N. latitude is composed of the following species: black and yellow rockfish (*Sebastes 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*). With the exception of the portion of the blue rockfish stock occurring in waters off California (i.e., 40°10' N. latitude to the California-Oregon border at 42° N. latitude), the component species of the Minor Nearshore Rockfish North complex are all unassessed category 3 species. The portion of the blue rockfish stock off California is rated as a category 2 stock on the basis of the relatively data-limited assessment conducted in 2007 (Key*, et al.* 2008).

The complex OFL for 2013 and 2014 is the summed contribution of the OFLs estimated for the component stocks that were derived using the data-limited methods described above, except for blue rockfish off California where the OFL contribution was projected from the 2007 assessment using the $F_{50\%}$ F_{MSY} proxy harvest rate and apportioning 12.7 percent of the OFL based on average catches of the assessed stock north of 40°10' N. latitude. The preferred 2013 and 2014 complex ABC is the summed contribution of the component stocks' ABCs using the SSC-recommended stock categories (and associated sigmas) and a P* of 0.45 (see Section 2.1.2). The basis for deciding these ABCs is the same as that used to derive the 2012 No Action ABC for the complex. The preferred 2013 and 2014 complex ACL is set equal to the ABC. The resulting 2013 and 2014 ACL for the Minor Nearshore Rockfish North complex is approximately 15 percent less than the complex OFL (Table 2-40).

Table 2-40. Preferred harvest specifications (mt) for the Minor Nearshore Rockfish complex north of 40°10' N. latitude.

Stock Complex and Component Stocks	OFL		ABC		ACL	
	2013	2014	2013	2014	2013	2014
Minor Nearshore Rockfish North	110	110	94	94	94	94
Black and yellow	*0.0*	*0.0*	*0.0*	*0.0*		
Blue (CA)	*27.4*	*27.4*	*25.0*	*25.0*		
Blue (OR & WA)	*32.3*	*32.3*	*26.9*	*26.9*		
Brown	*5.5*	*5.5*	*4.6*	*4.6*		
Calico	*0.0*	*0.0*	*0.0*	*0.0*		
China	*9.8*	*9.8*	*8.2*	*8.2*		
Copper	*26.0*	*26.0*	*21.6*	*21.6*		
Gopher	*0.0*	*0.0*	*0.0*	*0.0*		
Grass	*0.7*	*0.7*	*0.5*	*0.5*		
Kelp	*0.0*	*0.0*	*0.0*	*0.0*		
Olive	*0.3*	*0.3*	*0.3*	*0.3*		
Quillback	*7.4*	*7.4*	*6.2*	*6.2*		
Treefish	*0.2*	*0.2*	*0.2*	*0.2*		

Minor Shelf Rockfish North of 40°10’ N. Latitude

The Minor Shelf Rockfish complex north of 40°10' N. latitude is comprised of the following species: bronzespotted rockfish (*Sebastes gilli*); bocaccio (*Sebastes paucispinis*); chameleon rockfish (*S. phillipsi*); 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*). With the exception of chilipepper rockfish, which was assessed in 2007 (Field 2008); greenstriped rockfish, which was assessed in 2009 (Hicks, *et al.* 2009); and greenspotted rockfish off California, which was assessed in 2011 (Dick, *et al.* 2011), the Minor Shelf Rockfish North complex consists of unassessed stocks.

The 2013 and 2014 OFL contribution of chilipepper rockfish to the Minor Shelf Rockfish North complex is 7 percent of the projected OFLs from the 2007 assessment using the $F_{50\%}$ F_{MSY} proxy harvest rate (see Section 2.1.3.1).

The greenstriped assessment was a coastwide assessment, and the harvest specifications were apportioned using the mean of the 2003-2008 swept area biomass estimates north of 40°10’ N. latitude (84.5 percent) from the NMFS trawl survey. For the 2011-2012 management cycle, the Council recommended continuing to manage greenstriped rockfish within the Minor Shelf Rockfish complexes due to the complications associated with managing this species with IFQs. Species pulled out of a complex managed with IFQs must be converted into an IFQ management unit under the Amendment 20 rules. Greenstriped rockfish is a trawl-dominant bycatch species that is rarely landed due to their diminutive size and low market desirability. An initial allocation of quota share for greenstriped would be less than straightforward given the unreliable catch history. The SSC rated the greenstriped stock as category 2 on the basis of the very uncertain catch history in the 2009 assessment that prevented the estimation of discrete year classes.

The new greenspotted rockfish assessment done for the portion of the stock off California was modeled as two area assessments north and south of Point Conception at 34º27’ N. latitude. The assessment indicates the stock is in the precautionary zone with spawning biomass depletions of 30.6 percent and 37.4 percent for the stocks north and south of Point Conception, respectively. The stocks have shown substantial biomass increases since implementation of the RCAs in 2003. Shelf rockfish are particularly well-protected by the RCAs, and greenspotted rockfish catches have been negligible since 2003. The Council recommends continuing to manage greenspotted rockfish within the Minor Shelf Rockfish complexes since catch histories are too uncertain to allocate QS in the IFQ fishery. The OFL contribution of greenspotted rockfish to the Minor Shelf Rockfish North complex was based on apportioning 22.2 percent of the projected OFLs from the assessment for the stock north of Point Conception, which is the average estimated catch proportion in the assessment for the stock occurring in the area between 40°10’ N. latitude and the California-Oregon border at 42° N. latitude. The OFL contribution for the portion of the stock occurring north of 42° N. latitude was derived using DBSRA. The SSC categorized the assessed portion of the stock as a category 2 stock since recruitments were not estimated. The unassessed portion of the stock was categorized as a category 3 stock.

The complex OFLs for 2013 and 2014 are the summed contribution of the OFLs estimated for the component stocks that were derived using the data-limited methods for unassessed stocks and the assessments for chilipepper, greenstriped and greenspotted rockfish described above. The preferred 2013 and 2014 complex ABCs are the summed contribution of the component stocks' ABCs using the SSC-recommended stock categories (and associated sigmas) and a P* of 0.45 (see Section 2.1.2). The basis for deciding these ABCs is the same as that used to derive the 2012 No Action ABC for the complex. The preferred 2013 and 2014 ACLs for the Minor Shelf Rockfish North complex of 968 mt is the same as the No Action 2012 ACL and is less than the preferred ABC for the complex. The resulting ACLs for Minor Shelf Rockfish North represent a 56 percent reduction from the OFLs (Table 2-41).

Table 2-41. Preferred harvest specifications (mt) for the Minor Shelf Rockfish complex north of 40°10' N. latitude.

Stock Complex and Component Stocks	OFL		ABC		ACL	
	2013	2014	2013	2014	2013	2014
Minor Shelf Rockfish North	2,183	2,195	1,920	1,932	968	968
Bronzespotted	*0.0*	*0.0*	*0.0*	*0.0*		
Bocaccio	*284.0*	*284.0*	*236.9*	*236.9*		
Chameleon	*0.0*	*0.0*	*0.0*	*0.0*		
Chilipepper	*133.1*	*129.6*	*111.0*	*108.1*		
Cowcod	*0.0*	*0.0*	*0.0*	*0.0*		
Dusky	*a/*	*a/*	*a/*	*a/*		
Dwarf-red	*a/*	*a/*	*a/*	*a/*		
Flag	*0.1*	*0.1*	*0.1*	*0.1*		
Freckled	*0.0*	*0.0*	*0.0*	*0.0*		
Greenblotched	*1.3*	*1.3*	*1.1*	*1.1*		
Greenspotted 40°10' to 42° N. latitude	***9.4***	***9.4***	***9***	***9***		
Greenspotted N. of 42° N. latitude (OR & WA)	*6.1*	*6.1*	*5.1*	*5.1*		
Greenstriped	*1,252.3*	*1,268.3*	*1,143*	*1,158*		
Halfbanded	*0.0*	*0.0*	*0.0*	*0.0*		
Harlequin	*0.0*	*0.0*	*0.0*	*0.0*		
Honeycomb	*0.0*	*0.0*	*0.0*	*0.0*		
Mexican	*0.0*	*0.0*	*0.0*	*0.0*		
Pink	*0.0*	*0.0*	*0.0*	*0.0*		
Pinkrose	*0.0*	*0.0*	*0.0*	*0.0*		
Puget Sound	*0.0*	*0.0*	*0.0*	*0.0*		
Pygmy	*0.0*	*0.0*	*0.0*	*0.0*		
Redstripe	*269.9*	*269.9*	*225.1*	*225.1*		
Rosethorn	*12.9*	*12.9*	*10.8*	*10.8*		
Rosy	*3.0*	*3.0*	*2.5*	*2.5*		
Silvergray	*159.4*	*159.4*	*133.0*	*133.0*		
Speckled	*0.2*	*0.2*	*0.1*	*0.1*		
Squarespot	*0.2*	*0.2*	*0.1*	*0.1*		
Starry	*0.0*	*0.0*	*0.0*	*0.0*		
Stripetail	*40.4*	*40.4*	*33.7*	*33.7*		
Swordspine	*0.0*	*0.0*	*0.0*	*0.0*		
Tiger	*1.0*	*1.0*	*0.8*	*0.8*		
Vermilion	*9.7*	*9.7*	*8.1*	*8.1*		

a/ The SSC did not recommend OFLs or ABCs for these stocks.

Minor Slope Rockfish North of 40°10’ N. Latitude

The Minor Slope Rockfish complex north of 40°10' N. latitude is comprised of the following species: aurora rockfish (*Sebastes 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*).

These are all unassessed species except for splitnose rockfish, which was assessed in 2009 (Gertseva, *et al.* 2009). Splitnose rockfish have been managed with stock-specific harvest specifications south of 40°10’ N. latitude and within the northern Minor Slope Rockfish complex north of 40°10’ N. latitude. The Council recommended that splitnose rockfish continue to be managed with stock-specific specifications in the south and under the Minor Slope Rockfish complex in the north. The splitnose rockfish assessment was used as the basis for this species’ contribution to the Minor Slope Rockfish North complex. A north-south apportionment of the splitnose stock was based on the average 1916-2008 assessed area catch, which indicated 64.2 percent of the catch occurred south of 40^{0}10’ N. latitude. Therefore, the remaining 35.8 percent represents the contribution of the splitnose stock to the Minor Slope Rockfish North complex. The Council recommended continuing this management strategy largely due to the implications of determining the uncertain catch history by trawl permit to initially allocate trawl splitnose QS under Amendment 20, since splitnose rockfish are not targeted and predominantly discarded at sea. Therefore, there is very sparse data available to determine catch history. The SSC categorized splitnose rockfish as a category 1 stock since recruitments were estimated in the assessment.

The complex OFLs for 2013 and 2014 are the summed contribution of the OFLs estimated for the component stocks that were derived using the data-limited methods described above, except for splitnose rockfish where the OFL contribution was projected from the 2009 assessment. The preferred 2013 and 2014 complex ABCs are the summed contribution of the component stocks’ ABCs using the SSC-recommended stock categories (and associated sigmas) and a P* of 0.45 (see Section 2.1.2). The basis for deciding these ABCs is the same as that used to derive the 2012 No Action ABCs for the complex. The preferred 2013 and 2014 ACL for Minor Slope Rockfish North of 1,160 mt is the same as the No Action 2012 ACL and less than the preferred ABCs for the complex. The resulting 2013 and 2014 ACL for Minor Slope Rockfish North represent a 24 and 25 percent reduction from the 2013 and 2014 OFLs, respectively (Table 2-42).

Table 2-42. Preferred harvest specifications (mt) for the Minor Slope Rockfish complex north of 40°10’ N. latitude.

Stock Complex and Component Stocks	OFL		ABC		ACL	
	2013	**2014**	**2013**	**2014**	**2013**	**2014**
Minor Slope Rockfish North	1,518	1,553	1,381	1,414	1,160	1,160
Aurora	*15.4*	*15.4*	*12.8*	*12.8*		
Bank	*17.2*	*17.2*	*14.4*	*14.4*		
Blackgill	*4.7*	*4.7*	*3.9*	*3.9*		
Redbanded	*45.3*	*45.3*	*37.7*	*37.7*		
Rougheye	*71.1*	*71.1*	*59.3*	*59.3*		
Sharpchin	*214.5*	*214.5*	*178.9*	*178.9*		
Shortraker	*18.7*	*18.7*	*15.6*	*15.6*		
Splitnose	*939.0*	*974.1*	*897.7*	*931.3*		
Yellowmouth	*192.4*	*192.4*	*160.5*	*160.5*		

Minor Nearshore Rockfish South of 40°10' N. Latitude

The Minor Nearshore Rockfish complex south of 40°10' N. latitude is further subdivided into the following management categories: 1) shallow nearshore rockfish [comprised of black and yellow rockfish (*Sebastes 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*)]. With the exception of the blue rockfish stock occurring in waters off California north of Point Conception (i.e., 34°27' N. latitude to 40°10' N. latitude) and gopher rockfish north of Point Conception (34°27' N. latitude), all of the Minor Nearshore Rockfish South stocks are unassessed. The blue rockfish stock was estimated to be at 29.7 percent of its unfished biomass in 2007; therefore, the stock is considered to be in the precautionary zone. Spawning biomass depletion of gopher rockfish north of Point Conception was estimated to be at 97 percent of its unfished biomass in 2005.

During the 2009 and 2010 biennial specifications process, the Council contemplated removing blue rockfish from the Minor Nearshore Rockfish complexes. Blue rockfish was managed within the Minor Nearshore Rockfish complexes because of scientific uncertainty and management needs, given the interaction of blue rockfish with other nearshore species. When blue rockfish occur offshore they can be targeted separately from other nearshore rockfish, but those that occur inshore mix with other nearshore rockfish stocks. Blue rockfish are managed under the California nearshore management plan which has mandatory sorting requirements for landed catch. Landings are routinely tracked and monitored, thereby reducing management uncertainty. For more efficient state management, blue rockfish remains a component stock within the Minor Nearshore Rockfish complexes. The OFL contribution of blue rockfish is projected from the 2007 assessment (Key, *et al.* 2008) using the proxy $F_{50\%}$ F_{MSY} harvest rate and apportioning 87.3 percent of the OFL based on average catches of the assessed stock south of 40°10' N. latitude. The OFL contribution of blue rockfish south of 34º27' N. latitude is based on DCAC. The assessed portion of the blue rockfish stock is categorized as a category 2 stock, and the unassessed portion south of 34º27' N. latitude is categorized as a category 3 stock.

During the 2007-2008 biennial specifications process, the Council decided to continue managing gopher rockfish within the Minor Nearshore Rockfish South complex since there was adequate resource protection under the California nearshore management plan and managing gopher rockfish with stock-specific harvest specifications could disrupt that plan. The OFL contribution of gopher rockfish north of 34º27' N. latitude is projected from the 2005 assessment (Key, *et al.* 2006) using the proxy $F_{50\%}$ F_{MSY} harvest rate. The OFL contribution of gopher rockfish south of 34º27' N. latitude is based on DCAC. The assessed portion of the gopher rockfish stock is categorized as a category 1 stock and the unassessed portion south of 34º27' N. latitude is categorized as a category 3 stock.

The complex OFLs for 2013 and 2014 are the summed contribution of the OFLs estimated for the component stocks that were derived using the data-limited methods for unassessed stocks and the assessments for blue and gopher rockfish described above. The preferred 2013 and 2014 complex ABCs are the summed contribution of the component stocks' ABCs using the SSC-recommended stock categories (and associated sigmas) and a P* of 0.45 (see Section 2.1.2). The basis for deciding these ABCs is the same as that used to derive the 2012 No Action ABC for the complex. The preferred 2013 and 2014 ACL for the Minor Nearshore Rockfish South complex of 990 mt is the same as the No Action 2012 ACL and is less than the preferred ABCs for the complex. The resulting ACL for Minor Nearshore Rockfish South represents a 15 percent reduction from the OFLs (Table 2-43).

Table 2-43. Preferred harvest specifications (mt) for the Minor Nearshore Rockfish complex south of 40°10' N. latitude.

Stock Complex and Component Stocks	OFL		ABC		ACL	
	2013	2014	2013	2014	2013	2014
Minor Nearshore Rockfish South	1,164	1,160	1,005	1,001	990	990
Shallow Nearshore Species	*NA*	*NA*	*NA*	*NA*		
Black and yellow	*27.5*	*27.5*	*23.0*	*23.0*		
China	*16.6*	*16.6*	*13.8*	*13.8*		
Gopher (N. of Point Conception)	*157.0*	*153.0*	*150.1*	*146.3*		
Gopher (S. of Point Conception)	*25.6*	*25.6*	*21.4*	*21.4*		
Grass	*59.6*	*59.6*	*49.7*	*49.7*		
Kelp	*27.7*	*27.7*	*23.1*	*23.1*		
Deeper Nearshore Species	*NA*	*NA*	*NA*	*NA*		
Blue (assessed area)	*187.8*	*187.8*	*171.4*	*171.4*		
Blue (S. of 34°27' N. latitude)	*72.9*	*72.9*	*60.8*	*60.8*		
Brown	*204.6*	*204.6*	*170.6*	*170.6*		
Calico	*0.0*	*0.0*	*0.0*	*0.0*		
Copper	*141.5*	*141.5*	*118.0*	*118.0*		
Olive	*224.6*	*224.6*	*187.4*	*187.4*		
Quillback	*5.4*	*5.4*	*4.5*	*4.5*		
Treefish	*13.2*	*13.2*	*11.0*	*11.0*		

Minor Shelf Rockfish South of 40°10' N. Latitude

The Minor Shelf Rockfish complex south of 40°10' N. latitude is composed of the following species: bronzespotted rockfish (*Sebastes 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*). With the exception of greenstriped rockfish, which was assessed in 2009 (Hicks, *et al.* 2009) and greenspotted rockfish, which was newly assessed in 2011 (Dick, *et al.* 2011), none of the Minor Shelf Rockfish South stocks have been assessed.

The Council recommended continuing to manage greenstriped rockfish within the Minor Shelf Rockfish complexes due to the complications associated with managing this species with IFQs. Species pulled out of a complex managed with IFQs must be converted into an IFQ management unit under the Amendment 20 rules. Greenstriped rockfish is a trawl-dominant bycatch species that is rarely landed due to their diminutive size and low market desirability. An initial allocation of quota share for greenstriped would be less than straightforward, given the unreliable catch history. The 2013 and 2014 OFL contributions from greenstriped rockfish were projected from the 2009 assessment using the proxy $F_{50\%}$ F_{MSY} harvest rate and apportioned using the mean of the 2003-2008 swept area biomass estimates south of 40°10' N. latitude (15.5 percent) from the NMFS trawl survey. The greenstriped rockfish stock is recommended as a category 2 stock based on relatively high assessment uncertainty due to uncertain estimates of historical discards.

The new greenspotted rockfish assessment done for the portion of the stock off California was modeled as two area assessments north and south of Point Conception at 34º27’ N. latitude. The assessment indicates the stock is in the precautionary zone with spawning biomass depletions of 30.6 percent and 37.4 percent for the stocks north and south of Point Conception, respectively. The stocks have shown substantial biomass increases since implementation of the RCAs in 2003. Shelf rockfish are particularly well-protected by the RCAs, and greenspotted rockfish catches have been negligible since 2003. The Council recommends continuing to manage greenspotted rockfish within the Minor Shelf Rockfish complexes since catch histories are too uncertain to allocate QS in the IFQ fishery. The OFL contribution of greenspotted rockfish to the Minor Shelf Rockfish South complex was based on apportioning 77.8 percent of the projected OFLs from the assessment for the stock north of Point Conception, which is the average estimated catch proportion in the assessment for the stock occurring in the area between 34º27’ N. latitude and 40°10’ N. latitude. The OFL contributions for the stock occurring south of 34º27’ N. latitude were projected from the assessment using the proxy $F_{50\%}$ harvest rate. The SSC categorized the assessed portion of the stock as a category 2 stock since recruitments were not estimated.

The complex OFLs for 2013 and 2014 are the summed contribution of the OFLs estimated for the component stocks that were derived using the data-limited methods for unassessed stocks and the assessments for greenstriped and greenspotted rockfish described above. The preferred 2013 and 2014 complex ABCs are the summed contribution of the component stocks’ ABCs using the SSC-recommended stock categories (and associated sigmas) and a P* of 0.45 (see Section 2.1.2). The basis for deciding these ABCs is the same as that used to derive the 2012 No Action ABC for the complex. The preferred 2013 and 2014 ACL for the Minor Shelf Rockfish South complex of 714 mt is the same as the No Action 2012 ACL and is less than the preferred ABC for the complex. The resulting ACL for Minor Shelf Rockfish South represents a 63 percent reduction from the OFLs (Table 2-44).

Table 2-44. Preferred harvest specifications (mt) for the Minor Shelf Rockfish complex south of 40°10' N. latitude.

Stock Complex and Component Stocks	OFL		ABC		ACL	
	2013	2014	2013	2014	2013	2014
Minor Shelf Rockfish South	1,910	1,913	1,617	1,620	714	714
Bronzespotted	*3.6*	*3.6*	*3.0*	*3.0*		
Chameleon	*0.0*	*0.0*	*0.0*	*0.0*		
Dusky	*a/*	*a/*	*a/*	*a/*		
Dwarf-red	*a/*	*a/*	*a/*	*a/*		
Flag	*23.4*	*23.4*	*19.5*	*19.5*		
Freckled	*0.0*	*0.0*	*0.0*	*0.0*		
Greenblotched	*23.1*	*23.1*	*19.3*	*19.3*		
Greenspotted	***80.3***	***80.3***	*73.3*	*73.3*		
Greenstriped	*229.7*	*232.7*	*209.7*	*212.4*		
Halfbanded	*0.0*	*0.0*	*0.0*	*0.0*		
Harlequin	*0.0*	*0.0*	*0.0*	*0.0*		
Honeycomb	*9.9*	*9.9*	*8.2*	*8.2*		
Mexican	*5.1*	*5.1*	*4.2*	*4.2*		
Pink	*2.5*	*2.5*	*2.1*	*2.1*		
Pinkrose	*0.0*	*0.0*	*0.0*	*0.0*		
Pygmy	*0.0*	*0.0*	*0.0*	*0.0*		
Redstripe	*0.5*	*0.5*	*0.4*	*0.4*		
Rosethorn	*2.1*	*2.1*	*1.8*	*1.8*		
Rosy	*44.5*	*44.5*	*37.1*	*37.1*		
Silvergray	*0.5*	*0.5*	*0.4*	*0.4*		
Speckled	*39.4*	*39.4*	*32.8*	*32.8*		
Squarespot	*11.1*	*11.1*	*9.2*	*9.2*		
Starry	*62.6*	*62.6*	*52.2*	*52.2*		
Stripetail	*23.6*	*23.6*	*19.7*	*19.7*		
Swordspine	*14.2*	*14.2*	*11.9*	*11.9*		
Tiger	*0.0*	*0.0*	*0.0*	*0.0*		
Vermilion	*269.3*	*269.3*	*224.6*	*224.6*		
Yellowtail	*1,064.4*	*1,064.4*	*887.7*	*887.7*		

a/ The SSC did not recommend OFLs or ABCs for these stocks.

Minor Slope Rockfish South of 40°10' N. Latitude

The Minor Slope Rockfish complex south of 40°10' N. latitude is composed of the following species: aurora rockfish (*Sebastes aurora*), bank rockfish (*S. rufus*), blackgill rockfish (*S. melanostomus*), POP (*S. alutus*), redbanded rockfish (*S. babcocki*), rougheye rockfish (*S. aleutianus*), sharpchin rockfish (*S. zacentrus*), shortraker rockfish (*S. borealis*), and yellowmouth rockfish (*S. reedi*). With the exception of bank rockfish, which was assessed in 2000 (Piner, *et al.* 2000), and blackgill rockfish, which was newly assessed in 2011 (Field and Pearson 2011), none of the Minor Slope Rockfish South stocks have been assessed.

The new blackgill rockfish assessment was done for the stock south of 40°10' N. latitude. Blackgill rockfish spawning biomass depletion was estimated to be 30 percent of its unfished biomass at the start of 2011, which places this stock in the precautionary zone. The Council recommends continuing to manage this stock in the Minor Slope Rockfish South complex and establishing 2013 and 2014 HGs equal to the

40-10 adjusted ACLs calculated for the stock (see Section 2.1.3.3). The blackgill OFL contribution to the 2013 and 2014 complex OFLs are projected from the 2011 assessment using the proxy $F_{50\%}$ F_{MSY} harvest rate. The SSC categorized blackgill rockfish as a category 2 stock since recruitments were not estimated in the new assessment.

The complex OFLs for 2013 and 2014 are the summed contribution of the OFLs estimated for the component stocks that were derived using the data-limited methods for unassessed stocks and the assessments for bank and blackgill rockfish described above. The preferred 2013 and 2014 complex ABCs are the summed contribution of the component stocks' ABCs using the SSC-recommended stock categories (and associated sigmas) and a P* of 0.45 (see Section 2.1.2). The basis for deciding these ABCs is the same as that used to derive the 2012 No Action ABC for the complex. The preferred 2013 and 2014 ACLs for the Minor Slope Rockfish South complex of 618 mt and 622 mt, respectively are equal to the preferred ABCs. These ACLs are slightly lower than the No Action 2012 ACL of 626 mt since the ACLs cannot exceed the ABCs. The resulting ACLs for Minor Slope Rockfish South represent a 9 percent reduction from the OFLs (Table 2-45).

Table 2-45. Preferred harvest specifications (mt) for the Minor Slope Rockfish complex south of 40°10' N. latitude.

Stock Complex and Component Stocks	OFL		ABC		ACL	
	2013	2014	2013	2014	2013	2014
Minor Slope Rockfish South	681	685	618	622	618	622
Aurora	*26.1*	*26.1*	*21.7*	*21.7*		
Bank	*503.2*	*503.2*	*459.4*	*459.4*		
Blackgill	***130.0***	***134.0***	***118.7***	***122.3***		
Pacific ocean perch	*0.0*	*0.0*	*0.0*	*0.0*		
Redbanded	*10.4*	*10.4*	*8.7*	*8.7*		
Rougheye	*0.4*	*0.4*	*0.3*	*0.3*		
Sharpchin	*9.8*	*9.8*	*8.2*	*8.2*		
Shortraker	*0.1*	*0.1*	*0.1*	*0.1*		
Yellowmouth	*0.8*	*0.8*	*0.7*	*0.7*		

Other Flatfish

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

The complex OFL for 2013 and 2014 is the summed contribution of the OFLs estimated for the component stocks that were derived using the data-limited methods for unassessed stocks described above. The preferred 2013 and 2014 complex ABC is the summed contribution of the component stocks' ABCs using the SSC-recommended category 3 for these unassessed stocks, the associated sigma of 1.44, and a P* of 0.4 (see Section 2.1.2). The basis for deciding this ABC is the same as that used to derive the 2012 No Action ABC for the complex. The preferred 2013 and 2014 ACL for the Other Flatfish complex of 4,884 mt is equal to No Action 2012 ACL. This ACL represents a 51 percent reduction from the OFL (Table 2-46). For sanddabs and rex sole, the available trawl survey data and the sizes of selectivity and maturity leads to the assumption that the stocks are above $B_{MSY.}$ The reduction is expected to adequately address management uncertainty.

Table 2-46. Preferred harvest specifications (mt) for the Other Flatfish complex.

Stock Complex and Component Stocks	OFL		ABC		ACL	
	2013	2014	2013	2014	2013	2014
Other Flatfish	10,060	10,060	6,982	6,982	4,884	4,884
Butter sole	*4.6*	*4.6*	*3.2*	*3.2*		
Curlfin sole	*8.2*	*8.2*	*5.7*	*5.7*		
Flathead sole	*35.0*	*35.0*	*24.3*	*24.3*		
Pacific sanddab	*4,801.0*	*4,801.0*	*3,331.9*	*3,331.9*		
Rex sole	*4,371.5*	*4,371.5*	*3,033.8*	*3,033.8*		
Rock sole	*66.7*	*66.7*	*46.3*	*46.3*		
Sand sole	*773.2*	*773.2*	*536.6*	*536.6*		

Other Fish

The Other Fish stock complex contains all the unassessed groundfish FMP species that are neither rockfish (family *Scorpaenidae*) nor flatfish, except for spiny dogfish which was newly assessed in 2011. These species include big skate (*Raja binoculata*), California skate (*Raja inornata*), leopard shark (*Triakis semifasciata*), soupfin shark (*Galeorhinus zyopterus*), spiny dogfish (*Squalus acanthias*), finescale codling (*Antimora microlepis*), Pacific grenadier (*Coryphaenoides acrolepis*), ratfish (*Hydrolagus colliei*), cabezon (*Scorpaenichthys marmoratus*) (off Washington), and kelp greenling (*Hexagrammos decagrammus*).

A new assessment of spiny dogfish was done in 2011 indicating a healthy status with a spawning biomass depletion of 63 percent of its unfished biomass in 2011 (Gertseva and Taylor 2011). The spiny dogfish contribution to the complex 2013 and 2014 OFLs were projected from the new assessment using the proxy $F_{45\%}$ F_{MSY} harvest rate. The SSC categorized the stock as a category 2 stock since recruitments were not estimated.

The Other Fish complex is an aggregation of species with different life history characteristics and depth distributions. The historical catch of many of the component stocks is poorly understood with some stocks missing any record of landings on the west coast. The SSC recommended re-evaluating the formation of this complex for the next management cycle and giving consideration to adding new species related to the component species of the complex into the FMP and re-grouping species with similar vulnerabilities, ecological interactions, and distributions.

The complex OFL for 2013 and 2014 is the summed contribution of the known OFLs estimated for the component stocks that were derived using the data-limited methods for unassessed stocks and the projections from the new spiny dogfish assessment described above. The 2013 and 2014 OFL is biased low since three of the eleven stocks do not contribute an OFL yield due to lack of available catch information and an approved method for calculating an OFL for these stocks. The preferred 2013 and 2014 complex ABC is the summed known contribution of the component stocks' ABCs using the SSC-recommended category 3 for these unassessed stocks, the associated sigma of 1.44, and a P* of 0.4; and a P* of 0.3 applied to the sigma of 0.72 for category 2 stocks to determine the spiny dogfish ABC contribution (see Section 2.1.2). The basis for deciding the 2013 and 2014 ABCs is dramatically different from that used to derive the 2012 No Action ABC for the complex since only the contributions of species with calculated ABCs (based on a positive OFL contribution) are summed to determine the ABCs. The preferred 2013 and 2014 ACLs for the Other Fish complex of 4,717 mt and 4,697 mt, respectively are equal to the preferred 2013 and 2014 ABCs, which are lower than the No Action 2012 ACL of 5,575 mt. These ACLs represent a 31 percent reduction from the OFLs (Table 2-47). The 2013 and 2014 OFLs represent a 39 percent reduction from the No Action OFL of 11,150 mt and the 2013 and 2014 ACLs represent a 39 percent reduction from the No Action ACL.

Table 2-47. Preferred harvest specifications (mt) for the Other Fish complex.

Stock Complex and Component Stocks	OFL a/		ABC a/		ACL	
	2013	2014	2013	2014	2013	2014
Other Fish	6,832	6,802	4,717	4,697	4,717	4,697
Big skate	*458.0*	*458.0*	*317.9*	*317.9*		
Cabezon (WA)	*b/*	*b/*	*b/*	*b/*		
California skate	*86.0*	*86.0*	*59.7*	*59.7*		
Finescale codling	*b/*	*b/*	*b/*	*b/*		
Kelp greenling (CA)	*118.9*	*118.9*	*82.5*	*82.5*		
Kelp greenling (OR & WA)	*b/*	*b/*	*b/*	*b/*		
Leopard shark	*167.1*	*167.1*	*116.0*	*116.0*		
Pacific grenadier	*1,519.0*	*1,519.0*	*1,054.2*	*1,054.2*		
Ratfish	*1,441.0*	*1,441.0*	*1,000.1*	*1,000.1*		
Soupfin shark	*61.6*	*61.6*	*42.8*	*42.8*		
Spiny dogfish	***2,980***	***2,950***	***2,044***	***2,024***		

a/ Values for these specifications are the sum of known contributions of component stocks.
b/ No OFL or ABC contribution for these stocks given the lack of an approved method for estimating the OFL.

2.2 Accountability Measures

Accountability measures, which are also referred to as management measures, are used to meet the goals of the MSA and groundfish FMP, including preventing the ACL from being exceeded and correcting or mitigating overages of the ACL if they occur. For the 2013-14 cycle, the first set of AMs are implemented when deductions from the ACL, also called set-asides, are made to account for groundfish mortality in other sectors. The ACL less the set-asides is called the fishery HG or commercial HG (sablefish north of 36° N. latitude and Pacific whiting), which is the amount available for the sector-specific allocations. Sector allocations include formal long-term allocations (e.g., Amendments 6 and 21) and short-term allocations implemented for the biennial period. Section 2.2 details the proposed set-asides and allocations for 2013-14. Section 2.3 and Section 2.4 details the remaining AMs including groundfish conservation areas (including recreational and commercial area closures), season dates, cumulative landing limits for the commercial fisheries, and bag limits for the recreational fisheries.

2.2.1 Deductions from the ACL

Deductions from most groundfish ACLs are made to account for groundfish mortality in the Pacific Coast treaty Indian tribal fisheries, scientific research, nongroundfish target fisheries (hereinafter incidental open access fisheries), and, as necessary, EFPs. Set-asides from the sablefish north of 36° N. latitude ACL are slightly different due to the sablefish allocation framework (see Section 2.2.2.1, Amendment 6). Set-asides from the sablefish north of 36° N. latitude ACL include groundfish mortality in tribal fisheries, research, recreational fisheries, and EFPs. The Council and NMFS do not have direct management control over these activities, except for EFPs and recreational fisheries. While NMFS has direct control over the terms and conditions of the EFP permits and recreational fishery management, sufficient yield set-aside must be available to accommodate the anticipated groundfish impacts. Deductions from the ACL to account for these activities are important accountability measures that increase the probability that catches will remain below the ACLs.

If the Council discovers that groundfish mortality in tribal fisheries, scientific research, nongroundfish fisheries, recreational fisheries (sablefish only), and EFPs is higher than estimated during the biennial process, inseason adjustments to management measures may be needed. A wide range of management measure adjustments can be considered for the nontrawl sector (e.g., bag limits, trip limits, season dates), however, limited adjustments can be made in the trawl sector since quota pounds (QP) for the year have already been issued.

Under the No Action Alternative, if the deductions from the ACL are higher than actual mortality, unused portions of the set-aside could allow management measures in the nontrawl fisheries to be adjusted through inseason action to allow for harvest that attains the fishery HGs and ultimately the ACLs. Under No Action, additional catch cannot be reassigned to the trawl sector without recalculating QP for the year, an action which is not considered routine. A proposed action for 2013-2014 would allow the ACL set-asides to be redistributed to the trawl and nontrawl sectors in the event that the amounts set aside are higher than necessary to accommodate groundfish mortality in research, EFP, and incidental open access fisheries (Section 2.3.2). Any amount available for reapportionment would be reapportioned to the sectors in proportion to the original allocations for the calendar year, modified to account for Council recommendations with respect to reapportionment to: 1) sectors that are closed, 2) for reapportionments after September 1 in the IFQ sector, and 3) sectors for which catch of the species to be reapportioned would not be projected to be reached. Table 2-48 and Table 2-49 detail the deductions from the preferred ACLs for the 2013-14 cycle, which were used in the analysis of the Preferred Alternative.[17] The ACLs for canary and POP vary between the integrated alternatives (see Section 2.4); however, the set-aside values remain constant. The set-asides for sablefish north of 36° N. latitude are outlined in Table 2-50 and were also used in the analysis of the integrated alternatives. The approach used to calculate appropriate set-asides is similar to the approach used in 2011-2012 (No Action). A brief summary of the calculations behind the set-asides follows below.

2.2.1.1 Tribal Fishery Set-Asides

Tribal fisheries consist of trawl (bottom, mid-water, and whiting), fixed gear, and troll. The requested tribal set-asides are based on the amounts in the January 1, 2012 regulations updated with tribal requests (see Agenda Item E.4.b, Supplemental Tribal Report, November 2011, Agenda Item I.3.b, Supplemental Tribal Report, April 2012, and Agenda Item D.5.b, Supplemental Makah Report, June 2012).

2.2.1.2 Research Set-Asides

Research activities include the NMFS trawl survey, International Pacific Halibut Commission longline survey, and other Federal and state research. The Council approach is that set-asides should be equal to the maximum historical scientific research catch from 2005-2010, except for canary rockfish and yelloweye rockfish. The maximum historical catch for canary rockfish was considered a rare event and therefore not used. The yelloweye rockfish set-aside was set higher than the historical maximum to accommodate anticipated research.

As stated above, the Council policy for canary and yelloweye rockfish was not based on the maximum historical value. The Council considered the high canary rockfish research catches of 7.2 mt in 2006 a

[17] Set-asides for the Preferred Alternative were updated at the June 2012 Council meeting, based on best available information, and differ from Alternatives 1-8. The set-asides used in Alternatives 1-8 can be found in the DEIS, Tables 2-48 and 2-49. The differences between the set-asides under the Preferred Alternative and Alternatives 1-8 are small, except the tribal set-asides for petrale sole (from 45.4 to 220 mt) and yellowtail rockfish (490 to 677 mt).

rare event. The largest catches came from the NMFS trawl survey, and surveys in later years encountered substantially less canary. The Council adopted a 4.5 mt canary rockfish set-aside, which is higher than the average research catch from 2005-2010. For yelloweye rockfish, the Council adopted a 3.3 mt research set-aside based on anticipated research needs of the International Pacific Halibut Commission (1.1 mt), Washington Department of Fish and Wildlife (1 mt), Oregon Department of Fish & Wildlife (1 mt), and other projects (0.2 mt).

2.2.1.3 Incidental Open Access Set-Asides

Deductions from ACLs are made to account for groundfish mortality in the incidental open access fisheries. The set-asides for all species, except longnose skate, were derived from the maximum historical values in the 2007-2010 WCGOP Total Mortality reports. The recommended set-aside for longnose skate was based on data from the 2009 and 2010 Total Mortality reports, the years in which longnose skate were reported separately from the Other Fish category.

2.2.1.4 EFP Set-Asides

The Council recommended three EFPs and associated set-asides for 2013-2014. The first EFP seeks to test the effectiveness of trolled longline gear to selectively harvest chilipepper rockfish in waters off central California (Agenda Item E.3.a, Attachment 1, November 2011). The second EFP seeks to test the effectiveness of vertical hook-and-line gear to selectively harvest midwater species such as yellowtail rockfish (Agenda Item E.3.a, Attachment 2, November 2011). The third EFP seeks to survey the distribution and size of overfished species in the Rockfish Conservation Area (RCA) off the central coast of California using hook-and-line and trap gear (Agenda Item E.3.a, Attachment 3, November 2011). No total catch limits or yield set-asides are required for the third EFP since those catches will be covered using QP allocated in the shorebased IFQ fishery or trip limits for non-IFQ species.

2.2.1.5 Recreational (Sablefish north of 36° N. latitude only)

The allocation framework for sablefish north of 36° N. latitude specifies that anticipated recreational catches of sablefish be deducted from the ACL prior to the commercial limited entry and open access allocations. For 2013-2014, the set-aside is the maximum historical value from recreational fisheries from 2004-2011 (Table 2-50).

Table 2-48. 2013 preferred ACLs and estimates of tribal (Trib), EFP, research (Res.), and incidental open access (OA) groundfish mortality in metric tons, used to calculate the fishery harvest guideline, under all integrated alternatives.

Species	Area	ACL	Trib.	EFP	Res.	OA	Fishery HG
Arrowtooth flounder	Coastwide	6,157	2,041	0	16.4	30	4,069.6
Black	N of 46º16' N. lat.	411	14	0	0	0	397.0
Black	S of 46º16' N. lat.	1,000	0	0	0	0	1,000.0
Bocaccio	S of 40º10' N. lat.	320	0	6	1.7	0.7	311.6
Cabezon	46º16' to 42º N. lat.	47	0	0	0	0	47.0
Cabezon	S of 42º N. lat.	163	0	0	0	0	163.0
California scorpionfish	S of 34°27' N. lat.	120	0	0	0	2	118.0
Canary rockfish	Coastwide	116	9.5	1.5	4.5	2	98.5
Chilipepper	S of 40º10' N. lat.	1,690	0	210	9	5	1,466.0
Cowcod	S of 40º10' N. lat.	3	0	0	0.1	0	2.9
Darkblotched rockfish	Coastwide	317	0.1	0.2	2.1	18.4	296.2
Dover sole	Coastwide	25,000	1,497	0	38	55	23,410.0
English sole	Coastwide	6,815	91	0	5	7	6,712.0
Lingcod	N of 40'10º N. lat.	3,036	250	0	11.7	16	2,758.3
Lingcod	S of 40'10º N. lat.	1,111	0	2	0	7	1,102.0
Longnose skate	Coastwide	2,000	56	0	13.2	3	1,927.8
Longspine thornyhead	N of 34º27' N. lat.	2,009	30	0	13	3	1,963.0
Longspine thornyhead	S of 34º27' N. lat.	356	0	0	1	2	353.0
Minor nearshore rockfish	N of 40º10' N. lat.	94	0	0	0	0	94.0
Minor nearshore rockfish	S of 40º10' N. lat.	990	0	0	0	0	990.0
Minor shelf rockfish north	N of 40º10' N. lat.	968	30	3	6.2	26	902.8
Minor shelf rockfish south	S of 40º10' N. lat.	714	0	31	6	9	668.0
Minor slope rockfish north	N of 40º10' N. lat.	1,160	36	1	6	19	1,098.0
Minor slope rockfish south	S of 40º10' N. lat.	618	0	2	2	17	597.0
Other fish	Coastwide	4,717	111.8	3	12.5	49.53	4,540.2
Other flatfish	Coastwide	4,884	60	0	17	125	4,682.0
Pacific cod	Coastwide	1,600	400	0	7.04	2	1,191.0
Pacific whiting	Coastwide		TBD	2	133	2,000	TBD
Petrale sole	Coastwide	2,592	220	0	11.6	2.4	2,358.0
POP	Coastwide	150	10.9	0	5.2	0.4	133.5
Sablefish	N of 36º N. lat.	See Table 2-50					
Sablefish	S of 36º N. lat.	1,439	0	0	3	2	1,434.0
Shortbelly	Coastwide	50	0	0	2	0	48.0
Shortspine thornyhead	N of 34º27' N. lat.	1,540	50	0	7.2	2	1,480.8
Shortspine thornyhead	S of 34º27' N. lat.	397	0	0	1	41	355.0
Splitnose	S of 40º10' N. lat.	1,610	0	3	9	0	1,598.0
Starry flounder	Coastwide	1,520	2	0	0	5	1,513.0
Widow	Coastwide	1,500	60	18	7.9	3.3	1,410.8
Yelloweye rockfish	Coastwide	18	2.3	0.02	3.3	0.2	12.2
Yellowtail	N of 40º10' N. lat.	4,378	677	10	11.5	3	3,676.5

Table 2-49. 2014 preferred ACLs and estimates of tribal (Trib.), EFP, research (Res.), and incidental open access (OA) groundfish mortality, used to calculate the fishery harvest guideline, under all integrated alternatives.

Species	Area	ACL	Trib.	EFP	Res.	OA	Fishery HG
Arrowtooth flounder	Coastwide	5,758.0	2,041.0	0.0	16.4	30.0	3,670.6
Black	N of 46º16' N. lat.	409.0	14.0	0.0	0.0	0.0	395.0
Black	S of 46º16' N. lat.	1,000.0	0.0	0.0	0.0	0.0	1,000.0
Bocaccio	S of 40º10' N. lat.	337.0	0.0	6.0	1.7	0.7	328.6
Cabezon	46º16' to 42º N. lat.	47.0	0.0	0.0	0.0	0.0	47.0
Cabezon	S of 42º N. lat.	158.0	0.0	0.0	0.0	0.0	158.0
California scorpionfish	S of 34°27' N. lat.	117.0	0.0	0.0	0.0	2.0	115.0
Canary rockfish	Coastwide	119.0	9.5	1.5	4.5	2.0	101.5
Chilipepper	S of 40º10' N. lat.	1,647.0	0.0	210.0	9.0	5.0	1,423.0
Cowcod	S of 40º10' N. lat.	3.0	0.0	0.0	0.1	0.0	2.9
Darkblotched rockfish	Coastwide	330.0	0.1	0.2	2.1	18.4	309.2
Dover sole	Coastwide	25,000	1,497.0	0.0	38.0	55.0	2,3410.0
English sole	Coastwide	5,646.0	91.0	0.0	5.0	7.0	5,543.0
Lingcod	N of 40'10º N. lat.	2,878.0	250.0	0.0	11.7	16.0	2,600.3
Lingcod	S of 40'10º N. lat.	1,063.0	0.0	2.0	0.0	7.0	1,054.0
Longnose skate	Coastwide	2,000.0	56.0	0.0	13.2	3.0	1,927.8
Longspine thornyhead	N of 34º27' N. lat.	1,958.0	30.0	0.0	13.0	3.0	1,912.0
Longspine thornyhead	S of 34º27' N. lat.	347.0	0.0	0.0	1.0	2.0	344.0
Minor nearshore rockfish	N of 40º10' N. lat.	94.0	0.0	0.0	0.0	0.0	94.0
Minor nearshore rockfish	S of 40º10' N. lat.	990.0	0.0	0.0	0.0	0.0	990.0
Minor shelf rockfish north	N of 40º10' N. lat.	968.0	30.0	3.0	6.2	26.0	902.8
Minor shelf rockfish south	S of 40º10' N. lat.	714.0	0.0	31.0	6.0	9.0	668.0
Minor slope rockfish north	N of 40º10' N. lat.	1,160.0	36.0	1.0	6.0	19.0	1098.0
Minor slope rockfish south	S of 40º10' N. lat.	622.0	0.0	2.0	2.0	17.0	601.0
Other fish	Coastwide	4,697.0	111.8	3.0	12.5	49.5	4,520.2
Other flatfish	Coastwide	4,884.0	60.0	0.0	17.0	125.0	4,682.0
Pacific cod	Coastwide	1,600.0	400.0	0.0	7.0	2.0	1,191.0
Pacific whiting	Coastwide	TBD	TBD	2.0	133.0	2,000	TBD
Petrale sole	Coastwide	2,652.0	220.0	0.0	11.6	2.4	2,418.0
POP	Coastwide	153.0	10.9	0.0	5.2	0.4	136.5
Sablefish	N of 36º N. lat.	See Table 2-50					
Sablefish	S of 36º N. lat.	1,560.0	0.0	0.0	3.0	2.0	1,555.0
Shortbelly	Coastwide	50.0	0.0	0.0	2.0	0.0	48.0
Shortspine thornyhead	N of 34º27' N. lat.	1,525.0	50.0	0.0	7.2	2.0	1,465.8
Shortspine thornyhead	S of 34º27' N. lat.	393.0	0.0	0.0	1.0	41.0	351.0
Splitnose	S of 40º10' N. lat.	1,670.0	0.0	3.0	9.0	0.0	1,658.0
Starry flounder	Coastwide	1,528.0	2.0	0.0	0.0	5.0	1,521.0
Widow	Coastwide	1,500.0	60.0	18.0	7.9	3.3	1,410.8
Yelloweye rockfish	Coastwide	18.0	2.3	0.0	3.3	0.2	12.2
Yellowtail	N of 40º10' N. lat.	4,382.0	677.0	10.0	11.5	3.0	3,680.5

Table 2-50. Sablefish ACLs and estimates of tribal, research, recreational, and EFPs mortality in metric tons used to calculate the commercial harvest guideline, under all integrated alternatives.

Year	ACL	Tribal	Research	Recreational	EFP	Commercial HG
2013	4,012	401	26	6.1	4	3,575
2014	4,349	435	26	6.1	4	3,878

2.2.2 Allocations

The fishery HGs (Table 2-48 and Table 2-49) for most species are further allocated between the trawl and nontrawl fisheries. The trawl and nontrawl allocations are based on the percentages adopted under Amendment 21 to the groundfish FMP or decided during the 2013-14 biennium. Sablefish north of 36° N. latitude is allocated under the Amendment 6 framework, which allocates the commercial HG (Table 2-50) between the limited entry (trawl and fixed gear) and open access sectors. Further, the FMP outlines criteria for allocating Pacific whiting, darkblotched, POP, and widow between the shorebased IFQ, catcher-processor, and mothership sectors. For some species, no allocations are necessary since ACL attainment has historically been low due to the lack of market demand, limited access as a result of the RCA configurations, or the need to limit overfished species interactions. Further, some species are managed and allocated by the west coast states (e.g., nearshore species).

For any stock that has been declared overfished, the formal trawl/nontrawl and open access/limited entry allocation established under provisions of the FMP and regulations (50 CFR 660.50) may be temporarily revised for the duration of the rebuilding period. Details of formal allocations that are temporarily suspended are detailed in the following sections.

2.2.2.1 Long-Term Allocations

Amendment 6

Amendment 6, established allocation procedures in the FMP between the open access (including directed and incidental open access) and limited entry sectors. Amendment 21-1 modified the list of species subject to Amendment 6 allocations. The species and complexes that continue to have open access and limited entry allocations, unless modified by the biennial actions, are found in Table 2-51. The species that comprise the nearshore and shelf complexes are outlined in Chapter 2.1, Table 2-40, Table 2-41, Table 2-43, and Table 2-44.

The limited entry and open access allocations for bocaccio, canary, cowcod, and yelloweye are temporarily suspended since the stocks are overfished. Further, the shelf rockfish allocations are suspended since access is limited by RCAs and the need to limit overfished species catches. Nearshore rockfish allocations are also suspended due to overfished species constraints. As such, the Council adopted two-year allocations, except for nearshore rockfish, which are described in Section 2.2.2.2. The nearshore rockfish complex is managed by the west coast states which implement allocations through state regulations.

Detailed descriptions of the allocations for sablefish north of 36° north latitude can be found in Chapter 6 of the FMP. Table 2-52 to Table 2-57 detail the sablefish allocations calculations for use in the 2013-2014 cycle.

Table 2-51. Limited entry and open access allocations established by FMP Amendment 6.

Stock or Stock Complex	Limited Entry Share	Open Access Share
Nearshore and Shelf Rockfish North of 40°10 N. latitude	91.7%	8.3%
Nearshore and Shelf Rockfish South of 40°10 N. latitude	55.7%	44.3%
Sablefish north of 36° N. latitude	90.6%	9.4%

Table 2-52. Limited entry and open access FMP allocations applied to the 2013-2014 ACLs and resulting commercial harvest guideline for sablefish north of 36° N. latitude (in mt).

			Limited Entry Harvest Guideline		Open Access Harvest Guideline	
Year	**ACL**	**Commercial HG (MT) a/**	%	MT	%	MT
2013	4,012	3,575	90.6%	3,239	9.4%	336
2014	4,349	3,878	90.6%	3,513	9.4%	365

a/ Set-asides from the ACL used to calculate the commercial HG can be found in **Table 2-50**.

Table 2-53. Sablefish north of 36° N. latitude allocations, in metric tons, between limited entry fixed gear and limited entry trawl for 2013-2014.

	Limited Entry HG	Limited Entry Fixed Gear		Limited Entry Trawl	
Year	MT	%	MT	%	MT
2013	3,239	42%	1,360	58%	1,878
2014	3,513	42%	1,476	58%	2,038

Table 2-54. Sablefish north of 36° N. latitude allocations, in metric tons, within the limited entry fixed gear sector for 2013-2014. The total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

	Limited Entry Fixed Gear			
Year	**Total Catch Share (mt)**	**Landed Catch Share (mt)**	**Primary Season Share (mt)**	**LEFG DTL Share (mt)**
2013	1,360	1,317	1,119	198
2014	1,476	1,429	1,214	214

Table 2-55. Tier limits in pounds for the primary season for sablefish north of 36° N. latitude.

	Limited Entry Fixed Gear			
Year	**Primary Season Share (mt)**	**Tier 1 (lbs)**	**Tier 2 (lbs)**	**Tier 3 (lbs)**
2013	1,119	34,513	15,688	8,964
2014	1,214	37,441	17,019	9,725

Table 2-56. Sablefish north of 36° N. latitude allocations, in metric tons within the limited entry trawl sector for 2013-14.

	Limited Entry Trawl		
Year	**All Trawl (mt)**	**At-sea Whiting (mt)**	**Shorebased IFQ (mt)**
2013	1,878	50	1,828
2014	2,038	50	1,988

Table 2-57. Open access allocations in metric tons for sablefish north of 36° N. latitude allocations for 2013-14. Sablefish mortality in nongroundfish fisheries is accounted for in the incidental OA column. The total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

Year	Open Share (OA) (mt)	Incidental OA Removals (mt)	Directed OA Total Catch Share (mt)	Directed OA Landed Catch Share (mt)
2013	336	17	319	309
2014	365	17	348	336

Amendment 21

Amendment 21 to the FMP specified allocations between the trawl and nontrawl sectors. The trawl allocation improves implementation of the shorebased IFQ and at-sea co-op programs. Long-term, formal allocations are expected to provide more stability to the trawl fishery sectors by reducing the risk of the trawl sector being closed as a result of a nontrawl sector exceeding an allocation or HG (e.g., recreational fisheries).

The Council recommended suspending the FMP allocation of petrale sole (95 percent to trawl and 5 percent to nontrawl) during rebuilding and using a two-year allocation of 35 mt to nontrawl with the remainder allocated to trawl (Table 2-58 and Table 2-59). This same approach was used in 2011-2012. The 35 mt value represents roughly twice the maximum nontrawl catch of petrale from 2004-2008 (see Figure 2 in Agenda Item B.7.b, Supplemental GMT Report, June 2010).

Amendment 21 also specified procedures for Pacific halibut bycatch allocations to the shorebased IFQ fishery. The FMP and regulations sets the trawl bycatch mortality limit at 15 percent of the Area 2A total constant exploitation yield (TCEY) for legal size halibut (net weight), not to exceed 130,000 pounds annually for legal size halibut (net weight) for 2012 through 2014 and, beginning in 2015, not to exceed 100,000 pounds annually for legal size halibut (net weight). Details of the Pacific halibut calculation can be found in 50 CFR 660.55(m). The 2012 Pacific halibut harvest specifications and associated allocations were unavailable at the time the analysis was completed, therefore the analysis of the integrated alternatives uses the 2011 values.

Pacific Whiting

Pacific whiting is managed consistent with the agreement with Canada on Pacific hake/whiting and the Pacific Whiting Act. The Joint Management Committee (U.S. and Canada) recommends the coastwide TAC and corresponding U.S. TAC for Pacific whiting no later than March 25 of each year. Except for establishing the catch level, all other aspects of Pacific whiting management are subject to the MSA. The FMP states that the commercial HG for Pacific whiting is allocated among three sectors, as follows: 42 percent to the shorebased IFQ program, 34 percent for the catcher-processor co-operative program, and 24 percent for the mothership co-operative program. The 2012 Pacific whiting harvest specifications and associated allocations were unavailable at the time the analysis was completed, therefore the analysis of the integrated alternatives uses the 2011 allocations.

2.2.2.2 Short-Term Allocations

Two-year trawl and nontrawl allocations are decided during the biennial process for those species without long-term allocations or species where the long-term allocation is suspended. The preferred ACLs and allocations for species subject to short-term allocations are indicated in Table 2-58 and Table 2-59.

The integrated alternatives explore a range of canary and POP ACLs and allocations which are described by alternative in Section 2.4. Alternatives 1-8 analyzed the No Action cowcod trawl and non-trawl allocation (66 percent trawl and 34 percent non-trawl) and, in Appendix C, an option that reversed the allocation (34 percent trawl and 66 percent non-trawl) was analyzed. The Council's preferred cowcod allocation is 34 percent trawl and 66 percent non-trawl. The rationale for the preferred allocation is that the recreational fishery in California accounts for more than 85 percent of the economic value for the state, while the commercial fishery is approximately 15 percent. Additionally, recent data indicate the non-trawl sector, in particular the recreational fisheries, have a greater risk of exceeding the No Action allocation. There are no proposed changes to management measures or projected mortalities between the No Action and preferred allocations; the higher allocation to the non-trawl sector provides a buffer.

The Council recommended a two-year trawl and nontrawl HG for longnose skate of 90 percent to the trawl fishery and 10 percent to the nontrawl fishery. The allocation percentages reflect historical catch of longnose skate between the two sectors (see Appendix C, Table C-54).

2.2.2.3 Species Without Allocations

Species without trawl and nontrawl or limited entry and open access allocations include: black rockfish, cabezon (Oregon and California), California scorpionfish, longspine thornyhead south of 34° 27' N. latitude, minor nearshore rockfish north and south, shortbelly, and the Other Fish complex, including spiny dogfish. The nearshore species, including nearshore rockfish, are managed and allocated by the west coast states. For the remaining species, ACL attainment has historically been low due to the lack of market demand, limited access as a result of the RCA configurations, or the need to limit overfished species interactions. While there is no need for allocations between sectors, management measures for these species are proposed to keep total catch within the ACL (e.g., trip limits, bag limits, etc.).

Table 2-58. Species-specific fishery harvest guidelines and allocations, in metric tons, for 2013.

Species	Area	Fishery HG	Allocation Type	Trawl %	Trawl Mt	Non-trawl %	Non-trawl Mt
Arrowtooth flounder	Coastwide	4,069.6	Amendment 21	95%	3,866.1	5%	203.5
Black	N of 46º16' N. lat.	397.0	None				
Black	S of 46º16' N. lat.	1,000.0	None				
Bocaccio	S of 40º10' N. lat.	311.6	Biennial	N/A	74.9	N/A	236.7
Cabezon	46º16' to 42º N. lat.	47.0	None				
Cabezon	S of 42º N. lat.	163.0	None				
California scorpionfish	S of 34°27' N. lat.	118.0	None				
Canary rockfish	Coastwide	98.5	Biennial	N/A	52.5	N/A	46.0
Chilipepper	S of 40º10' N. lat.	1,466.0	Amendment 21	75%	1,099.5	25%	366.5
Cowcod	S of 40º10' N. lat.	2.9	Biennial	N/A	1.0	N/A	1.9
Darkblotched rockfish	Coastwide	296.2	Amendment 21	95%	281.4	5%	14.8
Dover sole	Coastwide	23,410.0	Amendment 21	95%	22,239.5	5%	1,170.5
English sole	Coastwide	6,712.0	Amendment 21	95%	6,376.4	5%	335.6
Lingcod	N of 40'10º N. lat.	2,758.3	Amendment 21	45%	1,241.2	55%	1,517.1
Lingcod	S of 40'10º N. lat.	1,102.0	Amendment 21	45%	495.9	55%	606.1
Longnose skate	Coastwide	1,927.8	Amendment 21	90%	1,735.0	10%	192.8
Longspine thornyhead	N of 34º27' N. lat.	1,963.0	Amendment 21	95%	1,864.9	5%	98.2
Longspine thornyhead	S of 34º27' N. lat.	353.0	None				
Minor nearshore rockfish	N of 40º10' N. lat.	94.0	None				
Minor nearshore rockfish	S of 40º10' N. lat.	990.0	None				
Minor shelf rockfish north	N of 40º10' N. lat.	902.8	Biennial	60.2%	543.5	39.8%	359.3
Minor shelf rockfish south	S of 40º10' N. lat.	668.0	Biennial	12.2%	81.5	87.8%	586.5
Minor slope rockfish north	N of 40º10' N. lat.	1,098.0	Amendment 21	81%	889.4	19%	208.6
Minor slope rockfish south	S of 40º10' N. lat.	597.0	Amendment 21	63%	376.1	37%	220.9
Other fish	Coastwide	4,540.2	None				
Other flatfish	Coastwide	4,682.0	Amendment 21	90%	4,213.8	10%	468.2
Pacific cod	Coastwide	1,191.0	Amendment 21	95%	1,131.4	5%	59.5
Pacific whiting	Coastwide	0.0	Amendment 21	100%	0.0	0%	0.0
Petrale sole	Coastwide	2,358.0	Biennial	N/A	2,323.0	N/A	35.0
POP	Coastwide	133.5	Amendment 21	95%	126.8	5%	6.7
Sablefish	N of 36º N. lat.	See Table 2-52 to Table 2-57					
Sablefish	S of 36º N. lat.	1,434.0	Amendment 21	42%	602.3	58%	831.7
Shortbelly	Coastwide	48.0	None		48.0		0.0
Shortspine thornyhead	N of 34º27' N. lat.	1,480.8	Amendment 21	95%	1,406.7	5%	74.0
Shortspine thornyhead	S of 34º27' N. lat.	355.0	Amendment 21	NA	50.0	NA	305.0
Splitnose	S of 40º10' N. lat.	1,598.0	Amendment 21	95%	1,518.1	5%	79.9
Starry flounder	Coastwide	1,513.0	Amendment 21	50%	756.5	50%	756.5
Widow	Coastwide	1,410.8	Amendment 21	91%	1,283.8	9%	127.0
Yelloweye rockfish	Coastwide	12.2	Biennial	N/A	1.0	N/A	11.2
Yellowtail	N of 40º10' N. lat.	3,676.5	Amendment 21	88%	3,235.3	12%	441.2

Table 2-59. Species-specific fishery harvest guidelines and allocations, in metric tons, for 2014. Bolded values indicate updates from the DEIS, published June 15, 2012.

				Trawl		Non-trawl	
Species	Area	Fishery HG	Allocation Type	%	Mt	%	Mt
Arrowtooth flounder	Coastwide	3,670.6	Amendment 21	95%	3,487.1	5%	183.5
Black	N of 46º16' N. lat.	395.0	None				
Black	S of 46º16' N. lat.	1,000.0	None				
Bocaccio	S of 40º10' N. lat.	328.6	Biennial	N/A	79.0	N/A	249.6
Cabezon	46º16' to 42º N. lat.	47.0	None				
Cabezon	S of 42º N. lat.	158.0	None				
California scorpionfish	S of 34°27' N. lat.	115.0	None				
Canary rockfish	Coastwide	101.5	Biennial	N/A	54.1	N/A	47.4
Chilipepper	S of 40º10' N. lat.	1,423.0	Amendment 21	75%	1,067.3	25%	355.8
Cowcod	S of 40º10' N. lat.	2.9	Biennial	N/A	1.0	N/A	1.9
Darkblotched rockfish	Coastwide	309.2	Amendment 21	95%	293.7	5%	15.5
Dover sole	Coastwide	23,410.0	Amendment 21	95%	22,239.5	5%	1,170.5
English sole	Coastwide	5,543.0	Amendment 21	95%	5,265.9	5%	277.2
Lingcod	N of 40'10º N. lat.	2,600.3	Amendment 21	45%	1,170.1	55%	1,430.2
Lingcod	S of 40'10º N. lat.	1,054.0	Amendment 21	45%	474.3	55%	579.7
Longnose skate	Coastwide	1,927.8	Biennial	90%	1,735.0	10%	192.8
Longspine thornyhead	N of 34º27' N. lat.	1,912.0	Amendment 21	95%	1,816.4	5%	95.6
Longspine thornyhead	S of 34º27' N. lat.	344.0	None				
Minor nearshore rockfish	N of 40º10' N. lat.	94.0	None				
Minor nearshore rockfish	S of 40º10' N. lat.	990.0	None				
Minor shelf rockfish north	N of 40º10' N. lat.	902.8	Biennial	60.2%	543.5	39.8%	359.3
Minor shelf rockfish south	S of 40º10' N. lat.	668.0	Biennial	12.2%	81.5	87.8%	586.5
Minor slope rockfish north	N of 40º10' N. lat.	1,098.0	Amendment 21	81%	889.4	19%	208.6
Minor slope rockfish south	S of 40º10' N. lat.	601.0	Amendment 21	63%	378.6	37%	222.4
Other fish	Coastwide	4,520.2	None				
Other flatfish	Coastwide	4,682.0	Amendment 21	90%	4,213.8	10%	468.2
Pacific cod	Coastwide	1,191.0	Amendment 21	95%	1,131.4	5%	59.5
Pacific whiting	Coastwide	TBD	Amendment 21	100%	TBA	0%	TBA
Petrale sole	Coastwide	2,418.0	Biennial	N/A	2383.0	N/A	35.0
POP	Coastwide	136.5	Amendment 21	95%	129.7	5%	6.8
Sablefish	N of 36º N. lat.	0.0	See Table 2-52 to Table 2-57				
Sablefish	S of 36º N. lat.	1,555.0	Amendment 21	42%	653.1	58%	901.9
Shortbelly	Coastwide	48.0	None				
Shortspine thornyhead	N of 34º27' N. lat.	1,465.8	Amendment 21	95%	1,392.5	5%	73.3
Shortspine thornyhead	S of 34º27' N. lat.	351.0	Amendment 21	N/A	50.0	N/A	301.0
Splitnose	S of 40º10' N. lat.	1,658.0	Amendment 21	95%	1,575.1	5%	82.9
Starry flounder	Coastwide	1,521.0	Amendment 21	50%	760.5	50%	760.5
Widow	Coastwide	1,410.8	Amendment 21	91%	1,283.8	9%	127.0
Yelloweye rockfish	Coastwide	12.2	Biennial	N/A	1.0	N/A	11.2
Yellowtail	N of 40º10' N. lat.	3,680.5	Amendment 21	88%	3,238.8	12%	441.7

2.2.3 Within Sector Allocations

2.2.3.1 Within Trawl Allocations

Amendment 21 Within Trawl Allocations

Amendment 21 and implementing regulations specified that the within trawl whiting allocations of darkblotched, POP, and widow would be done pro-rata to the sector's whiting allocation. The whiting allocations are 42 percent to shoreside, 34 percent to the catcher-processor, and 24 percent to the mothership sector. The whiting shoreside sector allocations are combined with the nonwhiting shorebased allocations to create the total shorebased IFQ sector allocation. Table 2-60 and Table 2-61 detail the allocation calculations for darkblotched, POP, and widow for 2013 and 2014.

The Council adopted the rebuilt widow rockfish Amendment 21 within trawl allocation as the Preferred Alternative, as specified in the FMP and regulations. Additionally, the Council requested analyzing a range of widow rockfish within trawl allocations to the whiting sectors. The requested range for the at-sea sector is the status quo 2012 level (147.9 mt) to 300 mt, which would be further allocated between the mothership and catcher-processor sector pro-rata to the sectors whiting allocation. The remainder would be allocated to the shoreside whiting sector which is combined with the nonwhiting shorebased allocations to create the total shorebased IFQ sector. This analysis can be found Appendix C and in Chapter 4.

Table 2-60. Darkblotched, POP, and widow within trawl FMP allocations for 2013.

		Allocation Formula			
Species	Trawl Allocation (mt)	Nonwhiting	Whiting	Nonwhiting (mt)	Whiting (mt)
Darkblotched	281.4	The rest	9% or 25 mt, whichever is greater	256.4	25
POP	126.8	The rest	17% or 30 mt, whichever is greater	96.8	30
Widow	1,284	The rest	10% or 500 mt, whichever is greater	784	500

	Within Whiting Sector Allocations			
Species	Whiting Sector Total (mt)	Shorebased 42% (mt)	Catcher-processor 34% (mt)	Mothership 24% (mt)
Darkblotched	25	10.6	8.6	6.1
POP	30	12.6	10.2	7.2
Widow	500	210.0	170.0	120.0

Shorebased IFQ Total Allocations			
Species	Shorebased Whiting (mt)	Nonwhiting (mt)	Shorebased IFQ Total (mt)
Darkblotched	10.6	256.1	266.7
POP	12.6	96.8	109.4
Widow	210.0	790	1,000

Table 2-61. Darkblotched, POP, and widow within FMP trawl allocations for 2014.

Species	Trawl Allocation (mt)	Allocation Formula: Nonwhiting	Allocation Formula: Whiting	Nonwhiting (mt)	Whiting (mt)
Darkblotched	293.7	The rest	9% or 25 mt, whichever is greater	267.3	26.4
POP	129.7	The rest	17% or 30 mt, whichever is greater	99.7	30
Widow	1,284	The rest	10% or 500 mt, whichever is greater	784	500

	Within Whiting Sector Allocations			
Species	Whiting Sector Total (mt)	Shorebased 42% (mt)	Catcher-processor 34% (mt)	Mothership 24% (mt)
Darkblotched	26.4	11.1	9.0	6.3
POP	30	12.6	10.2	7.2
Widow	500	210.0	170.0	120.0

Shorebased IFQ Allocation Calculations			
Species	Shoreside Whiting (mt)	Shorebased Nonwhiting (mt)	Shorebased IFQ Total (mt)
Darkblotched	11.1	267.3	278.4
POP	12.6	99.7	112.3
Widow	210.0	784	994

At-Sea Whiting Set-Asides

Unlike set-asides that are taken as off-the-top deductions after setting the ACL, set-asides for some species are taken from the trawl allocation to accommodate bycatch in the at-sea whiting fishery (catcher-processor and mothership). These catches are not allocations and are not actively managed inseason, therefore the set-aside amounts need to be set high enough to accommodate the historical maximum or any increased catch that is anticipated. Recent catch in the at-sea sectors from 2009-2010 was evaluated and set-asides were recommended by the Council in November 2011 (Table 2-62). The proposed changes from No Action for arrowtooth flounder, lingcod north of 42° N. latitude, and minor slope rockfish north of 40°10 N. latitude were calculated by roughly doubling the maximum value.

At its June 2012 meeting, the Council considered catch estimates from the 2011 at-sea whiting fishery relative to the preferred at-sea whiting set-asides in Table 2-62 (Agenda Item D.5.b, NMFS Letter). Two species – arrowtooth flounder and spiny dogfish, which is part of the Other Fish set-aside - had catches higher than the preferred set-asides for 2013-2014. The Council recommended maintaining the set-asides as displayed in Table 2-62 since the 2011 catches were an anomaly due to the timing of fishing operations, which were later than normal. Further, the Council wanted to provide the opportunity for the at-sea sectors to regulate their catch. In the event that catches of set-aside species need to be reduced in 2013-2014, potential inseason actions include implementing bycatch reduction areas (BRA) which would prohibit vessels from fishing shoreward of a boundary line approximating the 75-fm, 100-fm or 150-fm depth contours and would be expected to reduce catches of some species.

Table 2-62. At-sea whiting set-asides, which are deducted from the trawl allocation, for 2013-14.

Species or Species Complex	Area	Set Aside (mt)
Arrowtooth Flounder	Coastwide	20
Dover Sole	Coastwide	5
English Sole	Coastwide	5
Lingcod	N. of 40°10 N. lat.	15
Longnose Skate	Coastwide	5
Longspine Thornyhead	N. of 34°27 N. lat.	5
Minor Shelf Rockfish	N. of 40°10 N. lat.	35
Minor Slope Rockfish	N. of 40°10 N. lat.	100
Other Fish	Coastwide	520
Other Flatfish	Coastwide	20
Pacific Cod	Coastwide	5
Pacific Halibut a/	Coastwide	5
Petrale Sole	Coastwide	5
Sablefish	N. of 36° N. lat.	50
Shortspine Thornyhead	N. of 34°27 N. lat.	20
Starry Flounder	Coastwide	5
Yellowtail	N. of 40°10 N. lat.	300

a/ As stated in 660.55(m), the Pacific halibut set-aside from the trawl allocation is 10 mt, of which 5 mt is used to accommodate bycatch in the at-sea whiting sectors and 5 mt for the shorebased trawl sector south of40°10 N. latitude.

2.2.3.2 Within Nontrawl Allocations

The Council adopted two-year within nontrawl allocations for bocaccio, canary, and yelloweye for 2013-2014 under the Preferred Alternative (Table 2-63). The recreational values would be implemented as HGs. The canary within nontrawl allocations vary by alternative and are further explained under the analysis of the integrated alternatives (Section 2.4).

Table 2-63. Preferred two-year within nontrawl allocations for bocaccio, canary, and yelloweye for 2013-2014.

2013							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	320	116	3	317	150	2,592	18
-Total Set-Asides	8.4	17.5	0.1	20.8	16.5	234	5.82
Fishery Harvest Guideline	**311.6**	**98.5**	**2.9**	**296.2**	**133.5**	**2,358.0**	**12.2**
-Trawl Allocation	**74.9**	**52.5**	**1.0**	**281**	**127.0**	**2,323**	1
-Non-Trawl Allocation	**236.7**	**46.0**	**1.9**	**15.0**	**7.0**	**35.0**	**11.2**
Non-Nearshore	72.3	3.5					1.1
Nearshore Fixed Gear	0.9	6.2					1.2
Washington Recreational [a/]	N/A	3.1					2.9
Oregon Recreational [a/]	N/A	10.8					2.6
California Recreational [a/]	163.5	22.4					3.4
a/ Values represent HGs which may be adjusted within the non-trawl allocation.							

2014							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	337	119	3	330	153	2,652	18
-Total Set-Asides	8.4	17.5	0.1	20.8	16.5	234	5.82
Fishery Harvest Guideline	**328.6**	**101.5**	**2.9**	**309.2**	**136.5**	**2,418.0**	**12.2**
-Non-Trawl Allocation	**249.6**	**47.4**	**1.9**	**15**	**7**	**35**	**11.2**
Non-Nearshore	76.2	3.7					1.1
Nearshore Fixed Gear	0.9	6.4					1.2
Washington Recreational [a/]	N/A	3.2					2.9
Oregon Recreational [a/]	N/A	11.1					2.6
California Recreational [a/]	172.5	23					3.4
a/ Values represent HGs which may be adjusted within the non-trawl allocation.							

Harvest Guidelines

Accountability measures that increase the likelihood that total catch stays within the ACL include HGs, which are a specified numerical harvest objective that is not a quota. Attainment of an HG does not require closure of a fishery.

Black Rockfish (OR and CA)

HGs are recommended for the southern component of the black rockfish stock with 58 percent to Oregon and 42 percent to California. This allocation scheme is based on recent year landings, consistent with allocations that have been in place since 2004 (Agenda Item E.9.b, Supplemental Joint ODFW/CDFG

Report, November 2011). Both states further allocate black rockfish between commercial and recreational nearshore fisheries; however, those allocations are not implemented in Federal regulations.

Blackgill South of 40°10 N. latitude

Blackgill rockfish is part of the minor slope rockfish complex south of 40°10' N. latitude and subject to an Amendment 21 allocation (63 percent to trawl and 37 percent to nontrawl). To improve inseason tracking of blackgill rockfish south of 40°10' N. latitude, the Council recommended HGs for 2013-2014 of 106 mt and 110 mt, respectively. Since a HG is implemented, processors must sort and report blackgill south 40°10' N. latitude prior to the first weighing after offload. Further, the Council provided guidance that the commercial nontrawl apportionment of blackgill should be 60 percent to limited entry and 40 percent to open access fixed gears. This apportionment reflects the historical distribution of catch between the limited entry and open access fixed gear sectors from 2005-2010 (Table 3 in Agenda Item E.9.b, GMT Report 2, November 2011).

Table 2-64. Blackgill rockfish within nontrawl allocations for limited entry and open access fixed gears for 2013-2014.

Year	Nontrawl Allocation (mt)	Limited Entry Fixed Gear (mt)	Open Access Fixed Gear (mt)
2013	44	26.4	17.6
2014	45	27	18

Blue Rockfish South of 42° N. latitude

Since 2009, blue rockfish south of 42° N. latitude has been managed with an HG to prevent overfishing blue rockfish, which is in the precautionary zone (below B_{MSY}). Table 2-65 shows the OFL contribution, ABC contribution, and 40-10 adjusted values for both the assessed and unassessed portions of the blue rockfish stock both north and south of 40º10' N. latitude within California. For development of the integrated alternatives, the Council recommended specifying a 2013-2014 blue rockfish HG of 236 mt for California fisheries. This HG was calculated from the 2007 assessment (Key, *et al.* 2008), which was conducted for the portion of the stock in waters off California north of Point Conception at 34º27' N. latitude. The OFLs were derived from the assessment. The ABCs were derived using a P* of 0.45 for category 2 stocks, which was then adjusted using the 40-10 default harvest policy, as specified in the FMP for species in the precautionary zone. The HG contribution for the unassessed portion of the stock south of Point Conception was calculated by first estimating an OFL using the DCAC methodology and then applying an ABC adjustment (using a P* of 0.45 for a category 3 stock). The HG contribution for the unassessed area was set equal to the ABC since the stock is assumed to be above B_{MSY}. The 2013 and 2014 blue rockfish HG contributions for the assessed and unassessed areas are then summed to determine the HG.

Table 2-65. Blue rockfish harvest guideline calculations for both the assessed and unassessed areas within California for 2013-2014.

Area	OFL contribution by area		ABC contribution by area		40-10 adjusted HG contribution by area	
	2013	2014	2013	2014	2013	2014
North of 34°27' N. lat. (assessed area)	215	215	196	196	175	175
South of 34°27' N. lat. (unassessed area)	73	73	61	61	61	61
Total for California	288	288	257	257	236	236

Sablefish South of 36º N latitude

The Council recommended trip limits for sablefish south of 36º N latitude be modeled assuming a 55 percent to limited entry and 45 percent to open access allocation, based on the historical landings from 2000-2009 (see Table 9 in Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). These percentages are not implemented as HGs but influence the catch and revenue for each sector under the integrated alternatives.

2.3 New Accountability Measures

Several new accountability measures, designed to meet the goals and objectives specified in the FMP, were analyzed for use in 2013-2014. The following section provides an overview of the measures considered within the integrated alternatives. Section 2.4 describes the integrated alternatives and discusses the performance of these new measures in relation to the objectives of the proposed action. A focused evaluation of the performance and effects of the new accountability measures and range of options considered can be found in Appendix C.

Implementation of these new measures is considered under all of the integrated alternatives described in Section 2.4, except under No Action. The new measures would not be implemented under the No Action Alternative.

2.3.1 Modifications to the Boundaries Defining RCAs

RCAs are large area closures intended to protect a complex of species, such as the overfished shelf rockfish species. The boundaries for RCAs are defined by straight lines connecting a series of latitude and longitude coordinates that approximate depth contours. A set of coordinates are defined for each depth contour and the RCA structures are implemented by gear and/or fishery (e.g., trawl RCA, a nontrawl RCA, and a recreational RCAs). For the 2013-2014 cycle, changes to selected coordinates are proposed that more closely approximate the boundaries with depth contours based on the best available data (Table 2-66). These modifications should provide improved and more efficient access to target species while minimizing interactions with overfished species. The analysis of the integrated alternatives examines the impacts of the proposed changes.

Table 2-66. Summary of boundary adjustments proposed for 2013-2014 and included in the analysis of the integrated alternatives.

Area	Proposed Modifications
Washington and Oregon	150 and 200 fm lines
Oregon	200 fm lines
California – Usal and Noyo Canyons	150 fm lines

2.3.2 Management of ACL Set-Asides

The Council considered a range of options for reapportioning the ACL set-asides used to account for groundfish mortality from scientific research, incidental open access fisheries, and EFPs (see Section 2.3 for details on the ACL set-asides proposed for 2013-2014). The Council considered whether to release the ACL set-asides for reapportioning based on real time catch accounting (i.e., final estimates) or projected catch accounting (see Appendix C). Projected catch accounting was adopted as the preferred methodology since it is consistent with the best available data approach used by the Council for inseason management of the fisheries. The Council also considered whether the reallocation of set-asides should be done based on the original allocations prescribed at the start of the year or whether modifications could be made to account for fishery progress to date. The Council chose the latter approach as the preferred option to provide maximum flexibility to attain the OY.

2.3.3 Catch Accounting between Limited Entry and Open Access

This Council-proposed FMP amendment would reinstate a provision that was inadvertently deleted when Amendment 21 was implemented, and clarifies the application of that provision with respect to catch accounting[18] for set-asides. The provision that was inadvertently deleted specified the decision rules for determining the allocation against which a vessel's catch would count, i.e. whether it would count against the limited entry or the open access allocation. As it was specified, the provision also set up the situation in which catch might be deducted from both the ACL before sector allocations are made and deducted from an open access or limited entry sector allocation. In this regard, this amendment would add a clarification to eliminate the possibility of a duplicate deduction.

2.3.4 Related Regulatory and FMP Language Clarifications

The Council proposed two management measures to ensure accurate catch accounting between sectors that 1) would require that all fish from any trip be offloaded prior to the commencement of a subsequent trip and 2) specify that participants in the shorebased individual fishing quota (IFQ) program using a non-endorsed gear be exempt from the open access trip limits since catch is covered by quota pounds (QP).

[18] The terms "catch accounting" and "catch," as used in this section, cover the application of a vessel's harvest against a sector allocation. Depending on how the allocations and management measures are specified, harvest may be measured as landings (catch minus discards), catch (including discards), or total mortality (catch minus discard survival). Regardless of the measure used in a particular situation, the management objective is to maintain total mortality within the ACLs.

2.3.5 Sorting Requirements

Sorting requirements for aurora, shortraker, and rougheye rockfish north of 40°10 N. latitude are considered for 2013-2014. The measures would require processors to sort and report these species from the slope rockfish complex prior to the first weighing after offload. The purpose of a sorting requirement would be to improve the accuracy of total mortality estimates for these stocks and the frequency with which they are reported. Improved monitoring would improve the ability to evaluate the need for inseason management action to keep catch within the complex harvest specifications.

In June 2012, the Council did not select a new sorting requirement for aurora, shortraker, and rougheye rockfish north of 40°10 N. latitude as part the Preferred Alternative. It was unclear if the measure would meet the objective of improving the accuracy of total mortality estimates for these stocks or whether data collected under the No Action procedures are appropriate. Further, the Council requested that the comprehensive review of the groundfish stocks and complexes is completed prior to initiating a sorting requirement. Implementation of a sorting requirement involves considerable effort and resources on behalf of the states, particularly the port sampling programs. Funding for those programs has been stagnant or decreased and it has been difficult to achieve the sampling goals for the existing market categories. Increasing the number of market categories, as a result of a new sorting requirement, would exacerbate this issue. The Council envisions that the results of the comprehensive review of the stock complexes could be used to set priorities for the port samplers and maximize the limited resources.

2.3.6 Widow Rockfish Within-Trawl Allocation

The Council considered but rejected a change to the widow rockfish allocation to the trawl sectors specified in the FMP that would have provided more widow to the shoreside sector to allow greater opportunity to target widow and yellowtail rockfish. The needs of the shoreside trawl sector would best be met by allocating as much of the trawl allocation of widow rockfish as possible since a healthy widow rockfish stock is a valuable target for that sector. The needs of the at-sea sectors would best be met by allocating enough widow rockfish to prevent impeding the ability of these sectors to target Pacific whiting. While widow rockfish are not a target species in the at-sea whiting fisheries, the amount of widow rockfish allocated to the at-sea sectors has the potential to limit their ability to attain whiting allocations. If the total catch of widow rockfish hits the allocation for an at-sea sector, the season ends for that sector even if they have not attained their allocation of whiting. The analysis of sector needs for widow therefore compared the recent historical catches and catch rates of widow with respect to whiting by the at-sea sectors to understand whether the widow allocation options meet the needs of the at-sea sectors (see Appendix C). The Council rejected the option to reallocate widow rockfish because historical data and public testimony from the at-sea sectors indicated that a lower allocation could reduce the sector's ability to efficiently access Pacific whiting.

2.3.7 Shorebased IFQ Accumulation Limits

The maximum number of quota shares (QSs) and quota pounds (QPs) an entity may control in the shorebased IFQ fishery is limited by accumulation limits (defined in regulation at 50 CFR 660.111). These limits vary according to the management unit for the stock or stock complex and are intended to restrict the consolidation of quota holdings by just a few entities. The QS limits restrict the amount an individual or entity may control through ownership or other means. The annual QP limits refer to the maximum amount that may be assigned to any one vessel during a given year to cover catch. The annual QP vessel limits are larger than control limits to allow several QS holders to work together on a single vessel. Additionally, there are daily vessel limits that regulate the unused QP in vessel accounts for Pacific halibut and overfished species.

Performance of the accumulation limits was evaluated based on fishery performance in 2011 (see Appendix C). The Council adopted changes to the shorebased IFQ accumulation limits for lingcod QP (also called vessel use limits) based on concerns that the proposed lingcod management unit for 2013-2014 – changing from coastwide to north and south of 40°10 N. latitude – would result in QP limits which could limit flexibility in vessel operations. Council action from June would modify the current QP limit in regulation from 3.8 percent to 5.3 percent in the north and 13.3 percent in the south. All other accumulation limits (both QP and QS) remain as specified under No Action.

2.3.8 Shorebased IFQ Surplus Carry-Over

Current regulations provide for a carry-over provision that allows a limited amount of surplus QP or IBQ pounds in a vessel account to be carried over from one year to the next or allows a deficit in a vessel account in one year to be covered with QP or IBQ pounds from a subsequent year, up to a carryover limit (50 CFR 660.140(e)(5)). The carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve optimum yield (OY) while preserving the conservation of stocks. This measure seeks to clarify regulations with regard to current accountability measures, which include modifications (reductions or suspension) to the eligible surplus carry-over percentages, in the event it is necessary to address MSA conservation requirements. The measure seeks to implement such accountability measures through routine[19] inseason adjustments recommended at a Council meeting. Lastly, the current list of automatic actions that may be implemented by NMFS would be revised to include closing the shorebased IFQ fisheries, in addition to the at-sea whiting fishery (see regulations at 660.60 (d)).

In June 2012, the Council adopted the option which would modify the surplus carry-over program as described above as an interim solution. The Council was concerned that the fleet may attempt to maximize harvest of QPs and revenue annually (i.e., fish every last pound for maximum economic benefit) since the QP may not be available in the following year (i.e., there is no guarantee that surplus carry-over in one year would be available for harvest in the following year). Attempting to harvest all QPs may increase the risk of fishing into deficit, which results in a negative socioeconomic impact, since it is a multispecies fishery and there is limited precision in the harvesting activities. The Council requested further analysis and development of options to ensure that, in the long term, the surplus carry-over program can be implemented with greater certainty..

2.3.9 Remove or Reduce the Minimum Lingcod Length Limit in the Shorebased IFQ Fishery

Lingcod length limits have been in place since the late 1990's and were implemented to minimize harvest of immature fish while maintaining the reproductive potential of the stock. Current commercial length limits vary north and south of 42° N. latitude, and are 22 inches and 24 inches, respectively. In 2011, the limited entry trawl fishery was rationalized with total catch IFQ issued for many species, including lingcod. Since the IFQ program monitors total catch, the existing length limit induces regulatory discards for some fish that may be marketable. The purpose of the management measures would be to remove the lingcod length limit or reduce it to 20 inches coastwide while still maintaining the reproductive potential of the stock.

[19] Regulations at 660.60(c) outline routine management measures. Modifications and/or issuance of surplus carry-over does not require changes to regulations; therefore classifying this measure as routine may not be appropriate. As such, a Council recommendation may be more appropriate.

The Council recommended maintaining the minimum lingcod length limit in the shorebased IFQ fishery, for the start of the biennium in response to concerns about differential length limits between sectors expressed by the Council's Enforcement Committee (Agenda Item D.5.b, Supplemental EC Report). The Council requested similar analyses be conducted for all sectors (commercial and recreational), including an 18 inch minimum lingcod length limit, which could be implemented inseason, if desired (see Appendix C for the analysis).

2.3.10 Threshold for Switching from the Primary to Daily Trip Limit Fishery for Sablefish North of 36° N. Latitude

The purpose of the proposed action is to remedy unforeseen complications to the limited entry fixed gear sablefish primary fishery north of 36° N. latitude, which resulted from the 2009 elimination of the daily trip limit (DTL) in the sablefish DTL fishery in this area. Elimination of the daily limit inadvertently impacted the amount of sablefish that primary fishery participants are allowed land, as they conclude fishing on their tier limits. The Council-proposed action would implement a 300 pound threshold, in the absence of a daily limit established in regulation, to facilitate the transition of a vessel from the sablefish primary fishery to the sablefish DTL fishery. The 300 pound threshold was the most common DTL in this fishery over the past seven years, and would give maximum access of a fisher to their tier pounds.

2.3.11 Recreational Shelf Rockfish Retention in the Cowcod Conservation Area

In 2001, CCAs were implemented as part of the cowcod rebuilding strategy. As specified in the FMP Appendix F (see Cowcod Rebuilding Strategy), as new information becomes available on cowcod behavior and fisheries interactions with cowcod, the boundaries or related regulations concerning the current CCAs may change, and additional CCAs may be established by regulation. Some recreational fishing is currently permitted within the CCA (see regulations at 660.360(3)(B)). During these fishing operations, shelf rockfish, including bocaccio, are encountered but are required to be discarded, resulting in bycatch. Modifications to the retention allowances for shelf rockfish in the CCA are proposed by the Council to reduce bycatch (i.e., regulatory discards) by recreational fisheries operating in the CCAs, while still rebuilding cowcod and bocaccio.

2.3.12 Remove the California Recreational Bocaccio Minimum Size and Fillet Limit

Federal regulations for the California recreational fisheries implement a 10 inch minimum size limit and 5 inch filet limit for bocaccio. The size limit and corresponding filet limit was implemented in 2001 to protect juveniles from pier and jetty anglers during years of heavy recruitment. At that time, managers believed that bocaccio below that size would have a high survival rate when caught in shallow water. Recent data suggest that there have been very few encounters of small bocaccio during good recruitment years (e.g., 2003, 2005, and 2009), and even fewer discards, suggesting the size limit is ineffective. The Council-proposed management measure would remove the recreational bocaccio minimum size and filet limit for 2013-2014, while still rebuilding the bocaccio stock consistent with Council objectives.

2.4 Integrated Alternatives

This section contains a description of the integrated alternatives which link the ACL alternatives described in Section 2.1 to the management measures necessary to meet the goals and objectives outlined in the FMP and MSA. Prior to the 2011-2012 cycle, the integrated alternatives were referred to as the strategic rebuilding alternatives or the holistic approach to rebuilding. The integrated alternatives contain the preferred nonoverfished species ACLs along with a strategically arrayed range of overfished species ACLs (including the preferred). The results of the integrated analysis demonstrate how rebuilding overfished species within the complex structure of a fishery constrains fishing opportunities by sector (or gear type) and region and how those constraints affect communities along the west coast. Constraining fishing opportunity, in this context, refers the number and degree of management controls necessary to keep overfished species mortality within the ACLs. Previous analyses conducted for biennial cycle management have generally demonstrated that as overfished species ACLs are reduced, more management measures are required to keep overfished species mortality within the harvest specifications, which, in turn, limits access to healthy stocks. At some level, when access to healthy stocks is limited, communities are impacted.

Under the Preferred Alternative and Alternative 1, harvest rates, or in the case of petrale sole, the harvest control rule, specified in the current rebuilding plans is recommended to rebuild all overfished species. As discussed in Section 2.1, the target years for canary and POP must be modified because new scientific information shows that T_{TARGET} is less than $T_{F=0}$ for both these stocks (in other words, even if no fishing mortality were to occur, the new information tells us these stocks could not be rebuilt by the T_{TARGET} specified in the current rebuilding plans). Therefore, the integrated alternatives in 2013-2014 explore a range of canary and POP ACLs, while maintaining the current rebuilding plans for the other overfished species showing steady progress towards rebuilding. The results inform whether the Preferred Alternative and Alternative 1 rebuilds these stocks as quickly as possible, while taking into account the needs of the fishing communities and other MSA requirements. As such, the canary and POP ACLs and allocations vary between the alternatives while all other variables remain constant. Table 2-67 and Table 2-68 outline the overfished species ACLs used in the integrated alternatives analysis, detailed descriptions of each alternative follow.

Management measures under the action alternatives (i.e., Preferred alternative and Alternatives 1-8) include adjustments to routine measures as well as the new measures described in Section 2.3. Further, suboptions are explored for various management measures (e.g., ranges of allocations, depth closures, bag limits, trip limits, etc.). Appendix B contains detailed analysis of the integrated alternatives and Appendix C contains detailed analysis of the management measures included in the integrated alternatives.

Table 2-67. 2013 Integrated Alternatives for Overfished Species (in mt).

Species	No Action	Preferred Alt. & Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Bocaccio	274	320	320	320	320	320	320	320	320
Canary	107	116	101	116	48	216	101	147	147
Cowcod	3	3	3	3	3	3	3	3	3
Darkblotched	296	317	317	317	317	317	317	317	317
POP a/	183	150	150	74	247	74	222	222	150
Petrale	1,160	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592
Yelloweye	17	18	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt ACT is implemented.

Table 2-68. 2014 Integrated Alternatives for Overfished Species (in mt).

Species	No Action	Preferred Alt. & Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Bocaccio	274	337	337	337	337	337	337	337	337
Canary	107	119	104	119	49	220	104	151	151
Cowcod	3	3	3	3	3	3	3	3	3
Darkblotched	296	330	330	330	330	330	330	330	330
POP a/	183	153	153	76	251	76	226	226	153
Petrale	1,160	2,652	2,652	2,652	2,652	2,652	2,652	2,652	2,652
Yelloweye	17	18	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt ACT is implemented.

2.4.1 No Action Alternative

The No Action Alternative represents the 2012 harvest specifications and management measures specified in regulation as of January 1, 2012 (76 FR 77415). The No Action Alternative does not incorporate the best available scientific information represented by new stock assessments, projections from previous stock assessments, and new rebuilding analyses (where applicable) adopted by the Council in 2011 for use in 2013-14. Therefore, for some species the ACLs and other stock reference points (e.g., OFL, ABC) may not be consistent with the harvest management framework outlined in the FMP. That is, for some species, carrying the 2012 harvest specifications forward to 2013-2014 would result in unsustainable harvest levels.

CEQ regulations at 40 CFR 1502.14 require an EIS to include the No Action Alternative. While in this case this alternative is inconsistent with the purpose and need for the proposed action, it is used to compare the effects of continuing to manage the fishery using current measures versus implementing new harvest specifications and any adjustments to management measures associated with those specifications (for example, to prevent ACLs from being exceeded).

Other constructs of a No Action Alternative were explored, including incorporating the best available science developed since 2009 (when the previous round of stock assessments was completed) and applying the results to status quo harvest policies. However, this construct would not reflect current conditions in the fishery to which the action alternatives could be compared. In fact, as discussed below, the Council's Preferred Alternative, Alternative 1, represents new science applied to status quo policies for overfished species. The current conditions in the fishery are best reflected by the regulations in place on January 1, 2012 and the associated estimates of landings, revenue, and community impacts.

2.4.1.1 No Action Allocation Scheme

Section 2.1 describes the harvest specifications considerations and the OFLs and ABCs under the No Action Alternative. The ACLs and associated allocations under the integrated alternatives analysis of No Action are summarized Table 2-69. Table 2-70 through Table 2-75 detail the allocation of sablefish north of 40°10 N. latitude among sectors. (Because sablefish is the most valuable commercial groundfish species and is caught in a number of different groundfish fisheries, its allocation scheme is complex.) Table 2-76 summarizes the allocations of overfished species under the No Action Alternative.

Table 2-69. No Action Alternative: 2012 ACLs, Fishery Harvest Guidelines, and Allocations. All areas are north latitude.

				Trawl		Nontrawl	
Species	**Area**	**ACL**	**Fishery HG**	**% of HG**	**Mt**	**% of HG**	**Mt**
Arrowtooth flounder	Coastwide	12,049	9,971.0	95%	9,472	5%	499
Black	N of 46º16'	415	401.0				
Black	S of 46º16'	1,000	1,000.0				
Bocaccio	S of 40º10'	274	260.6	N/A	60.0	N/A	189.6
Cabezon	46º16' to 42º	48	48.0				
Cabezon	S of 42º	168	168.0				
California scorpionfish	S of 34°27'	126	124.0				
Canary rockfish	Coastwide	107	87.0	N/A	34.8	N/A	29.8
Chilipepper	S of 40º10'	1,789	1,775.0	75%	1,331	25%	444
Cowcod	S of 40º10'	3	2.7	N/A	1.8	N/A	1
Darkblotched rockfish	Coastwide	296	277.3	95%	263	5%	14
Dover sole	Coastwide	25,000	23,410.0	95%	22,240	5%	1,171
English sole	Coastwide	10,150	10,050.0	95%	9,548	5%	503
Lingcod	N of 40'10º	2,151	1,880.0	45%	846	55%	1,034
Lingcod	S of 40'10º	2,164	2,157.0	45%	971	55%	1,186
Longnose skate	Coastwide	1,349	1,220.0	95%	1,159	5%	61
Longspine thornyhead	N of 34º27'	2,064	2,020.0	95%	1,919	5%	101
Longspine thornyhead	S of 34º27'	366	363.0				
Nearshore rockfish north	N of 40º10'	99	99.0				
Nearshore rockfish south	S of 40º10'	990	990.0				
Minor shelf rockfish north	N of 40º10'	968	925.0	60.2%	557	39.8%	368
Minor shelf rockfish south	S of 40º10'	714	701.0	12.2%	86	87.8%	615
Minor slope rockfish north	N of 40º10'	1,160	1,092.0	81%	885	19%	207
Minor slope rockfish south	S of 40º10'	626	599.0	63%	377	37%	222
Other fish	Coastwide	5,575	5,575.0		5,575		0
Other flatfish	Coastwide	4,884	4,686.0	90%	4,217	10%	469
Pacific cod	Coastwide	1,600	1,200.0	95%	1,140	5%	60
Pacific whiting	Coastwide	0	0.0	100%	0	0%	0
Petrale sole	Coastwide	1,160	1,094.6	N/A	1,060	N/A	35
POP	Coastwide	157	144.1	95%	137	5%	7
Sablefish	N of 36º	5,347	See Table 2-70 to Table 2-75				
Sablefish	S of 36º	1,258	1,224.0	42%		58%	710
Shortbelly	Coastwide	50	49.0		49		0
Shortspine thornyhead	N of 34º27'	1,556	1,511.0	95%	1,435	5%	76
Shortspine thornyhead	S of 34º27'	401	359.0	NA	50	NA	309
Splitnose	S of 40º10'	1,538	1,531.0	95%	1,454	5%	77
Starry flounder	Coastwide	1,360	1,353.0	50%	677	50%	677

Species	Area	ACL	Fishery HG	Trawl % of HG	Trawl Mt	Nontrawl % of HG	Nontrawl Mt
Widow	Coastwide	600	539.1	91%	491	9%	49
Yelloweye rockfish	Coastwide	17	11.1	N/A	0.6	N/A	10.5
Yellowtail	N of 40º10'	4,371	3,872.0	88%	3,407	12%	465

Table 2-70. No Action: Allocations, in metric tons, of the sablefish north of 36° N. latitude commercial harvest guideline, between limited entry and open access for 2012.

		Limited Entry Harvest Guideline		Open Access Harvest Guideline	
Year	**Commercial HG (MT)**	% Comm. HG	MT	% Comm. HG	MT
2012	4,790	90.6%	4,340	9.4%	450

Table 2-71. No Action. Sablefish north of 36° N. latitude allocations, in metric tons, between limited entry fixed gear and limited entry trawl for 2012.

	Limited Entry HG	Limited Entry Fixed Gear		Limited Entry Trawl	
Year	MT	% of LE HG	MT	% of LE HG	MT
2012	4,340	42%	1,823	58%	2,517

Table 2-72. No Action. Sablefish north of 36° N. latitude allocations, in metric tons, within the limited entry fixed gear sector for 2012. The total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

	Limited Entry Fixed Gear			
Year	**Total Catch Share (mt)**	**Landed Catch Share (mt)**	**Primary Season Share (mt)**	**LEFG DTL Share (mt)**
2012	1,823	1,764	1,500	265

Table 2-73. No Action. Tier limits in pounds for the primary season for sablefish north of 36° N. latitude in 2012.

	Limited Entry Fixed Gear			
Year	**Primary Season Share (mt)**	**Tier 1 (lbs)**	**Tier 2 (lbs)**	**Tier 3 (lbs)**
2012	1,500	46,237	21,017	12,010

Table 2-74. No Action. Sablefish north of 36° N. latitude allocations, in metric tons within the limited entry trawl sector for 2012.

	Limited Entry Trawl		
Year	**All Trawl (mt)**	**At-sea Whiting (mt)**	**Shorebased IFQ (mt)**
2012	2,517	50	2,467

Table 2-75. No Action. Open access allocations in metric tons for sablefish north of 36° N. latitude allocations. Sablefish mortality in nongroundfish fisheries is accounted for in the incidental OA column. The

total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

Year	Open Share (OA) (mt)	Incidental OA Mortality (mt)	Directed OA Total Catch Share (mt)	Directed OA Landed Catch Share (mt)
2012	450	17	433	419

Table 2-76. No Action Allocation of Overfished Species.

No Action - 2012							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP a/**	**Petrale**	**Yelloweye**
ACL	274	107	3	296	157	1160	17
Total Set-Asides	13.4	20	0.3	18.7	12.9	65.4	5.9
Fishery Harvest Guideline	260.6	87	2.7	277.3	144.1	1094.6	11.1
Trawl Allocation							
Shorebased IFQ	60	26.2	1.8	248.9	119.5	1054.6	0.6
At-Sea Whiting	N/A	8.2	N/A	14.5	17.4	5	N/A
Catcher Processor	N/A	4.8	N/A	8.5	10.2		N/A
Mothership	N/A	3.4	N/A	6	7.2		N/A
Nontrawl Allocation			0.9	14	7	35	
Non-Nearshore Fixed Gear	57.9	2.3					1.3
Nearshore Fixed Gear	0.7	4					1.1
Washington Recreational [b/]	N/A	2					2.6
Oregon Recreational [b/]	N/A	7					2.4
California Recreational [b/]	131	14.5					3.1
a/ The POP ACL is 183 and the ACT is 157 mt. The set-asides are subtracted from the ACT.							
b/ Values represent HGs.							

2.4.1.2 Shorebased IFQ Fishery – No Action

Groundfish allocated to the shorebased limited entry trawl fishery are managed under an IFQ program in which all vessels with trawl permits making shorebased groundfish landings with groundfish trawl or legal groundfish nontrawl gear are required to participate. Within the IFQ fishery a number of strategies are used which may be subjected to different regulations. The three primary strategies are the use of mid-water trawl gear to target Pacific whiting during the primary whiting season (see regulations at 660.131(b)(2)(iii)(c)), the use of bottom-trawl gear to target nonwhiting, and the use of legal groundfish nontrawl gears to target groundfish (termed gear switching, 660.140(k)). Principle management measures for the shorebased IFQ fishery include:

- Catch Controls: IFQ and individual bycatch quota (IBQ) for Pacific halibut are the primary catch control tools in the shorebased IFQ fishery. Additionally, cumulative monthly landing limits (hereinafter trip limits) for non-IFQ species and Pacific whiting outside the primary season dates apply to each vessel (see regulations Table 1 North and South to Part 660, Subpart D). Once a vessel reaches a limit, the species or species complex can no longer be retained and sold.

- Accumulation limits: The maximum number of QS and QP an entity may control in the shorebased IFQ fishery is limited by accumulation limits (defined in regulation at 50 CFR 660.111). These limits vary according to the management unit for the stock or stock complex and are intended to prevent the consolidation of quota holdings by just a few entities.
- Carry-over provision: The carry-over provision allows a limited amount of surplus QP or IBQ pounds in a vessel account to be carried over from one year to the next or allows a deficit in a vessel account in one year to be covered with QP or IBQ pounds from a subsequent year, up to a carryover limit. The carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve OY while preserving the conservation of stocks. The eligible percentages used for the carry-over provision may be modified during the biennial specifications and management measures process or automatically by NMFS under MSA authority at 305(d).
- Monitoring and Reporting: All trips in the shorebased IFQ fishery are monitored at sea by the West Coast Groundfish Observer Program (WCGOP) and landings are tracked by electronic fish tickets, verified by catch monitors. Together, these two programs provide robust, near-real time tracking and reporting of IFQ species and Pacific halibut IBQ.
- Gear Restrictions: IFQ species may be harvested with groundfish trawl or legal groundfish nontrawl gear. Trawl gear restrictions prohibit certain types of gear that may be used in rocky habitat, reducing habitat impacts and also limiting overfished species bycatch for those species that inhabit rocky substrate. Further, gear restrictions minimize catch of overfished species while allowing sufficient access to target species. For example, the selective flatfish trawl net, which is required shoreward of the trawl RCA north of 40°10' N. latitude, reduces rockfish bycatch while efficiently catching flatfish. Scottish seine gear is exempted from trawl RCA closures in the area between 38° N. latitude and 36° N. latitude and depths less than 100 fm because the gear has demonstrated low bycatch rates of overfished species. IFQ species can also be harvested with legal nontrawl gears, which have different selectivity and habitat impacts than trawl gears.
- RCAs: Vessels harvesting IFQ must abide by RCA closures, which are specified by gear type (see regulations Table 1 North and South to Part 660, Subpart D and Table 2 North and South to Part 660, Subpart E). For example, features of the trawl RCA include eliminating trawl fishing opportunity north of Cape Alava (48°10' N. latitude) in depths 150 fm or less. South of Cape Alava to 40°10 N. latitude, fishing is restricted to depths shallower than 75 fm for five of the six fishing two-month periods. These RCA features were designed to provide sufficient access to target species while minimizing bycatch of overfished species, particularly canary and yelloweye rockfish. The nontrawl RCA is less complicated and dynamic than the trawl RCA, however, the nontrawl RCA still provides for reductions in canary and yelloweye bycatch.
- Bycatch Reduction Areas: Bycatch in the Pacific whiting fishery can be mitigated by implementing bycatch reduction areas. These areas restrictions apply to vessels using mid-water gear during the primary whiting season and limit fishing to depths greater than any of the specified management lines between 75 fm and 150 fm (see regulations at 660.131(c)(4) Subpart D).
- Ocean Conservation Zones: Chinook salmon bycatch in the Pacific whiting fishery can be mitigated by implementing the ocean salmon conservation zones. These zones apply to vessels using mid-water gear during the primary whiting season and restrict fishing to depths

seaward of 100 fm.

- Other Groundfish Conservation Areas – Several other groundfish conservation areas exist and provide overfished species and habitat protection. Though not much bottom trawling is done south of Point 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 CCAs (Figure 2-4). Closed EFH areas are used to protect bottom habitat from the adverse effects of trawl gear (see regulations at 660.75). Three areas off the Washington coast are designed to reduce bycatch of yelloweye rockfish. North Coast Area B and South Coast Area B are closed to commercial fishing (Figure 2-5, Figure 2-6). South Coast Area A was a voluntary "area to be avoided" for commercial groundfish fisheries (Figure 2-6).

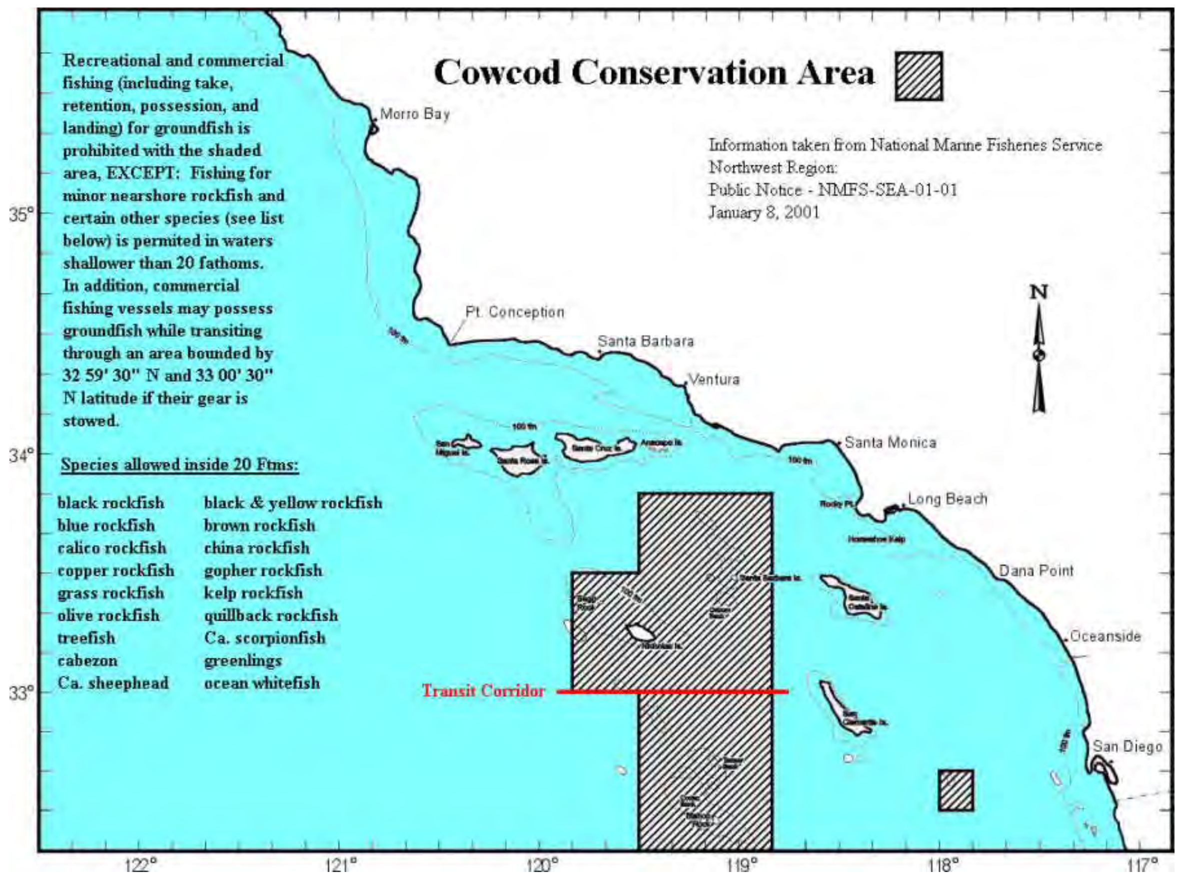


Figure 2-4. The current Cowcod Conservation Areas located in the Southern California Bight.

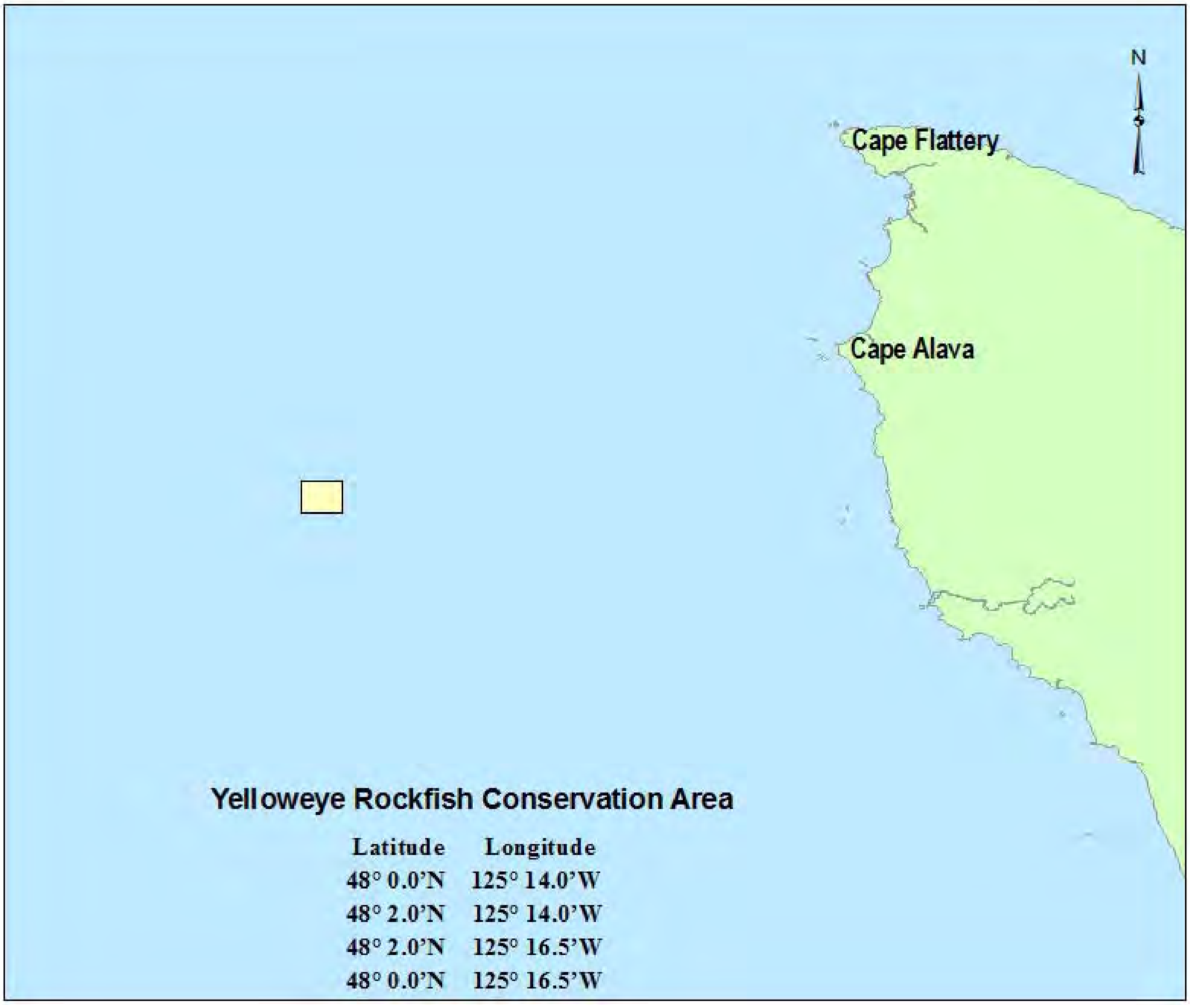


Figure 2-5. North Coast Area B, a Yelloweye Rockfish Conservation Area in northern Washington.

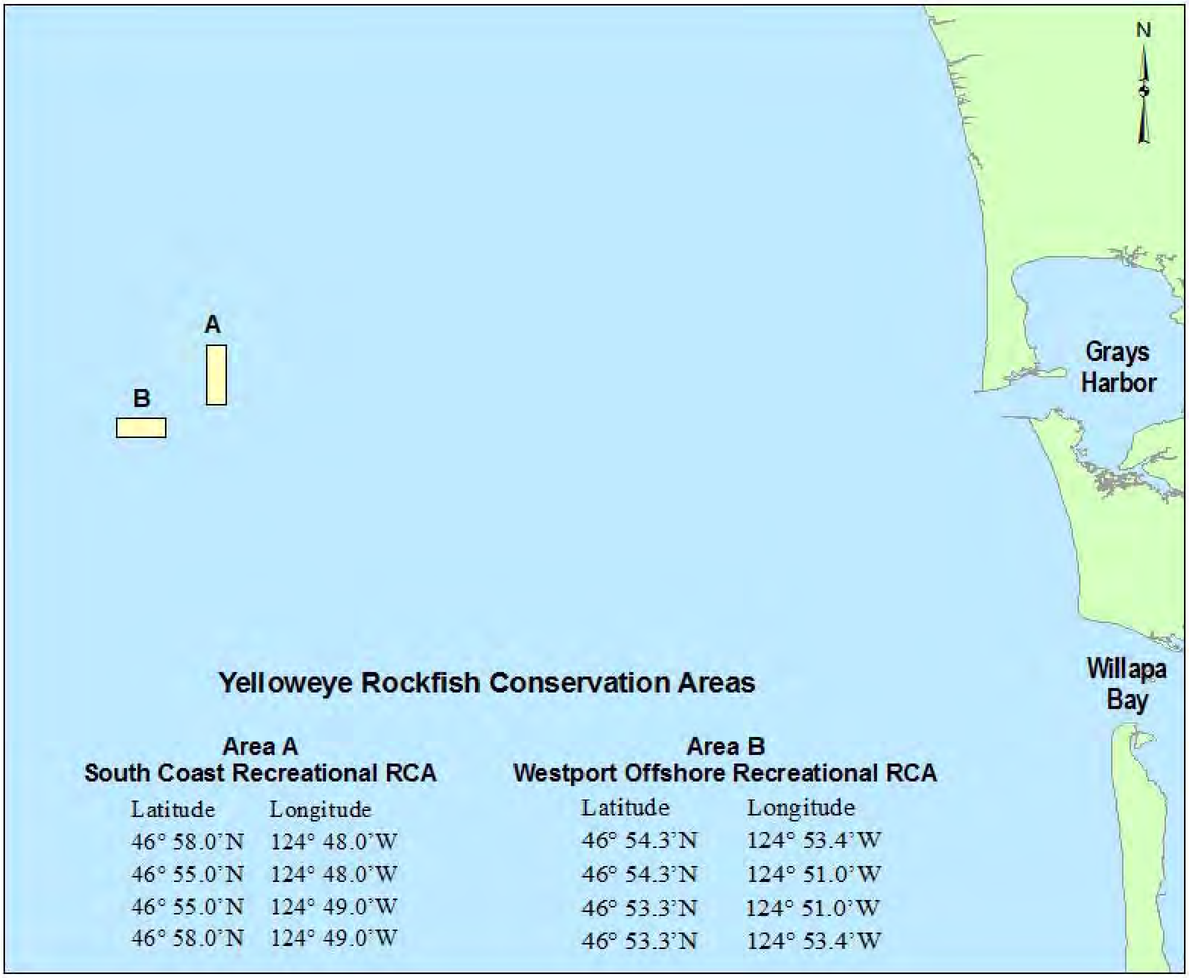


Figure 2-6. South Coast Area A and B, Yelloweye Rockfish Conservation Areas in southern Washington. South Coast Area A is an area to be voluntarily avoided.

2.4.1.3 At-Sea Whiting Co-ops – No Action

The at-sea sector is composed of catcher-processors and motherships that target Pacific whiting with mid-water trawl gear and process at sea. This sector is managed under a system of cooperatives (co-ops) that are somewhat like IFQs except that the harvest privilege is assigned to a group, the co-op, instead of an individual. The members of the group then decide how and when the collectively-held harvest privilege would be used. The trawl rationalization program establishes a set of rules for the formation of co-ops in the at-sea mothership sector that provide a strong incentive for catcher vessels to form co-ops associated with a mothership processor (see regulations at 660.150). In the case of the catcher-processor sector, a single, voluntary co-op has been in existence for some time. In that instance the allocation to the sector is essentially an allocation to the co-op. Further, a catcher-processor permit endorsement is required, which essentially closes this sector to new entrants; a move intended to lend greater stability to the functioning of the current, voluntary co-op. Regulations at 660.160 outline the catcher-processor co-op provisions.

Principle management measures in the at-sea sector are similar to those included for the shorebased IFQ vessels using mid-water gears during the primary whiting season and include bycatch reduction areas and ocean salmon conservation zones.

2.4.1.4 Limited Entry and Open Access Fixed Gear Management – No Action

The limited entry fixed gear fishery includes vessels that hold a Federal limited entry permit endorsed by gear type (pot or longline) that targets groundfish. Some limited entry permits have a sablefish endorsement which allows them to participate in the primary sablefish fishery and land higher amounts of sablefish (i.e., tiers) compared to the trip limit fishery (see regulations at 660.231). Further, permit stacking allows sablefish tier limits from one to three permits to be used on a single vessel during the primary sablefish season. Additional catch controls in the limited entry fishery include trip limits for numerous species and a nontrawl RCA to limit interactions with overfished species. Table 2-77 summarizes the principle management measures for limited entry fixed gear vessels.

The directed open access sector is composed of vessels without a Federal limited entry permit (trawl or fixed gear) that targets groundfish, including sablefish and nearshore species. Commercial fishing vessels targeting nongroundfish species (e.g., salmon, pink shrimp, etc.), but landing groundfish under the open access limits are included in the category of incidental open access fisheries. Catch controls for both the incidental and directed open access fishery include trip limits and the nontrawl RCA. Table 2-78 summarizes the principle management measures for open access fixed gear vessels.

Table 2-79 summarizes the limited entry and open access sablefish trip limits north and south of 36° N. latitude under the No Action Alternative. Alternatives 1-7 propose to reduce the trip limits in response to lower sablefish ACLs.

One nontrawl RCA is implemented for the limited entry and open access fixed gear fisheries. Routine RCA adjustments can be made for four northern subareas bounded by Cape Mendocino at 40°10' N. latitude, 43° N. latitude, Cascade Head, Point Chehalis at 46.888° N. latitude, and the U.S.-Canada border. These adjustments may be necessary inseason to reduce projected catches of overfished species, typically yelloweye and canary rockfish. The nontrawl RCA seaward boundary south of 40°10' N. latitude under the No Action Alternative is defined by management lines specified with waypoints at roughly 150 fm to avoid areas where bocaccio, canary and yelloweye rockfish are most abundant.

Other groundfish conservation areas include the North Coast Area B Yelloweye Rockfish Conservation Area (YRCA) in Washington (Figure 2-5) which has been closed to limited entry and open access fixed gears since 2007. Additionally, the South Coast Areas A and B YRCAs (Figure 2-6) and the “C-shaped” YRCA in waters off northern Washington (Figure 2-7) were voluntary “areas to be avoided.” Fishing is not allowed in the CCAs (Figure 2-4) under the No Action Alternative, except for some nearshore commercial fishing opportunities described in the nearshore section.

The models used project overfished species catches in the limited entry and directed open access fisheries and inform management measures are stratified by area of fishing shoreward (nearshore) or seaward (non-nearshore) of the nontrawl RCA. Therefore, the following discussion describes No Action in this context.

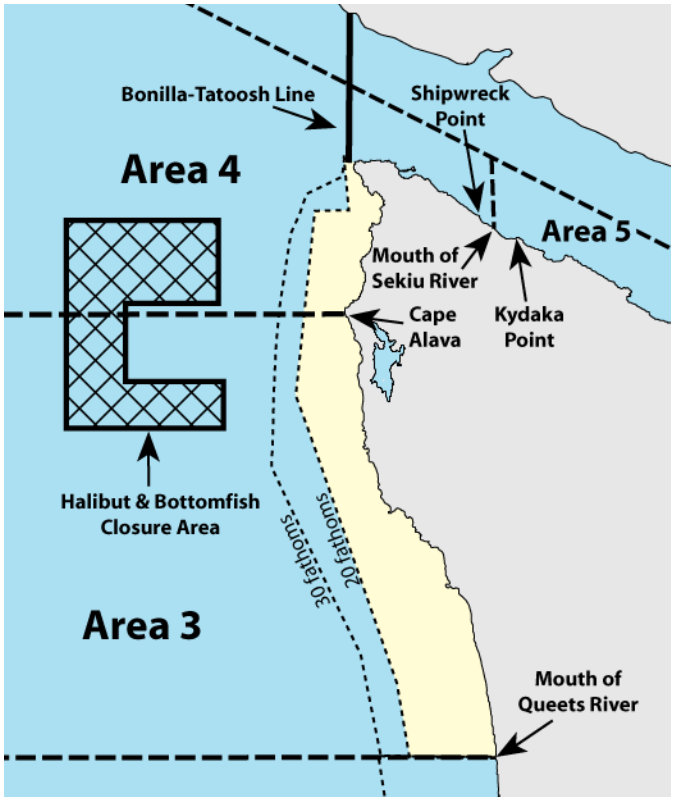


Figure 2-7. The current "C-shaped" Yelloweye Rockfish Conservation Area in waters off northern Washington where recreational groundfish and Pacific halibut fishing was prohibited. Commercial limited entry and open access fixed gear fleets were asked to voluntarily avoid fishing in this YRCA in 2009-2010.

Table 2-77. Summary of limited entry fixed gear fishery management measures under the No Action Alternative.

Cumulative limits	• Cumulative trip limits for most species, specific to geographic area (See regulations Table 2 North and South to Part 660, Subpart E) • Primary sablefish fishery managed with tier limits Tier 1 = 46,238 lb, Tier 2 = 21,017 lb, Tier 3 = 12,010 lb • Canary and yelloweye landings prohibited coastwide • South of 40°10 N. latitude landings of cowcod and bronzespotted rockfish prohibited
Size limits	Lingcod • North of 42° N. lat. minimum size limit 22 inches total length • South of 42° N. lat. minimum size limit 24 inches total length
Gear restrictions	• Longline, trap or pot marked at the surface, at each terminal end, with a pole, flag, light, radar reflector, and a buoy • Must be attended at least once every 7 days • Traps must have biodegradable escape panels
Seasons	• Primary sablefish fishery from 4/1 to 10/31 • Permit stacking of up to 3 permits is allowed in primary sablefish fishery • Additional seasonal restrictions may be implemented via routine action or the fishery may "close" for some species or some areas during the year through inseason action
GCAs	YRCA • North Coast Commercial YRCA (WA) closed to commercial fixed gears • North Coast Recreational YRCA (WA) is a voluntary area to be avoided • Westport Offshore Recreational YRCA (WA) is a voluntary area to be avoided
	CCA Fishing is prohibited in CCAs with the following exceptions: • Fishing for "other flatfish" when using no more than 12 hooks, #2 or smaller • Fishing for rockfish and lingcod shoreward of the 20 fm
	Farallon Islands commercial fishing for groundfish is prohibited shoreward of 10 fm with the following exceptions: Fishing for "other flatfish" when using no more than 12 hooks, #2 or smaller Cordell Banks Commercial fishing for groundfish is prohibited in depths less than 100 fm
	EFH Fishing with all bottom contact gear, including longline and pot/trap gear, is prohibited within the following EFH conservation areas: Thompson Seamount, President Jackson Seamount, Cordell Bank (50 fm (91 m) isobath), Harris Point, Richardson Rock, Scorpion, Painted Cave, Anacapa Island, Carrington Point, Judith Rock, Skunk Point, Footprint, Gull Island, South Point, and Santa Barbara. Fishing with bottom contact gear is also prohibited within the Davidson Seamount
Nontrawl RCAs	• North of 46°16 N. lat. Shoreline to 100 fm • 46°16- 43° N. lat. 30 to 100 fm • 43°-42° N. lat. 20 to 100 fm • 42°-40°10 N. lat. 20 fm depth contour to 100 fm • 40°10-34°27 N. lat. – 30 to 150 fm • South of 34°27 N. lat. – 60 to 150 fm Fishing is prohibited in nontrawl RCAs with the following exception: Fishing for "other flatfish" when using no more than 12 hooks, #2 or smaller
Monitoring	• VMS required • WCGOP observer coverage when requested
Reporting	• VMS declarations

Table 2-78. Summary of open access fishery management measures under the No Action Alternative.

Cumulative limits	• Cumulative trip limits for most species, specific to trawl type and geographic area (See regulations Table 2 North and South to Part 660, Subpart E) • Canary and yelloweye landings prohibited coastwide • South of 40°10 N. latitude landings of cowcod and bronzespotted rockfish prohibited
Gear restrictions	• Longline, trap, pot, hook-and-line (fixed or mobile), setnet (anchored gillnet or trammel net (south of 38° N. lat. only), spear, and nongroundfish trawl gear for: pink shrimp, ridgeback prawn, and California halibut or sea cucumbers (south of Pt. 38°57.50' N. lat.) <u>Nongroundfish trawl gear:</u> • Is exempt from the limited entry trawl gear restrictions • Footrope (>19”) prohibited in EFH <u>Fixed gear:</u> • Must be marked at the surface, at each terminal end, with a pole, flag, light, radar reflector, and a buoy; vertical hook-and-line gear that is closely tended may be marked only with a single buoy of sufficient size to float the gear • Must be attended at least once every 7 days • Fishing for groundfish with set nets is prohibited in the fishery management area north of 38°00.00' N. lat. • Traps must have biodegradable escape panels • Spears may be propelled by hand or by mechanical means
Seasons	Seasonal restrictions may be implemented via routine action or the fishery may “close” for some species or some areas during the year through inseason action
GCAs	<u>YRCA</u> • North Coast Commercial YRCA (WA) closed to commercial fixed gears • North Coast Recreational YRCA (WA) is a voluntary area to be avoided • Westport Offshore Recreational YRCA (WA) is a voluntary area to be avoided • Salmon Troll YRCA. Fishing for salmon is prohibited
	<u>CCA</u> Fishing is prohibited in CCAs with the following exceptions: • Fishing for “other flatfish” when using no more than 12 hooks, #2 or smaller • Fishing for rockfish and lingcod shoreward of the 20 fm
Open Access nontrawl RCAs	• <u>North of 46°16 N. lat</u>. Shoreline to 100 fm • <u>46°16- 43° N. lat.</u> 30 to 100 fm • <u>43°-42° N. lat.</u> 20 to 100 fm • <u>42°-40°10 N. lat.</u> 20 fm depth contour to 100 fm • <u>40°10-34°27 N. lat.</u> – 30 to 150 fm • <u>South of 34°27 N. lat</u>. – 60 to 150 fm Fishing is prohibited in nontrawl RCAs with the following exception: Fishing for “other flatfish” when using no more than 12 hooks, #2 or smaller
Monitoring	• VMS required • WCGOP observer coverage when requested
Reporting	• VMS declarations

Table 2-79. No Action. Sablefish trip limits north and south of 36° N. latitude for limited entry and open access fixed gears.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 900 lb., not to exceed 1,800 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,800 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,350 lb., not to exceed 2,700 lb. per 2 mo.					

Non-Nearshore - No Action

The non-nearshore model projects mortality for the limited entry fixed gear and the open access sectors north of 36° N. latitude and seaward of the nontrawl RCA based on the sablefish north ACL. The sablefish north stock is the primary target and provides the main source of revenue in both sectors. The bycatch projections are based on the assumption that the limited entry and open access allocations for sablefish are completely harvested.

Yelloweye rockfish and canary rockfish are the two key rebuilding stocks for these sectors, and the seaward nontrawl RCA boundary is the main management measure for lowering catches of these two stocks. The nontrawl RCA was put in place to mitigate bycatch of the rebuilding stocks and has closed off productive, traditional fishing grounds for these sectors. In general, the WCGOP data and distribution of these stocks suggests that overall encounters of these two stocks would decrease as the nontrawl RCA is extended seaward.

Nearshore - No Action

The nearshore model projects mortality based on landings of nearshore species by the limited entry and opens access sectors shoreward of the nontrawl RCA. The majority of vessels participating in nearshore commercial fisheries do not hold Federal limited entry permits, and the most common gear used is jig gear. However, some vessels use longline gear to target nearshore species and, in rare instances, pots or traps are used in the nearshore fishery.

California and Oregon limit entry to the nearshore groundfish fishery by requiring a state limited entry permit to take commercial quantities of nearshore groundfish species. Washington does not allow a nearshore commercial fishery. More conservative state harvest targets or guidelines than those specified in Federal regulations exist for most nearshore species, and state trip limits supersede Federal limits in these cases. State trip limits are designed to stay within nearshore species limits 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' north latitude.

In Oregon, limited entry permit holders may land commercial quantities of black and blue rockfish under state cumulative trip limits (currently two-month periods), with an additional total of 15 lbs per day of any combination of other nearshore groundfish species and two rockfish species with Federal designation as shelf rockfish (tiger and vermillion). Vessels that also have a nearshore endorsement permit, in addition to the black/blue limited entry permit, may land commercial quantities of other nearshore groundfish species up to the state’s cumulative trip limits and the Federal limits for tiger and vermilion rockfish. 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 be landed dead.

In California, limited entry permit holders who also have either a shallow nearshore fishery or deeper nearshore fishery permit administered by California Department of Fish and Game (CDFG) may land minor nearshore rockfish from either the shallow nearshore or deeper nearshore complexes. Trip limits for shallow nearshore rockfish, deeper nearshore rockfish, cabezon, and California scorpionfish vary by period. There is some nearshore commercial fishing allowed in the CCAs (Figure 2-4) in depths shallower than 20 fm under the No Action Alternative. Only southern minor nearshore rockfish, (both shallow and deeper nearshore rockfish), California scorpionfish, cabezon, greenlings, California sheephead, and ocean whitefish are allowed to be retained in depths less than 20 fm in the CCAs.

2.4.1.5 Tribal Fishery Management Measures – No Action

Tribal fisheries consist of trawl (bottom, mid-water, and whiting), fixed gear, and troll. Principle management controls in the tribal fisheries include set-asides, HGs, and trip limits. Tribal set-asides are outlined in 2.2.1.1. Set-asides are the same as the values in the January 1, 2012 regulations, however, projected catches of petrale sole and widow rockfish were updated based on a letter received from Makah at the November 2011 Council meeting (Agenda Item E.4.b, Supplemental Tribal Report, November 2011). The Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) conducted their groundfish fisheries in 2011 with the trip limits shown in Table 2-80 and the following allocations:

- The sablefish allocation was 10 percent of the sablefish ACL north of 36° N. latitude (6,471 mt). The allocation of 535 mt was further reduced by 1.5 percent for discard mortality, to produce landed catch allocations of 527 mt.

- Black rockfish was managed with a HG of 30,000 pounds north of Cape Alava, Washington at 48°09'30" N. latitude, and 10,000 pounds between Destruction Island, Washington at 47°40' N. latitude and Leadbetter Point, Washington at 46°38'10" N. latitude. There were no harvest restrictions on black rockfish between Cape Alava and Destruction Island.

- Lingcod had a 250 mt HG.

- Pacific cod had a 400 mt tribal HG.

- Longspine and shortspine thornyheads were managed to the limited entry cumulative limits in place at the beginning of the year, but with those limits accumulated across vessels into a cumulative fleetwide harvest target for the year.

- The Makah Tribe would manage the midwater trawl fisheries as follows: Yellowtail rockfish taken in the directed tribal mid-water trawl fisheries are subject to a catch limit of 677 mt for the entire fleet. Landings of widow rockfish must not exceed 10 percent of the weight of yellowtail rockfish landed, for a given vessel, throughout the year. These limits may be adjusted by the tribe inseason to minimize the incidental catch of canary rockfish and widow rockfish, provided the catch of yellowtail rockfish does not exceed 677 mt for the fleet.

- The 2012 Pacific whiting TAC had not been adopted at the time of the analysis, therefore the 2011 harvest level and allocations are used under No Action. In 2011 the U.S. TAC of 290,903 mt for Pacific whiting resulted in a start of the year tribal allocation of 66,908 mt that NMFS based on the percentage requested by Makah (17.5 percent of the U.S. TAC) and an additional amount to accommodate the Quileute's developing fishery (76FR28897).

All mid-water landing limits were subject to inseason adjustments to minimize the take of both canary and widow rockfish. Full rockfish retention programs, where all overfished and marketable rockfish are retained, as well as a Makah trawl observer program, were in place to provide catch accountability.

Table 2-80. The No Action: Tribal fishery.

<table>
<tr><td>Cumulative limits</td><td>Full retention of rockfish

Rockfish taken during open competition tribal commercial fisheries for Pacific halibut would not be subject to trip limits.

Thornyheads
• Shortspine thornyhead cumulative trip limits are 17,000-lb per 2 months
• Longspine thornyhead cumulative trip limits are 22,000-lb per 2 months

<u>Canary rockfish</u> 300 lb per trip
<u>Yelloweye rockfish</u> 100 lb per trip

<u>Makah Tribe midwater trawl fisheries</u>:
Yellowtail rockfish taken in the directed tribal mid-water trawl fisheries are subject to a catch limit of 677 mt for the entire fleet. Landings of widow rockfish must not exceed 10 percent of the weight of yellowtail rockfish landed, for a given vessel, throughout the year. These limits may be adjusted by the tribe inseason to minimize the incidental catch of canary rockfish and widow rockfish, provided the catch of yellowtail rockfish does not exceed 677 mt for the fleet.

<u>Other rockfish</u>, including minor nearshore, minor shelf, and minor slope rockfish 300 lb per trip limit per species or species group, or to the nontribal limited entry trip limit for those species if those limits are less restrictive than 300 lb (136 kg) per trip.

<u>Lingcod</u> are subject to an overall catch of 250 mt for all treaty fishing.

<u>Flatfish and other fish (bottom trawl)</u>.
• For Dover sole, English sole, other flatfish 110,000 lbs (49,895 kg) per 2 months; and for arrowtooth flounder 150,000 lbs (68,039 kg) per 2 months. The Dover sole and arrowtooth limits in place at the beginning of the season would be combined across periods and the fleet to create a cumulative harvest target. The limits available to individual vessels would then be adjusted inseason to stay within the overall harvest targets and overfished species limits.
• <u>Petrale sole</u> - 50,000 lb per 2 month limit for the entire year. Trawl vessels are restricted to small footrope trawl gear.

<u>Pacific whiting</u> -The tribal allocation for 2011 is 66,908 mt.

<u>Pacific cod</u> - Managed to the tribal HG of 400 mt.

<u>Spiny dogfish</u> - limited entry trip limits for the non-tribal fisheries apply</td></tr>
<tr><td>Monitoring</td><td>• The Makah Tribe shoreside observer program to monitor and enforce Makah limits.</td></tr>
<tr><td>Reporting</td><td>• VMS declarations for trawl only</td></tr>
</table>

2.4.1.6 Recreational Fishery Management Measures – No Action

Washington Recreational – No Action

Primary catch controls for the Washington recreational fishery are season dates, depth closures, bag limits, and groundfish conservation areas, including YRCAs. Under the No Action Alternative, Washington recreational fisheries would operate under the 2012 ACLs for yelloweye rockfish of 17 mt and canary rockfish of 107 mt (Table 2-69), and the associated Washington recreational HGs of 2.6 mt for yelloweye rockfish and 2.0 mt for canary rockfish (Table 2-76).

Groundfish Seasons and Area Restrictions

Season Structure

Under the No Action Alternative, the Washington recreational fishery would be open year-round for groundfish, except lingcod. Washington would continue to prohibit the retention of canary and yelloweye rockfish in all areas.

Depth restrictions are the primary tool used to keep recreational mortality of yelloweye and canary rockfish within specified HGs. Restrictions limiting the depth where groundfish fisheries are permitted are more severe in the area north of the Queets River (Marine Areas 3 and 4) where yelloweye and canary rockfish abundance is higher and therefore caught incidentally at a higher rate. Depth restrictions are fewer in the south coast where incidental catch of yelloweye and canary becomes progressively less. Table 2-81 summarizes key features of the Washington recreational regulations.

Table 2-81. No Action. Washington Recreational Seasons and Groundfish Retention Restrictions.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>3 & 4 (N. Coast)</td><td colspan="5">Open all depths</td><td colspan="4">Open <20 fm June 1-Sep 30 a/</td><td colspan="3">Open all depths</td></tr>
<tr><td>2 (S. Coast)</td><td colspan="2">Open all depths</td><td colspan="4">Open <30 fm Mar 15 - June 15 b/, c/, d/, g/</td><td colspan="2">Open all depths except lingcod prohibited on Fri. and Sat. >30 fm e/,g</td><td colspan="4">Open all depths g/</td></tr>
<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths g/</td><td colspan="5">Open all depths f/, g/</td><td colspan="3">Open all depths g/</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of rockfish allowed seaward of 30 fm.
d/ Retention of lingcod allowed seaward of 30 fm on days that the primary halibut season is open.
e/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 – August 31.
f/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.
g/ Retention of lingcod prohibited in deepwater areas at all times.</td></tr>
</table>

<u>North Coast (Marine Areas 3 and 4)</u>

The retention of bottomfish is prohibited seaward of a line approximating 20 fm from June 1- September 30, except on days that Pacific halibut fishing is open. Fishing for, retention, or possession of groundfish and Pacific halibut is prohibited in the C-shaped YRCA (Figure 2-7).

<u>South Coast (Marine Area 2)</u>
The retention of bottomfish, except rockfish, is prohibited seaward of 30 fm from March 15 through June 15, except sablefish and Pacific cod retention is allowed May 1 through June 15. Retention of lingcod is allowed on days open to the primary Pacific halibut season. The retention of lingcod is prohibited south of 46°58’ N. latitude and seaward of 30 fm on Fridays and Saturdays from July 1 through August 31. Fishing for, retention, or possession of lingcod is prohibited in deepwater areas seaward of a line extending from 47°31.70’ N. latitude, 124°45.00’ W. longitude to 46°38.17’ N. latitude, 124°30.00’ W. longitude year-round, except as allowed on days open to the Pacific halibut fishery (Figure 2-8). Fishing for, retention or possession of bottomfish or Pacific halibut is prohibited in the South Coast YRCA and Westport Offshore YRCA (Figure 2-6).

<u>Columbia River (Marine Area 1)</u>
Retention of bottomfish, except sablefish and Pacific cod, is prohibited with halibut onboard from May 1 through September 30, and fishing for, retention, or possession of lingcod in deepwater areas seaward of a line extending 47°31.70 N. latitude, 124°45.00’ W. longitude to 46°38.17’ N. latitude, 124°30.00’ W. longitude year-round (Figure 2-8).

Area Restrictions
Under the No Action Alternative, fishing for, retention, or possession of groundfish and halibut during the Washington recreational groundfish and Pacific halibut fisheries would be prohibited in the C-shaped YRCA in the north coast (Figure 2-5), and the South Coast and Westport YRCAs in the south coast (Figure 2-6).

Fishing for, retention, or possession of lingcod would be prohibited seaward of a line connecting the following coordinates from the Queets River (47°31.70’ N. latitude, 124° 45.00’ W. longitude) to 46°25.00’ N. latitude, 124°21.00’ W. longitude, year round except as allowed in Washington Marine Area 2 on days open to the primary Pacific halibut fishery (Figure 2-8):

1. 47°31.70’ N. lat 124°45.00’ W. long.
2. 46°38.17’ N. lat 124°30.00’ W. long.
3. 46°38.17’ N. lat 124°21.00’ W. long.
4. 46°25.00’ N. lat 124°21.00’ W. long.

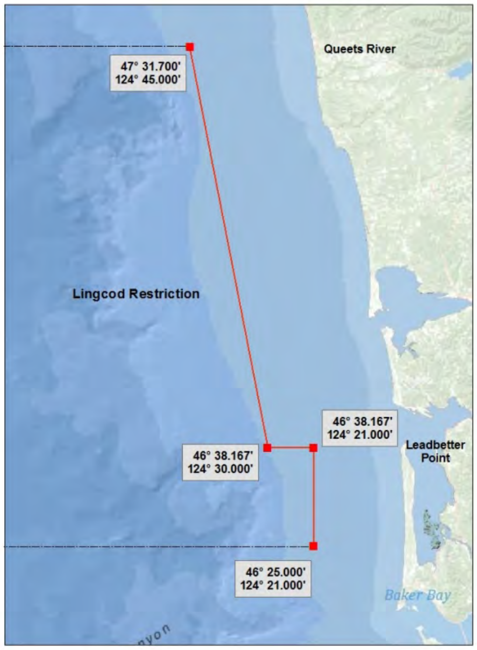


Figure 2-8. No Action. Washington Lingcod Restricted Area.

Groundfish Bag Limits

Under the No Action Alternative the recreational groundfish bag limit, including rockfish and lingcod, would be 12 fish per day. Of the 12 recreational groundfish allowed to be landed per day, sub-limits of 10 rockfish, two lingcod and two cabezon apply.

Lingcod Seasons and Size Limits

The lingcod season in Marine Areas 1 through 3 (Washington-Oregon border at 46°16' N. latitude to Cape Alava at 48°10' N. latitude) was open from the Saturday closest to March 15 through the Saturday closest to October 15, which is March 17 through October 13 in 2012. Marine Area 4 (Cape Alava to the U.S. Canadian border) was open from April 16 through the Saturday closest to October 15, whichever is earlier, which is April 16 through October 13 in 2012.

Under the No Action Alternative the lingcod seasons and size limits by area are as follows:

- Marine Areas 1-3: March 16 through October 12 in 2013 and March 15 through October 18 in 2014. Minimum size, 22 inches.
- Marine Area 4: April 16 through October 12 in 2013 and April 16 to October 15 in 2014. Minimum size, 24 inches.

Pacific Halibut Seasons

It is expected that the Pacific halibut seasons in 2013 and 2014 would be similar to the halibut seasons in 2011 and 2012. There are no changes to the restrictions on groundfish retention during the Pacific halibut season proposed under the No Action Alternative.

Additional Management Measures Analyzed
No additional management measures were analyzed for the No Action Alternative. Status quo management measures would be used to keep recreational harvests of overfished species within specified HGs.

Inseason Management Response
Projected mortality for Washington's recreational fishery is based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in Recreational Fishery Information Network (RecFIN). It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons would continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

Washington's Ocean Sampling Program is able to produce estimates of groundfish catch with a one month lag time. Management measures such as more restrictive depth closures, area closures, groundfish retention restrictions, or changes to seasons can be implemented immediately through emergency changes to state regulations if inseason catch reports indicate that recreational harvests of overfished species are exceeding pre-season projections to the point where HGs are at risk of being exceeded.

Oregon Recreational – No Action

Primary catch controls for the Oregon recreational fishery are season dates, depth closures, bag limits, and groundfish conservation areas, including YRCAs. The No Action Alternative analyzes the Oregon recreational fishery under the 2012 ACLs (Table 2-69) and Oregon recreational a HGs (Table 2-76). Additionally, a HG of 440.8 mt for black rockfish would be implemented.

Groundfish Seasons and Area Restrictions

Season structure
Under the No Action Alternative, the Oregon recreational groundfish fishery would be open offshore year-round, except from April 1 to September 30 when fishing is only allowed shoreward of 40 fm, as defined by waypoints (Figure 2-9). Closing the fishery outside of 40 fm from April 1 to September 30, months when angler effort and yelloweye rockfish encounters are greatest, mitigates mortality of yelloweye rockfish. Projected mortality of yelloweye and canary rockfish are within the HG, therefore the shore-based fishery would be open year-round.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Groundfish Season	Open all depths			Open < 40 fm						Open all depths		
Marine Bag Limit [1]	Ten (10)			1 Fish Cabezon Sub-Bag [2]						Ten (10)		
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

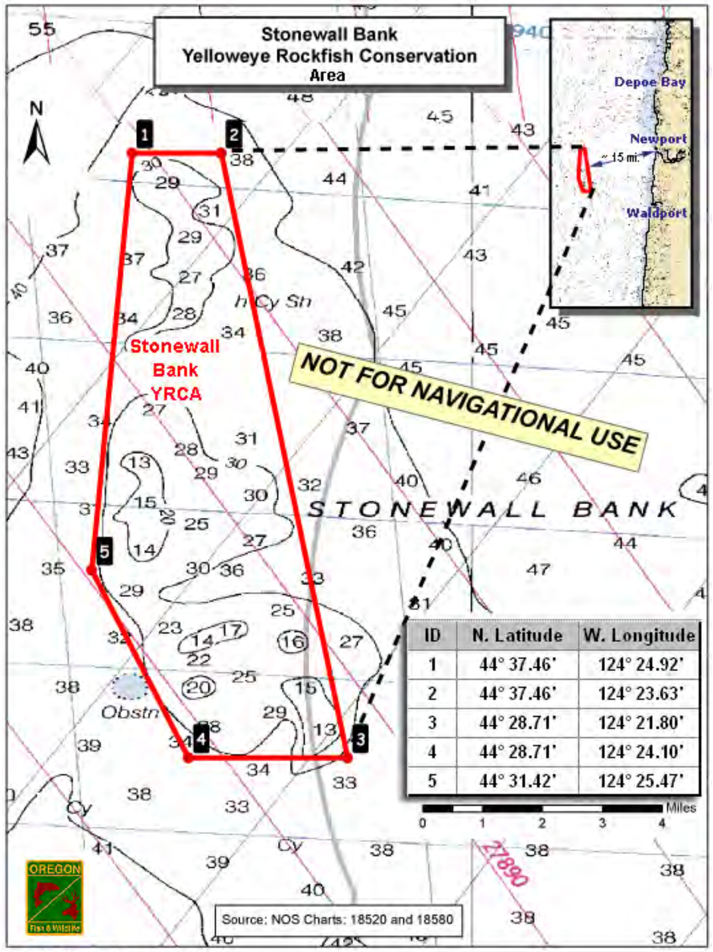
1 Marine bag limit includes all species other than lingcod, salmon, steelhead, Pacific halibut, flatfish, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine, and smelt.
2 From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon.
3 Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut.

Figure 2-9. No Action. Oregon recreational groundfish season structure and bag limits under the No Action Alternative.

Area Closures

The Stonewall Bank YRCA has been in place since 2006 and would also remain under the No Action alterative (Figure 2-10). The YRCA is located approximately 15 miles west of the Port of Newport and consists of the high-relief area of Stonewall Bank, an area of high yelloweye rockfish encounters. No recreational fishing for groundfish and Pacific halibut can occur within this YRCA, which is bounded by the following waypoints:

44°37.458’ N. latitude 124°24.918’ W. longitude
44°37.458’ N. latitude 124°23.628’ W. longitude
44°28.710’ N. latitude 124°21.798’ W. longitude
44°28.710’ N. latitude 124°24.102’ W. longitude
44°31.422’ N. latitude 124°25.500’ W. longitude



ODFW, 05/22/06. Reprinted 12/12/06

Figure 2-10. The Stonewall Bank Yelloweye Rockfish Conservation Area where recreational fishing for groundfish and Pacific halibut is prohibited. Under the No Action Alternative, the area would remain closed.

Groundfish Bag Limits and Size Limits

Under the No Action Alternative, the marine fish daily bag limit of 10 fish in aggregate that was allowed in 2011-2012 Oregon recreational fisheries would carry forward for 2013-2014 (Figure 2-9). The 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. During April through September, there was a one fish sub-bag limit for cabezon (of the 10 fish marine bag limit no more than one could be cabezon). This cabezon sub-bag limit would also carry forward for 2013-2014. A flatfish daily bag limit of 25, which includes all soles and flounders except Pacific halibut, was allowed in addition to the marine fish daily bag limit. Additionally a three-fish bag limit was allowed for lingcod. Retention of canary and yelloweye rockfish was prohibited in 2011-2012 and would continue to be prohibited under the No Action Alternative.

The following minimum size limits applied to 2011-2012 Oregon recreational fisheries and would be carried forward under the No Action Alternative:

- Lingcod – 22 in.
- Cabezon – 16 in.
- Kelp greenling – 10 in.

Pacific Halibut Seasons
Under the No Action Alternative, the recreational Pacific halibut fisheries should be able to proceed as in 2011 and 2012, in regards to days and areas open, etc., depending on the halibut quota. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery would be similarly limited in 2013 and 2014.

Additional Management Measures Analyzed
Under the No Action Alternative, no additional management measures were analyzed for the Oregon recreational fisheries. Since projected mortality is within the HGs for the No Action Alternative, the status quo season structure and regulations should be sufficient, therefore no additional management measures were analyzed.

Inseason Management Tools
Oregon has a responsive port-based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track mortality and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2013 (or 2014) fishery does not proceed as expected.

Inseason management tools, designed to mitigate mortality, include bag limit adjustments (including non-retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish mortality, since retention of these species is prohibited. If catch rates indicate that the harvest targets for yelloweye rockfish would be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduce mortality. Oregon Department of Fish and Wildlife (ODFW) would monitor inseason progress toward recreational harvest targets for canary rockfish and yelloweye rockfish. Regulations would depend upon the timing of the determination for their need.

Adjustments to the marine fish daily bag limit to no more than 10 fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than 3 fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2011 levels. Season and/or area closures may also be considered if harvest targets are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit mortality. Closing certain days each week would help lengthen the duration of a fishery approaching an HG.

Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling, as release survival is very high. They may also be used to reduce mortality of nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and would continue into 2013-2014, testing the effectiveness and selectivity of various gears and the survivability of rockfish released at depth.

Directed yellowtail rockfish and/or flatfish fisheries may be implemented inseason, as were implemented in 2004, in the event of a closure of the recreational groundfish fishery due to attainment Federal or state HGs or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries would be monitored to ensure that mortality of yelloweye and canary rockfish are within the harvest targets/guidelines.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2011 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries would be monitored to ensure that mortality of yelloweye rockfish and canary rockfish is not in excess of the HGs.

California Recreational – No Action

Primary catch controls for the California recreational fishery are season dates, bag limits, and groundfish conservation areas. Projected mortality and season structures for 2013-2014 under the No Action Alternative would be based on CDFG's updated RecFISH model. Model projections were originally calculated in April 2011 for the five recreational groundfish management areas using updated 2009 and 2010 RecFIN estimates; overfished species mortality is reported statewide. Recreational HGs are reported in Table 2-76.

Groundfish Seasons and Area Restrictions:
Figure 2-14 details the groundfish seasons and area restrictions under the No Action Alternative. All divers and shore-based anglers are exempt from the seasonal closures for rockfish, cabezon, greenlings, lingcod, and California scorpionfish.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 12–Oct 31 <20fm						Closed	
Mendocino	Closed				May 12–Aug 15<20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 <60fm									

Figure 2-11. No Action: California recreational groundfish season structure for 2013-2014.

In 2009, four YRCAs were adopted in the Northern and Mendocino Management Areas for use in management. The YRCAs include habitat in both state and Federal waters and can be implemented inseason (if needed) to reduce yelloweye rockfish mortality. To date, these YRCAs have not been implemented but would remain available under the No Action Alternative.

The California Fish and Game Commission (Commission) has implemented or is currently in the process of implementing marine protected areas (MPAs) throughout the entire state. When MPA implementation is complete, more than 124 MPAs covering approximately 848 square miles (16 percent) of state waters would be in effect (California Department of Fish and Game 2011b). Since most of these MPAs occur in state waters, many in 20 fm or less, the available fishing areas, particularly in the Northern and Mendocino Management Areas, would be reduced.

Groundfish Bag Limits and Size Limits:
Under the No Action Alternative, a statewide 10 fish rockfish, cabezon, and greenling bag limit with a sub-bag limit of two fish for bocaccio and greenlings and a three fish sub-bag limit for cabezon would remain in place. Retention of bronzespotted, canary, cowcod, and yelloweye rockfish was prohibited in 2011-2012 and would continue to be prohibited under the No Action Alternative. The following bag limits would also apply:

- California scorpionfish – 5 fish
- Leopard shark – 3 fish
- Lingcod – 2 fish
- Sanddabs – None
- Soupfin shark – 1 fish

There is no bag limit for Pacific sanddab, petrale sole and starry flounder. A bag limit of 10 fish of any one species within the 20 finfish maximum bag limit would apply to the remaining species in the groundfish FMP.

The following minimum size limits applied to 2011-2012 California recreational fisheries would be carried forward under the No Action Alternative:

- Bocaccio – 10 inches
- California scorpionfish – 10 inches
- Cabezon – 15 inches
- Kelp greenling – 12 inches
- Leopard shark – 36 inches
- Lingcod – 22 inches

Inseason Management Response:

CDFG closely monitors yelloweye rockfish and cowcod – performing weekly tracking using preliminary California Recreational Fisheries Survey (CRFS) field reports. These preliminary CFRS reports are converted into an anticipated catch value in metric tons using catch and effort data from previous years. This weekly "proxy" value is then used to approximate catch during the five to eight week lag time in CRFS catch estimates. If angler effort or bycatch of overfished groundfish species changes dramatically from prior years, actual mortality can be higher or lower than projected. Based on the inseason tracking, if any of the overfished species HGs are projected to be attained inseason, CDFG could enact emergency management actions to slow and/or reduce catches. Management measures include closing one or more recreational groundfish management areas for boat-based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

2.4.2 Preferred Alternative – 116 mt Canary Rockfish ACL and 150 mt POP ACL

The Preferred Alternative (and all of the action alternatives) incorporates the best available scientific information for stock assessment projections described in Section 2.1.

The Preferred Alternative represents the continuation of status quo harvest management policies for overfished species while contemplating several new management measures, as described in Section 2.3. New stock assessments and rebuilding analyses show that the current target rebuilding years for canary rockfish and POP are less than the re-estimated minimum feasible rebuilding time ($T_{F=0}$, or prohibiting all harvest).[20] Under the Preferred Alternative, the target year for canary rockfish would be changed by three years (from 2027 to 2030), which is two years longer than the re-estimated $T_{F=0}$. The target year for POP would be changed by 31 years (from 2020 to 2051), which is 8 years longer than $T_{F=0}$. Overfished species ACLs are derived using a constant SPR harvest rate for rockfish that is specified in the current rebuilding plans and the harvest control rule for petrale sole, applied to the latest stock assessment and rebuilding analyses.

The Preferred Alternative is consistent with the FMP and SSC recommendations. Maintaining the current rebuilding plans for species other than canary and POP is consistent with FMP section 4.6.3.4. That is, the new rebuilding analyses for the species other than canary and POP are showing steady progress to rebuilding and changes are not required. The SSC recommended the canary and POP rebuilding plans be revised since current target rebuilding years are less than the re-estimated minimum feasible rebuilding time ($T_{F=0}$). The target years and associated harvest rates for canary and POP under the Preferred Alternative result in ACLs that are intended to rebuild the stocks in a time period that is as short as possible, taking into account the status and biology of overfished stocks and the needs of the fishing communities.

2.4.2.1 Preferred Alternative Allocation Scheme

The ACLs and allocations under the Preferred Alternative are detailed in Section 2.4.2. A summary of the overfished species ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative is presented in Table 2-82. The preferred cowcod allocation is 34 percent to trawl and 66 percent to non-trawl; remaining alternatives contain the reverse allocation.

[20] Put another way, even if all harvest of these two species were to be prohibited (likely requiring closure of many fisheries) the likelihood of canary rebuilding by 2027 is 48 percent and POP rebuilding by 2020 is 25 percent.

Table 2-82. Preferred Alternative. Overfished species ACLs and allocations for 2013-2014.

2013							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	320	116	3	317	150	2,592	18
-Total Set-Asides	8.4	17.5	0.1	20.8	16.5	234	5.82
Fishery Harvest Guideline	**311.6**	**98.5**	**2.9**	**296.2**	**133.5**	**2,358.0**	**12.2**
-Trawl Allocation	**74.9**	**52.5**	**1.0**	**281.4**	**126.8**	**2,323.0**	1
Shorebased IFQ	74.9	39.9	1.0	266.3	109.6	2,318.0	1
At-Sea Whiting	N/A	12.6	N/A	14.7	17.4	5	--
Catcher Processor	N/A	7.4	N/A	8.6	10.2		--
Mothership	N/A	5.2	N/A	6.1	7.2		--
-Non-Trawl Allocation	**236.7**	**46.0**	**1.9**	**14.8**	**6.7**	**35.0**	**11.2**
Non-Nearshore	72.3	3.5					1.1
Nearshore Fixed Gear	0.9	6.2					1.2
Washington Recreational [a/]	N/A	3.1					2.9
Oregon Recreational [a/]	N/A	10.8					2.6
California Recreational a/	163.5	22.4					3.4
a/ Values represent HGs which may be adjusted within the non-trawl allocation.							

2014							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	337	119	3	330	153	2,652	18
-Total Set-Asides	8.4	17.5	0.1	20.8	16.5	234	5.82
Fishery Harvest Guideline	**328.6**	**101.5**	**2.9**	**309.2**	**136.5**	**2,418.0**	**12.2**
-Trawl Allocation	**79.0**	**54.1**	**1.0**	**293.7**	**129.7**	**2383.0**	**1**
Shorebased IFQ	79.0	41.1	1.0	278.3	112.3	2,378.0	1
At-Sea Whiting	N/A	13	N/A	15.4	17.4	5	--
Catcher Processor	N/A	7.6	N/A	9	10.2		--
Mothership	N/A	5.4	N/A	6.3	7.2		--
-Non-Trawl Allocation	**249.6**	**47.4**	**1.9**	**15.5**	**6.8**	**35.0**	**11.2**
Non-Nearshore	76.2	3.7					1.1
Nearshore Fixed Gear	0.9	6.4					1.2
Washington Recreational [a/]	N/A	3.2					2.9
Oregon Recreational [a/]	N/A	11.1					2.6
California Recreational [a/]	172.5	23					3.4
a/ Values represent HGs which may be adjusted within the non-trawl allocation.							

2.4.2.2 Preferred Alternative Management Measures

The following bullet points summarize management measure changes by sector under the Preferred Alternative. A more detailed discussion of management measures by sector follows. New measures, discussed under Section 2.3 and analyzed in Appendix C, would be implemented. Overarching changes include modifications to the boundaries defining the RCAs, inseason reapportionments of unused ACL set-asides to the trawl and nontrawl sectors, and modifications to catch accounting language between the limited entry and open access sectors (Section 2.3.3 and Section 2.3.4). New management measures that are specific to a sector are described below.

- The shorebased IFQ fishery would operate under the same management measures as No Action with a few modifications. The preferred trawl RCA configuration would be the structure in place as of June 2012 (instead of January 1, 2012). The lingcod QP accumulation limits for vessels (also called vessel use limits) would be 5.3 percent north of 40°10 N. latitude and 13.3 percent south 40°10 N. latitude (see Section 2.3.7). Also, enhanced accountability measures are implemented for the surplus carry-over program (see Section 2.3.8).[21]
- At-sea whiting co-ops would continue to be managed under the co-op program and the same management measures as No Action. Set-asides to accommodate bycatch in the fishery would be implemented (Table 2-62) and include the following changes from No Action: increases for arrowtooth flounder, lingcod north of 42° N. latitude, and minor slope rockfish north of 40°10 N. latitude.
- Tribal fisheries would operate under the same management measures as No Action (Table 2-80) with a few modifications. Selected changes to set-asides and allocations as outlined in Table 2-48 and Table 2-49 would be implemented, including changes to widow rockfish (45 mt to 60 mt), petrale sole (45.4 to 220 mt), minor shelf rockfish (9 to 30 mt), and shortspine thornyhead (38 to 50 mt). Further, an 800 pound per trip limit for redstripe rockfish would be established in addition to the 300 pound per trip limit for all other minor shelf rockfish. The No Action tribal trip limit for petrale sole (50,000 pounds per 2 months) would be removed and the tribal fleet would be managed to the 220 mt set-aside.
- The non-nearshore fixed gear fishery would operate under the same management measures as the No Action Alternative with a few modificaitons. The No Action nontrawl RCA configuration would be maintained. Routine adjustments to sablefish and blackgill south of 40°10 N. latitude bimonthly trip limits are proposed to keep mortality within the harvest specifications. A 300 pound threshold, in the absence of a daily limit, would be implemented in regulation to facilitate the transition of a vessel from the sablefish primary tier fishery to the DTL fishery (see Section 2.3.10).
- Under the Preferred Alternative for the nearshore fisheries, the seaward boundary of the non-trawl RCA is the same as No Action, except in the area 42° N. latitude to 43° N. latitude, the RCA would be moved from 20 fm to 30 fm. Since projected mortality of overfished species is within the nearshore allocation, landings in Oregon could be 8 percent higher compared to No Action. In California, landings are projected to be the same as No Action, except for increases to greenling and lingcod. The No Action trip limits are recommended for the start of the biennium, however routine inseason adjustments may be recommended.

[21] A variety of program changes are planned for the shorebased IFQ fishery during 2013-14 under separate regulatory actions. For the purposes of this evaluation "No Action" assumes these changes are external actions contributing to cumulative effects.

- Washington and Oregon recreational fisheries would operate under the same management measures as No Action, except the HGs for canary and yelloweye would be increased (Table 2-86).
- For California recreational fisheries, the season length in the Mendocino Management Area would be increased relative to No Action (from 104 days to 111 days). The Council's preferred management measures include increases to the bocaccio and greenling bag limits, removing the bocaccio minimum length and filet limit, and providing for shelf rockfish retention (including bocaccio rockfish) in the CCA (see Sections 2.3.11 and Section 2.3.12). A range of depth closures are analyzed for the Southern Management Area to reduce cowcod bycatch – from 60 fm to 40 fm; the Council's preferred depth closure is 50 fm.

Shorebased IFQ Fishery

Under the Preferred Alternative, the trawl RCA for the shorebased IFQ fishery would be the same configuration as in June 2012 (Table 2-83).

Table 2-83. Trawl RCA boundaries as of June 21, 2012 (76FR22679).

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td>North of 48°10' N. lat.</td><td>shore - modified[2/] 200 fm line[1/]</td><td>shore - 200 fm line[1/]</td><td colspan="2">shore - 150 fm line[1/]</td><td>shore - 200 fm line[1/]</td><td>shore - modified[2/] 200 fm line[1/]</td></tr>
<tr><td>48°10' N. lat. - 45°46' N. lat.</td><td rowspan="2">75 fm line[1/] - modified[2/] 200 fm line[1/]</td><td>75 fm line1/ - 150 fm line1/</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>75 fm line[1/] - 150 fm line[1/]</td></tr>
<tr><td>45°46' N. lat. - 40°10' N. lat.</td><td>75 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>75 fm line[1/] - modified[2/] 200 fm line[1/]</td></tr>
<tr><td>South of 40°10' N. lat.</td><td colspan="6">100 fm line[1/] - 150 fm line [1/ 2/]</td></tr>
</table>

1/ The Rockfish Conservation Area is an area closed to fishing by particular gear types, bounded by lines specifically defined by latitude and longitude coordinates set out at §§ 660.71-660.74. This RCA is not defined by depth contours, and the boundary lines that define the RCA may close areas that are deeper or shallower than the depth contour. Vessels that are subject to the RCA restrictions may not fish in the RCA, or operate in the RCA for any purpose other than transiting.
2/ The "modified" fathom lines are modified to exclude certain petrale sole areas from the RCA.

The Council adopted changes to the shorebased IFQ accumulation limits for lingcod QP (also called vessel use limits) based on concerns that the proposed lingcod management unit for 2013-2014 – changing from coastwide to north and south of 40°10 N. latitude – would result in QP limits which could limit flexibility in vessel operations. The Preferred Alternative would modify the current QP limit in regulation from 3.8 percent to 5.3 percent in the north and 13.3 percent in the south.

The Council recommended changes to the shorebased IFQ carry-over program (Section 2.3.8). This measure seeks to clarify regulations with regard to current accountability measures, which include modifications (reductions or suspension) to the eligible surplus carry-over percentages, in the event it is necessary to address Magnuson Act conservation requirements. The measure seeks to implement such accountability measures through a Council recommendation to National Marine Fisheries Service (NMFS). Lastly, the current list of automatic actions that may be implemented by NMFS would be revised to include closing the shorebased IFQ fisheries, in addition to the at-sea whiting fishery (see regulations at 660.60 (d)).

The Council recommended maintaining the minimum lingcod length limit for the shorebased IFQ fishery, instead of removing the limit, for the start of the biennium (Section 2.3.9). This change from the Preferred Alternative in the DEIS was in response to concern expressed by the Council's Enforcement Committee that differential length limits between sectors would be problematic (Agenda Item D.5.b, Supplemental EC Report, June 2012). The Council requested that the FEIS analyze an 18 inch minimum lingcod length limit for commercial and recreational fisheries, which could be implemented inseason, if desired (see Appendix C).

Limited Entry and Open Access Fixed Gear

Non-nearshore

Under the Preferred Alternative, the non-nearshore fishery would operate under the management measures described under No Action. Routine adjustments to sablefish and blackgill south of 40°10 N. latitude trip limits are proposed and detailed below. Further, if adopted, the new measures discussed under Section 2.3 and analyzed in Appendix C, would be implemented.

Under this alternative, the sablefish north of 36° N. latitude ACL decreases substantially, from 5,347 mt in 2012 to 3,569 mt and 3,872 mt in 2013 and 2014, respectively (Table 2-18). These amounts represent a 19-25 percent decrease relative to the No Action Alternative. Landings for other species encountered in the non-nearshore fishery are anticipated to be the same as in 2011, except blackgill south of 40°10' N. latitude.

The decrease in the sablefish landings translates directly into lower expected catch of the rebuilding stocks for the non-nearshore sector that are within the proposed allocations (Table 2-82). Since the projected mortality of overfished species is within the allocations, the No Action nontrawl RCA structure is proposed (Table 2-77). The expected decrease in yelloweye and canary bycatch are not substantial enough to consider modifying the seaward boundary of the nontrawl RCA to provide greater access to fishing grounds since such action would be expected to increase encounters with canary, yelloweye, and other shelf rockfish stocks like bocaccio. The nontrawl RCA was established at 100 fm because the 100 fm depth contour marks the transition between shelf and slope habitats. If fishing areas are reopened on the shelf, catch of shelf rockfish stocks like canary and yelloweye could increase. In addition, estimates of yelloweye catch in these sectors have shown variability in recent years with estimates of actual catch differing by more than 50 percent higher and lower than the bycatch projections from the non-nearshore model. Such volatility requires some caution when interpreting and planning based on projected mortality.

Adjustments to sablefish trip limits to coincide with the lower sablefish ACLs are proposed for the both the limited entry and open access fixed gear sectors (Table 2-84 and Table 2-85). These trip limits are estimated to attain approximately 91 percent of the allocations and may be adjusted inseason as necessary. The proposed trip limits apply under all of the integrated alternatives.

The Council-proposed action would implement a 300 pound sablefish threshold, in the absence of a daily limit established in regulation, to facilitate the transition of a vessel from the sablefish primary fishery to the sablefish DTL fishery. The 300 pound threshold was the most common DTL in this fishery over the past seven years, and would give maximum access of a fisher to their tier pounds.

A range of blackgill rockfish trip limits south of 40°10' N. latitude were explored to keep landings within the blackgill HG (see Appendix C). For limited entry fixed gear south of 40°10' N. latitude, the Council recommended a minor slope rockfish and darkblotched trip limit of 40,000 pounds/2 months, of which no more than 1,375 pounds may be blackgill rockfish. For open access fixed gear south of 40°10' N. latitude, the Council recommended a minor slope rockfish and darkblotched trip limit of 10,000 pounds/2 months, of which no more than 475 pounds may be blackgill rockfish. These trip limits are projected to attain 100 percent of the nontrawl blackgill allocation.

Further, detailed analysis of routine adjustments to longnose skate and spiny dogfish trip limits and/or RCAs is provided in Appendix C, in the event adjustments are needed to keep mortality within the harvest specifications.

Table 2-84. 2013 Sablefish trip limits for all alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,880 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.					

Table 2-85. 2014 Sablefish trip limits for all alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N	1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.					
	OA N	300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.					
South of 36° N. lat.	LE S	1,930 lb. per week					
	OA S	300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.					

Nearshore

Under the Preferred Alternative, the nearshore fishery would operate under the management measures described under No Action. The same trip limit adjustments for sablefish as presented in Table 2-84 and Table 2-85 would apply (some are caught shoreward of the nontrawl RCA).

Under the Preferred Alternative, the allocations of canary and yelloweye rockfish to the nearshore fishery are higher (Table 2-82) than the No Action Alternative (Table 2-76). Although both California and Oregon would have some increased opportunity compared to the No Action Alternative, management measures and projected landings are lower than years prior to 2009 (PFMC 2008a).

Similar to the No Action Alternative, the Preferred Alternative is modeled assuming the bycatch rates, weather, and market conditions experienced in 2011 would be the same in 2013 and 2014, and assumes no variation in landings. If catches are higher than projected, few management measures are available to further reduce yelloweye catch in this fishery (if needed). Further reductions in yelloweye catch would require substantial reductions to landed catch or total fishery closure between 43° N. latitude and 40° 10' N. latitude, the area with the highest yelloweye bycatch rates. Depth restrictions shallower than 10 fm are not advised because of vessel safety concerns.

The Preferred Alternative maintains the No Action catch sharing between Oregon and California for canary (OR = 26.7 percent; CA = 73.3 percent) and yelloweye rockfish (OR = 72.7 percent; CA = 27.3 percent). Under the Preferred Alternative, the seaward boundary of the non-trawl RCA is the same as No Action, except in the area 42° N. latitude to 43° N. latitude, the RCA would be moved from 20 fm to 30 fm. Since projected mortality of overfished species is within the nearshore allocation, landings in Oregon could be 8 percent higher compared to No Action. In California, landings are projected to be the same as No Action, except for increases to greenling and lingcod. The No Action trip limits are recommended for the start of the biennium, however routine inseason adjustments may be recommended.

Tribal Fisheries

Tribal fisheries would operate under the same management measures as No Action (Table 2-80) with a few selected changes. Set-asides and allocations as outlined in Table 2-48 and Table 2-49 would be implemented. Set-asides changes include widow rockfish (45 mt to 60 mt), petrale sole (45.4 to 220 mt), minor shelf rockfish (9 to 30 mt), and shortspine thornyhead (38 to 50 mt). Further, an 800 pound per trip limit for redstripe rockfish would be established in addition to the 300 pound per trip limit for all other minor shelf rockfish. The No Action tribal trip limit for petrale sole (50,000 pounds per 2 months) would be removed and the tribal fleet would be managed to the 220 mt set-aside.

Recreational

California

The California recreational fishery would operate under the management measures described below. Additionally, new measures described below and in Section 2.3 and analyzed in Appendix C would be implemented. The preferred allocations to the California recreational fishery are higher (Table 2-82) than the No Action Alternative (Table 2-76). Although there would be some increased opportunity compared to No Action, management measures would still have to be more restrictive than previous years (PFMC 2002).

Groundfish Seasons and Area Restrictions:
Under the Preferred Alternative, the season structure would be similar to the No Action Alternative except for an increase in the season length for the Mendocino Management Area and a change in the depth restriction from 60 to 50 fm in the Southern Management Area (Figure 2-12). A range of depth closures (60 fm to 40 fm) for the Southern Management Area was analyzed in Appendices C and D. All divers and shore-based anglers are exempt from the seasonal closures for rockfish, cabezon, greenlings, lingcod, and California scorpionfish.

Similar to No Action, YRCAs would be available under this alternative and could be implemented inseason if catches are projected to exceed HGs.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 15 – Oct 31 <20fm						Closed	
Mendocino	Closed				May 15 – Sept 2 <20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 <50fm									

Figure 2-12. Preferred Alternative: California recreational groundfish season structure and depth constraints for 2013-2014.

Groundfish Bag Limits and Size Limits

The Preferred Alternative groundfish bag limits and size limits are the same as No Action, except for the following:

Bocaccio – The No Action sub-bag limit for bocaccio is two fish, with a minimum size limit of 10 inches. The proposed action would increase the sub-bag limit from two fish to three fish. The increase in the sub-bag limit is expected to increase total California recreational mortality of bocaccio by 11.5 percent. The proposed action also removes the minimum size limit of 10 inches and the corresponding filet limit of five inches. Removing the size limit is expected to increase total bocaccio mortality by 1.0 percent. The proposed changes are not mutually exclusive, and the projections are additive. Currently bocaccio is the only rockfish species in the recreational sector that has a size limit. Removing the size limit would reduce regulatory complexity. Catch of other overfished species, as a result of these management measures, is not expected to increase.

Greenlings – The No Action status quo sub-bag limit for greenlings is two fish. The proposed action would increase the sub-bag limit to 10 fish to maintain consistency with state regulations and stay within the greenling contribution to the Other Fish complex. By increasing the sub-bag limit, the estimated take would be approximately 23.8 mt. The Council is not proposing any changes to the minimum size restriction for greenling. There are no expected changes to catch of overfished species as a result of this increase.

Additional Management Measures Analyzed

<u>Shelf Rockfish Retention in CCA</u>

Under the Preferred Alternative, the Council proposes to modify existing regulations governing recreational groundfish fishing within the CCA to allow retention of shelf rockfish taken during the open season for groundfish within the existing depth constraint of 20 fm. No changes to nongroundfish recreational fisheries or corresponding management measures are being proposed. Under this proposal, if the season for groundfish is open, anglers could retain shelf rockfish, including bocaccio. Removing the prohibition on shelf rockfish retention, including bocaccio, in depths of 20 fm or less in the CCA when fishing for rockfish is open, is intended to reduce bycatch that currently occurs when shelf rockfish are caught while in pursuit of other species within the 10 fish rockfish, cabezon, and greenling (RCG) bag limit. Under the proposed action, recreational anglers would be expected to meet their RCG bag limit sooner, which would reduce bycatch of shelf rockfish and may reduce encounters with overfished species. Also, this change would make regulations more consistent with retention regulations outside the CCA.

Increased mortality of shelf rockfish is expected to be minimal and can be accommodated within the recreational HG with a minimal risk of exceeding the ACLs. No ACLs for target or overfished species are expected to be exceeded as a result of this action.

Inseason Management Response

Similar to the No Action Alternative, inseason management response would include closing one or more recreational groundfish management areas for boat-based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

2.4.3 Alternative 1– 116 mt Canary Rockfish ACL and 150 mt POP ACL

Alternative 1 (and all of the action alternatives) incorporates the best available scientific information for stock assessment projections described in Section 2.1.

Similar to the Preferred Alternative, Alternative 1 represents the continuation of status quo harvest management policies for overfished species while contemplating several new management measures, as described in Section 2.3. New stock assessments and rebuilding analyses show that the current target rebuilding years for canary rockfish and POP are less than the re-estimated minimum feasible rebuilding time ($T_{F=0}$, or prohibiting all harvest).[22] Under Alterative 1 and the Preferred Alternative, the target year for canary rockfish would be changed by three years (from 2027 to 2030), which is two years longer than the re-estimated $T_{F=0}$. The target year for POP would be changed by 31 years (from 2020 to 2051), which is 8 years longer than $T_{F=0}$. Overfished species ACLs are derived using a constant SPR harvest rate for rockfish that is specified in the current rebuilding plans and the harvest control rule for petrale sole, applied to the latest stock assessment and rebuilding analyses.

Alternative 1 is consistent with the FMP and SSC recommendations. Maintaining the current rebuilding plans for species other than canary and POP is consistent with FMP section 4.6.3.4. That is, the new rebuilding analyses for the species other than canary and POP are showing steady progress to rebuilding and changes are not required. The SSC recommended the canary and POP rebuilding plans be revised since current target rebuilding years are less than the re-estimated minimum feasible rebuilding time ($T_{F=0}$). The target years and associated harvest rates for canary and POP under Alternative 1 result in ACLs that are intended to rebuild the stocks in a time period that is as short as possible, taking into account the status and biology of overfished stocks and the needs of the fishing communities.

2.4.3.1 Alternative 1 Allocation Scheme

The ACLs and allocations under Alternative 1 are detailed in 2.4.2. A summary of the overfished species ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative is presented in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10 N. latitude (66 percent to trawl, 34 percent to nontrawl) is included in Alternatives 1-8 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C). The option was selected under the Preferred Alternative.

[22] Put another way, even if all harvest of these two species were to be prohibited (likely requiring closure of many fisheries) the likelihood of canary rebuilding by 2027 is 48 percent and POP rebuilding by 2020 is 25 percent.

Table 2-86. Alternative 1. Overfished species ACLs and allocations for 2013-2014.

Alternative 1. 2013							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	320	116	3	317	150	2,592	18
Total Set-Asides	5	16.8	0.12	19.7	12.9	74.8	5.82
Fishery Harvest Guideline	315.0	99.2	2.9	297.3	137.1	2,517.2	12.2
Trawl Allocation	76.9	53.1	1.9	282.7	130.4	2482	1
Shorebased IFQ	76.9	40.3	1.9	268	113	2,477	1
At-Sea Whiting	N/A	12.8	N/A	14.7	17.4	5	--
Catcher Processor	N/A	7.5	N/A	8.6	10.2		--
Mothership	N/A	5.3	N/A	6.1	7.2		--
Nontrawl Allocations	243.0	46.4	1.0	15.0	7.0	35.0	11.2
Non-Nearshore	74.2	3.6					1.1
Nearshore Fixed Gear	0.9	6.2					1.2
Washington Recreational [a/]	N/A	3.1					2.9
Oregon Recreational [a/]	N/A	10.9					2.6
California Recreational [a/]	167.9	22.6					3.4
a/ Values represent HGs.							

Alternative 1. 2014							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	337	119	3	330	153	2,652	18
Total Set-Asides	5	16.8	0.12	19.7	12.9	74.8	5.8
Fishery Harvest Guideline	332.0	102.2	2.9	310.3	140.1	2,577.2	12.2
Trawl Allocation	79.8	54.70	1.9	294.4	133.4	2542	1
Shorebased IFQ	79.8	41.5	1.9	279	116	2,537	1
At-Sea Whiting	N/A	13.2	N/A	15.4	17.4	5	--
Catcher Processor	N/A	7.7	N/A	9	10.2		--
Mothership	N/A	5.5	N/A	6.4	7.2		--
Nontrawl Allocations	252.1	47.8	1	16	7	35	11.2
Non-Nearshore	77	3.7					1.1
Nearshore Fixed Gear	0.9	6.4					1.2
Washington Recreational [a/]	N/A	3.2					2.9
Oregon Recreational [a/]	N/A	11.2					2.6
California Recreational	174.2	23.3					3.4
a/ Values represent HGs.							

2.4.3.2 Alternative 1 Management Measures

The following bullet points summarize management measure changes by sector under Alternative 1. New measures, discussed under Section 2.3 and analyzed in Appendix C, would be implemented. Overarching changes include modifications to the boundaries defining the RCAs, inseason reapportionments of unused ACL set-asides to the trawl and nontrawl sectors, and modifications to catch accounting language between the limited entry and open access sectors in Section 2.3.3 (not including the items in Section 2.3.4). New management measures that are specific to a sector are described below.

- The shorebased IFQ fishery would operate under the same management measures as the Preferred Alternative, with a few modifications. The No Action trawl RCA configuration would be implemented under Alternative 1, which is the structure in place January 1, 2012. The minimum lingcod length limit of 20 inches would be removed, which would reduce regulatory discards compared to No Action and the Preferred Alternative. Further, the No Action lingcod accumulation limits for vessels (also called vessel use limits) would be implemented (3.5 percent north and south of 40°10 N. latitude). The enhanced accountability measures for the surplus carry-over would not be implemented (Section 2.3.8).
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries would operate under the same management measures as the Preferred Alternative, except the petrale sole set-aside would be 60 mt (instead of 220 mt) and the No Action tribal trip limit for petrale sole of 50,000 pounds per 2 months would remain in place.
- The non-nearshore fixed gear fishery would operate under the same management measures as the Preferred Alternative.
- The nearshore fixed gear fishery would operate under the same management measures as the Preferred Alternative.
- Washington and Oregon recreational fisheries would operate under the same management measures as the Preferred Alternative.
- The California recreational fisheries would operate under the same management measures as the Preferred Alternative.

2.4.4 Alternative 2

Alternative 2 incorporates the best available scientific information and stock assessment projections described in section 2.1. The nonoverfished species ACLs and allocations under Alternative 2 are detailed in section 2.2.2.

Under Alternative 2, the target rebuilding year for canary rockfish is changed by two years (from 2027 to 2029), which is one year longer than the minimum feasible time to rebuild ($T_{F=0}$). The canary rockfish ACL under Alternative 2 is most similar to the No Action ACL, and would require both the harvest control rule (SPR) and the T_{TARGET} in the current rebuilding plan to be revised. All other ACLs are the same as under the Preferred Alternative and Alternative 1. Table 2-87 summarizes the key rebuilding plan parameters under this alternative, compared to a $T_{F=0}$ scenario, Alternative 1, and the Preferred Alternative.

This alternative demonstrates the tradeoffs between reducing the ACL for canary rockfish and the benefits of reducing the rebuilding time for the stock. Historically, canary rockfish has limited access to target species in many fisheries because its distribution results in bycatch across a range of habitats and depth ranges.

Table 2-87. Alternative 2. Key rebuilding features of Alternative 2 compared to a $T_{F=0}$ scenario, the Council's Preferred Alternative (P), and Alternative 1.

Stock	Current Ttarget	Current SPR or Harvest Control Rule	PPA Ttarget	Alt.	ACLs (mt)		SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond T@F=0 (yrs.)	Prob. of Rebuilding by Ttarget	Prob. of Rebuilding by Tmax	Current Tmax	Re-est. Tmax
					2013	2014							
Canary	2027	88.7%	2030		0	0	100%	2028	0	48.2%	75.0%	2046	2050
				2	101	104	90.0%	2029	1	36.4%	75.0%		
				P,1	116	119	88.7%	2030	2	34.4%	75.0%		
POP	2020	86.4%	2051		0	0	100%	2043	0	25.0%	85.5%	2045	2071
				P,1,2	150	153	86.4%	2051	8	25.0%	73.0%		

2.4.4.1 Alternative 2 Allocation Scheme

The nonoverfished species ACLs and allocations under Alternative 2 are detailed in Section 2.2.2. Table 2-88 summarizes the canary and POP ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative. The remaining overfished species ACLs and allocations are the same as in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10 N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C).

Table 2-88. Alternative 2. Overfished species ACLs and allocations for 2013-2014.

Alternative 2. 2013		
Sector	**Canary**	**POP**
ACL	101	150
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	84.2	137.1
Trawl Allocation	45	130.4
Shorebased IFQ	34.2	113
At-Sea Whiting	10.8	17.4
Catcher Processor	6.3	10.2
Mothership	4.5	7.2
Nontrawl Allocation	39.4	7.0
Non-Nearshore	3	
Nearshore Fixed Gear	5.3	
Washington Recreational [a/]	2.6	
Oregon Recreational [a/]	9.3	
California Recreational [a/]	19.2	
a/ Values represent HGs.		

Alternative 2. 2014		
Sector	**Canary**	**POP**
ACL	104	153
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	87.2	140.1
Trawl Allocation	46.70	133.4
Shorebased IFQ	35.5	116
At-Sea Whiting	11.2	17.4
Catcher Processor	6.6	10.2
Mothership	4.6	7.2
Nontrawl Allocation	40.8	7
Non-Nearshore	3.1	
Nearshore Fixed Gear	5.5	
Washington Recreational [a/]	2.7	
Oregon Recreational [a/]	9.6	
California Recreational [a/]	19.9	
a/ Values represent HGs.		

2.4.4.2 Alternative 2 Management Measures

The following bullet points summarize management measure by sector under Alternative 2. If adopted by the Council, new management measures discussed under Preferred Alternative and in Section 2.3 would be implemented.

- The shorebased IFQ fishery would operate under the same measures described under Alternative 1.
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries would operate under the same management measures as Alternative 1.
- The non-nearshore fixed gear fishery would operate under the same management measures described under the Preferred Alternative.
- The nearshore fixed gear fishery could operate under the management measures described under the Preferred Alternative.
- Washington and Oregon recreational fisheries would operate under the same management measures as the Preferred Alternative.
- California recreational fisheries would operate under the same measures described under the Preferred Alternative.

2.4.5 Alternative 3

Alternative 3 incorporates the best available scientific information from stock assessment projections described in Section 2.1. The nonoverfished species ACLs and allocations under the Alternative 3 are detailed in Section 2.2.2.

Under Alternative 3 the target year for POP is adjusted to 2046, 3 years beyond the re-estimated TF=0 (no harvest scenario). All other ACLs are the same as under Alternative 1. (As noted above, the target year for POP and canary rockfish must be adjusted from their current values because they are unlikely to be met even with zero harvest.) This alternative represents the tradeoffs involved in pursuing a more aggressive rebuilding schedule for POP and would require both the harvest control rule (SPR) and the T_{TARGET} in the current rebuilding plan to be revised. Table 2-89 summarizes the key features of the rebuilding plans under this alternative, compared to a $T_{F=0}$ scenario, the Preferred Alternative, and Alternative 1.

This alternative is intended to explore the tradeoffs between the benefits of rebuilding POP five years sooner than the Preferred Alternative and Alternative 1 and the effects of the lower POP ACL.

Table 2-89. Alternative 3. Key rebuilding features of Alternative 3 compared to a $T_{F=0}$ scenario, the Council's Preferred Alternative (P), and Alternative 1 .

Stock	Current Ttarget	Current SPR or Harvest Control Rule	PPA Ttarget	ACL Alt.	ACLs (mt)		SPR or Harvest Control Rule	Median Time to Rebuild	Reb. Duration Beyond T@F=0 (yrs.)	Prob. of Reb. by Ttarget	Prob. of Reb. by Tmax	Current Tmax	Re-est. Tmax
					2013	2014							
Canary	2027	88.7%	2030		0	0	100%	2028	0	48.2%	75.0%	2046	2050
				1, P,3	116	119	88.7%	2030	2	34.4%	75.0%		
POP	2020	86.4%	2051		0	0	100%	2043	0	25.0%	85.5%	2045	2071
				3	74	76	92.9%	2046	3	25.0%	79.0%		
				1, P	150	153	86.4%	2051	8	25.0%	73.0%		

2.4.5.1 Alternative 3 Allocation Scheme

Table 2-90 summarizes the canary and POP ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative. The remaining overfished species ACLs and allocations are the same as in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10 N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C). The nonoverfished species ACLs and allocations under Alternative 3 are detailed in Section 2.2.2.

Table 2-90. Alternative 3. Overfished species ACLs and allocations for 2013-2014.

Alternative 3. 2013		
Sector	**Canary**	**POP**
ACL	116	74
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	99.2	61.1
Trawl Allocation	53.1	58.4
Shorebased IFQ	40.3	41
At-Sea Whiting	12.8	17.4
Catcher Processor	7.5	10.2
Mothership	5.3	7.2
Nontrawl Allocation	46.4	3.0
Non-Nearshore	3.6	
Nearshore Fixed Gear	6.2	
Washington Recreational [a/]	3.1	
Oregon Recreational [a/]	10.9	
California Recreational [a/]	22.6	
a/ Values represent HGs.		

Alternative 3. 2014		
Sector	**Canary**	**POP**
ACL	119	76
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	102.2	63.1
Trawl Allocation	54.30	60.4
Shorebased IFQ	41.5	43
At-Sea Whiting	12.8	17.4
Catcher Processor	7.5	10.2
Mothership	5.3	7.2
Nontrawl Allocation	47.8	3
Non-Nearshore	3.7	
Nearshore Fixed Gear	6.4	
Washington Recreational [a/]	3.2	
Oregon Recreational [a/]	11.2	
California Recreational [a/]	23.3	
a/ Values represent HGs.		

2.4.5.2 Alternative 3 Management Measures

The following bullet points summarize management measures by sector under Alternative 3. If adopted by the Council, new management measures discussed under Alternative 1 and in Section 2.3 would be implemented.

- The shorebased IFQ fishery would operate under the same measures described under Alternative 1.
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries would operate under the same management measures as Alternative 1.
- The non-nearshore fixed gear fishery would operate under the same management measures described under the Preferred Alternative.
- The nearshore fixed gear fishery could operate under the management measures described under the Preferred Alternative.
- Washington and Oregon recreational fisheries would operate under the same management measures as the Preferred Alternative.
- California recreational fisheries would operate under the same measures described under the Preferred Alternative.

2.4.6 Alternative 4

Alternative 4 incorporates the best available scientific information from stock assessment projections described in Section 2.1. The nonoverfished species ACLs and allocations under the Alternative 4 are detailed in Section 2.2.

Under Alternative 4, the target year for canary rockfish would be changed from 2027 to 2028, which is the same year as $T_{F=0}$. The target year for POP would be changed from 2020 to 2060, 17 years beyond the re-estimated TF=0. (As noted above, the target year for POP and canary rockfish must be adjusted from their current values because they are unlikely to be met even with zero harvest.) These policies would result in a lower ACL for canary rockfish compared to No Action (49 mt versus 102 mt) and a comparatively higher ACL for POP (247 mt compared to a 157 ACT under No Action). This alternative would require both the harvest control rule and the T_{target} in the current rebuilding plan to be revised for canary and POP. Table 2-91 summarizes the key features of the rebuilding plans under this alternative, compared to a $T_{F=0}$ scenario, the Preferred Alternative, and Alternative 1.

Alternative 4 is intended to highlight the differential effects of the ACLs on fishery participants and communities compared to the intermediate values contained in the Preferred Alternative and Alternative 1.

Table 2-91. Alternative 4. Key rebuilding features of Alternative 4 compared to a $T_{F=0}$ scenario, the Council's Preferred Alternative (P), and Alternative 1 .

Stock	Current Ttarget	Current SPR or Harvest Control Rule	PPA Ttarget	ACL Alt.	ACLs (mt)		SPR or Harvest Control Rule	Median Time to Rebuild	Reb. Duration Beyond T@F=0 (yrs.)	Prob. of Reb. by Ttarget	Prob. of Reb. by Tmax	Current Tmax	Re-est. Tmax
					2013	2014							
Canary	2027	88.7%	2030		0	0	100%	2028	0	48.2%	75.0%	2046	2050
				4	48	49	95.1%	2028	0	41.2%	75.0%		
				P,1	116	119	88.7%	2030	2	34.4%	75.0%		
POP	2020	86.4%	2051		0	0	100%	2043	0	25.0%	85.5%	2045	2071
				P, 1	150	153	86.4%	2051	8	25.0%	73.0%		
				4	247	251	79.2%	2060	17	25.0%	62.0%		

2.4.6.1 Alternative 4 Allocation Scheme

Table 2-92 summarizes the canary and POP ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative. The remaining overfished species ACLs and allocations are the same as in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10’ N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C).

Table 2-92. Alternative 4. Overfished species ACLs and allocations for 2013-2014.

Alternative 4. 2013		
Sector	**Canary**	**POP**
ACL	48	247
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	31.2	234.1
Trawl Allocation	16.8	222
Shorebased IFQ	12.8	200
At-Sea Whiting	4	22
Catcher Processor	2.3	12.9
Mothership	1.7	9.1
Nontrawl Allocation	14.7	12.0
Non-Nearshore	1.1	
Nearshore Fixed Gear	2	
Washington Recreational [a/]	1	
Oregon Recreational [a/]	3.5	
California Recreational [a/]	7.1	
a/ Values represent HGs.		

Alternative 4. 2014		
Sector	**Canary**	**POP**
ACL	49	251
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	32.2	238.1
Trawl Allocation	17.40	226.3
Shorebased IFQ	13.2	204
At-Sea Whiting	4.2	22.3
Catcher Processor	2.5	13.1
Mothership	1.7	9.2
Nontrawl Allocations	15.2	12
Non-Nearshore	1.2	
Nearshore Fixed Gear	2	
Washington Recreational [a/]	1	
Oregon Recreational [a/]	3.6	
California Recreational [a/]	7.4	
a/ Values represent HGs.		

2.4.6.2 Alternative 4 Management Measures

The following bullet points summarize management measures by sector under Alternative 4. If adopted by the Council, new management measures discussed under Alternative 1 and in Section 2.3, would be implemented.

- The shorebased IFQ fishery operates under the same management measures as Alternative 1. The seaward boundary of the nontrawl RCA, which applies to vessels harvesting IFQ with fixed gears, would be modified from 100 to 150 fm north of 40°10' N. latitude to address canary bycatch in the non-nearshore fixed gear fisheries (see fourth bullet below).
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries continue to be managed under the same management measures as Alternative 1.
- The non-nearshore fixed gear fishery operates under the same management measures as Alternative 1, except modifications to the seaward boundary of the nontrawl RCA would be necessary based on the lower canary rockfish allocation (Table 2-92). The seaward boundary of the nontrawl RCA would be moved from 100 to 150 fm north of 40°10' N. latitude, affecting both the limited entry and open access fixed gear sectors.
- Two sub-alternatives (Alternative 4a and 4b) explore depth restrictions and changes to trip limits in the nearshore fishery as a result of the lower canary rockfish allocation (Table 2-92). In the area north of 42° N. latitude, Alternatives 4a and 4b include a 20 fm nontrawl RCA configuration and trip limits that are projected to decrease landings relative to No Action (there is no difference between the sub-alternatives in this area). South of 42° N. latitude under Alternative 4a the nontrawl RCA configuration would be 20 fm, and trip limit reductions are needed to stay within the overfished species allocations. Under Alternative 4b, the No Action nontrawl RCA configuration can be maintained and greater trip limit reductions are proposed, compared to Alternative 4a, south of 42° N. latitude.
- The Washington recreational fishery operates under the same management measures as the Preferred Alternative.
- There two sub-alternatives (Alternative 4a and 4b) for Oregon recreational that explore depth restrictions and changes to the Pacific halibut season as a result of the lower proposed canary rockfish allocation (Table 2-92). Alternative 4a would maintain the Pacific halibut seasons as described under No Action and would restrict the Oregon recreational bottomfish fishery to 20 fm year-round. Alternative 4b would eliminate the all-depth Pacific halibut fishery and would restrict the Oregon recreational bottomfish fishery to 30 fm year-round.
- There are two sub-alternatives (Alternative 4a and 4b) for California recreational that explore season and depth restrictions as a result of the lower proposed canary rockfish allocation (Table 2-92). Under Alternative 4a, longer seasons and more restrictive depth constraints are proposed; whereas Alternative 4b explored shorter seasons and less restrictive depths.

Limited Entry and Open Access Fixed Gear

Non-Nearshore

Under this alternative, the proposed two-year allocation of canary rockfish—1.1 mt in 2013 and 1.2 mt in 2014—would require an adjustment to the seaward boundary of the nontrawl RCA. The non-nearshore fixed gear sectors would need a two-year canary allocation of at least 1.5 mt in 2013 and 1.6 mt in 2014 to maintain the No Action RCA configuration. As under all other alternatives, the two-year allocation of yelloweye rockfish to the non-nearshore sectors is 1.1 mt in both 2013 and 2014.

To reduce canary impacts to the two-year allocations proposed under this alternative, the seaward boundary would have to be moved from 100 to 150 fm in all areas north of 40° 10’ N. latitude, which would be deeper than has been implemented since the inception of RCAs.

Nearshore

Under Alternative 4, while the allocation of yelloweye rockfish is higher compared to No Action, the allocation of canary rockfish is 50 percent lower (Table 2-76 and Table 2-92). Fishing activity in both states is severely restricted due to the low amount of canary rockfish; therefore, nearshore landings would have to be reduced between 20 and 45 percent compared to No Action depending on the area and nontrawl RCA configuration. The same range of trip limit adjustments for sablefish as discussed under Alternative 1 for the non-nearshore sector would apply to the nearshore sector.

The analysis incorporated the status quo state sharing for canary (OR = 26.7 percent; CA = 73.3 percent) and yelloweye rockfish (OR = 72.7 percent; CA = 27.3 percent). Tradeoffs were also analyzed between greater depth restrictions and higher reductions in landed catch (Alternatives 4a and 4b). In Oregon, mortality of overfished species is modeled assuming a 20 fm depth restriction statewide for both alternatives. In California, mortality of overfished species is modeled assuming a 20 fm depth restriction statewide (Alternative 4a) and the same nontrawl RCA under No Action (20 fm between 42° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N. latitude and 34° 27' N. latitude; and 60 fm south of 34° 27' N. latitude) (Alternative 4b).

North of 42° N. latitude – under Alternative 4a and 4b, a 20 fm depth restriction would be implemented statewide and landings would have to be reduced by 39 percent relative to the No Action Alternative. Furthermore, not only would landings be drastically reduced, but fishing area would be reduced; the RCA north of 43° N. latitude may have to be moved from 30 fm to 20 fm. (There is no difference between the 4a and 4b sub-alternatives north of 42° N. latitude.)

South of 42° N. latitude – under Alternative 4a, a 20 fm depth restriction would be implemented statewide in addition to a 20 percent reduction in landed catch for all species compared to No Action. The restrictive RCA statewide is necessary to reduce canary catch that occurs south of 40° 10' N. latitude.

Although few canary catches have been documented south of 34° 27' N. latitude, the overfished species impact projection model for the nearshore fishery is unable to differentiate canary rockfish mortality occurring north and south of 34° 27' N. latitude. As a result, the entire RCA south of 40° 10' N. latitude would have to be restricted to 20 fm. Since the fishery south of 34° 27' N. latitude is allowed to operate out to depths of 60 fm, this would represent a tremendous loss of fishing grounds and could effectively eliminate the fishery in this area because many of the species tend to be found at the deeper depths in this area.

Under Alternative 4b, maintaining the No Action RCA configuration would require reductions in landed catch of 45 percent, and would effectively eliminate this fishery because the operational costs would be greater than any potential profits.

Two alternative catch sharing relationships analyzed the tradeoffs of varying overfished species allocations compared to No Action (Table 2-93). An equal catch sharing (50:50) and a reverse status quo (i.e., reverse the percentages for each species) were used to bracket the upper and lower ranges of landings and corresponding management measures. Table 2-94 summarizes the proposed management measures under the range of allocations.

Under the equal sharing scenario, Oregon would receive more canary and less yelloweye compared to status quo catch sharing. The RCA configuration and landings under the equal sharing would be the same as discussed under Alternative 1a (i.e., 20 fm and a 14 percent reduction in landing relative to No Action). Under this same scenario, California would be afforded less canary rockfish compared to status quo, but more yelloweye rockfish. The RCA configuration and landings under this scenario would be the same as discussed under Alternative 1 (there is no difference in the nontrawl RCA configurations for California under the Alternative 1 sub-alternatives).

Under the reverse status quo, Oregon would receive more canary rockfish, yet substantially less yelloweye rockfish compared to status quo, and California would receive substantially more yelloweye rockfish and less canary rockfish. The RCA configuration and landings for Oregon would be the same as Alternative 1a (i.e., 20 fm and a 14 percent reduction in landing relative to No Action).

Under this same scenario, California would receive substantially more yelloweye rockfish and less canary rockfish compared to status quo. The RCA configuration would be similar to No Action, except that the area between 40º 10' N. latitude to 34º 27' N. latitude would be modified to 20 fm. In addition, a 70 percent reduction in landed catch would be necessary to stay within the canary allocation.

Table 2-93. Alternative 4: Allocations of canary and yelloweye rockfish for 2013-14 under alternate nearshore catch sharing scenarios.

		Status Quo	Equal Sharing	Reverse Status Quo
OR	Canary	0.5	1.0	1.5
	Yelloweye	0.87	0.6	0.33
CA	Canary	1.5	1.0	0.5
	Yelloweye	0.33	0.6	0.87

Table 2-94. Alternative 4: Description of management measures by area under alternate catch sharing scenarios.

		Catch Sharing		
	AREA	**Status Quo**	**Equal Sharing**	**Reverse Status Quo**
OR	north of 43º	(Alt a): RCA=20 fm; Landings=40% reduction (Alt b): same as Alt a	same as Alt 1	same as Alt 1
	42º-43º			
CA	42º - 40º10'	(Alt a): Landings=45% reduction (Alt b): Landings=20% reduction	RCA=20 fm; Landings=50% reduction	RCA=20 fm; Landings=70% reduction
	40º10' to 34º27'	(Alt a): Landings=45% reduction (Alt b): RCA=20 fm; Landings=20% reduction	RCA=20 fm; Landings=50% reduction	RCA=20 fm; Landings=70% reduction
	south of 34º27'	(Alt a): Landings=45% reduction (Alt b): RCA=20 fm; Landings=20% reduction	RCA=60 fm; Landings=50% reduction	RCA=60 fm; Landings=70% reduction

Recreational

Oregon

Several modifications to Oregon recreational management measures under Alterative 4 are proposed to stay within the lower canary rockfish ACL and allocations (Table 2-92).

Groundfish Seasons and Area Restrictions

Under Alternative 4, the Oregon recreational groundfish fishery should be able to operate a year-round fishery with further depth restrictions (25 or 20 fm) than are proposed under the No Action Alternative. The Oregon recreational groundfish fishery could be somewhat less restricted (30 fm instead of 25 or 20 fm) if the recreational Pacific halibut fishery were cancelled.

Depth management is the main tool used for controlling canary and yelloweye rockfish catch in the Oregon recreational fishery. Two options are shown under Integrated Alternative 4: a year-round recreational groundfish fishery restricted to inside of 20 fm for the entire year, and a year-round recreational groundfish fishery restricted to inside of 30 fm year-round but with the Pacific halibut fishery cancelled (Figure 2-13). Both alternatives (4A and 4B) are more restrictive than the 2011-2012 Oregon recreational groundfish season under the No Action Alternative.

Alt.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SQ	All depth			40 fm						All depth		
4A	20 fm											
4B	30 fm --No Halibut											

Figure 2-13. Alternatives for the Oregon recreational fishery season in 2013-14 under Integrated Alternative 4.

Area Restriction Alternatives

No changes to the boundary of the Stonewall Bank YRCA would occur from those listed in the No-Action Alternative under Integrated Alternative 4, as the YRCA is a yelloweye rockfish savings area and has little effect on canary rockfish catch.

Groundfish Bag Limits and Size Limits

Under Integrated Alternative 4, the No Action Alternative bag limits for marine fish, lingcod, and flatfish would remain in place (Figure 2-14) including no retention of yelloweye or canary rockfish at any time or depth. These daily bag limits provide the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process would likely start off each season with reduced marine and lingcod daily bag limits and may increase or further reduce them inseason, depending on the progression of the fishery relative to the impact on species with harvest targets/guidelines and state landing caps.

The Oregon shorebased recreational fishery would be managed for a year-round season within the canary and yelloweye rockfish HGs. Also, fishing for, take, retention, and possession of sanddabs and "other flatfishes," excluding Pacific halibut, could be legal year-round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions. The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions (i.e., 40, 30, 25 and 20 fm lines).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine Bag Limit [1]	Ten (10)			1 Fish Cabezon Sub-Bag [2]						Ten (10)		
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

1 Marine 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

2 From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon

3 Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut

Figure 2-14. Oregon recreational groundfish season in 2013-14 under Integrate Alternative 4.

Pacific Halibut Seasons

Under Alternative 4A, the Pacific halibut fishery would be able to proceed as under the No Action Alternative; however, the groundfish fishery would have further depth restrictions than the No Action Alternative. Under Alternative 4B, the groundfish fishery would be somewhat less restricted than under Alternative 4A; however the Pacific halibut fishery would not be allowed. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery would be similarly limited in 2013 and 2014, if the halibut fishery were allowed to proceed.

Additional Management Measures Analyzed

No additional management measures were analyzed for the Oregon recreational fisheries. Status quo management measures (bag limits, depth restrictions, etc.) would provide the basis for keeping recreational mortality of overfished species within sector-specific HGs for 2013-2014.

Inseason Management Tools

The same inseason management tools detailed under No Action would be available under Alternative 4.

California

Under Alternative 4, the allocations to the California recreational fishery are the same or higher than the No Action Alternative except for canary rockfish, which is lower (Table 2-76 and Table 2-92). Management measures under this alternative are summarized below. The proposed groundfish season structure and depth constraints listed out by recreational management area can be seen in Figure 2-15, Figure 2-16, Figure 2-17, and Figure 2-18.

Groundfish Seasons and Area Restrictions:

Under this alternative, the tradeoffs between different season lengths and depth restrictions were explored (Alternatives 4a and 4b). Under Alternative 4a, longer seasons and more restrictive depth constraints were examined; whereas Alternative b explored shorter seasons and less restrictive depths.

Under Alternative 4a, the depth restrictions would be more constraining in most management areas compared to the No Action Alternative, except for the northern management areas (Figure 2-15, Figure 2-16). Due to the low canary rockfish encounter rates, the season length in the Northern and Mendocino Management Areas could be extended under this alternative; the depth restrictions would decrease as well. The San Francisco and Central Management Areas would see a decrease in season length and a substantial increase in the depth restriction compared to the No Action Alternative. The San Francisco and Central Management Areas have historically seen the highest canary rockfish encounters. The Southern Management would see an increase in the depth restriction.

2013												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 1 – Oct 31 < 20fm						Closed	
Mendocino	Closed				May 1 – Oct 31 < 20fm						Closed	
San Francisco	Closed					June 1 – Nov 30 < 20fm						C
Central	Closed					June 1 – Nov 30 < 20fm						C
Southern	Closed		Mar 1 – Dec 31 <40fm									

Figure 2-15. Alternative 4 (Alternative a): California recreational groundfish season structure and depth constraints for 2013.

2014												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 1 – Nov 30 <20fm							C
Mendocino	Closed				May 1 – Nov 30 <20fm							C
San Francisco	Closed					June 1 – Nov 30 < 20fm						C
Central	Closed					June 1 – Dec 31 < 20fm						
Southern	Closed		March 1 – Dec 31 < 40fm									

Figure 2-16. Alternative 4 (Alternative a): California recreational groundfish season structure and depth constraints for 2014.

Under Alternative 4b, the season lengths would be shorter in most management areas compared to the No Action Alternative, except for the Southern Management Area (Figure 2-17; Figure 2-18). In addition to season length, the Southern and Central Management Areas would see an increase in the depth restrictions as well. Due to the low canary encounter rates, the depth restrictions would decrease in the Northern and Mendocino Management Areas under this alternative. The San Francisco and Central Management Areas would see a substantial decrease in season length compared to the No Action Alternative. The San Francisco and Central Management Areas have historically seen the highest canary rockfish encounters. The Southern Management would see an increase in the depth restriction.

2013												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed					Jun 1-Aug 31 <30fm			Closed			
Mendocino	Closed					Jun 1-Aug 31 <30fm			Closed			
San Francisco	Closed				May 15 - Aug 31 <30fm				Closed			
Central	Closed				May 15 - Aug 31 <30fm				Closed			
Southern	Closed		Mar 1 – Dec 31 < 40fm									

Figure 2-17. Alternative 4 (Alternative b): California recreational groundfish season structure and depth constraints for 2013.

2014												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed					Jun 1-Aug 31<30fm			Closed			
Mendocino	Closed					Jun 1-Aug 31<30fm			Closed			
San Francisco	Closed				May 1-Aug 31<30fm				Closed			
Central	Closed				May 1-Aug 31<30fm				Closed			
Southern	Closed		March 1 – Dec 31 <40fm									

Figure 2-18. Alternative 4 (Alternative b): California recreational groundfish season structure and depth constraints for 2014.

Similar to No Action Alternative, the YRCAs would be available under this alternative and could be implemented inseason if catches are projected to exceed HGs.

Groundfish Bag Limits and Size Limits:
Under Alternative 4, there are no changes to the groundfish bag limits or size limits except for the following:

<u>Bocaccio</u> – Under Alternatives a and b, the status quo sub-bag limit for bocaccio is two fish, with a minimum size of 10 inches. The Council proposes to increase the sub-bag limit from two fish to three fish. The increase in the sub-bag limit is expected to increase bocaccio mortality in the California recreational fishery by 11.5 percent. The Council is also proposing to remove the minimum size limit of 10 inches. Removing the size limit is expected to increase bocaccio mortality by 1.0 percent. The proposed changes are not mutually exclusive, and the mortality estimates are additive. Currently bocaccio is the only rockfish species in the recreational sector that has a size limit, and removing the size limit would reduce regulatory complexity. Mortality of other overfished species, as a result of these management measures, is not expected to increase.

<u>Greenlings</u> – Under Alternatives 4a and 4b, the status quo sub-bag limit for greenlings is two fish. The Council is proposing to increase the sub-bag limit to 10 fish to maintain consistency with state regulations, which were modified to reflect the increased contribution to the Other Fish complex analyzed in the 2011-12 FEIS. By increasing the sub-bag limit, the estimated take would be approximately 52,500 pounds. CDFG is not proposing any changes to the minimum size restriction. Mortality of other overfished species, as a result of these management measures, is not expected to increase.

Additional Management Measures Analyzed:

<u>Shelf Rockfish Retention in CCA</u>
Under the Alternative 4a and 4b, the Council proposes to modify the existing regulations governing recreational groundfish fishing within the CCA to allow retention of shelf rockfish taken during the open season for groundfish within the existing depth constraint of 20 fm. No changes to nongroundfish recreational fisheries or corresponding management measures are being proposed. Under this proposal, if the season for groundfish is open, anglers could retain shelf rockfish, including bocaccio. Removing the prohibition on shelf rockfish retention, including bocaccio, in depths of 20 fm or less in the CCA when fishing for rockfish is open, is intended to reduce bycatch that currently occurs when shelf rockfish are caught while in pursuit of other species within the 10 fish RCG bag limit. Under the proposed action, recreational anglers would be expected to meet their RCG bag limit sooner, which would reduce bycatch of shelf rockfish and may reduce encounters with overfished species. Also, this change would make regulations more consistent with retention regulations outside the CCA.

Increased mortality of shelf rockfish is expected to be minimal, and can be accommodated within the recreational HG with a minimal risk of exceeding the ACLs. No ACLs for target or overfished species are expected to be exceeded as a result of this action.

Inseason Management Response:
Similar to the No Action Alternative, inseason management response would include closing one or more recreational groundfish management areas for boat-based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

2.4.7 Alternative 5

Alternative 5 incorporates the best available scientific information from stock assessment projections described in Section 2.1. The nonoverfished species ACLs and allocations under Alternative 5 are detailed in Section 2.2.2.

Under Alternative 5 the target year for canary rockfish would be changed from 2027 to 2032, five years beyond the re-estimated $T_{F=0}$. The target year for POP would be changed to 2046, the same as under Alternative 3, and three years beyond $T_{F=0}$. (As noted above, the target year for POP and canary rockfish must be adjusted from their current values because they are unlikely to be met even with zero harvest.) This alternative contrasts with Alternative 4, which has the earliest target year considered for canary (and lowest ACL) and the latest target year considered for POP (and highest ACL). This alternative would require both the harvest control rule and the T_{target} in the current rebuilding plan to be revised for canary and POP. Table 2-95 summarizes the key features of the rebuilding plans under this alternative, compared to a $T_{F=0}$ scenario, Preferred Alternative, and Alternative 1.

Taken together, Alternatives 4 and 5 contrast the differential effects of alternative rebuilding strategies for these two species, because their distribution, habitat preferences, and vulnerability to fishing gear mean that bycatch levels vary across fishery sectors or participants.

Table 2-95. Alternative 5. Key rebuilding features of Alternative 5 compared to a $T_{F=0}$ scenario, the Council's Preferred Alternative (P), and Alternative 1.

Stock	Current Ttarget	Current SPR or Harvest Control Rule	PPA Ttarget	ACL Alt.	ACLs (mt) 2013	ACLs (mt) 2014	SPR or Harvest Control Rule	Median Time to Rebuild	Reb. Duration Beyond T@F=0 (yrs.)	Prob. of Reb. by Ttarget	Prob. of Reb. by Tmax	Current Tmax	Re-est. Tmax
Canary	2027	88.7%	2030		0	0	100%	2028	0	48.2%	75.0%	2046	2050
				P,1	116	119	88.7%	2030	2	34.4%	75.0%		
				5	216	220	80.3%	2032	4	27.9%	74.9%		
POP	2020	86.4%	2051		0	0	100%	2043	0	25.0%	85.5%	2045	2071
				5	74	76	92.9%	2046	3	25.0%	79.0%		
				P,1	150	153	86.4%	2051	8	25.0%	73.0%		

2.4.7.1 Alternative 5 Allocation Scheme

Table 2-96 summarizes the canary and POP ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative. The remaining overfished species ACLs and allocations are the same as in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10' N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C).

Table 2-96. Alternative 5. Overfished species ACLs and allocations for 2013-2014.

Alternative 5. 2013		
Sector	**Canary**	**POP**
ACL	216	74
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	199.2	61.1
Trawl Allocation	106.5	58.4
Shorebased IFQ	80.9	41
At-Sea Whiting	25.6	17.4
Catcher Processor	15.0	10.2
Mothership	10.6	7.2
Nontrawl Allocation	93.1	3.0
Non-Nearshore	7.2	
Nearshore Fixed Gear	12.5	
Washington Recreational [a/]	6.2	
Oregon Recreational [a/]	21.9	
California Recreational [a/]	45.3	
a/ Values represent HGs.		

Alternative 5. 2014		
Sector	**Canary**	**POP**
ACL	220	76
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	203.2	63.1
Trawl Allocation	108.60	60.4
Shorebased IFQ	82.5	43
At-Sea Whiting	26.1	17.4
Catcher Processor	15.3	10.2
Mothership	10.8	7.2
Nontrawl Allocation	94.9	3
Non-Nearshore	7.3	
Nearshore Fixed Gear	12.7	
Washington Recreational [a/]	6.4	
Oregon Recreational [a/]	22.3	
California Recreational [a/]	46.2	
a/ Values represent HGs.		

2.4.7.2 Alternative 5 Management Measures

The following bullet points summarize management measures by sector under Alternative 5. If adopted by the Council, new management measures discussed under Alternative 1 and in Section 2.3 would be implemented.

- The shorebased IFQ fishery would operate under the same measures described under Alternative 1.
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries would operate under the same management measures as Alternative 1.
- The non-nearshore fixed gear fishery operates under the same management measures described under the Preferred Alternative.
- The nearshore fixed gear fishery could operate under the management measures described under the Preferred Alternative.
- Washington and Oregon recreational fisheries would operate under the same management measures as the Preferred Alternative.
- California recreational fisheries would operate under the same measures described under the Preferred Alternative.

2.4.8 Alternative 6

Alternative 6 incorporates the best available scientific information from stock assessment projections described in Section 2.1. The nonoverfished species ACLs and allocations under the Alternative 6 are detailed in Section 2.2.2.

Under Alternative 6 the canary rockfish target year is adjusted to the same year as under Alternative 2, 2029, or one year after the re-estimated $T_{F=0}$ (and two years later than the current target year). The target year for POP is adjusted from the current (No Action) value of 2020 to 2057, 14 years later than the re-estimated $T_{F=0}$. (As noted above, the target year for POP and canary rockfish must be adjusted from their current values because they are unlikely to be met even with zero harvest.) This alternative would require both the harvest control rule and the T_{target} in the current rebuilding plan to be revised for canary and POP. Table 2-98 summarizes the key features of the rebuilding plans under this alternative, compared to a $T_{F=0}$ scenario, the Preferred Alternative, and Alternative 1.

Alternative 6 demonstrates the tradeoffs of combining a relatively high ACL for POP (although less than Alternative 4, the highest) with an ACL for canary that is similar to No Action.

2.4.8.1 Alternative 6 Allocation Scheme

Table 2-97 summarizes the canary and POP ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative. The remaining overfished species ACLs and allocations are the same as in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10’ N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C).

Table 2-97. Alternative 6. Overfished species ACLs and allocations for 2013-2014.

Alternative 6. 2013		
Sector	**Canary**	**POP**
ACL	101	222
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	84.2	209.1
Trawl Allocation	45	198.6
Shorebased IFQ	34.2	179
At-Sea Whiting	10.8	19.6
Catcher Processor	6.3	11.5
Mothership	4.5	8.1
Nontrawl Allocation	39.4	10.0
Non-Nearshore	3	
Nearshore Fixed Gear	5.3	
Washington Recreational [a/]	2.6	
Oregon Recreational [a/]	9.3	
California Recreational [a/]	19.2	
a/ Values represent HGs.		

Alternative 6. 2014		
Sector	**Canary**	**POP**
ACL	104	226
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	87.2	213.1
Trawl Allocation	46.70	202
Shorebased IFQ	35.5	182
At-Sea Whiting	11.2	20
Catcher Processor	6.6	11.7
Mothership	4.6	8.3
Nontrawl Allocation	40.8	11
Non-Nearshore	3.1	
Nearshore Fixed Gear	5.5	
Washington Recreational [a/]	2.7	
Oregon Recreational [a/]	9.6	
California Recreational [a/]	19.9	
a/ Values represent HGs.		

Table 2-98. Alternative 6. Key rebuilding features of Alternative 6 compared to a $T_{F=0}$ scenario, the Council's Preferred Alternative (P), and Alternative 1.

Stock	Current Ttarget	Current SPR or Harvest Control Rule	PPA Ttarget	ACL Alt.	ACLs (mt) 2013	ACLs (mt) 2014	SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond T@F=0 (yrs.)	Prob. of Rebuilding by Ttarget	Prob. of Rebuilding by Tmax	Current Tmax	Re-est. Tmax
Canary	2027	88.7%	2030		0	0	100%	2028	0	48.2%	75.0%	2046	2050
				6	101	104	90.0%	2029	1	36.4%	75.0%		
				P,1	116	119	88.7%	2030	2	34.4%	75.0%		
POP	2020	86.4%	2051		0	0	100%	2043	0	25.0%	85.5%	2045	2071
				P,1	150	153	86.4%	2051	8	25.0%	73.0%		
				6	222	226	80.9%	2057	14	25.0%	NA		

2.4.8.2 Alternative 6 Management Measures

The following bullet points summarize management measures by sector under Alternative 6. If adopted by the Council, new management measures discussed under Alternative 1 would be implemented.

- The shorebased IFQ fishery would operate under the same measures described under Alternative 1.
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries would operate under the same management measures as Alternative 1.
- The non-nearshore fixed gear fishery operates under the same management measures described under the Preferred Alternative.
- The nearshore fixed gear fishery could operate under the management measures described the Preferred Alternative.
- Washington and Oregon recreational fisheries would operate under the same management measures as the Preferred Alternative.
- California recreational fisheries would operate under the same measures described under the Preferred Alternative.

2.4.9 Alternative 7

Alternative 7 incorporates the best available scientific information from stock assessment projections described in Section 2.1. The nonoverfished species ACLs and allocations under Alternative 7 are detailed in Section 2.2.2.

Under Alternative 7 the canary rockfish target year would be changed by three years (2027 to 2030), two years after TF=0. The POP target year is the same as under Alternative 6 (2057). (As noted above, the target year for POP and canary rockfish must be adjusted from their current values because they are unlikely to be met even with zero harvest.) This alternative would require both the harvest control rule and the T_{target} in the current rebuilding plan to be revised for canary and POP. Table 2-99 summarizes the key features of the rebuilding plans under this alternative, compared to a $T_{F=0}$ scenario, the Preferred Alternative, and Alternative 1.

Table 2-99. Alternative 7. Key rebuilding features of Alternative 7 compared to a $T_{F=0}$ scenario, the Council's Preferred Alternative (P), and Alternative 1.

Stock	Current Ttarget	Current SPR or Harvest Control Rule	PPA Ttarget	Int. Alt.	ACLs (mt)		SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond T@F=0 (yrs.)	Prob. of Rebuilding by Ttarget	Prob. of Rebuilding by Tmax	Current Tmax	Re-est. Tmax
					2013	2014							
Canary	2027	88.7%	2030		0	0	100%	2028	0	48.2%	75.0%	2046	2050
				P,1	116	119	88.7%	2030	2	34.4%	75.0%		
				7	147	151	85.9%	2030	2	31.7%	75.0%		
POP	2020	86.4%	2051		0	0	100%	2043	0	25.0%	85.5%	2045	2071
				P,1	150	153	86.4%	2051	8	25.0%	73.0%		
				7	222	226	80.9%	2057	14	25.0%	NA		

2.4.9.1 Alternative 7 Allocation Scheme

Table 2-100 summarizes the canary and POP ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative. The remaining overfished species ACLs and allocations are the same as in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10' N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C).

Table 2-100. Alternative 7. Overfished species ACLs and allocations for 2013-2014.

Alternative 7. 2013		
Sector	**Canary**	**POP**
ACL	147	222
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	130.2	209.1
Trawl Allocation	69.6	198.6
Shorebased IFQ	52.9	179
At-Sea Whiting	16.7	19.6
Catcher Processor	9.8	11.5
Mothership	6.9	8.1
Nontrawl Allocation	60.9	10.0
Non-Nearshore	4.7	
Nearshore Fixed Gear	8.2	
Washington Recreational [a/]	4.1	
Oregon Recreational [a/]	14.3	
California Recreational [a/]	29.6	
a/ Values represent HGs.		

Alternative 7. 2014		
Sector	**Canary**	**POP**
ACL	151	226
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	134.2	213.1
Trawl Allocation	71.80	202
Shorebased IFQ	54.5	182
At-Sea Whiting	17.3	20
Catcher Processor	10.1	11.7
Mothership	7.2	8.3
Nontrawl Allocation	62.6	11
Non-Nearshore	4.8	
Nearshore Fixed Gear	8.4	
Washington Recreational [a/]	4.2	
Oregon Recreational [a/]	14.7	
California Recreational [a/]	30.5	
a/ Values represent HGs which may be adjusted within the nontrawl allocation.		

2.4.9.2 Alternative 7 Management Measures

The following bullet points summarize management measures by sector under Alternative 7. If adopted by the Council, new management measures discussed under Alternative 1 would be implemented.

- The shorebased IFQ fishery would operate under the same measures described under Alternative 1.
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries would operate under the same management measures as Alternative 1.
- The non-nearshore fixed gear fishery operates under the same management measures described under the Preferred Alternative.
- The nearshore fixed gear fishery could operate under the management measures described under the Preferred Alternative.
- Washington and Oregon recreational fisheries would operate under the same management measures as the Preferred Alternative.
- California recreational fisheries would operate under the same measures described under the Preferred Alternative.

2.4.10 Alternative 8

Alternative 8 incorporates the best available scientific information from stock assessment projections described in Section 2.1. The nonoverfished species ACLs and allocations under Alternative 8 are detailed in Section 2.2.2.

Under Alternative 8 the canary rockfish target year would be changed by three years (2027 to 2030), two years after TF=0. The canary ACL is approximately 30 mt higher than the Preferred Alternative (Alternative 1) but rebuilds in the same year (2030). The POP target year (2051) and ACL (150 mt) is the same as under Alternative 1, the Preferred Alternative. (As noted above, the target year for POP and canary rockfish must be adjusted from their current values because they are unlikely to be met even with zero harvest.). Table 2-101 summarizes the key features of the rebuilding plans under this alternative, compared to a $T_{F=0}$ scenario, the Preferred Alternative, and Alternative 1.

Table 2-101. Alternative 8. Key rebuilding features of Alternative 7 compared to a $T_{F=0}$ scenario, the preferred Alternative (P), and Alternative 1.

Stock	Current Ttarget	Current SPR or Harvest Control Rule	PPA Ttarget	Int. Alt.	ACLs (mt)		SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond T@F=0 (yrs.)	Prob. of Rebuilding by Ttarget	Prob. of Rebuilding by Tmax	Current Tmax	Re-est. Tmax
					2013	2014							
Canary	2027	88.7%	2030		0	0	100%	2028	0	48.2%	75.0%	2046	2050
				P,1	116	119	88.7%	2030	2	34.4%	75.0%		
				7,8	147	151	85.9%	2030	2	31.7%	75.0%		
POP	2020	86.4%	2051		0	0	100%	2043	0	25.0%	85.5%	2045	2071
				P,1,8	150	153	86.4%	2051	8	25.0%	73.0%		

2.4.10.1 Alternative 8 Allocation Scheme

Table 2-102 summarizes the canary and POP ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative. The remaining overfished species ACLs and allocations are the same as in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10’ N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C).

Table 2-102. Alternative 8. Overfished species ACLs and allocations for 2013-2014.

Alternative 8. 2013		
Sector	**Canary**	**POP**
ACL	147	150
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	130.2	137.1
Trawl Allocation	69.6	130.4
Shorebased IFQ	52.9	113
At-Sea Whiting	16.7	17.4
Catcher Processor	9.8	10.2
Mothership	6.9	7.2
Nontrawl Allocation	60.9	7.0
Non-Nearshore	4.7	
Nearshore Fixed Gear	8.2	
Washington Recreational [a/]	4.1	
Oregon Recreational [a/]	14.3	
California Recreational [a/]	29.6	
a/ Values represent HGs.		

Alternative 8. 2014		
Sector	**Canary**	**POP**
ACL	151	153
Total Set-Asides	16.8	12.9
Fishery Harvest Guideline	134.2	140.1
Trawl Allocation	71.80	133.4
Shorebased IFQ	54.5	116
At-Sea Whiting	17.3	17.4
Catcher Processor	10.1	10.2
Mothership	7.2	7.2
Nontrawl Allocation	62.6	7
Non-Nearshore	4.8	
Nearshore Fixed Gear	8.4	
Washington Recreational [a/]	4.2	
Oregon Recreational [a/]	14.7	
California Recreational [a/]	30.5	
a/ Values represent HGs which may be adjusted within the nontrawl allocation.		

2.4.10.2 Alternative 8 Management Measures

The following bullet points summarize management measures by sector under Alternative 8. If adopted by the Council, new management measures discussed under Alternative 1 would be implemented.

- The shorebased IFQ fishery would operate under the same measures described under Alternative 1.
- The at-sea whiting co-ops would operate under the same management measures described under the Preferred Alternative.
- Tribal fisheries would operate under the same management measures as Alternative 1.
- The non-nearshore fixed gear fishery operates under the same management measures described under the Preferred Alternative.
- The nearshore fixed gear fishery could operate under the management measures described under the Preferred Alternative.
- Washington and Oregon recreational fisheries would operate under the same management measures as the Preferred Alternative.
- California recreational fisheries would operate under the same measures described under the Preferred Alternative.

2.5 Alternatives Considered but Eliminated from More Detailed Analysis

2.5.1 Harvest Specifications

At the June 2011 meeting, the Council announced their intent to minimize changes to harvest specifications and rebuilding plans in order to simplify the process and increase the probability of timely implementation of new regulations on January 1, 2013. Therefore, unless new science dictated otherwise, the Council elected to propose 2013-2014 harvest specifications that used the same basis as used to decide status quo 2012 harvest specifications.

At the September 2011 meeting, the Council decided preliminary preferred 2013-2014 OFLs and ABCs. In November 2011, the Council decided their final preferred OFLs and ABCs and preliminary preferred ACLs and rebuilding plans for overfished species. The SSC-recommended the preferred 2013-2014 OFLs, which used the same basis as was used to determine the No Action 2012 OFLs (notwithstanding a correction to a discovered bias in the OFLs determined using DBSRA and DCAC methods), except for lingcod (the Preferred Alternative changes the area designations for the OFLs) and the stocks managed in the Other Fish complex. New methods for determining the OFL contributions of six species in that complex were reviewed by the SSC in March 2012. The SSC recommended the methods and results for determining the OFLs of four of the six component stocks in the Other Fish complex and the Council adopted the preferred OFLs for the Other Fish complex in March 2012 based on the SSC's recommendation. The method proposed for two of the six stocks (cabezon in Washington and kelp greenling in Washington and Oregon), where OFLs are estimated by modifying previous assessment models (adding extra catch), was considered but rejected by the SSC since the interplay between amounts of catch used in the model, model parameters, and estimated OFLs was found to be counterintuitive. The SSC recommended further exploration is required to consider this method for determining a data-poor OFL. The ABCs used the same basis as was used for the No Action 2012 ABCs except for blackgill, greenspotted, and yelloweye rockfish where the SSC-recommended stock categorizations changed; and sablefish and spiny dogfish where lower P* values were decided by the Council. These decisions led to larger scientific uncertainty buffers and lower ABCs relative to the No Action alternative. All other OFL and ABC alternatives were considered but eliminated from more detailed analysis.

The Council decided their preliminary preferred 2013-2014 ACLs and rebuilding plans in November 2011 using the same policies as used in the No Action 2012 ACLs and rebuilding plans, except for canary rockfish, POP, sablefish, longnose skate, widow rockfish, and the Other Fish complex. Only one Other Fish ACL alternative was recommended for detailed analysis. For canary rockfish, POP, longnose skate, and widow rockfish alternative ACLs were recommended for detailed analysis.

Because the rebuilding analysis for canary rockfish and POP indicated that the stocks could not be rebuilt by the current T_{TARGET}, even in the absence of fishing, a broad range of alternative $T_{TAREGET}$ values with associated SPRs and ACLs were considered for each species (Addenda E.4.a attachment 4, November 2011). The Council chose to maintain the current rebuilding plans for the five other overfished species. For both POP and canary rockfish, the range of ACLs initially considered by the Council began with TF=0 and looked at the ACLs associated with one year increments in the time to rebuild. The upper end of the range for each species was the probability to rebuild by T_{MAX} equal to 50 percent (Agenda Item E.4.a, Attachment 4, November 2011). In recommending ACLs for detailed analysis and development of the integrated alternatives, the Council considered the rebuilding times, how the commercial and recreational fisheries would likely be affected, the "needs of fishing communities," and the other factors.

POP is a slope species that affects access to target species on the continental slope including sablefish, Dover sole, thornyheads and petrale sole. The catch of Pacific whiting can also been affected by the availability of POP. Sablefish is a top income earning species across all commercial fisheries. Canary rockfish is a shelf species. Restricting canary rockfish limits access to lingcod, shelf rockfish including yellowtail, and widow rockfish, shelf flatfish including arrowtooth flounder, and Pacific whiting. Alternative 4 considered the lowest canary rockfish ACL alternative with 48 mt in 2013 and 49 mt in 2014, while Alternatives 3 and 5 considered the lowest POP ACL alternative with 74 mt in 2013 and 76 mt in 2014. However, the lowest canary rockfish and POP values were not combined into a single integrated alternative for full analysis. As discussed below, combining the most restrictive ACLs for both species into one alternative was expected to result in severe adverse impacts on the commercial and recreational fisheries and fishing communities, such that it was not a viable alternative.

The effect of a combination of low canary ACLs (i.e., <100 mt) and low POP ACLs (i.e., <150 mt) could result in limiting trawl fisheries to deeper waters outside the range of canary and POP. The low canary ACL would adversely affect the smaller-sized trawlers that cannot safely fish the deeper slope waters. Smaller-size trawlers would likely be limited to very restricted fishing on the shelf shoreward of the RCA. The whiting fishery would be very challenged if both canary and POP ACLs were low. This is because it is likely that they would have to avoid larger areas of the shelf and slope to target whiting without exceeding a canary or POP allocation. When canary allocations are low, the whiting fleet tends to move to deeper waters to avoid canary at the expense of higher bycatch rates of darkblotched and POP. When POP allocations are low, the fleet targets whiting on the shelf to avoid that species. When both allocations are low, there are few areas the whiting fleets can go to safely target whiting.

The low canary 2013 and 2014 ACLs of 48 and 49 mt, respectively are predicted to reduce fishing opportunities in California between Pt. Conception and 40º10' N. latitude. The variation of the canary ACL affects other fishing sectors and the predicted rebuilding progress of other overfished species. The amount of allowable canary harvest can directly affect predicted rebuilding progress of bocaccio and cowcod between Pt. Conception and 40º10' N. latitude, and yelloweye rockfish, especially when the ACL is as low as 50 mt. There is a negligible effect for the slope rockfish species (darkblotched and POP) since the majority of the harvest of these species occurs outside the areas where most canary are known to occur. The same is true for petrale sole under the current management system since petrale sole are targeted by the shorebased IFQ fleet on the slope in the winter, late fall and early spring periods. Shelf targeting opportunities for petrale by the shorebased IFQ fleet in the summer and early fall periods are limited by the available amount of canary, as well as yelloweye, Pacific halibut IBQ, and, of course, petrale sole. While the amount of allowable canary bycatch has socioeconomic impacts to fishing communities dependent on the shelf trawl fishery (i.e., shoreward of the RCA), there is a negligible direct impact on the petrale sole stock across the range of canary ACLs analyzed.

2.5.2 Management Measures

The following summarizes management measures that were considered but rejected for more detailed analysis. Additionally, Appendix C contains detailed analysis of management measures, including some measures that were rejected for implementation.

2.5.2.1 Stock Complexes

The Council continues to improve methodologies to estimate harvest specifications for species without stock assessments (i.e., data-poor species) and evaluate the performance of the existing stock complexes relative to the revised National Standard 1 Guidelines. In April 2011, a workshop was held to explore assessment methods for data-poor stocks.[23] The Scientific and Statistical Subcommittee (SSC) reviewed the proceedings and several methods were approved for general use without extensive review of the input data (i.e., historical landings, assumed depletion, assumed apportionment north and south of 40°10' N. latitude) for use in the 2013-2014 cycle (see Section 2.1).[24] The SSC endorsed the overfishing limit (OFL) estimates for the component stocks for use in calculating the OFLs for the complexes (nearshore, shelf, slope, other fish, and other flatfish); however the SSC noted the methods are dependent upon accurate historical mortality estimates and further investigation of the best possible estimates is a high priority. Further, the SSC said uncertainty in the catch history should be included in evaluating and implementing these data-poor methods.

Also in April 2011, the Council recommended the analysis to evaluate the performance of stock complexes and any necessary management measure alternatives be developed in time to inform decision-making for the 2013-2014 cycle. In August 2011, Cope et. al (2011b) published a productivity and susceptibility analysis, which indicated three species in the nearshore (china, copper, quillback) and slope (aurora, shortraker, and rougheye) may be vulnerable to overfishing based on recent estimates of the OFL contributions to the complex as well as the preliminary historical landings. The Council received reports from the Groundfish Management Team (GMT) that outlined the process for conducting a thorough stock complex analysis, preliminary estimates of mortality for the species identified by Cope et. al (2011b), and a range of management measures for consideration.[25] However, given difficulties reconciling historical data, the comprehensive analysis and evaluation is still ongoing. As recommended by the SSC, there is a high priority on reconciling the historical data that informs the OFL estimates.

For the 2013-2014 cycle, the Council explored measures to increase the accuracy of reporting for these species to help inform the future OFL estimates - estimated from either data-poor methodologies or

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[23] Agenda Item E.2.a, Attachment 6, June 2011.

[24] Agenda Item E.2.b, Supplemental SSC Report, June 2011

[25] Agenda Item E.4.a, Supplemental Attachment 7, June 2011; Agenda Item E.4.b, Supplemental GMT Report 2, Agenda Item G.5.a, Attachment 5, September 2011, Agenda Item E.9.b, Supplemental GMT Report 3, November 2011

formal stock assessments - and the larger stock complex restructuring analysis. Accuracy in reporting is essential to determine if mortality of the component species approaches unsustainable levels which could result in a biological impact in the long term. The SSC recommended against using OFL contribution values to evaluate whether overfishing is occurring for component stocks, since OFLs are set for stock complexes, rather than for individual stocks within a complex.[26] The SSC recommended a comparison of recent catches of the component species to the OFL contributions to identify whether stock complexes are working as they were intended. The SSC noted that if catches regularly exceed OFL contribution values, this could indicate a problem with how the stock complexes are structured, and justify action in the next management cycle which could include removing the species concerned from the complex and prioritizing it for a full assessment.

In November 2011, the Council requested an analysis to inform whether a sorting requirement for aurora, shortraker, and rougheye rockfish north of 40°10' N. latitude would improve the accuracy of total mortality estimates for these stocks and the frequency with which they are reported, compared to No Action.[27] The three species were chosen because they were identified in the Cope et. al paper as vulnerable and the preliminary historical estimates of mortality were higher than the estimated species-specific ABC and OFL contributions to the slope rockfish north complex proposed for 2013-2014 (Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). Management options considered but rejected for more detailed analysis include 1) coastwide sorting requirements for aurora, shortraker, and rougheye, 2) removal of aurora, shortraker, and rougheye from the slope rockfish complex, establishing a new complex or individual harvest specifications, along with management measures and 3) species specific HGs with limited entry and open access trip limits for aurora, shortraker, and rougheye (instead of limits at the complex level) which could be adjusted inseason to reduce landings.

The Council considered but rejected a coastwide sorting requirement since preliminary historical estimates of mortality indicate that mortality of these species south of 40°10' N. latitude has been low in recent years (2008-2010). Further, existing regulations in California (i.e., south of 42° N. latitude) require the species, not the complex, be reported on fish tickets (CDFG Code sections 8043 and 8045). The Council's primary objective for the sorting requirement was to improve the quality of data for use in management. Since this measure would not improve the data quality it was rejected.

The Council rejected removing the three species from the slope rockfish north complex, establishing a new complex or species-specific harvest specifications, and establishing IFQ as the primary catch control until the comprehensive analysis of stock complexes is completed and the historical estimates of mortality are finalized. [28] Methodologies to estimate the species-specific historical mortality estimates by sector need to be finalized, reviewed, and accepted by the Council and its advisory bodies. This step is necessary to inform the OFL and ABC estimates, evaluate the existing allocation structure, and inform any potential modifications to the allocations between the trawl and nontrawl sectors as well as within the trawl sector (i.e., allocations between shorebased IFQ, mothership, and catcher-processors).

Current regulations provide a formula for issuing QS in the shorebased IFQ fishery in the event species are removed from an IFQ management unit. For example, if a person holds one percent of a species group (e.g., slope rockfish north) before the subdivision, that person will hold one percent of the QS for each IFQ species resulting from the subdivision (e.g., aurora, shortraker, and rougheye). However, now that species-specific estimates of landings are available, additional options for initial issuance may need

[26] Agenda Item I.3.b, Supplemental SSC Report, April 2012

[27] Under No Action, state port biologists sample the shoreside landings with coverage levels varying by state, port, month, etc. Species composition data are provided by the states on a quarterly basis.

[28] Preliminary historically data indicate that aurora, shortraker, and rougheye are primarily caught with trawl gears. Further, the FMP allocates 81 percent of the slope rockfish complex to the trawl sector.

to be considered. For example, it is anticipated that individual catch history of the component species (e.g., aurora, shortraker, and rougheye) are different than the aggregate slope rockfish north landings used in the initial issuance of slope rockfish QS.

Historically, there were no concerns identified for individual species within the complex. Slope rockfish trip limits were routinely increased to attain the slope rockfish ACL (e.g., trip limits ranged from 1,500 lbs/2 months to a high of 8,000 lbs/2 months in the north). Participants in the shorebased IFQ fishery now have an incentive to voluntarily reduce catch of these species, now that there is an acknowledgement that historical mortality may have been higher than the estimated OFL and ABC contributions to the complex. Establishing IFQ at the species level would add complexity to the existing program and could result in thinly traded markets, which could negatively impact the performance of the program and the communities involved in the fishery. A thin market results in assets that cannot easily be sold or exchanged without a substantial change in price. Ensuring the health and sustainability of the aurora, shortraker, and rougheye stocks is important to industry for maintaining the slope rockfish target strategy as well as providing access to other valuable slope target species (e.g., Dover, thornyhead, and sablefish). The Council and NMFS have previously asked industry to voluntarily avoid species with some success, which may be a viable option until the historical estimates are resolved and long term solutions identified.

The Council rejected the option to adopt a species specific HG along with limited entry and open access trip limits for aurora, shortraker, and rougheye since preliminary estimates of mortality for these species with fixed gears is low (Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). Routine adjustments could be made to the existing slope rockfish fixed gear trip limits, which could reduce mortality of these species.

The Council rejected a Federal sorting requirement for three nearshore species (china, copper, and quillback) since existing regulations in Oregon and California already require sorting (there is no nearshore commercial fishery in Washington). The Council's primary objective for the sorting requirement was to improve the quality of data for use in management. Since this measure would not improve the data quality it was rejected. These three species were identified in the Cope et. al paper as vulnerable and the preliminary historical estimates of mortality for china and quillback were higher than the estimated ABC and OFL contributions to the slope rockfish north complex proposed for 2013-2014 (Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). Additionally, the Council considered that recreational fishery data from Washington, Oregon, and California is already collected and reported at the species level.

2.5.2.2 Shorebased IFQ – Surplus Carry-Over

Current regulations provide for a carry-over provision that allows a limited amount of surplus QP or IBQ pounds in a vessel account to be carried over from one year to the next or allows a deficit in a vessel account in one year to be covered with QP or IBQ pounds from a subsequent year, up to a carryover limit (50 CFR 660.140(e)(5)). The carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve optimum yield (OY) while preserving the conservation of stocks. The Council considered an option that would clarify regulations with regard to current accountability measures, which include modifications (reductions or suspension) to the eligible surplus carry-over percentages, in the event it is necessary to address MSA conservation requirements (see Appendix C). Further, the option sought to implement such accountability measures through routine inseason actions based on recommendations generated at a Council meeting. Lastly, the current list of automatic actions that may be implemented by NMFS would have been revised to include closing the shorebased IFQ fisheries, in addition to the at-sea whiting fishery (see regulations at 660.60 (d)).

Other options to modify the surplus carry-over provision were considered but rejected for more detailed analysis including 1) using a multi-year average of mortality in the trawl sector as the metric to assess whether accountability measures should be considered if the ACL is exceeded, 2) reductions to the surplus carry-over would occur in the following year, as opposed to reductions that occur in the year after the vessel accounts are reconciled, 3) holding back 10 percent of the trawl allocation until the vessel accounts from the previous year are reconciled, 4) establishing a fishery ACT below the fishery HG such that both the trawl and nontrawl sector allocations would be reduced at the start of the year. Once the vessel accounts from the previous year are reconciled, both the trawl and nontrawl sector allocations could be increased, 5) suspending the surplus carry-over provision while maintaining the deficit provision, and 6) suspending the surplus carry-over program but increasing the deficit provision. Generally, these measures were rejected because they increased regulatory complexity and/or were not consistent with the Council's objectives for the surplus carry-over provision. Appendix C contains greater detail on the measures that were considered but rejected for more detailed analysis.

At the September 2011 meeting, the Council also considered two management measures for the shorebased IFQ and at-sea whiting co-ops that were rejected for more detailed analysis: exempting the mid-water whiting fishery from chafing gear requirements and allowing multiple gears in the IFQ fishery. Both items were considered too broad in scope to be contemplated in the biennial specifications action and were recommended for inclusion in future trawl rationalization trailing actions.

2.5.2.3 Other Rejected Measures

The Council also considering restructuring the commercial nearshore trip limits in California in response to anticipated changes in state permitting. Action at the state level did not occur and therefore this measure was not necessary.

The Council also considered a public comment letter proposing to exempt certain vessels from the VMS requirement when transiting federal waters with rockfish onboard (Agenda Item G.9.c, Supplemental Public Comment, September 2011). The Council previously considered this request when it was recommended by the Vessel Monitoring Systems Committee in November 2009 (Agenda Item G.9.b, VMSC Report). As detailed in the 2009 Enforcement Committee Report, VMS is an important tool for monitoring compliance (Agenda Item G.9.b, Supplemental EC Report, November 2009). While understanding the situational difficulties that exist in various areas of the coast with regard to the current VMS regulations, the Council felt the proposal did not sufficiently warrant modification of the existing VMS regulations.

The proposed change to the 150 fathom depth contour line adjacent to the Cordell Bank Biogenic EFH Conservation Area (see Appendix C) is not considered further in the evaluation of the alternatives, because it is inconsistent with the depth-based management objective of the RCAs. Analysis of bathymetry data shows that the current waypoints describing the 150 fm line are consistent with actual bathymetry in this area. The proposal, which would make the 150 fm line match the boundary of the EFH Conservation Area, would allow fishing in depths less than 150 fm. In addition, the Council's Enforcement Consultants Committee did not agree that this would result in one of the purported benefits, simplification of Federal regulations.

Chapter 3 Affected Environment

3.1 Biological Resources

This section describes the current condition of biological resources that may be affected by the action. The effects of implementation of the alternatives on the biological resources are presented in Chapter 4.

3.1.1 Groundfish Overview

More than 90 species are managed under the Groundfish FMP. These species include: 60-plus rockfish, including all genera and species from the family *Scorpaenidae* (*Sebastes*, *Scorpaena*, *Sebastolobus*, and *Scorpaenodes*); 12 flatfish species; 6 roundfish species; and 6 miscellaneous fish species that include sharks, skates, grenadiers, rattails, and morids. Rockfish vary in their morphological and behavioral traits, with some species being semi-pelagic and found in mid-water schools, and others leading solitary, sedentary, bottom-dwelling lives (Love, *et al.* 2002). Rockfish inhabit varied depths, from nearshore kelp forests and rock outcroppings to deepwater (> 150 fm) habitats on the continental slope. Despite the range of behaviors and habitats, most rockfish share general life history characteristics, including slow growth rates, bearing live young, and large infrequent recruitment events. These life history characteristics contribute to relatively low average productivity that may reduce their ability to withstand heavy exploitation (Parker, *et al.* 2000), especially during periods of unfavorable environmental conditions.

Roundfish managed under the Groundfish FMP include lingcod, cabezon, kelp greenling, Pacific cod, sablefish, and Pacific whiting. In general, roundfish share similar morphology, are faster growing, have shorter life spans, and have external fertilization with some species having large and highly variable recruitment events. Adult lingcod are a relatively sedentary species found coastwide on the rocky shelf and in nearshore habitats. Lingcod grow rapidly; reaching 12 inches in the first year and have a maximum lifespan of 20 years. Cabezon is a coastwide species primarily found nearshore in intertidal areas and jetty rocks (Love 1996; Miller and Lea 1972). The cabezon's lifespan may exceed 20 years (Wilson-Vandenberg 1992). Kelp greenling are relatively common with the adults found in rocky reefs in shallow nearshore areas. The estimated maximum age for kelp greenling is 16 years (Howard 1992). Pacific cod are widely distributed from Alaska to Santa Monica, California (Hart 1988; Love 1996). Although Pacific cod prefer shallow, soft bottom habitats in marine and estuarine environments (Garrison and Miller 1982), adults have been found associated with coarse sand and gravel substrates (Garrison and Miller 1982; Palsson 1990)). Compared to the other roundfish, adult sablefish are a longer-living species. Adult sablefish commonly occur over sand and mud (McFarlane and Beamish 1983; NOAA 1990) in deep marine waters, but have also been found over hard-packed mud and clay bottoms in the vicinity of submarine canyons (MBC 1987). The coastal stock of Pacific whiting is semi-pelagic and is the most abundant single-species groundfish population in the California Current system (Stewart, *et al.* 2011a). The stock is characterized by highly variable recruitment patterns and a relatively short lifespan.

Flatfish species (*Pleuronectiformes*) have asymmetrical skulls with both eyes on the same side of the head. The 12 flatfish species in the Groundfish FMP include assessed species, such as arrowtooth flounder, Dover sole, English sole, petrale sole, and starry flounder, and unassessed species within the Other Flatfish complex (i.e., butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole). Most of the flatfish species are distributed coastwide with the exception of arrowtooth flounder, butter sole, and flathead sole, which are found north of central California. Flatfish species are primarily found in waters of the continental shelf, but vary in deep distribution. Flatfish species primarily found in nearshore areas include starry flounder, Pacific sanddab, butter sole, curlfin sole, sand sole and rock sole. Flatfish species found in deeper waters include Dover sole, flathead sole, and petrale sole. The remaining flatfish show more variation in depth distribution. Many flatfish migrate seasonally from shallow water summer feeding grounds on the continental shelf to deep water spawning grounds over the continental slope (NOAA 1990). Though there are variations between species, most of the flatfishes are found on soft bottom such as sand or sandy gravel substrates and mud; however, some are found in eelgrass habitats (Pearson and Owen 1992) and, in the case of arrowtooth flounder, occasionally over low-relief rock-sponge bottoms (NOAA 1990).

The life history traits of groundfish have important implications on stock assessments and how the stocks are managed. This is because fishing changes population abundance of the target species, as well as affects life history traits and population dynamics and may affect the yield. For each groundfish species, detailed information on habitat utilization patterns, fisheries that harvest the species, geographic range, migrations and movements, reproduction, growth and development, and trophic interactions are fully described in Appendix B2 to the final EIS titled, "The Pacific Coast Groundfish FMP, EFH Designation and Minimization of Adverse Impacts (NMFS 2005). Historical catch and management information for each groundfish stock can be found in Volume 1 of the 2008 Status of the Pacific Coast Groundfish Fishery stock assessment and fishery evaluation (SAFE document) (PFMC 2008b). The west coast latitudinal and depth distributions of groundfish species managed under the Groundfish FMP are provided in Table 3-1.

Table 3-1. Latitudinal and depth distributions of groundfish species (adults) managed under the FMP.

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
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.	17-140	115-140
Black rockfish	*Sebastes melanops*	N. 34º N lat.	N. 34º N lat.	0-200	0-30
Black-and-yellow	*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.,	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 dalli*	S. 38º N lat.	S. 33º N lat.	10-140	33-50

Common Name	Scientific Name	Latitudinal Distribution		Depth Distribution (fm)	
		Overall	Highest Density	Overall	Highest Density
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
Darkblotched rockfish	*Sebastes crameri*	N. 33º N lat.	N. 38º N lat.	16-300	96-220
Dusky rockfish	*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 lentiginosus*	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 [d/]	*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
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

Common Name	Scientific Name	Latitudinal Distribution		Depth Distribution (fm)	
		Overall	Highest Density	Overall	Highest Density
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*	Coastwide	Coastwide	0-42	0-27
Kelp greenling	*Hexagrammos*	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 suckleyi*	Coastwide	Coastwide	0->640	0-190
Other Species					
Finescale codling	*Antimora microlepis*	Coastwide	N. 38º N lat.	190-1,588	190-470
Pacific rattail	*Coryphaenoides acrolepis*	Coastwide	N. 38º N lat.	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; Love, *et al.* 2002; Miller and Lea 1972), 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 40º10' N. lat. is listed as depleted.
d/ Only two occurrences of harlequin rockfish south of 51º N. lat. (off Newport, OR and La Push, WA; (Casillas, *et al.* 1998)).

3.1.1.1 Stock Assessment Overview

Fishery specifications include OFLs, ABCs, and ACLs. The OFLs and ABC characterize the biological condition of the stocks. For 2011, the Groundfish FMP harvest specification framework was modified under Amendment 23 to be consistent with the revised NS1 guidelines. Amendment 23 retained the concept of OY. The ACL specified by the proposed action are comparable to the OY specification prior to 2011.

Stock assessments are used for setting harvest specifications by providing estimates of MSY, OFL, the MFMT, the MSST, ABC, OY, and ACLs. A stock assessment is the scientific and statistical process where the status of a fish population or subpopulation (stock) is assessed in terms of population size, reproductive status, fishing mortality, and sustainability. In the terms of the Groundfish FMP, stock assessments provide: 1) an estimate of the current biomass and reproductive potential, 2) an estimate of F_{MSY} or proxy thereof translated into exploitation rate, 3) the estimated MSY biomass (B_{MSY}), or proxy thereof, 4) estimated unfished biomass (B_0), and 5) the estimated variance (e.g., confidence interval) for the current biomass estimate. With the exception of Pacific whiting, which is assessed annually as specified in the Agreement with Canada on Pacific Hake/Whiting, groundfish stock assessments are conducted on a two-year cycle. Given the large number of groundfish species and limited state and Federal resources, a subset of all groundfish stocks are assessed in each stock assessment cycle. Overfished species stock assessments are typically conducted every two years, although a data report can be substituted for an assessment to monitor compliance with adopted rebuilding plans. The process for setting groundfish specifications involves the adoption of new and updated stock assessments. During the biennial specification process, the SSC reviews stock assessments and rebuilding analyses for overfished species and makes recommendations to the Council relative to the standards of the best available science and the soundness of the scientific information relative to management decisions. The Council then approves all or a portion of the stock assessments, or recommends further analysis.

The perception of stock status and productivity for many stocks may change substantially between stock assessments. Such changes can result from technical changes in the model, 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. The population dynamics of target species themselves are responsive to a mix of complex (and often poorly-understood) biological, oceanographic, and interspecies interactions. New data sources (e.g., new data, extensions of existing data sets, incorporation of environmental factors into assessments) can result in changes in parameter estimates and model outputs.

All stock assessments are subject to a peer review process, consistent with the MSA (§302(g)(1)(E)). The process considers components of the assessments starting with data collection and continuing through to scientific recommendations and information presented to the Council and its advisors. The TOR for the groundfish stock assessment process defines the expectations and responsibilities for various participants in the groundfish STAR process, and outlines the guidelines and procedures for a peer review process. The STAR process is a key element in an overall process designed to review the technical merits of stock assessments and other scientific information used by the SSC. This process allows the Council to make timely use of new fishery and survey data, to analyze and understand these data as completely as possible, to provide opportunity for public comment, and to assure that the results are as accurate and error-free as possible.

Sources of uncertainty in stock assessments include the inherent variability in populations, errors in sampling due to variability associated with the process of observing and measuring populations, and errors in model specifications (NRC 1998). The stock assessment process relies on a foundation of sound scientific data used in appropriate models to accurately characterize the status of stocks. The dynamics of fish stock growth, together with fluctuations in environmental conditions, result in stochastic variation in fish abundance (NRC 1998). Gathering information on the stocks is important and generally leads to greater certainty and confidence. However, increased data does not necessarily solve the problem of uncertainty in assessments. In general, stock assessments for species where there is abundant and reliable data tend to be more robust with respect to estimating stock trends and abundance.

Scientific uncertainty in stock assessments is taken into consideration when setting harvest specifications. The ABC is an annual catch specification that is the stock or stock complex's OFL reduced by an amount associated with scientific uncertainty in estimating the OFL, which is calculated as the estimated exploitable biomass multiplied by F_{MSY}. The SSC considered the uncertainty in estimating stock biomass and provided recommendations to the Council for quantifying this source of scientific uncertainty in groundfish stock assessments. A conceptual framework that factors in scientific uncertainty for stocks with quantitative assessments was implemented under Amendment 23. Under the framework, scientific uncertainty associated with estimating an OFL (σ) is quantified by the SSC, and the percentage reduction that defines the scientific uncertainty buffer and the ABC can be determined by translating the estimated σ to a range of overfishing probability (P*) values. Each P* value is then mapped to its corresponding buffer fraction. The Council then determines the preferred level of risk aversion by selecting an appropriate P* value, accordingly. In cases where the P* approach is used, the upper limit of P* values considered is 0.45.

Abundance-based Reference Points

Abundance-based reference points are defined in the Groundfish FMP. For each species with a stock assessment, a depletion level is estimated, which is current biomass relative to its unfished stock biomass (B_0 or $B_{unfished}$). The OFL 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. The proxy MSY abundance for all west coast groundfish species other than assessed flatfish species is currently 40 percent of B_0 (denoted $B_{40\%}$). The proxy MSY abundance threshold for assessed flatfish stocks is 25 percent of B_0 or $B_{25\%}$. The proxy threshold for declaring all groundfish stocks other than assessed flatfish stocks overfished is $B_{25\%}$, and that for assessed flatfish stocks is $B_{12.5\%}$. The MSA and NS1 guidelines refer to this threshold as the MSST. Stocks estimated to be above the depletion threshold, yet below an abundance level that supports MSY, are considered to be in the "precautionary zone" (between $B_{25\%}$ and $B_{40\%}$). The Groundfish FMP specifies precautionary reductions in harvest rate to better ensure future increases in the stock's abundance to B_{MSY}.

3.1.1.2 Overfished Stocks

Overfished stocks are those with spawning biomasses that have dropped below the MSST. The Groundfish FMP requires overfished stock to be rebuilt to B_{MSY} through harvest restrictions and conservation measures. Furthermore, the MSA requires the rebuilding periods 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. A rebuilding analysis that considers alternate harvest levels and rebuilding times is prepared for each overfished species.

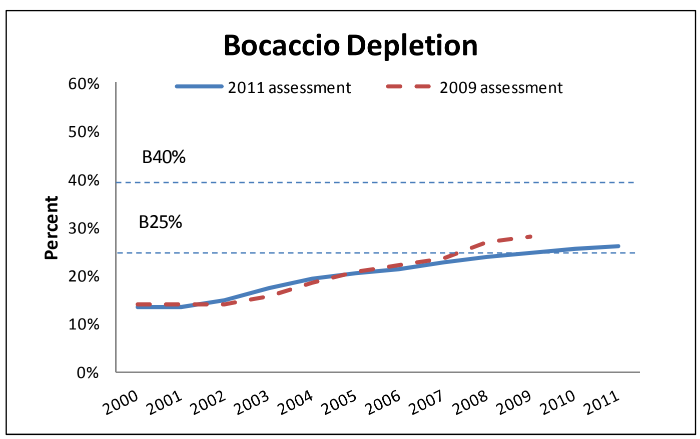
Table 3-2. Overfished stocks managed under the FMP.

Common name	Scientific name
Bocaccio [a/]	*Sebastes paucispinis*
Canary rockfish	*Sebastes pinniger*
Cowcod	*Sebastes levis*
Darkblotched rockfish	*Sebastes crameri*
Pacific ocean perch	*Sebastes alutus*
Petrale sole	*Eopsetta jordani*
Widow rockfish	*Sebastes entomelas*
Yelloweye rockfish	*Sebastes ruberrimus*

Table 3-3. Overfished stocks - biomass reference points in the most recent stock assessment.

Species	Last Assessed	Estimated Depletion in Year of Last Assessment	Spawning biomass or Spawning output
Bocaccio	2011 update	26%	2,029,000 million eggs
Canary rockfish	2011 update	24%	8,036 mt
Cowcod	2009 update	4.5%	98 mt
Darkblotched rockfish	2011 update	30.2%	13,926 mt
Pacific ocean perch	2011	19.1%	12,532 million eggs
Petrale sole	2011	18%	4,720 mt
Widow rockfish	2011	51.1%	36,342 million eggs
Yelloweye rockfish	2011 update	21.3%	219 million eggs

Bocaccio



Bocaccio are found throughout the coastal waters of the eastern Pacific Ocean from the Gulf of Alaska south to Baja California, Mexico. Although bocaccio range further north than Cape Blanco, Oregon, they are considered to be a separate stock due to differences in growth, maturity, and longevity. From the 1850s until 1950, the bocaccio population trajectory moderately declined, but is estimated to have steeply declined from the early 1950s through the early 1960s, as catches rose. One or several very strong recruitment events in the early 1960s resulted in the biomass sharply increasing. The stock is estimated to have exceeded the mean unfished biomass level through the early 1970s, when catches climb rapidly. By the mid-1980s depletion was at approximately 20 percent of the unfished level, and by the early 1990s depletion was estimated to be at 15 percent. Fishing mortality remained high throughout this period, even as catches declined rapidly. Recruitment during the 1990s was at very low levels. Since the early 2000s, spawning output has steadily increased, although the rate of increase has slowed in the latter half of the 2000s. Indications of strong 2009 and 2010 year classes are projected to result in increased abundance.

Depletion in 2011 is estimated at 26 percent (18.7 -33.1 percent), with the stock projected to be rebuilt by 2019.

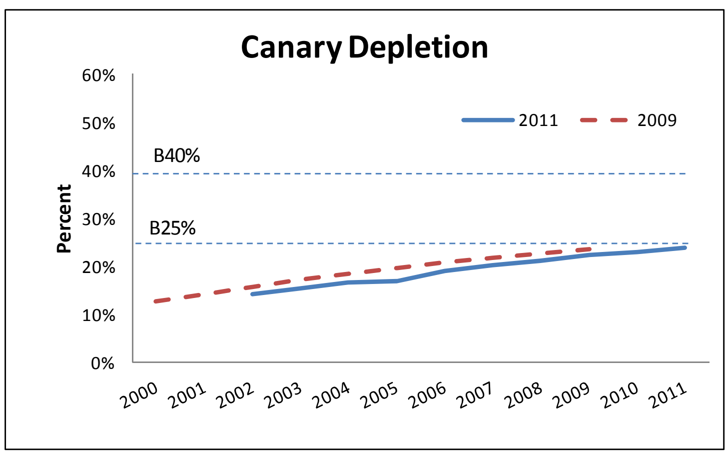
Field (2011a) prepared a stock assessment update for the bocaccio stock between the U.S.-Mexico border and Cape Blanco, Oregon using the Stock Synthesis 3.03 a model. The 2011 bocaccio assessment was originally scheduled to be an update of the 2009 full assessment (Field, *et al.* 2009) where the data are updated but the basic model structure is not. Assessment updates allow for expedited review by the SSC since the original full assessment had already undergone the more rigorous peer review of a STAR panel required in the groundfish stock assessment process. The update assessment presented to the SSC in June 2011 did not meet the TOR for an update because of changes in model structure and data. The STAT made these changes because a strict update estimated that the 2010 year-class was extraordinarily and unrealistically strong, based on length frequency data collected in the 2010 NMFS trawl survey. The Council decided that the update should receive additional exploration and review based on a limited set of analyses developed by the SSC. The SSC further reviewed the revised update assessment at the September 2011 “mop-up” panel and recommended this assessment for management decision-making.

The revised update assessment differs from a strict update in the following aspects: 1) it includes a new data source, an index of age-0 abundance based on power plant impingement data, and removes very small fish from the NWFSC data series, and 2) the major axis of uncertainty in the decision table is based on recruitment strength rather than the relative emphasis given to the different biomass indices. The revised update assessment estimates that depletion in spawning output was 26 percent at the start of 2011.

Recruitment for bocaccio is highly variable, with a small number of year classes dominating the catch in any given fishery or region. Currently there is evidence of a relatively strong 2009 year class and an extremely strong 2010 year class. A major uncertainty for the update is the relative magnitude of the incoming 2010 year class. More detailed information on the stock status can be found in the stock assessment document (Field 2011a).

Canary Rockfish

Wallace and Cope (2011) prepared a coastwide stock assessment update for canary rockfish using the Stock Synthesis model, version 3.21a. The new assessment used the same data sources as in 2009. However, since the 2009 stock assessment update, reconstruction of Oregon’s commercial landings prior to 1986 has been completed, and those data were included in this updated assessment. The information presented in this section was summarized from the 2011 stock assessment update.



Based on the revised catch series, canary rockfish were very lightly exploited until the early 1940s, when catches increased and a decline in biomass began. The spawning biomass experienced an accelerated rate of decline during the late 1970s, and reached a low of 9.7 percent of unfished biomass in the mid-1990s. The current depletion is 24 percent of the unfished biomass level in 2011 (~95 percent confidence interval 18-30 percent) and is an estimated increase of over 50 percent since 2000. The stock was estimated to have been at 11.5 percent the unfished biomass level in 2000. The canary rockfish spawning stock biomass is gradually increasing in response to reductions in harvest and above-average recruitment in the preceding decade. However, this trend is very uncertain.

Recent year class strengths (1997-2008) have generally been low, with only 4 of the 12 years (1999, 2001, 2006, and 2007) estimated to have produced large recruitments. Unfished spawning stock biomass is estimated to be 33,512 mt under the base case model in the 2011 assessment. The new assessment estimates the spawning stock biomass to be 8,036 mt (~95 percent confidence interval: 5,719-10,353 mt).

The base case assessment model explicitly captures parameter uncertainty in the asymptotic confidence intervals for key parameters and management quantities. Uncertainty around the base model results is considered through integration of rebuilding trajectories over two alternate states of nature corresponding to lower and higher stock-recruitment steepness, the parameter largely governing productivity and recent rebuilding trajectory. More detailed information can be found in the stock assessment document (Wallace and Cope 2011).

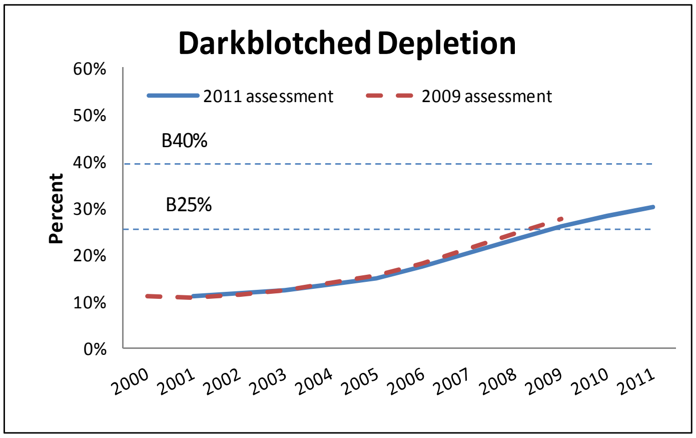
Cowcod

The most recent stock assessment update for cowcod in the Southern California Bight (U.S. waters south of Point Conception) was prepared in 2009 by Dick, et al. (Dick, *et al.* 2009) using an age-structured production model that used the Stock Synthesis 2 model. Cowcod is a long-lived species with a mean generation time estimated at 38 years. A cowcod status report prepared in 2011 indicates that management measures have performed well in keeping the total fishing-related mortality within the prescribed limits of the adopted rebuilding plan (Dick 2011).

In 2009, a project was conducted to evaluate the cowcod stock structure using tissue and otoliths (Dick 2011). The project considered whether cowcod was composed of one continuous stock or whether there could be more than one stock. The study also considered how factors such as the dramatic change in population size affected genetic variation. The genetic analysis suggested the likelihood of more than one cowcod stock with a likely break at Point Conception. Further, cowcod have low genetic diversity relative to other rockfishes, yet neither cowcod stock appears to have suffered detectable loss in genetic variation despite declines in abundance.

Estimated depletion in 2009 was 4.5 percent (~95 percent confidence interval: 3.8-21 percent). The cowcod stock shows a slow but increasing trend in stock biomass. Management actions since 2001 that include large-scale area closures specifically to reduce fishery interactions with cowcod has truncated data used in the assessment. A major source of uncertainty in the assessment was the assumed value of the steepness parameter in the stock-recruit relationship. In addition, the percentage of cowcod in total rockfish landings in years prior to the 1980s is not well-understood. More detailed information on the stock status can be found in the stock assessment document (Dick, *et al.* 2009) and in the 2011 cowcod status report (Dick 2011).

Darkblotched Rockfish

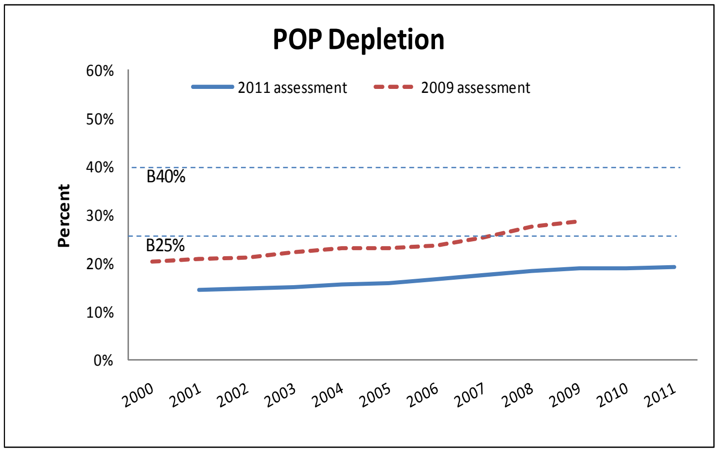


Stephens et al. (2011) prepared a stock assessment update for darkblotched rockfish in the U.S. Vancouver, Columbia, Eureka and Monterey areas using the Stock Synthesis model version 3.21d. The darkblotched rockfish population in these areas was modeled as a single stock. The information presented in this section was summarized from the 2011 stock assessment update.

The biomass (1+ age fish) in 2011 was estimated to be 13,926 mt. The recruitment pattern for darkblotched rockfish is highly variable between years. With the exception of the 1999, 2000, and 2008 year classes, recruitment levels (age-0 recruits) between the 1980s and 1990s were generally poor when compared with historical average recruitment levels. Darkblotched rockfish continues to show an increasing trend with the point estimate for the depletion of the spawning output at the start of 2011 at 30.2 percent of its unfished biomass. The assessment suggests that the west coast darkblotched stock is above the overfished threshold, but below the management target of $B_{40\%}$. The spawning output appears to have increased steadily over the past 10 years. Since 2003, overfishing is estimated to have occurred once, with estimated catch exceeding the ABC (now referred to as the OFL) by 1 mt in 2004.

The major sources of uncertainty in the updated darkblotched assessment are the estimated natural mortality and the assumed steepness of the stock-recruitment relationship. Sources of uncertainty not addressed in the model include the degree of connection between the populations of darkblotched rockfish off British Columbia and the U.S. West Coast, the effect of climatic variables on recruitment, growth, and survival of darkblotched rockfish, and gender-based differences in survival. More detailed information on the stock status can be found in the stock assessment update (Stephens, *et al.* 2011).

Pacific Ocean Perch (POP)

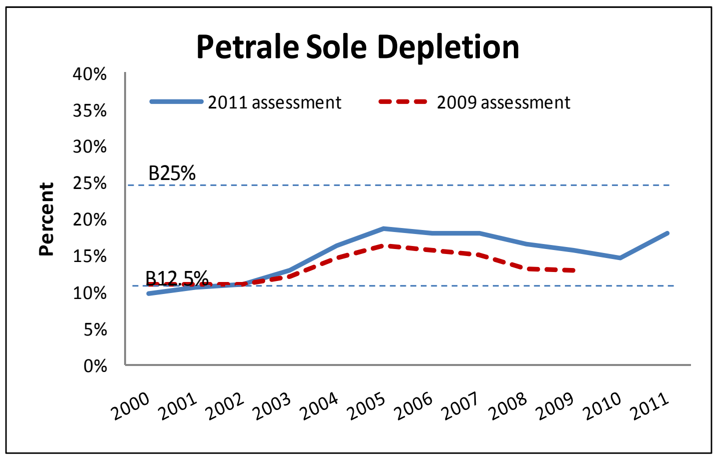


Hamel and Ono (2011) prepared a stock assessment for POP in the waters off the U.S. West Coast from northern California to the U.S.-Canada border. This is the first full assessment of POP since 2003. The assessment used the Stock Synthesis model, version 3.21d, which treats the data somewhat differently than the forward-projection statistical catch-at-age model used in past assessments (Hamel 2006a; Hamel 2008b; Hamel 2009; Hamel, *et al.* 2003; Tagart, *et al.* 2000). In addition, nearly all of the sources of data for POP have been re-evaluated for 2011 with varying degrees of change in the data used in past assessments. The information presented in this section was summarized from the 2011 stock assessment document.

The estimate of depletion of the spawning biomass at the start of 2011 is estimated to be 19.1 percent. The POP biomass shows an increasing trend. In 2011, the spawning output (3+ year-old fish) was estimated to be 25,482 mt. Because the estimated unfished biomass is estimated to be much larger in the 2011 stock assessment relative to past assessments (Hamel 2009), the estimated depletion of 19.1 percent in 2011 is lower than that estimated in 2009 (28.6 percent) in the 2009 assessment or the projected 2011 depletion (31.5 percent) in the 2009 assessment.

A number of sources of uncertainty are explicitly included in the 2011 assessment. For example, allowance is made for uncertainty in survey catchability coefficients. Unlike previous assessments, the 2011 assessment includes gender differences in growth and survival, a nonlinear relationship between individual spawner biomass and effective spawning output, and a more complicated relationship between age and maturity based upon published information. Among other sources of uncertainty that are not included in the current model are the degree of connectivity between the populations of POP off British Columbia, Alaska, and the U.S. West Coast, and the effect of other climatic variables on recruitment, growth, and survival of POP. More detailed information on the stock status can be found in the stock assessment document (Hamel and Ono 2011).

Petrale Sole



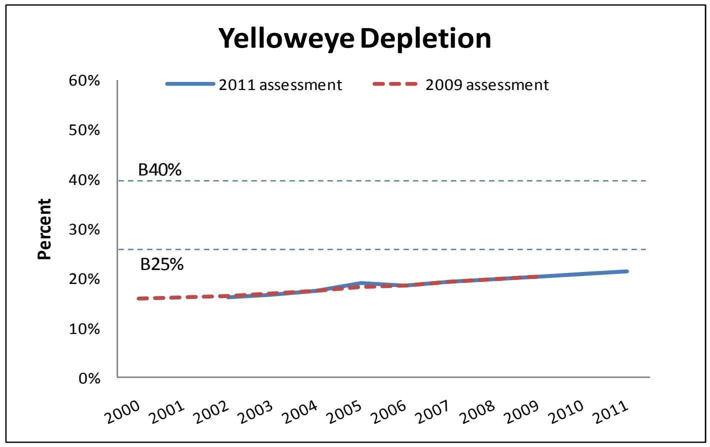
Haltuch et al. (2011) prepared a new coastwide stock assessment for petrale sole using the Stock Synthesis model version 3.21d. There is currently no genetic evidence suggesting distinct biological stocks of petrale sole off the U.S. West Coast. The information presented in this section was summarized from the new stock assessment document.

Petrale sole were lightly exploited during the early 1900s. By the 1950s the petrale sole fishery was well-developed, and showing clear signs of depletion and declines in catches and biomass. The petrale sole biomass was estimated to have dropped below the biomass target of $B_{25\%}$ in 1956, and declined below the MSST of $B_{12.5\%}$ during the 1980s and early 2000s. The petrale sole spawning stock biomass is estimated to have increased slightly from the late 1990s, peaking in 2005 in response to above-average recruitment. This increasing trend reversed in 2005, most likely due to strong year classes having passed through the fishery. The petrale sole biomass currently shows an increasing trend with recent above-average year classes recruiting into the spawning biomass. The estimated relative depletion level in 2011 is 18 percent (~95 percent asymptotic interval: ±3.6 percent, ~ 75 percent interval based on the range of states of nature: 15.1-21.4 percent), corresponding to 4,720 mt (~95 percent asymptotic interval: ±493 mt, states of nature interval: 4,440-5,052 mt) of female spawning biomass in the base model. Unfished spawning stock biomass was estimated to be 26,278 mt in 2011.

Parameter uncertainty is explicitly captured in the asymptotic confidence intervals reported throughout the assessment for key parameters and management quantities. The confidence intervals reflect the uncertainty in the model fit to the data sources included in the assessment, but do not include uncertainty associated with alternative model configurations, weighting of data sources (a combination of input sample sizes and relative weighting of likelihood components), or fixed parameters. More detailed information on the stock status can be found in the stock assessment document (Haltuch, *et al.* 2011).

Yelloweye Rockfish

Taylor and Wetzel (2011) prepared a coastwide stock assessment update for yelloweye rockfish in 2011 using the Stock Synthesis model version 3.21d. The following information is summarized from the new assessment.



Yelloweye rockfish are estimated to have been lightly exploited until the mid-1970s, when catches increased, resulting in a rapid decline in biomass and spawning output. Fishing mortality rates are estimated to have been in excess of the current MSY harvest rate for rockfish (SPR = 50 percent) from 1976 through 1999. Large reductions in harvest have been made since 2000, with annual harvests well below the MSY harvest rate. The coastwide abundance of yelloweye rockfish was estimated to have dropped below the $B_{40\%}$ management target in 1989 and the MSST in 1994. In hindsight, the spawning output appears to have passed through the target and threshold levels, with annual catch averaging almost five times the current estimate of the MSY. The coastwide stock remains below the MSST, although the spawning output is estimated to have been increasing since 2000, in response to reductions in harvest. The estimated relative depletion level in 2011 is 21.3 percent (~95 percent confidence interval = 18.9-24.0 percent).

Data for yelloweye rockfish are sparse and relatively uninformative, especially regarding current trends. Yelloweye rockfish catches are very uncertain due to the relatively small contribution of yelloweye to rockfish market categories and the relatively large scale of recreational removals. In addition, since 2001, management restrictions have required nearly all yelloweye rockfish caught by recreational and commercial fishermen to be discarded at sea. Parameters that generally contribute statistically significant model uncertainty to stock assessments, including those defining steepness, natural mortality, and growth are estimated, but may be poorly determined due to the short time-series of available data. Currently available fishery-independent indices of abundance are imprecise and not highly informative. It is unclear whether increased rates of recovery (or lack thereof) will be detectable without more precise survey methods applied over broad portions of the coast. Fishery data are also unlikely to produce conclusive information about the stock for the foreseeable future due to retention prohibitions and active avoidance of yelloweye among all fleets. More detailed information can be found in the stock assessment document (Taylor and Wetzel 2011).

3.1.1.3 Healthy Stocks

Healthy groundfish stocks are those with estimated spawning biomass levels at or greater than the B_{MSY} proxy (Table 3-4). Healthy species with new stock assessments in 2011 include Dover sole and spiny dogfish. The biological statuses of the newly-assessed stocks are summarized below.

Reference points from the most recent stock assessment are summarized in Table 3-5. The detailed information on life history, historical catch, and management information for each healthy groundfish stock can be found in the 2008 SAFE document (PFMC 2008b).

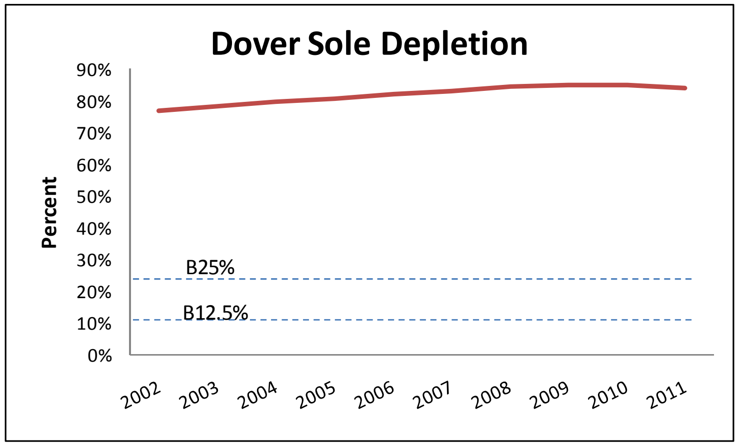
Table 3-4. Healthy stocks - reference points from most recent stock assessment.

Species	Last Assessed	Estimated Depletion in Year of Last Assessment	Spawning Biomass or Output when Last
Flatfish Species			
Arrowtooth flounder	2007	79%	63,302 mt
Dover sole	2011	84%	393,507 mt
English sole	2007	116%	41,907 mt
Starry flounder	2005	North 44% South 62%	North 2,112 mt
Rockfish Species			
Black rockfish south	2007	71%	3,227 M larvae
Black rockfish north	2007	53%	1,281 mt
Blackgill rockfish	2005	52%	4,977 mt
California scorpionfish	2004	58%-80%	563-816 mt
Chilipepper rockfish	2007	70%	23,224 mt
Greenstriped rockfish	2009	81%	5,736 M eggs
Gopher rockfish	2005	97%	1,931 mt
Longspine thornyhead	2005	71%	75,049mt
Shortbelly rockfish	2007	73%f/	--
Shortspine thornyhead	2005	63%	82,151 mt
Splitnose rockfish	2009	66%	8,426 M eggs
Yellowtail rockfish	2004	55%	12,407 mt
Roundfish Species			
Cabezon (off CA)	2009	48%	627 mt
Cabezon (off OR)	2009	52%	214 mt
Kelp greenling	2005	49%	157 mt
Lingcod	2009	North 62% South 74%	North 20,484 mt South 18,656 mt
Pacific hake	2011	91-175%	1.87 -2.18 million mt
Miscellaneous Species			
Longnose skate	2007	66%	4,634 mt
Spiny dogfish	2011	63%	44,660 thousands of fish

3.1.1.4 Healthy Stocks with New Assessments

Dover Sole

Hicks and Wetzel (2011) prepared a new stock assessment for Dover sole using the Stock Synthesis model, version 3.12f. The information in the following section was summarized from the new stock assessment.



Exploitation rates on Dover sole have never exceeded the MSY proxy level and the base case model did not predict that the stock has ever fallen below the target biomass. Recent exploitation rates on Dover sole have been small.

Larger than average recruitments in the early 1960s resulted in an increase in the Dover sole spawning biomass. A period of smaller than average recruitments in the late 1970s and early 1980s, along with the highest catches on record caused a decline in spawning biomass throughout the 1980s. More recently, spawning biomass has been increasing. However, a recent increase in Dover sole catches and low estimated recruitment in the early 2000s seem to be resulting in a slight downward trend in spawning biomass. In 2011 the level of depletion was estimated at 83.75 percent, well above $B_{25\%}$.

The uncertainty in the estimated spawning biomass is high. Although there is a large quantity of data available for Dover sole, there is little information about natural mortality, steepness, and historical recruitment. Further and more detailed information on the stock status can be found in the stock assessment document.

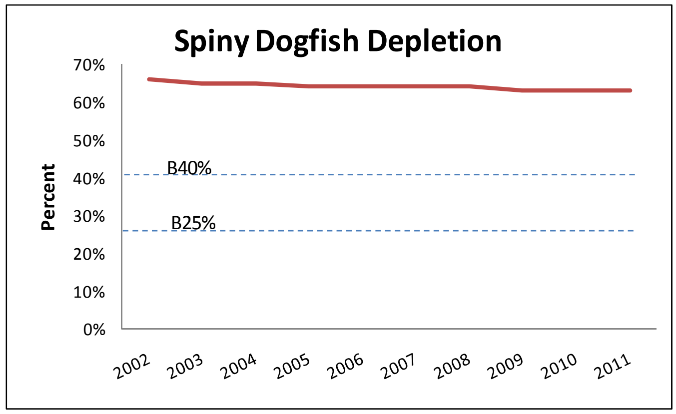
Pacific Whiting (Hake)

The Joint U.S. and Canadian Hake Technical Working Group (JTWG) prepared a new stock assessment for Pacific whiting in 2011 (Stewart, *et al.* 2011a). The assessment considered two models: stock synthesis 3 (SS3) and TINSS, representing the collective work of the JTWG. The information in the following section was summarized from the new stock assessment.

The spawning biomass at the beginning of 2011 was estimated at 1.87 million mt by the SS model and 2.18 million mt in the TINSS model. The 2011 spawning biomass in both the SS and TINSS models was estimated to be rebounding rapidly based on the strength of the 2005, 2006, and particularly the 2008 year classes. However the estimate is quite uncertain. Relative spawning depletion in 2011 was estimated at approximately 91 percent of the unfished biomass level by the SS model and/or 175 percent of the unfished biomass level by the TINSS model. Estimates of uncertainty in current relative depletion are extremely broad, from 35 percent-203 percent of unfished biomass in the SS model and 75 percent-409 percent in the TINSS model.

Pacific hake displays the highest degree of recruitment variability of any west coast groundfish stock, resulting in large and rapid changes in stock biomass. This volatility, coupled with a dynamic fishery, which potentially targets strong cohorts, and a biennial rather than annual fishery-independent acoustic survey, will continue to result in highly uncertain estimates of current stock status and even less certain projections of stock trajectory in future stock assessments. Both assessment models address the substantial uncertainty associated with several important model parameters including acoustic survey catchability (q) and the productivity of the stock (SS via the steepness (h) of the stock-recruitment relationship; TINSS via F_{MSY}, and natural mortality, M). More detailed information on the stock status can be found in the stock assessment document (Stewart, *et al.* 2011a).

Spiny Dogfish



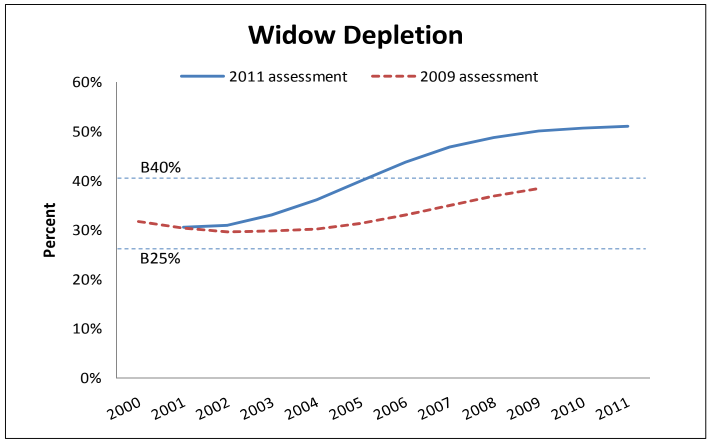
Gertseva and Taylor (2011) prepared a coastwide stock assessment for spiny dogfish using the Stock Synthesis model, version 3.21f. This was the first west coast spiny dogfish stock assessment. The information in the following section was summarized from the new stock assessment.

A brief but intense fishery for spiny dogfish livers occurred in the 1940s and ended in 1950. During this period landings averaged around 6,821 mt per year. The largest landings of 16,876 mt occurred in 1944. In the mid-1970s, an export market for dogfish as a food fish developed and landings averaged around 450 mt per year. For the last 10 years annual landings have ranged from 164 to 876 mt. Because dogfish was largely discarded and not landed in the past 10 years, total catch estimates range between 1,147 mt and 2,396 mt per year.

With minimal catches of spiny dogfish between 1950 and 1974, the spawning output increased (mostly as a result of maturation of younger dogfish that were not selected by the liver fishery). For the last 35 years, spawning output of spiny dogfish has been slowly but steadily declining due to fishery removals and low productivity of the stock. At the beginning of 2011, the spawning stock output was estimated to be 44,660 thousand of fish (95 percent confidence interval: 8,937-80,383), which represents 63 percent of the unfished spawning output level.

The west coast spiny dogfish stock likely interacts and overlaps with dogfish observed off British Columbia. Given the relatively low estimated rate of exchange between the U.S. West Coast and British Columbia dogfish, the west coast stock assessment was considered appropriate, but recognized that the scope of the assessment does not capture all removals and dynamics affecting the status and trends of the larger, transboundary population. Uncertainty in the model was explored though asymptotic variance and sensitivity analyses. More detailed information on the stock status can be found in the stock assessment document (Gertseva and Taylor 2011).

Widow Rockfish



He et al. (2011) prepared a new coastwide stock assessment for widow rockfish using Stock Synthesis model, version 3.22b. The new assessment indicates the west coast widow rockfish stock is now successfully rebuilt after having been declared overfished in 2011. The following information was summarized from the new assessment.

Stock spawning output steadily declined after major commercial fisheries for widow rockfish began in the 1980s. Spawning output in 2011 is estimated at 36,342 million eggs (~95 percent confidence: 24,528-48,156 million eggs). Overall, the spawning output patterns in the 2011 assessment and all previous widow rockfish assessments were similar, showing steep declines from the early 1980s to 2001 and increasing trends since rebuilding measures were first implemented in 2002. Recruitments remained low in the early 1990s and have been very low since 2001 as compared to the long-term average. Depletion in 2011 is estimated at 51.1 percent (~95 percent confidence interval = 41-61.2 percent). Because the biomass is estimated to be above the B_{MSY} target of $B_{40\%}$, the stock is considered to be successfully rebuilt.

As in the past assessments, there is substantial uncertainty in estimates of the stock-recruitment relationship. The sensitivity analysis in this assessment shows that small changes in the steepness parameter (h) can lead to large changes in point estimates for stock status and management reference points. Estimates of recruitment in recent years are highly uncertain and they are key factors in determining future trajectory of the stock. Further and more detailed information on the stock status can be found in the stock assessment document.

3.1.1.5 Precautionary Zone Stocks

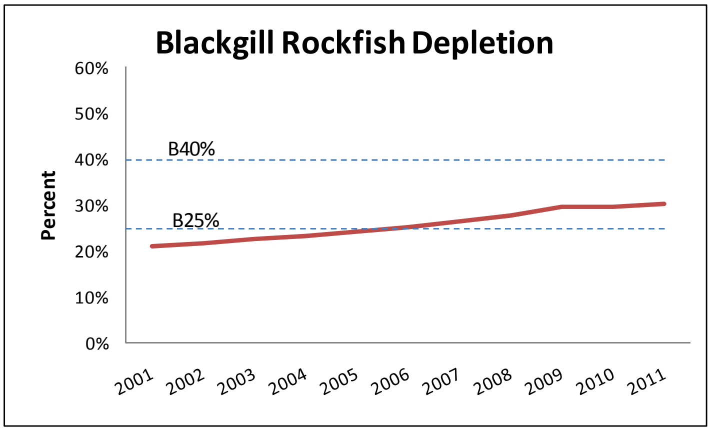
Precautionary zone groundfish stocks are those with estimated spawning biomass levels less than the B_{MSY} proxy and greater than the MSST, that have not been declared overfished (Table 3-5). Biological characteristics of precautionary zone stocks that are relevant to biological resources that may be affected by implementation of the alternatives are summarized in Table 3-5. Detailed information regarding life history, historical catch, and management information for each precautionary zone groundfish stock can be found in the 2008 SAFE document (PFMC 2008b). This section provides information on precautionary zone stocks that were assessed in 2011.

Table 3-5. Precautionary zone stocks - reference points from most recent stock assessment.

Species	Last Assessed	Estimated Depletion in Year of Last Assessment	Spawning Biomass when Last Assessed
Blackgill rockfish	2011	30.2%	6,585 mt
Blue rockfish	2007	29.7%	618
Greenspotted rockfish	2010	30.6% North 37.4% South	162.8 billion larvae North 287.1 billion larvae South
Sablefish	2011	33%	60,957 mt

Precautionary Zone Stocks with New Assessments

Blackgill Rockfish



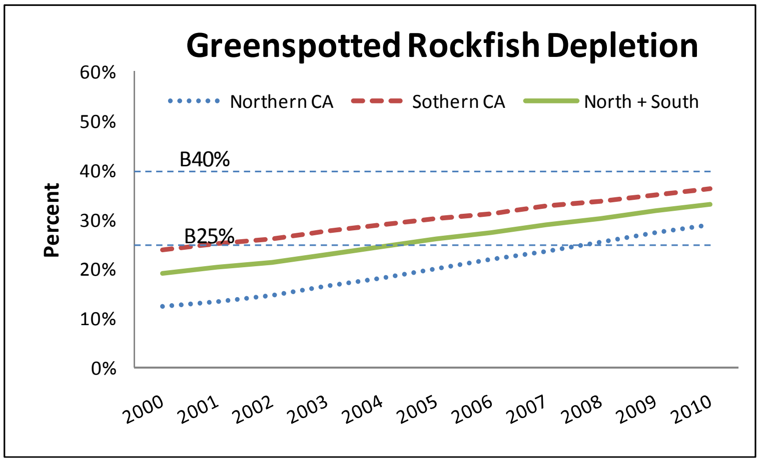
Field and Pearson (2011) prepared a new stock assessment for blackgill rockfish in the Conception and Monterey areas using the Stock Synthesis 3.21f model. The information in the following section was summarized from the new stock assessment.

Catches of blackgill rockfish primarily occur in the Southern California Bight south of Point Conception (34º27' N. latitude) where the species is caught in both directed fixed gear (hook-and-line) and historically, gillnet fisheries. Landings of this species are estimated to have risen slowly from very low levels (approximately 20-30 mt) in the 1950s, and then climbed rapidly in the 1970s and 1980s as improvements in technology and declines in other target species led fishermen to target blackgill rockfish in deeper and more offshore waters. Landings peaked in the mid-1980s at just over 1,000 mt, but have declined to approximately 100 mt to 150 mt in recent years.

The spawning output of blackgill rockfish was at high levels in the mid-1970s, but began to decline steeply in the late 1970s through the 1980s, consistent with the rapid development and growth of the targeted fishery. The biomass reached a low of approximately 18 percent of the unfished level in the mid-1990s. Since that time, catches have declined and spawning output has increased. The estimated depletion level in 2011 is 30.2 percent.

Catch data used in the assessment are generally reliable throughout the time period, although there is a lot of uncertainty in catch data prior to the early 1980s. Ageing is very difficult for this species, which appears to have highly variable size at age, as well as apparent regional differences in growth rates and potentially other life history traits. The lack of a reliable, long-term, fishery-independent survey index that reflects abundance from the entire range of the stock is problematic. In general, natural mortality and growth parameters comprised the greatest contribution to the model uncertainty. More detailed information on the stock status can be found in the stock assessment document (Field and Pearson 2011).

Greenspotted Rockfish



Dick et al. (2011) prepared a greenspotted rockfish stock assessment for the California portion of the stock using the Stock Synthesis model, version 3.21f. This is the first greenspotted rockfish stock assessment. The information in the following section was summarized from the stock assessment.

Although no genetic information regarding stock structure was available, this resource was assessed as two separate stocks (north and south of Point Conception) to account for differences in growth and exploitation history. A relatively simple model was used, in which recruitment was assumed to follow a deterministic Beverton-Holt stock-recruit relationship, and natural mortality and stock-recruit steepness were assumed.

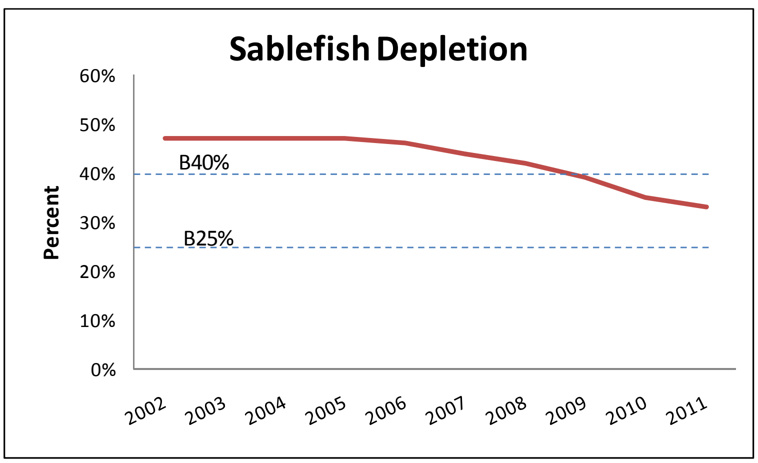
Trends in greenspotted rockfish stock status were estimated using spawning output since spawning output is a more reliable measure of reproductive potential than spawning biomass for species with size-dependent weight-specific fecundity. Early declines in spawning output in southern California were followed by an increasing trend during the 1930s and 1940s. Through the 1970s and most of the 1980s, estimated spawning output south of Point Conception declined rapidly, followed by a steady increase beginning in the late 1980s. In northern California, spawning output declined at a slower rate initially, but accelerated during the 1980s and 1990s. Model-estimated spawning output for the north has risen steadily since 1998.

The base models for greenspotted rockfish suggest that spawning output relative to unfished levels was below the MSST from 1984-2001 in southern California, and from 1990-2007 in northern California. Estimates of stock status in 2011 are 30.6 percent of unfished spawning output in the north and 37.4 percent in the south.

As with most of the west coast rockfish species, catch history is one of the major sources of uncertainty. An important component of uncertainty in historical landings is the fact that fishing effort exhibited a gradual shift towards deeper waters. Species composition sampling in Southern California began in the late 1970s, and were applied to historical landings of multi-species market categories. Further study is needed to validate regional differences in biological parameters for this species. Given the lack of information on the stock's population genetics, uncertainty regarding stock structure of greenspotted rockfish remains, with the possibility that only one genetic stock exists with a gradual cline in life history parameters, as is observed in other rockfish species on the west coast. The relationship between greenspotted rockfish found and harvested in the U.S. and in Mexico is also unclear. More detailed information on the stock status can be found in the stock assessment document (Dick, *et al.* 2011).

Sablefish

Stewart *et al*. (2011b) prepared a coastwide stock assessment for sablefish using the Stock Synthesis model, version 3.22. The following information was summarized from the new stock assessment.



Sablefish are estimated to have been exploited at a modest level through the first half of the 20th century. Following a period of above-average recruitments, the spawning stock biomass increased to nearly unexploited levels. Large harvests in the 1970s and 1980s are believed to have caused the stock biomass to decline. Estimates of the stock's productivity are highly uncertain due to lack of information on mortality, absolute stock size and productivity. Sablefish recruitment is estimated to be variable over the historical record, with substantial uncertainty in individual recruitment events. Recruitments during the 1980s were, on average, roughly an order of magnitude higher than the very poor recent cohorts estimated between 2002 and 2007.

The estimated spawning biomass in 2011 is 60,957 mt (95 percent interval ranges broadly from 16,418 mt to 105,495 mt). The relative spawning biomass is estimated to be at 33 percent of unfished biomass levels in 2011 (~95 percent intervals range from 18-49 percent). It appears that large 1999 and 2000 year classes briefly slowed the rate of stock decline between 2002 and 2005. An above-average 2008 cohort is currently moving through the population; however, it has yet to mature, and therefore is not currently contributing to the trend in spawning biomass.

The available data for sablefish are largely uninformative about the absolute size and productivity of the stock. Uncertainty in the properties of current ageing methods (both potential bias and imprecision), as well as relatively sparse fishery sampling, affect the reliability of age data. Because sablefish grow very rapidly and reach near asymptotic length in their first decade of life, length-frequency data is not particularly informative about historical patterns in recruitment. The patterns observed in historical sablefish recruitment suggest that stock trajectory (via shifts in recruitment strength) is closely linked to productivity regimes in the California current. Uncertainty in future environmental conditions should be considered a large source of uncertainty in all projections of stock status. More detailed information on the stock status can be found in the stock assessment document (Stewart, *et al.* 2011b).

3.1.1.6 Unassessed Groundfish Stocks

Unassessed groundfish stocks are category 3 species, and include species managed in complexes (i.e., the Minor Rockfish complexes, Other Flatfish, and Other Fish (Table 3-1). For category 3 species, it is impossible to quantitatively determine stock status or an overfished threshold. Relatively data-poor catch-based methods such as DBSRA and DCAC are used to determine the OFL for category 3 species.

3.1.2 Marine Ecosystem

3.1.2.1 California Current Large Marine Ecosystem

The California Current (CC) is formed by the bifurcation of the North Pacific Current. At approximately Vancouver Island, Canada, with seasonal variations, it begins to flow southward along the West Coast to mid-Baja, Mexico. The California Current flows southward year-round off shore from the shelf break to ~200 miles. Other coastal currents generally dominate along the continental shelf, including the northward Davidson Current and California Undercurrent, the Southern California Countercurrent, as well as many eddies and smaller shelf currents (PFMC 2011).

The California Current also defines the outer boundary of the California Current Large Marine Ecosystem (CCLME) that is delineated by bathymetry, productivity, and trophic interactions. The LME is an organizational unit to facilitate management of an entire ecosystem, and recognizes the complex dynamics between the biological and physical components. NOAA’s ecosystem-based management approach uses the LME concept to define ecosystem boundaries (PFMC, Agenda Item H.2.a Attachment 1, November 2011, *Discussion Document: Development of an Annual Report on Conditions in the California Current Ecosystem*).

Several Council and NMFS documents describe the prevailing marine ecosystem functions, variations, and drivers. The CPS SAFE document (PFMC 2011a) and the Groundfish SAFE document (PFMC 2008b) are hereby incorporated by reference. The Groundfish and CPS SAFE documents summarize stock assessment information as well as fishery statistics for all groundfish and CPS species. These typically include ecosystem information, bycatch, management strategies, and other fishery-related information.

3.1.2.2 EFH

EFH has been described within the project area for highly migratory species, CPS, salmon, and groundfish. The MSA defines EFH to mean "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. 1802 sec. 3(10)). Regulatory guidelines elaborate that the words "essential" and "necessary" mean EFH should be sufficient to "support a population adequate to maintain a sustainable fishery and the managed species' contributions to a healthy ecosystem." The regulatory guidelines also establish authority for Councils to designate Habitat Areas of Particular Concern (HAPC) based on the vulnerability and ecological value of specific habitat types. Councils are required to minimize, to the extent practicable, the adverse effects of fishing on EFH, when information indicates that fishing activities may adversely affect EFH. NMFS works through a consultation process to minimize adverse effects of nonfishing activities (50 CFR 600 subpart J). Refer to Volume 1 of the Council's 2008 groundfish SAFE document for more information.

Regional fishery management councils and NMFS are required to periodically review EFH and make changes as warranted by newly-available information. CPS and Pacific salmon EFH reviews were completed by Pacific Council and NMFS staff in 2010 and 2011, respectively. Groundfish EFH is currently undergoing an EFH review.

3.1.2.3 Physical and Biological Oceanography

The California Current is essentially the eastern limb of the Central Pacific Gyre, and begins where the west wind drift (or the North Pacific Current) reaches the North American Continent. This occurs near the northern end of Vancouver Island, roughly between 45° and 50° N latitude and 130° to 150° W longitude (Ware and McFarlane 1989). A divergence in the prevailing wind patterns causes the west wind drift to split into two broad coastal currents, the California Current to the south and the Alaska Current to the north. As there are really several dominant currents in the region, all of which vary in geographical location, intensity, and direction with the seasons, this region is often referred to as the California Current System (Hickey 1979). A more detailed description of the physical and biological oceanography of west coast marine ecosystems can be found in Volume 1 of the 2008 SAFE document.

3.1.2.4 California Current Large Marine Ecosystem

The effects of climate on the biota of the California Current ecosystem have been recognized for some time. Many of these effects and research illuminating these processes can be found in Volume 1 of the 2008 SAFE document (PFMC 2008b). Additional information regarding anthropogenic climate forcing follows.

Climate change and ocean acidification pose major additional stresses to managed fisheries on top of fishing mortality (IPCC 2007; IPPC 1995; WBGU 2006). Heat stress from warming waters and changes in the timing and magnitude of upwelling and associated nutrients and prey are just two examples. As climate change proceeds, there will likely be greater departure from historic population trends and increased uncertainty and risk in fisheries management. In addition, the effects of fishing pressure may unexpectedly magnify the effects of climate change and vice-versa (Harley and Rogers-Bennett 2004; Hsieh, *et al.* 2008; IPCC 2001). For example, overfishing and climate interactions are believed to have facilitated the sustained collapse of the Atlantic cod (Beaugrand, *et al.* 2003; Rose and O'Driscoll 2002).

Over the past decade, researchers have observed numerous oceanographic changes along the Pacific Coast which are consistent with anthropogenic climate forcing. They include: warmer surface waters in the California Current (Mendelssohn, *et al.* 2005; Mendelssohn, *et al.* 2003), increased stratification in the

Southern region of the current (Roemmick and McGowan 1995), increased rate of eustatic sea level rise (IPCC 2007), declining pH with episodes of aragonite undersaturated waters occurring on the continental shelf (Caldeira and Wickett 2008; Feely, *et al.* 2004; Orr, *et al.* 2005), and phenology (changes in the timing and duration of upwelling) (Barth, *et al.* 2007; Chan, *et al.* 2008). Ecological responses have also been observed, including shifts in planktonic community in the California Current from subtropical to tropical (Field, *et al.* 2006b; Roemmick and McGowan 1995), reproductive failures in seabird colonies (Peterson, *et al.* 2006; Sydeman, *et al.* 2006), numerous northward range extensions (Carlton 2000; Erickson, *et al.* 1991; Field, *et al.* 2006a; Hoff 2002; Roberts, *et al.* 2007; Tognazzini 2003; Walker, *et al.* 2002Rogers-Bennet, 2007 #195), shoaling of the oxygen minimum layer in deep water (Bograd, *et al.* 2008), and reoccurring seasonal dead zones off the coast of Oregon (Chan, *et al.* 2008).

Ludwig et al. (1993) argue the potential for adverse impacts on fish populations from the identified changes, individually and cumulatively, and our inability to formulate precise predictions regarding fisheries' responses requires adoption of a more precautionary approach to exploitation than is the norm. As climate change imposes a variety of selective pressures, it will be critical for fish populations to maintain their connectivity (Arctic Council Arctic Climate Impact Assessment, *et al.* 2005; FAO 2002; IPCC 2001; WBGU 2006). This will require preservation of large, genetically diverse populations which are broadly distributed, and maintenance of a more natural size distribution within populations, to promote productivity.

3.1.2.5 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 is discussed in Volume 1 of the 2008 groundfish SAFE document.

3.1.2.6 Marine Protected Areas

There are numerous Federal and state-managed MPAs 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. Federally-managed areas include National Wildlife Refuges, National Parks, National Marine Sanctuaries, and National Estuarine Research Reserves. In addition, there are navigation-related managed areas, weather and scientific buoys, and hazardous and danger areas. Finally, there are federally-managed fishing areas such as the RCAs, CCA, YRCA, and Pacific Whiting Salmon Conservation Zones off the Klamath and Columbia Rivers, designed to minimize impacts to Pacific salmon in those areas.

Many state-managed MPAs are under varying degrees of management, ranging from no-take marine reserves to designations allowing more intensive or extractive uses. The California Marine Life Protection Act guides a system of MPAs to increase coherence and effectiveness in protecting the state's marine life and habitats, marine ecosystems, and marine natural heritage, as well as to improve recreational, educational and study opportunities provided by marine ecosystems subject to minimal human disturbance. Oregon MPAs include marine gardens, research reserves, and two pilot marine reserves. Washington State manages marine reserves, conservation easements, state parks, and other areas, all with varying levels of regulation covering passive and extractive uses.

3.1.3 Nongroundfish Species

3.1.3.1 Pacific Halibut

Pacific halibut (*Hippoglossus stenolepis*) is a bottom-dwelling, right-eyed flatfish species from the family of flounders called *Pleuronectidae.* The 2010 Pacific halibut stock assessment shows that the portion of the Pacific halibut stock off the west coast has had an increasing biomass trend in recent years (Hare 2010). The commercial weight per unit effort and the International Halibut Commission stock assessment survey show substantial biomass increases for the west coast (Area 2A). However, the coastwide (U.S.-Canada) survey index of abundance declined by approximately 15 percent from 2009 to 2010. This is because in other areas, the stock has shown a continued decline with decreased growth rates.

Pacific halibut are taken with trawl, as well as commercial and recreational fixed gears as they co-occur with groundfish stocks, including canary and yelloweye rockfish. The fixed gear sablefish fishery is responsible for the most catch of Pacific halibut. North of Point Chehalis, Washington (46° 53' 18" N latitude) during the limited entry primary sablefish fishery under the Catch Sharing Plan, Pacific halibut are allowed to be landed when the Area 2A total allowable catch for Pacific halibut is above 900,000 pounds. Pacific halibut catch has been restricted in the trawl fisheries through the issuance of bycatch allowances. Historically, rockfish have also been caught in the Pacific halibut fishery.

3.1.3.2 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 CDFG completed its first-ever stock assessment of California halibut in July 2011. The assessment examined two separate halibut stocks off the coast of California, with the north-south boundary at Point Conception (California Department of Fish and Game 2011a). The following paragraph is summarized from the 2011 stock assessment.

The California halibut stock south of Point Conception is estimated to be at 14 percent of its unexploited spawning biomass level. The population level is estimated to have been at a low level since the start of the modeling time period (1971). Recent recruitments since 1999 are estimated to be low. MSY is estimated to occur at a very low fraction of the unexploited spawning biomass. Therefore, even though the population is estimated to be depleted, it is estimated to be above the spawning biomass level that would produce MSY and the fishing mortality is lower than the level that would produce MSY. This is partly due to the assumption that recruitment is independent of stock size. California halibut, like many other flatfishes, are prolific enough, and have a high reproductive potential, such that when environmental conditions are favorable, biomass can increase relatively quickly in a short timeframe. There is substantial uncertainty about many of the biological and fishing processes, including the stock-recruitment relationship, natural mortality, growth, and the survival of discarded fish. The stock north of Point Conception is estimated to be well above the biomass associated with MSY (B_{msy}) and fishing mortality is well below the fishing mortality rate associated with MSY (F_{msy}). The stock is estimated to have increased rapidly starting in 1995 due to large recruitments. For detailed information on the California halibut stock see www.dfg.ca.gov/marine/sfmp/halibut-assessment.asp.

California halibut is taken incidentally in the groundfish fishery. Table 3-12 shows annual estimates of California halibut total catch. The California halibut fisheries are known to take groundfish with overfished species catch being minimal. Groundfish catch in the California halibut fishery consists mostly of skates, starry flounder and other flatfish. Of the overfished species, only canary rockfish was caught in small amounts in most years by the limited entry trawl fishery and cowcod in a single year in the open access sectors (NMFS 2008; NMFS 2010a). California halibut are caught in groundfish fisheries (Table 3-12).

Table 3-6. Estimated catch (mt) of California halibut in the commercial groundfish fishery 2007-2010 (Bellman, *et al.* 2011a; Bellman, *et al.* 2008; Bellman, *et al.* 2010a; Bellman, *et al.* 2010b).

Fisheries	2007	2008	2009	2010
LE bottom trawl a/	42	39	48.4	54.7
Non-nearshore fixed gear	0	0	0.4	0.2
Nearshore fixed gear	1	1	4.0	1.8

a/ Does not include vessel trips targeting California Halibut

3.1.3.3 Coastal Pelagic Species (CPS)

CPS are taken incidentally in the groundfish fishery, and are believed to be most vulnerable to midwater trawl gear, with incidental take of CPS species documented in the midwater whiting fisheries. Estimates of total catch in the mothership, catcher/processor, shoreside and tribal whiting fisheries from 2007-2010 are shown in Table 3-7. Given that CPS are not associated with the ocean bottom, interactions with other groundfish fisheries are expected to be minimal.

Table 3-7. CPS catch in the Pacific whiting fisheries, 2007-2010 (mt).

Species	**2007**	**2008**	**2009**	**2010**
Squid (unidentified)	233	1,226	644	330
Jack Mackerel (*Trachurus symmetricus*)	8	51	2	5
Pacific Mackerel (*Scomber japonicus*)	4	1	0	0.1
Pacific Sardine (*Sardinops sagax*)	2	1	1	0.1

Pacific Sardine –(summarized from Hill, *et al.* 2010) Pacific sardine ranges from southeastern Alaska to the Gulf of California, México, and is thought to comprise three subpopulations. The northern subpopulation ranges seasonally from northern Baja California, México, to British Columbia, Canada, and offshore as far as 300 nm. Stock biomass is defined as the sum of the biomass for Pacific sardines ages 1 and older. Through the 1980s and 1990s the Pacific sardine biomass increased rapidly, peaking at 1.57 million mt in 2000. From 2000 to 2010, the biomass appeared to trend downward. However, the 2011 full assessment concluded that biomass was much higher than in recent years. The 2012 Pacific sardine fishery specifications include an ACL set equal to the ABC of 141,000 mt with an ACT set equal to the calculated HG of 109,409 mt. In 2011, the incidental catch in the Pacific whiting fisheries was a negligible proportion of the HG.

Pacific Mackerel –(summarized from 2011 assessment, Crone, *et al.* 2011) Pacific mackerel in the northeastern Pacific Ocean range from southeastern Alaska to Banderas Bay (Puerto Vallarta), Mexico, including the Gulf of California. The fish are common from Monterey Bay, California, to Cabo San Lucas, Baja California, but are most abundant south of Point Conception, California. Of three possible spawning stocks, the 'northeastern Pacific Ocean' population is harvested by fishers in the U.S. and Baja California, Mexico. Total biomass (age-1+ biomass, B) has steadily declined from the mid-1980s to the early 2000s, at which time the population began to increase moderately in size. However, in historical terms, the population remains at a relatively low abundance level, due primarily to oceanographic conditions. Limited fishing pressure over the last decade has not likely compromised this species' biology (i.e., their role in the larger CPS assemblage off the Pacific coast). For the 2011-12 fishing year, the ACT was set at 30,336 mt with an incidental set-aside of 10,128 mt. In 2010-11 the incidental catch in the Pacific whiting fisheries was a diminutive in proportion to the HG or incidental landing specification.

Northern anchovy, jack mackerel and market squid – The management of northern anchovy, jack mackerel and market squid primarily focuses on biomass, rather than catch. These species are very important to the ecosystem as forage and are classified as "monitored species," meaning they do not have HGs or management measures other than state regulations to limit effort as necessary. Landings of these species are monitored, and should landings (targeted or incidental) increase, active management may be recommended, including stock assessments and regulatory considerations. Only very minor amounts of northern anchovy and market squid are taken in the whiting fishery. Jack mackerel, however, is more frequently encountered. Between 2007 and 2010 the annual catch of jack mackerel in the Pacific whiting fishery ranged from 2 mt to 51 mt.

3.1.3.4 Dungeness Crab

The Dungeness crab (*Cancer magister*) is distributed from the Aleutian Islands, Alaska, to Monterey Bay, California. Off the west coast, Dungeness crab is most abundant in nearshore areas from central California to the Washington-Canada border. 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. Routine stock assessments are not conducted on Dungeness crab stocks off the west coast, and catch per unit effort (CPUE) is unknown. The states of Washington, Oregon and California examine annual landings to evaluate the condition of the stock.

Dungeness crab is primarily harvested with pots and traps. Incidental catch of groundfish in the west coast Dungeness crab fisheries are not collected, but are believed to be very low because the crab traps are highly selective. Dungeness crab is taken incidentally, or harmed unintentionally, by groundfish gears. In some areas, interactions with Dungeness crab by nearshore flatfish trawls are a concern. Concentrating vessel effort in shallow water during the summer months (<75 fm) affects Dungeness crab in the north because they are less likely to survive discard during their summer molting season.

Table 3-8. Estimated catch (mt) of Dungeness crab in the commercial groundfish fishery 2007-2010 (Bellman et al. 2011, Bellman et al. 2010b, Bellman et al. 2010c, and Bellman et al. 2008).)

Fisheries	2007	2008	2009	2010
LE bottom trawl	246	222	180.3	265.9
Non-nearshore fixed gear	4	6	1.9	3.0
Nearshore fixed gear	16	11	9.0	2.9

3.1.3.5 Greenlings (other than kelp greenling), Ocean Whitefish, and California Sheephead

While kelp greenling, managed under the Groundfish FMP, represents the majority of the greenling that are caught in the fishery, the other greenling species including 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.

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. California sheephead was assessed in 2004 using the SS length-based model. Changes in the spawning potential ratio based on estimated current and unfished mature female and male spawning biomass indicates that the stock is below the California nearshore management plan target level of 50 percent of the unfished condition (Alonzo, *et al.* 2004).

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. Incidental catch data for the groundfish fishery are currently not available nor is data on the catch of groundfish in the state commercial or recreational target fisheries for these species.

3.1.3.6 Highly Migratory Species (HMS)

The following paragraph was summarized from the 2010 HMS SAFE document. HMS includes striped marlin (*Kajikia andax*), swordfish (*Xiphias gladius*), common thresher shark (*Alopias vulpinus*), pelagic thresher shark (*Alopias pelagicus*), bigeye thresher shark (*Alopias superciliosus*), shortfin mako shark (*Isurus oxyrinchus*), blue shark (*Prionace glauca*), North Pacific albacore (*Thunmus alalunga*), yellowfin tuna (*Yhumus albacores*), bigeye tuna (*Thunmus obesus*), skipjack tuna (*Katsuwonus pelamis*), bluefin tuna (*Thunmus orientalis*), and dorado (*Coryphaena hippurus*). These species are largely pelagic, open ocean species infrequently caught in groundfish directed fisheries. In California, HMS are occasionally taken by fisheries targeting groundfish. In 2009, about 100 kg of albacore were taken incidentally with groundfish trolling for sablefish and rockfish. Thresher sharks are incidentally taken in trawl gear.

3.1.3.7 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. 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 large proportion of canary rockfish incidental catch. However, the catch of groundfish has been reduced through the use of bycatch reduction devices (BRDs) which are 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. Most of the pink shrimp catch is taken with trawl gear with a minimum mesh size of one inch to three-eighths of an inch between the knots. Data collected by the WCGOP from the Oregon and California state-licensed pink shrimp trawl fisheries north of 40° 10’ N. latitude in 2009 tows observed coastwide total catch of groundfish (discarded + retained) in the 2009 pink shrimp fishery was largely comprised of Pacific hake (116.5 mt) and flatfish species (arrowtooth 1.3 mt, rex sole 1.3 mt, other flatfish 4.6 mt) (NWFSC 2010). Of the rebuilding species, darkblotched rockfish (1.1 mt) was the most commonly observed. Canary rockfish (0.002 mt), POP (0.02 mt) and widow rockfish (0.003 mt) were caught in small amounts (NWFSC 2010). The 2009 incidental catch data was similar to the 2008 pink shrimp fishery data (NMFS 2009).

3.1.3.8 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. Groundfish fisheries catch salmon incidentally and the salmon troll fishery has an incidental catch of groundfish. Section 3.1.4 (Protected Species) describes both ESA-listed and non ESA-listed salmon species affected by this action.

3.1.3.9 Sea Cucumber

Sea cucumbers are long, soft-bodied, marine invertebrates in the class *Holothuroidea*. 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 Point Conception), an area with no rocky outcroppings.

3.1.3.10 Ridgeback and Spot Prawns

Ridgeback prawns (*Sicyonia ingentis*) are found from Monterey, California south to Baja California, Mexico, in depths of 145 m to 525 m (Sunada, *et al.* 2001). They are more abundant south of Point Conception and are the most common invertebrate appearing in trawls. Their preferred habitat is sand, shell and green mud substrate, and they are relatively sessile. 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 catch of depleted groundfish in the ridgeback prawn fishery is considered to be negligible.

Spot prawns (*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 prawns are hermaphroditic. Spot prawn fisheries are state-managed. The use of trawl gear to target spot prawns 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.

3.1.3.11 Miscellaneous Nongroundfish Flatfish, Skates, and Tanner Crab

Species caught in the groundfish fisheries in amounts worth noting include non-FMP flatfish species, non-FMP skate species, and tanner crab. Table 3-15 shows the estimated catch of these species in the limited entry trawl, non-nearshore fixed gear and nearshore fixed gear fisheries from 2007 to 2010.

Table 3-9. Estimated catch (mt) of most common remaining nongroundfish species, in the commercial groundfish fishery a/ 2007-2010 (Bellman et al. 2011, Bellman et al. 2010b, Bellman et al. 2010c, and Bellman et al. 2008).

Species	2007	2008	2009	2010
Non-FMP flatfish	60	52	69.9	65.8
Non-FMP skate	--	--	216.5	126
Tanner Crab	452	559	508.6	461.1

a/ includes catch data from limited entry trawl, non-nearshore fixed gear, and nearshore fixed gear

3.1.4 Protected Species

Protected species are species listed under the ESA, the Marine Mammal Protection Act (MMPA), the Migratory Bird Treaty Act (MBTA), and EO 13186.

- The ESA protects species in danger of extinction throughout all or a significant part of their range, and mandates the conservation of critical habitat. The ESA defines "species" as a species, a subspecies, or for vertebrates a distinct population. 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 protection and conservation. Stock assessments are conducted annually 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 (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." All marine mammal species are protected under the MMPA, regardless of species or stock listings under the ESA.

- The MBTA implements treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, it is unlawful to take, kill, or possess migratory birds. In addition, Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, directs Federal agencies to negotiate Memoranda of Understanding with the United States Fish and Wildlife Service (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 species or stock listings under the ESA.

3.1.4.1 ESA-listed Salmon and Steelhead

Salmon caught in West Coast groundfish fisheries are anadromous, spending part of their life in fresh water streams and rivers from Central California to Alaska and part of their life in marine waters. During their marine phase they occur along the U.S. and Canada seaward into the north central Pacific Ocean, including Canadian territorial waters and the high seas. Critical portions of these ranges include the freshwater spawning grounds and migration routes. There are 31 West Coast salmon and Steelhead Evolutionarily Significant Units (ESUs) or distinct population segments (DPSs) in the action area (Table 3-10). The concept of ESUs and DPSs are used by NMFS in applying the ESA to salmon and steelhead. Of the ESA-listed species, Chinook are most likely to be encountered. The Chinook ESUs that NMFS has concluded to be affected by the groundfish fisheries are: Snake River fall Chinook, Upper Willamette River Chinook, Lower Columbia River Chinook, Puget Sound Chinook, Sacramento River winter-run Chinook, California coastal Chinook, and Central Valley spring-run Chinook (NMFS 2006b))

Table 3-10 Endangered Species Act Status of West Coast Salmon & Steelhead (highlighted ESUs are those most likely to be encountered in the groundfish fisheries).

Species/ESU		Status
Sockeye	Snake rive	Endangered
	Ozette Lake	Threatened
Chinook	**Sacramento River Winter-run**	Endangered
	Upper Columbia River Spring-run	Endangered
	Snake River Spring/Summer -run	Threatened
	Snake River Fall-run	Threatened
	Puget Sound	Threatened
	Lower Columbia River	Threatened
	Upper Willamette River	Threatened
	Central Valley Spring-run	Threatened
	California Coastal	Threatened
	Central Valley Fall and Late Fall-run	Species of Concern
Coho	Central California Coast	Endangered
	Southern Oregon/Northern California	Threatened
	Lower Columbia River	Threatened
	Oregon Coast	Threatened
	Puget Sound/Strait of Georgia	Species of Concern
Chum	Hood Canal Summer-run	Threatened
	Columbia River	Threatened
Steelhead	Southern California	Endangered
	Upper Columbia River	Threatened
	Central California Coast	Threatened
	South Central California Coast	Threatened
	Snake River Basin	Threatened
	Lower Columbia River	Threatened
	California Central Valley	Threatened
	Upper Willamette River	Threatened
	Middle Columbia River	Threatened
	Northern California	Threatened
	Puget Sound	Threatened
	Oregon Coast	Species of Concern

Sacramento River Winter-run Chinook

The Sacramento River winter-run Chinook ESU is represented by a single naturally-spawning population that has been completely displaced from its historical spawning habitat by the construction of Shasta and Keswick Dams. Having only one population in the ESU is a risk due to the lack of genetic diversity.

Snake River Fall-run Chinook

The Snake River Spring-Summer Chinook ESU includes all naturally-spawned populations of spring/summer-run Chinook salmon in the main stem of the Snake River, the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River sub-basins, as well as 15 artificial propagation programs. Although recent natural spawning abundance estimates have increased, all populations remain below minimum natural origin abundance thresholds (Ford, *et al.* 2010).

Puget Sound Chinook

The ESU includes all naturally-spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Strait of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington, as well as 26 artificial propagation programs. Most Puget Sound populations have consistently been below the spawner recruit levels that were identified as being consistent with recovery (Ford, *et al.* 2010). Risk factors for the ESU include high fractions of hatchery fish in many populations and widespread loss and degradation of habitat (Ford, *et al.* 2010).

Lower Columbia River Chinook

The Lower Columbia River Chinook ESU includes all naturally-spawned populations of Chinook salmon from the Columbia River and its tributaries from the Pacific to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River. The ESU includes the Willamette River to Willamette Falls, exclusive of spring-run Chinook salmon in the Clackamas River. Seventeen hatchery programs are considered to be part of the ESU. Lower Columbia River Chinook salmon includes three distinct components: spring run Chinook, tule fall Chinook, and bright fall Chinook. A recent 5-year review by Ford *et al*. (2010)concluded that the ESU is at very high risk of extinction with 28 of the 32 historical populations in the ESU considered to be extirpated or at very high risk; however, the overall biological risk category remains as threatened.

Upper Willamette River Chinook

The Upper Willamette River Chinook ESU includes all naturally-spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River and its tributaries, above Willamette Falls. Seven hatchery programs are also considered to be part of the ESU. Ford *et al.* (2010) verified the high fraction of hatchery fish in all of the populations in the ESU and highlighted the substantial risks associated with pre-spawning mortality.

Central Valley Spring-run Chinook

Central Valley Chinook stocks include spring stocks of the Sacramento and San Joaquin rivers and their tributaries. From the early 1990s through 2001there was an improving trend in the population, as well as major habitat improvements in the watersheds and reduced ocean catch; however, since 2005 there have been declines in the abundance in the Central Valley, including spring-run Chinook salmon (NMFS 2011). Major concerns with the ESU have been loss of diversity caused by the extirpation of spring-run Chinook salmon populations from most of the Central Valley, the small number and close proximity of extant spring-run Chinook salmon populations (only three streams) which are vulnerable to catastrophic events, and interactions with hatchery fish from populations outside the ESU (Good *et al*. 2005).

California Coastal Chinook

The ESU includes all naturally-spawned populations of Chinook salmon from rivers and streams south of the Klamath River to the Russian River, California, as well as seven artificial propagation programs: the Humboldt Fish Action Council (Freshwater Creek), Yager Creek, Redwood Creek, Hollow Tree, Van Arsdale Fish Station, Mattole Salmon Group, and Mad River Hatchery fall-run Chinook hatchery programs. Currently there is no evidence to suggest any substantial improvement in the status of this ESU since 2005 (NMFS 2011). Concern relative to the ESU's ability to recover include the low population size relative to historical abundance, mixed trends in the time series of abundance indices, and the low abundances and potential extirpations of populations in the southern part of the ESU (Good, *et al.* 2005).

Salmon Interactions in the Whiting Fishery

Table 3-11 shows the estimated annual catch of salmonids in all sectors of the Pacific whiting fishery from 2005 to 2010, and Table 3-18 shows salmon catch by sector for 2008 and 2009. On an annual basis there is temporal and spatial variation in the catch of salmon that is associated with 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, the higher bycatch rate for the tribal mothership sector, since these vessels fish within the tribal usual and accustomed areas (U/As), and have less flexibility to make spatial adjustments in response to salmon bycatch. 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 2006b). Ocean conditions may play a role, but specific causative factors, at least any that can be used predicatively, cannot be identified.

Table 3-11. Estimated Annual Catch of Salmonids in the Pacific Whiting Fishery, All Sectors, 2005-2010.

Salmonid Species							
Year	**Chinook**	**Coho**	**Pink**	**Chum**	**Sockeye**	**Steelhead**	**Unidentified**
2005	11,916	467	480	28	0	0	8
2006	3,975	53	0	136	0	0	0
2007	6,186	475	595	291	0	0	0
2008	3,380	52	16	79	2	0	31
2009	2,740	106	157	54	0	0	107
2010	4,489	21	0	19	2	0	4

Table 3-12 Coastwide estimated number of salmon caught in all 2009 Pacific Whiting Fisheries.

2009						
	Chinook	Coho	Chum	Pink	Sockeye	Unidentified
Tribal - Mothership	821	8	11	0	0	0
Tribal - Shoreside	1,321	49	0	129	0	0
Mothership	269	12	41	2	0	0
Catcher/Processors	22	0	0	0	0	0
Shorebased (EFP)	280	37	2	26	0	107
TOTAL	2,740	106	54	157	0	107
2008						
Tribal - Mothership	157	0	0	0	0	0
Tribal - Shoreside	539	21	11	9	0	0
Mothership	225	18	17	0	0	0
Catcher/Processors	497	3	43	0	2	18

Shorebased (EFP)	1,962	10	8	7	0	13
TOTAL	3,380	52	79	16	2	31

Information gathered from coded-wire-tag (CWT) recoveries in Chinook salmon in recent years (2006-2009) shows which hatchery stocks have been encountered in the fishery in recent years (Figure 3-1). Consistent with the most recent biological opinion, the Puget Sound ESU, Snake River Summer/Fall, Lower Columbia were most frequently encountered.

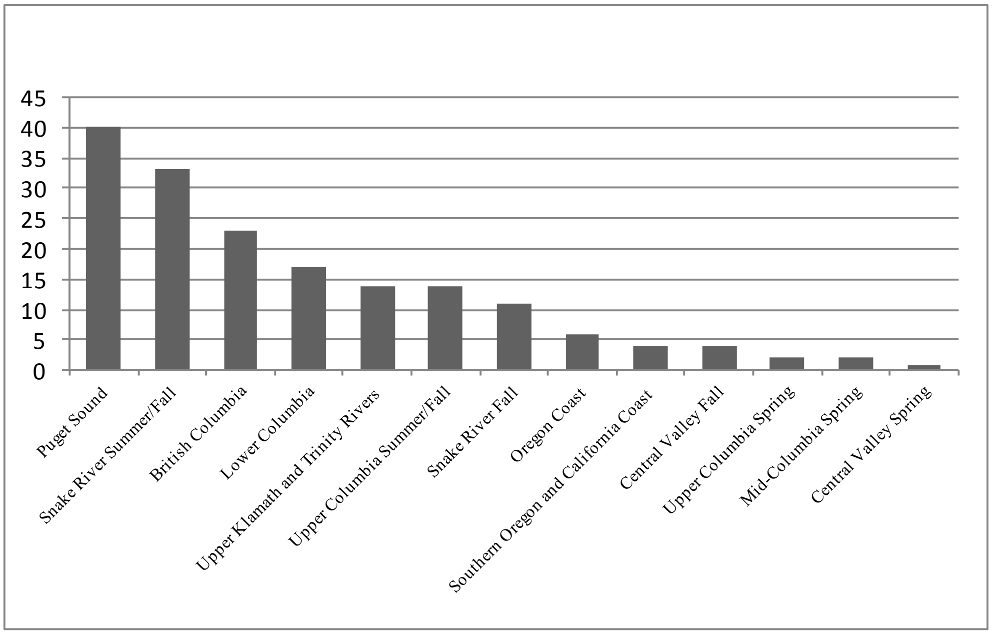


Figure 3-1. Pacific Whiting At-sea Fisheries, Number of Coded Wire Tags 2006-2009, by ESU (Source: Pacific States Marine Fisheries Commission, Regional Mark Processing Center 205 SE Spokane Street, Suite 100, Portland, Oregon 97202).

Salmon Interactions in the Nonwhiting Groundfish Fisheries

Data from the WCGOP were used to estimate the number of salmon caught in the nonwhiting groundfish fisheries. Table 3-19 shows the annual estimates bycatch by species from 2005 to 2009. Table 3-20 provides the estimated catch by species and fishery for 2008 and 2009.

Most salmon bycatch in the nonwhiting fisheries is Chinook salmon and is taken by the limited entry bottom trawl fishery. Estimates of Chinook bycatch from 2006 through 2009 remained considerably lower than 2005 (Table 3-19). Coho salmon bycatch has shown an increasing trend since 2005 with bycatch occurring in the fixed gear nearshore groundfish fishery (Table 3-20). Coho bycatch observations were all made North of Cape Mendocino, except an estimate of 19 individuals in 2006 that were taken in the limited entry trawl fishery (Bellman and Hastie 2008). Pink salmon bycatch was first observed in the limited entry bottom trawl fishery during 2009. One individual pink salmon was observed during the summer season in depths shallower than 125 fm south of Cape Mendocino. Chum and sockeye salmon were not observed as bycatch from 2005 to 2009 (Table 3-13).

Table 3-13. Estimated Annual Catch of Salmonids in the Nonwhiting Groundfish Fishery, All fisheries. (Bellman and Hastie 2008; Bellman, *et al.* 2010c; Bellman, *et al.* 2011b)

Salmonid Species							
Year	**Chinook**	**Coho**	**Pink**	**Chum**	**Sockeye**	**Steelhead**	**Unidentified**
2005	799	5	0	0	0	--	0
2006	96	19	0	0	0	--	0
2007	234	23	0	0	0	--	--
2008	389	39	0	0	0	--	--
2009	325	88	2	0	0	--	--

Table 3-14 Coastwide estimated number of salmon caught by nonwhiting groundfish fishery sectors 2008-2009. (Bellman et al. 2011a, Bellman et al. 2010a)

2009					
	Chinook	Coho	Chum	Pink	Sockeye
LE groundfish bottom trawl	296	0	0	2	0
California halibut trawl (LE/OA) a/	0	0	0	0	0
LE sablefish primary	0	0	0	0	0
LE sablefish non-primary	0	0	0	0	0
OA non-nearshore fixed gear	0	0	0	0	0
Nearshore fixed gear	29	88	0	0	0
TOTAL	*325*	*88*	*0*	*2*	*0*
2008					
LE groundfish bottom trawl	344	0	0	0	0
California halibut trawl (LE/OA) a/	45	0	0	0	0
LE sablefish primary	0	0	0	0	0
LE sablefish non-primary	0	0	0	0	0
OA non-nearshore fixed gear	0	0	0	0	0
Nearshore fixed gear	0	39	0	0	0
TOTAL	*389*	*39*	*0*	*0*	*0*

a/ LE bottom trawl vessels that hold a California halibut bottom trawl permit may participate in the state permitted California halibut fishery. California halibut tows can occur on the same trip as tows targeting groundfish and were identified in logbook and observer data based on the following criteria: 1) the reported tow target was California halibut or 2) the tow target was nearshore mix, sand sole, or other flatfish, and the tow took place in less than 30 fm and south of 40°10’ N. latitude.

3.1.4.2 Green Sturgeon

The southern distinct population segment (DPS) of North American green sturgeon was listed as threatened under the ESA in 2006 (71 FR 17757), and critical habitat was designated in 2009 (74 FR 52300). The North American green sturgeon southern DPS is defined as coastal and Central Valley populations, south of the Eel River in California. Green sturgeon critical habitat is designated from 0 to 60 fm (74 FR 52300). The depth distribution of all observed tows encountering green sturgeon bycatch was similar, with 60 percent of tows in the depth range of 5-15 fm and 75 percent from 5-20 fm (Al-Humaidhi, *et al.* 2011). Since 2007, the WCGOP has collected lengths, general condition, photographs, and tissue samples from all green sturgeon observed. All but one green sturgeon observed and measured as bycatch between 2007 and 2010 appeared to be less than 20 years of age (< 145 cm fork length) (Al-Humaidhi, *et al.* 2011). Green sturgeon age at first maturity in the Klamath River is approximately 14 years for males and 16-20 years for females. The majority of green sturgeons encountered by the west coast groundfish fishery are believed to be from the southern DPS (Al-Humaidhi, *et al.* 2011).

Table 3-15. Bycatch estimates of green sturgeon by fishery, 2002- 2010. (Data from Al-Humaidhi *et al.* 2011).

Year	Bycatch estimate by fishery (number of fish)				Coastwide Estimates all fisheries * (95% CV)
	LE trawl	CA halibut (OA & LE)	At-sea whiting (mothership and catcher/processor	Tribal Whiting	
2002	34	183	0	0	217 (140-351)
2003	0	389	0	0	389 (158-633)
2004	16	334	0	0	349 (165-575)
2005	10	648	0	1	658 (283-1,079)
2006	5	786	2	0	793(508-1,080)
2007	6	104	0	0	109 (16-221)
2008	0	190	0	0	189 (99-305)
2009	43		0	0	333 (167-539)
2010	8		0	0	190 (146-241)
* Does not include data representing catch in the shoreside whiting fishery					

The largest estimates of green sturgeon bycatch were taken by vessels targeting California halibut fishery (Table 3-25) in the California state-managed fishery; these vessels also landing groundfish from the same trips. Fishing in this sector primarily took place in depths less than 30 fm in fishing grounds adjacent to San Francisco Bay, California. Limited entry vessels participating in this fishery hold a Federal limited entry groundfish permit, and may target groundfish or California halibut on different tows within the same fishing trip. The largest estimate of green sturgeon bycatch in the limited entry sector of the California halibut fishery occurred in 2006, when 793 individuals were estimated to have been caught by the entire sector. In that year, the largest number of green sturgeon (108 individuals) were observed on limited entry vessels conducting California halibut tows during the winter season (January-April and November-December).

Changes in the state-managed California halibut trawl fishery may have resulted in reduced catch of green sturgeon. Since 2006, the fishery on the central California coast has been subject to more restrictive regulations and greater enforcement of trawl restrictions, including vessel permit requirements for commercial trawl and season closures from March 15 to June 15. In 2006, 71 percent of the California halibut was taken with trawl gear, while in 2009 only 52 percent was taken with trawl gear. Green sturgeon bycatch in the at-sea hake fishery was very low, as the At-Sea Hake Observer Program only recorded a total of 3 green sturgeon from 2002-2010 (Table 3-24).

3.1.4.3 Eulachon

Eulachon are found in the eastern north Pacific Ocean from northern California to southwest Alaska and into the southeastern Bering Sea. The southern DPS of eulachon was listed as threatened under the ESA in 2010 (75 FR 13012). The eulachon southern DPS is defined from the Mad River in northern California, north to the Skeena River in British Columbia. Eulachon are an anadromous fish. Adults migrate from the ocean to freshwater creeks and rivers where they spawn from late winter through early summer. The offspring hatch and migrate back to the ocean to forage until maturity. Once juvenile eulachon enter the ocean, they move from shallow nearshore areas to deeper areas over the continental shelf. There is little information available about eulachon movements in nearshore marine areas and the open ocean.

Eulachon are incidentally caught in the groundfish trawl fisheries. Table 3-16 shows estimates of the number of eulachon caught by trawl fisheries. Eulachon appears to be encountered in the at-sea hake fishery as bycatch with more occurring in the catcher-processor sector of the fishery than the other sectors (Table 3-16). The highest eulachon bycatch in this mid-water trawl fishery was in the summer of 2006 with 145 individuals being caught. In contrast, no eulachon were observed as bycatch in the bottom trawl fishery during 2006. The depth distribution of all observed tows encountering eulachon bycatch from 2002-2010, inclusive, indicates that 86 percent of tows that encountered eulachon, as well as 86 percent of the eulachon encountered, were in the depth range of 60-90 fm. The shallowest observed tow that encountered eulachon was at 19.5 fm and the deepest observed tow was at 118.5 fm. Collection of eulachon length data began in 2009.

Table 3-16. Eulachon catch estimates by fishery 2002- 2010. (Al-Humaidhi et al. 2011).

Year	Bycatch estimate by fishery (number of fish) a/b/		
	LE trawl	At-sea whiting (mothership and catcher/processor	Tribal Whiting
2002	821	0	0
2003	52	0	0
2004	5	0	0
2005	0	0	1
2006	0	145	0
2007	72	10	0
2008	0	43	0
2009	67	36	32
2010	21	0	0

a/ Point estimates of bycatch fluctuate due to a number of non-biological factors, including annual variation in observer coverage rates, fishing behavior, and various physical characteristics. Estimates of observer data uncertainty are presented the form of confidence intervals around bycatch estimates.
b/ Does not include data representing catch in the shoreside whiting fishery

3.1.4.4 Marine Mammals

U.S. west coast waters support a variety of marine mammals. Approximately 30 species, including seals, sea lions, sea otters, whales, dolphins, and porpoise, occur within the EEZ. Many species seasonally migrate through west coast waters, while others are year-round residents. Species in the action area that are listed under the ESA are shown in Table 3-17.

Table 3-17. ESA listed marine mammals that occur in the action area. (Highlighted species are those most likely to be encountered in the groundfish fisheries)

	Species	ESA listing
Whales	Humpback (*Megaptera novaeangliae*)	Endangered
	Sei (*Balaenoptera borealis*)	Endangered
	North Pacific Right (*Eubalaena japonica*)	Endangered
	Blue whales (*Balaenoptera musculus*)	Endangered
	Fin whales (*Balaenoptera physalus)*	Endangered
	Sperm whales (*Physter macrocephalus*)	**Endangered**
	Southern Resident Killer whales (*Orcinus orca*)	Endangered
Pinnipeds	**Stellar Sea lions**	**Threatened**
	Guadalupe Fur Seals (*Arctocephalus townsendi*)	Threatened

The information on marine mammal interactions in this paragraph and Table 3-18 is summarized from the NWFSC report titled "*Estimated bycatch of marine mammals, seabirds, and sea turtles in the U.S. west coast commercial groundfish fishery, 2002-2009*" (Jannot, *et al.* 2011). Table 3-18 provides a summary of marine mammal interactions documented by groundfish observers. All but one cetacean species (whales, dolphins, and porpoises) recorded as a take by groundfish observers were considered to have been killed by the fishing gear. In 2007, a sperm whale collided with a limited entry fixed gear vessel in the sablefish primary fishery off northern Washington when the vessel was moving at idle speed. Although the animal did not appear injured, it was considered a take under the ESA. A single bottlenose dolphin take occurred ~9 km offshore when it became entangled in a buoy line from a limited entry fixed gear sablefish (non-endorsed) vessel. The dolphin was release alive, but with injuries. Cetaceans with only a single observed takes include: a Pacific white-sided dolphin caught in 2003 by a limited entry bottom trawl vessel fishing at a mean depth of 300 fm off California; a harbor porpoise caught by a federally-permitted California halibut trawl vessel fishing off California at a mean depth of 8 fm; and, a Risso's dolphin caught by a federally-permitted bottom trawler fishing targeting thornyheads and flatfish at a mean depth of approximately 160 fm. Because there was only a single observed take recorded, they cannot be used for fleetwide bycatch estimations. Two cetacean specimens, a Pacific white-sided dolphin and a Dall's porpoise were caught by at-sea hake vessels off Washington, but were not within the observers' sample. Because they were recorded outside the observer samples they cannot be used for fleetwide bycatch estimations. The remaining observed takes are summarized in Table 3-18. In addition to observed takes, there have been 28 reported entanglements of humpback whales in fishing gear off the West Coast since 2000 (Southwest Region and Northwest Region stranding network). Of these, 15 were pot gear, 6 were net gear, and 7 were of unknown gear type. In most of these cases, the final status of the entangled animal was unknown.

Among the marine mammals, bycatch estimates were highest for California sea lions, which were caught primarily in trawl nets in the limited entry trawl (bottom and whiting) and California halibut trawl fisheries. Steller sea lions were the next highest, which were also caught in trawl nets in the at-sea whiting sectors, the limited entry trawl (bottom trawl and whiting) and California halibut trawl fisheries. Stellar sea lions taken on the west coast are believed to be primarily from the eastern stock (east of 140° west longitude). The majority of elephant seals were taken in the at-sea whiting fisheries.

Table 3-18. Marine Mammal by the West Coast Groundfish Observer Program and At-sea Pacific Whiting Observer Program, 2002-2009.

Cetaceans (stocks)	Distribution	ESA	MMPA	Observed Take By Year	Fleetwide estimated take (CV) a/
Bottlenose dolphin (*Tursiops truncates*) • California Coastal • California, Oregon, Washington offshore	45° N to 45° S. Inhabit s coastal and pelagic areas	Not listed	--	1-2009 (gear entanglement)	NA
Harbor porpoise (*Phocoena phocoena*) • Morro Bay • Monterey Bay • San Francisco-Russian River • Northern California/Southern Oregon • Oregon/Washington • Washington Inland Waters	Temperate waters from Cape Flattery, WA to Point Conception, CA (Barlow 1988)	Not Listed	--	1-2004	NA
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) •	Throughout the North Pacific. Inhabit the continental shelf and slope areas on the West Coast. Move north-south seasonally	Not Listed	--	2-2002, 2003 (1 outside observed sample)	NA
Risso's dolphin (*Grampus griseus*)	Tropical and warmer temperate waters worldwide. Favor deeper habitats over the continental shelf but seasonally move inshore (Leatherwood *et al*. 1980). On the West Coast, it is most abundant off of southern California (Forney and Barlow 1998).	Not listed	--	1-2008	NA
Sperm whale (*Physeter macrocephalus*) –	Widely distributed in tropical and temperate waters of the Pacific Ocean. Abundance appears to be greater south of 40° N latitude (Carretta *et al*. 2009). Hunt in deepwater habitats.	Endangered	Depleted througho ut it range	1-2007 (vessel collision)	NA
Dall's porpoise (*Phocoenoides dalli*)	Occur throughout the North Pacific Ocean. Distinct California-Oregon-Washington Stock.	Not listed	--	1-2002 (occurred outside observed sample)	NA

Table 3-22 (continued)					
Pinnipeds (stocks)					
Cetaceans (stocks)	**Distribution**	**ESA**	**MMPA**	**Observed Take By Year**	**Fleetwide estimated take (CV) a/**
California sea lion (*Zalophus californianus*) • U.S. • Baja California • Gulf of California	Canada to western Baja California and in the Gulf of California, Mexico	Not listed	--	5-2002 31-2003 8-2004 14-2005 21-2006 8-2007 7-2008 4-2009	46 (17-119) - 2002 116 (57 249) - 2003 13 (5-35) - 2004 21 (10-47) - 2005 95 (41-223) - 2006 31 (10-98) – 2007 13 (6-25) - 2008 10 (4-21) 2009
Harbor seal (*Phoca vitulina*) • California • Outer Oregon - Washington Coast • Inland Washington	Estuarine and nearshore habitats along the west coast of North America (Brown and Mate 1983).	Not listed	--	1-2004 1-2005 3-2006 4-2007 8-2008	NA-2004 NA-2005 NA-2006 NA-2007 29 (11-78) - 2008
Northern elephant seal (*Mirounga angustirostris*)	Breed on peninsulas and islands from Baja California to Oregon. Found in coastal waters as far north as Alaska (Le Boeuf *et al*. 2000) Undergo north-south migrations between breeding sites and forage sites (Stewart and DeLong 1995)	Not listed	--	3- 2004 1-2006 3-2007 7-2008 2-2009	3 (2-4) - 2004 NA- 2006 2 (1-4) - 2007 9 (6-12) - 2008 2 (1-7) 2009
Steller sea lion (*Eumetopias jubatus*) • Western –west of 144° W longitude • Eastern – East of 144° W longitude	Primarily found in the North Pacific region -most abundant in Alaska and the Aleutian Islands Primarily Eastern stock on West Coast	Threatened	Depleted throughout it range	3-2002 1-2003 2-2005 3-2006 4-2007 4-2008 12-2009	14 (5-37) - 2002 1 (0-2) - 2003 2 (1-5) - 2005 3 (2-5) - 2006 4 (2-6) - 2007 3 (1-11) 2008 17 (7-45) - 2009
a/ Fleetwide estimates of take cannot be accurately made when there is only a single event.					

3.1.4.5 Seabirds

The California current system supports a diverse array of seabird species. Species found of the west coast include resident species and transitory species (migrating or foraging). All the California Current system seabirds are highly mobile and require an abundant food source to support their high metabolic rates (Ainley*, et al.* 2005). The abundance of most seabird species on the west coast is influenced by similar physical and biological factors, such as oceanic productivity and prey availability (Ainley*, et al.* 2005; Tyler*, et al.* 1993). Specifically, the seasonal and latitudinal distribution of seabirds is defined by the intensity of coastal upwelling, which delivers nutrient-rich water and supports higher prey biomass in surface waters accessible to seabirds (Tyler*, et al.* 1993). On the west coast, upwelling is most intense south of Cape Blanco, OR (42° 50' N latitude) (Bakun*, et al.* 1974; Barth*, et al.* 2000).

Three distinct oceanic seasons have traditionally been defined for the U.S. west coast: the Upwelling, Oceanic, and Davidson Current seasons (Ford *et al*. 2004). The distribution of seabirds varies by season. During the upwelling season in the late spring and summer, northerly winds transport surface waters southward and away from the coast. Commonly-observed visiting species in summer include the sooty shearwater (*Puffinus griseus*), Northern fulmar (*Fulmarus glacialis*), and black-footed albatross (*Phoebastria nigripes*) (Tyler*, et al.* 1993). In the fall (Oceanic season), northerly winds and upwelling intensity decrease, and sea surface temperature reaches its annual maximum. Several species that nest further south in Mexico and southern California move northward, including the brown pelican (*Pelecanus occidentalis*) and storm-petrels. As winter approaches, these species again return south and breeders from boreal nesting colonies become more abundant, particularly off of California (Tyler*, et al.* 1993). The winter months along the west coast are characterized by warmer water delivered by the Davidson current and reduced levels of primary production (Davidson Current season). Seabird abundance during this time is generally low (Tyler *et al*. 1993).

Table 3-19 provides further information on species known to interact with the groundfish fishery and presents a summary of documented interactions by WCGOP observers and at-sea whiting observers 2002 and 2009. Table 3-20 presents opportunistic data on seabird interactions with groundfish vessels. These interactions were from data collected outside of regular species composition sampling, and thus in a non-random fashion. Two of the seabird species with documented interactions (short-tailed albatross and marbled murlette) are listed under the ESA. The California least tern (*Sterna antillarum browni*), which is found on the west coast, is also listed under the ESA. California least terns forage primarily in nearshore ocean waters and in shallow estuaries and lagoons, although some adults also feed close to shore in ocean waters. Fisheries are unlikely to impact California least tern populations directly through bycatch of individuals, and there have been no reported lethal takes of California least tern in west coast groundfish fisheries.

Short-tailed Albatross

Short-tailed albatrosses (*Phoebastria albatrus*) are large, pelagic seabirds with long narrow wings adapted for soaring just above the water surface. As of spring 2011, the global population estimate of short-tailed albatross was 3,463 individuals. Pre-exploitation global population estimates of short-tailed albatross are not known, but the main breeding population on Torishima Island was estimated to be at least 300,000 breeding pairs. Short-tailed albatross forage extensively along continental shelf margins, spending the majority of time within national EEZs, particularly the U.S. off Alaska, Russia, and Japan, rather than over international waters (Suryan*, et al.* 2007a; Suryan*, et al.* 2007b). Juveniles and sub-adults are prevalent off the west coasts of Canada and the U.S. (Environment Canada 2008).

Albatross, like many seabirds, attack baited hooks of longlines after the hooks are deployed; if they get hooked or snagged, they can be pulled underwater with the rest of the gear and drown (USFWS 2008).

Short-tailed albatross may also interact with trawl fisheries. Seabirds, including other albatrosses, fly behind vessels or float in offal plumes that trail beyond vessels, where they can strike the trawl cables (warps) or the sonar cable (third wire) attached to the net (NMFS 2006a), or become entangled on the outside of nets towed at or near the surface; those striking cables are very unlikely to show up on the vessels deck to be sampled (USFWS 2008).

From 2002-2009, there were two observed fishery interactions with short-tailed albatross reported by the WCGOP. Both interactions occurred in 2002, and were recorded opportunistically as “feeding on catch only” and not recorded as resulting in mortality. In 2011, a single short-tailed albatross was reported caught and killed by longline in the limited entry sablefish fishery approximately 65 kilometers off the Oregon coast (WCGOP, unpubl. data).

Marbled murrelet (*Brachyramphus marmoratus*)

The marbled murrelet is a small seabird. In the Pacific Northwest and California, murrelets tend to forage within 2 km of the coast during the breeding season, with somewhat greater dispersal during the non-breeding season. The most recent abundance estimate of the listed portion of the species (WA, OR, CA) is 17,700 (95 percent CI: 14,600 – 21,000) from northern California to Washington and 174 (91-256) in central California (USFWS 2009). There has been no reported mortality of marbled murrelets in west coast groundfish fisheries. The WCGOP reported single interactions with marbled murrelets in 2001 and 2002 in northern California. Both of these occurred in the limited entry trawl sector, and were reported as “boarded vessel only.”

Table 3-19. Seabird Species observed by the West Coast Groundfish Observer Program and At-sea Pacific Whiting Observer Program, 2002-2009.

Species	Distribution *	ESA	Fishery	Observed Take #-Year	Fleetwide estimated take #(CV) **
Black-footed albatross (Phoebastria nigripes)	Open ocean along the entire Pacific Coast on North America. Rarely seen near shore.	Not listed	Most taken in Fixed gear/non-nearshore with the exception of the following which were taken in the Pacific whiting fishery: 3 in 2003, 2 in 2005, 2 in 2006, 1 in2008	2001-1 2003-11 2004-4 2005-25 2006-15 2007-49 2008-27	2001 -No est. 2003- 39 (19-84) 2004- 47 (18-123) 2005-65 (31-141) 2006-32 (19-55) 2007-76 (35-164) 2008- 91 (47-181)
Brandt's cormorant (*Phalacrocorax penicillatus*)	NE Pacific coast from Alaska to Baja California. Their habitat being marine and estuarine. Highest concentrations closely tied to the California Current System	Not listed	Observed in the CA halibut, non-nearshore and nearshore fixed gear fisheries.	2002-1 2003-4 2004-2 2005-1 2007-2 2009-1	2002- 6 (2-18) 2003-9 (3-25) 2004-5 (2-11) 2005-No est. 2007-No est. 2009-No est.
Brown pelican *(Pelecanus occidentalis*)	Oceans, inshore waters, pilings and rocks. Pacific and southeastern U.S. coasts. Rarely as far north as Vancouver Island. Also found in Central and South America.	Delisted due to Recovery (2009)	Fixed gear/non-nearshore	2005-1	2005-1
Common murre (*Uria aalge*)	Open seas and gulfs. All coasts in the Northern hemisphere with cold currents or upwelling. In the Pacific they range from Arctic Alaska and the Aleutian Islands to central California.	Not listed	Occurrence in variety of fisheries- LE trawl (1 in 2004), CA halibut (37 in 2003), nearshore fixed gear (1 per year in 2004,2006 and 2009), and at-sea whiting (3 in 2004, and 2 in 2005)	2003-37 2004-10 2005-2 2006-1 2009-1	2003-No est. 2004-15 (100-26) 2005-2 2006-No est. 2009-No est.
Leach's storm petrel (*Oceanodroma leucorhoa*)	Open ocean in the Pacific and Atlantic oceans. Center of distribution in the Pacific ocean. North Pacific nesting sites from Japan to Baja California.	Not listed	LE trawl	2002-6 2003-1 2004-1	2002- No est. 2003- No est. 2004-2 (0-7)
Northern fulmar (*Fulmarus glacialis*)	Open ocean. In winter it is found along the Pacific Coast, occasionally to Baja California.	Not listed	Most taken in at-sea whiting with the exception of the following: LE trawl 1 in 2002 and non-nearshore fixed gear 2 in 2007.	2002-1 2004-21 2005-2 2007-53 2008-2 2009-32	2002- No est. 2004-21 2005-2 2007-53 2008-2 2009-32
Sooty shearwater (*Puffinus*	Open ocean throughout the Pacific	Not listed	Occurrence in at-sea whiting (8 in	2004-8	2004-8

griseus) (estimate includes Shearwater, unidentified)	Ocean, but go shoreward during foul weather. Large numbers migrate or summer from the West Coast to Alaska.		2004, and 2 in 2005) non-nearshore fixed gear (19 in 2006 and 1 in 2008)	2005-2 2006-19 2008-1	2005-2 2006-No est. 2008-No est.
Western gull (*Larus occidentalis)* (estimates includes unspecified gull species)	Coastal waters, beaches, harbors and open oceans. Pacific coast from Washington to Baja California. Occurs in winter along British Columbia coast.	Not listed	Non nearshore fixed gear	2002-4 2003-1 2006-2 2008-3 2009-1	2002-25 (8-74) 2003- No est. 2006- No est. 2008- No est. 2009- No est.
Unspecified tubenose species	NA	NA	At-sea whiting	2008-2 2009-6	2008-2 2009-6
Unspecified alcid species	NA	NA	At-sea whiting	2004-3 2008-2	2004-3 2008-2
Unidentified seabird	NA	NA	A single occurrence with /non-near shore fixed gear in 2003,In 2009 2 taken with nearshore fixed gear. The remaining occurred in at-sea whiting (2 in 2005 and 4 in 2008)	2003-1 2005 -2 2008 -4 2009 -2	2003-No est. 2005 -2 2008 -4 2009-No est.
* The Audubon Society Field Guide to North American Birds, Miklos D.F. Udvardy, California State University, Sacramento 1977 ** Opportunistic (non-randomly collected) data recorded by observers on are not included in bycatch estimation.					

Table 3-20. Opportunistic (non-randomly collected) data recorded by observers which are not included in the fleetwide bycatch estimation for seabirds.* (Jannot et al. 2011)

Species	Distribution **	ESA	Number observed opportunistically by fishery ***
Black-footed albatross (Phoebastria nigripes)	Open ocean along the entire Pacific Coast of North America. Rarely seen near shore.	Not listed	At-sea whiting – 3 (2007-2009) All nonwhiting fisheries 8 (2002-2009)
Brown Pelican	Oceans, inshore waters, pilings and rocks. Pacific and southeastern U.S. coasts. Occasionally as far north as Vancouver Island. Also found in Central and South America.	Delisted due to Recovery (2009)	All nonwhiting fisheries 1 (2002-2009)
Cassin's auklet	*Open ocean. Aleutians to central California. Large nesting site in Farallon Islands.	Not listed	All nonwhiting fisheries 1 (2002-2009)
Leach's storm petrel (*Oceanodroma leucorhoa*)	Open ocean in the Pacific and Atlantic ocean with the center of distribution being in the Pacific ocean. North Pacific nesting sites from Japan to Baja California.	Not listed	All nonwhiting fisheries 1 (2002-2009)
Northern fulmar (*Fulmarus glacialis*)	Open ocean. In winter it is found along the Pacific Coast, occasionally to Baja California.	Not listed	At-sea whiting – 13 (2007-2009) All nonwhiting fisheries 2 (2002-2009)
Marbled murrelet (*Brachyramplus marmoratus)*	*Coastal forests and shore waters from Kodiak Island to central California, Asian distribution from Sakhalin Island to Kamchatka coast.	Threatened (CA, OR, WA)	All nonwhiting fisheries 1 (2002-2009)
Western gull (*Larus occidentalis)* (estimates includes unspecified gull species)	Coastal waters, beaches, harbors and open oceans. Pacific coast from Washington to Baja California. Occurs in winter along British Columbia coast.	Not listed	At-sea whiting – 1 (2007-2009)
Unspecified gull	NA	NA	At-sea whiting – 15 (2007-2009)
Unspecified shearwater	NA	NA	At-sea whiting – 1 (2007-2009)
Unidentified seabird	NA	NA	All nonwhiting fisheries 19 (2002-2009)

* Seabirds are normally observed as part of the species composition sample. Opportunistic data on seabirds were collected outside of regular species composition sampling, and thus in a nonrandom fashion. On at-sea hake vessels, this occurs when the observer notes an interaction that took place on deck. On nonhake vessels, this occurs when there is an interaction that does not result in an immediate mortality and the seabird either departs injured or unharmed. Seabirds that are killed by fishing interactions on observed nonhake vessels are always sampled as part of the discarded catch under WCGOP protocols.
**The Audubon Society Field Guide to North American Birds, Miklos D.F. Udvardy California State University, Sacramento 1977
*** Nonwhiting sectors are combined for 2002-2009 period, and only data from 2007 through 2009 were available for the at-sea sectors.

3.1.4.6 Sea Turtles

Major threats to sea turtles in the U.S. include, but are not limited to, destruction and alteration of nesting and foraging habitats; incidental capture in commercial and recreational fisheries; entanglement in marine debris; and vessel strikes. All six species occurring in U.S. waters are listed under the ESA. The west coast groundfish fisheries have only one documented sea turtle interaction between 2002 and 2009. In 2008, WCGOP observers recorded a single fishery interaction with a leatherback turtle. In this case, the turtle was killed by fishing gear.

Leatherback turtles are present and potentially vulnerable as bycatch in the Pacific coast groundfish fishery during the summer-fall period (June through November) (Jannot, *et al.* 2011). Upwelling associated with the California Current system is most intense north of Point Conception, CA (Bakun, *et al.* 1974), but decreases considerably north of Cape Blanco, OR due to inconsistent wind patterns and changes in localized surface currents (Barth, *et al.* 2000). Although green and loggerhead turtles occur in the area, there are no known interactions with the groundfish fisheries.

Table 3-21. West coast sea turtles species and observed occurrence in the groundfish fisheries. (Jannot et al. 2011)

Species	Distribution **	ESA	Number observed
Leatherback (*Dermochelys coriacea*)	Distinct western Pacific population is highly migratory throughout tropical and temperate waters. Off the west coast, they have been observed as far north as Alaska but are more common off of central California (Benson et al. 2007b). Sightings data from Monterey Bay, California indicate that they are most abundant in late summer and early fall (Starbird et al. 1995). Leatherbacks are more abundant during periods of intense coastal upwelling, which could create favorable foraging conditions (Benson et al. 2007b).	Endangered	2008 -1
Green turtles (*Chelonia mydas)*	Habitat includes open ocean convergence zones and coastal areas for "benthic" feeding. In the eastern North Pacific, green turtles have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego south. (www.nmfs.noaa.gov/pr/species/turtles/green.htm)	Endangered	None
Loggerhead (*Caretta caretta)*	Habitat includes open ocean and nearshore coastal areas. In the eastern Pacific, loggerheads have been reported as far north as Alaska, and as far south as Chile. In the US, occasional sightings are reported from the coasts of Washington and Oregon, but most records are of juveniles off the coast of California. (www.nmfs.noaa.gov/pr/species/turtles/green.htm)	Endangered	None

3.2 Socioeconomic Environment

3.2.1 Groundfish Fishery Sectors

3.2.1.1 Commercial Fisheries

Section 3.2 in the 2011-12 Groundfish Harvest Specifications FEIS describes commercial fisheries targeting groundfish. That information is incorporated by reference here and summarized and updated. A series of tables summarizing landings and ex-vessel revenue in groundfish fisheries, landings and revenue by port, and indicators of fishery participations has been compiled from data in the Pacific Fishery Information Network (PacFIN) database and made available online.[29] These data may be summarized here to highlight current fishery trends.

Chapter 2 describes management measures as they are incorporated into the integrated alternatives; more generally, the following categories of measures are currently in use:

- Limited access (or limited entry) permits which restrict the number of vessels that may use specified gear types to catch allocated groundfish. Limited entry permits define the groundfish trawl sector (further subdivided between vessels delivering catch shoreside, catcher vessels delivering Pacific whiting to at-sea mothership processors, and at-sea Pacific whiting catcher-processors) and the limited entry fixed gear sector, which uses longline and pot gear, mainly to catch sablefish.
- Groundfish closed areas, principally RCAs imposed to exclude fishing vessels from areas of high overfished species bycatch. Enforcement of these closed areas is supported by requirements for vessels to participate in a vessel monitoring system (VMS) and carry a unit that transmits their position to enforcement officials.
- Catch control tools including IFQs in the shoreside trawl sector, co-ops and associated allocations in the at-sea whiting sectors, permit and vessel-specific sablefish allocations in the limited entry fixed gear sector (called “tier limits”), and 2-month cumulative landing limits used in all sectors for certain species and/or at certain times of the year.

Deployment of at-sea observers is another critical management, control, and surveillance (MCS) tool used in groundfish fisheries. Observer coverage is implemented by NMFS through the WCGOP. The principal purpose of observers is to document fish discarded at sea (“bycatch”) so that fishery managers may reasonably account for total catch in line with ACL objectives. Beginning in 2011 both the at-sea and shoreside components of the groundfish trawl sector have complete (100 percent) observer coverage. WCGOP has a target coverage rate for nontrawl groundfish fisheries of 20 percent.

Fishery managers frequently view groundfish fisheries in terms of fishery “sectors.” These sectors are defined by the permit status of participating vessels, gear type, target species, and various other factors. The Council allocates fishing opportunity (or the amount of fish vessels in a particular sector may harvest) either as part of the biennial process or through rules that have been established in the Groundfish FMP. Fishery sectors may receive a fixed allocation of the ACL for particular management units (stocks, geographic subdivisions of stocks, and stock complexes); in other cases fishery managers may identify a catch amount as a management objective (e.g., an “HG”) or simply as an accounting

[29] http://www.pcouncil.org/groundfish/background/document-library/historical-landings-and-revenue-in-groundfish-fisheries/

mechanism to prevent ACLs from being exceeded. Section 2.2.2 describes the allocation schemes under consideration as part of the proposed action.

Groundfish fishery sectors are briefly described below. Table 3-23 shows inflation adjusted ex-vessel revenue during the 2005-2010 baseline period by fishery sector and the year-to-year percent change in revenues.

Estimated average accounting net revenues ("profits") of vessels engaged in shoreside commercial groundfish fisheries in 2008 are shown in Table 3-24. These estimates were modeled using average ex-vessel revenues and vessel cost estimates collected by the NWFSC vessel cost-earnings survey (Appendix A). This model estimates average fixed costs associated with each vessel type and the average variable costs associated with harvesting the suite of groundfish species taken by each vessel category, and then subtracts these total costs from total ex-vessel revenues (taken from PacFIN for historical analysis, or from the GMT's sector models for analyzing the management alternatives) to derive average accounting net revenues for each shoreside groundfish vessel category. Accounting net revenues in this context are a rough measure of accounting profits accruing to owners of the vessels and operating capital used to harvest fish.

These baseline data are used in section 4.3 to evaluate the socioeconomic effects of the integrated alternatives.

At-sea Whiting

At-sea whiting comprises two sectors, one encompassing catcher vessels delivering to mothership processors and the other catcher-processors that directly harvest Pacific whiting. In both sectors a single cooperative manages fishing activity and is allocated a portion of the Pacific whiting TAC along with selected bycatch species (see section 2.1.3.2 for more details). The mothership sector's co-op was formed in 2011 under the auspices of the Council's trawl rationalization program (Amendment 20); the catcher-processor sector also continued operating as a voluntary co-op. In addition to the commercial at-sea sectors, the Makah Tribe in Washington State operates a mothership Pacific whiting fishery. The relationship between groundfish treaty tribe fisheries and commercial fisheries is described in more detail below.

The at-sea sectors accounted for 21.9 percent of coastwide revenue during the baseline period, averaging $18.8 million per year (Table 3-23). The catcher-processor component garnered almost two-thirds of this revenue. Whiting fisheries had the highest year-to-year variability, with the catcher-processor and mothership catcher vessel components ranking third and fourth respectively behind only the tribal whiting sectors. Preliminary estimates for 2011 show 9 vessels participated in the whiting catcher-processor fishery, and 18 catcher vessels (and 5 motherships) participated in the mothership whiting sector.

Because of the schooling, semi-pelagic nature of Pacific whiting, these fisheries have proportionately little incidental catch. Table 3-22 shows species composition of the whiting sectors' catch from 2007 in percentage terms. Nonwhiting species accounted for 1 percent of the catch during this period. However, due to the large volume of total catch the absolute amount of this incidental catch averaged 438 mt annually in the catcher-processor sector and 197 mt in the mothership sector. Because these fisheries do encounter overfished species that have relatively low ACLs, the fisheries both have an allocation or set-aside for selected species and engage in a variety of bycatch avoidance strategies. Bycatch of ESA-listed Chinook salmon is also an issue. Past ESA section 7 consultations have set a bycatch threshold of 11,000 Chinook salmon, which, if exceeded, trigger a re-initiation of consultations. The co-ops in each sector enforce bycatch avoidance measures for both overfished rockfish and Chinook salmon through their contract agreements.

Table 3-22. Species composition of whiting sectors' catch (percent), 2007-2010. (Source: NMFS NWR)

	Tribal		Commercial			Total
	Mothership	Shoreside	Mothership	Catcher/ Processors	Shoreside	
Whiting	97.7%	98.4%	99.5%	99.4%	98.8%	99.0%
Nonwhiting roundfish	0.01%	0.01%	0.01%	0.00%	0.04%	0.02%
Flatfish	0.02%	0.02%	0.01%	0.01%	0.01%	0.01%
Rockfish	0.30%	0.27%	0.34%	0.17%	0.45%	0.31%
Remaining Groundfish	0.94%	0.65%	0.06%	0.26%	0.12%	0.25%
Nongroundfish	1.01%	0.68%	0.05%	0.20%	0.59%	0.38%
Total	100%	100%	100%	100%	100%	100%
Nonwhiting ann. av. (mt)	290.3	220.5	196.6	438.3	696.7	1,854.2

Source data available at: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Whiting-Management/

IFQ (Shoreside Trawl) Fishery

Before 2011, the shoreside trawl fishery was composed of two separately managed sectors: a seasonal fishery targeting Pacific whiting with midwater trawl gear, and a year-round bottom trawl sector targeting other groundfish species. With the implementation of trawl rationalization (Amendment 20) these two fisheries were merged beginning in 2011 in terms of management through the IFQ program. IFQs (percents of the trawl sector allocation) are converted annually to QP that may be traded among licensed groundfish trawl vessels. In the first two years of the IFQ program (2011 and 2012) quota shares (QS) could not be transferred (although QP could be).[30] That restriction will likely be relaxed beginning sometime in the 2013-14 biennial period. The cumulative effects resulting from this change (and other aspects of the trawl rationalization program) are evaluated in section 4.4.

Although the whiting and nonwhiting fisheries are considered a single sector from a management perspective, the two fisheries continue to be operationally distinct. They use different fishing gear (midwater versus bottom trawl gear), and the whiting fishery targets a single species, which comprises almost all of their landings, while the bottom trawl fishery has a variety of targets and strategies. The two fisheries also have different seasonal harvest strategies. By regulation, the whiting fishery typically begins on April 1 and continues to the end of the calendar year; this restriction is imposed to reduce the incidental take of ESA-listed salmon species, although the season opening corresponds somewhat with the availability of Pacific whiting off the west coast. The bottom trawl fishery, on the other hand, operates year-round, although there are particular seasonal strategies depending on the species being targeted.

Another important change as part of the IFQ program is that vessels participating in the program (based on registration to an appropriately-endorsed Federal groundfish limited entry permit) may use any legal groundfish gear. This offers these vessels the opportunity to switch to fixed gear for part or all of the year. These vessels do not compete directly with traditional groundfish fixed gear fisheries (described below) because their catch is debited to the IFQ sector's allocation through the QP held in a vessel's account. This presents somewhat of a terminological challenge, because fishery managers commonly refer to the "shoreside trawl fishery" when referring to participants in the IFQ program even though some of these vessels are using other gear types to land their QP.

30 Developing a remedy in response to a recent court order (Pacific Dawn, LLC, v. Bryson, see Chapter 1) could delay the end of the QS trading moratorium)

Vessels operating under the IFQ program must carry observers, and NMFS has set up a data system to combine landings and discard information (gathered by observers) for debit against QP holdings. For managers this provides the benefit of more up-to-date total catch reporting. Landings and revenue reported in online tables go through 2010 and therefore do not reflect the way the fishery is currently operating. For that reason, the historical data are supplemented with available reports from 2011 (see section 3.2.1.2).

During the baseline period the shoreside groundfish trawl sector accounted for the biggest share of coastwide groundfish revenue at 44.3 percent for both whiting and nonwhiting (bottom trawl) components (Table 3-23). At $27.1 million per year (on average) the nonwhiting fishery earned almost two-thirds of the combined revenue of the whiting and nonwhiting components. In terms of year-to-year variability the nonwhiting component showed less variability than whiting fisheries. The largest increase, from 2007 to 2008, was 22 percent while the largest decrease, from 2009 to 2010, was -18 percent. This contrasts with the shoreside whiting fishery, where year on variation ranged from 81 to -53 percent during the baseline period.

The whiting component of the shoreside trawl fishery, like the at-sea whiting sectors, catches proportionately few incidental species; according to Table 3-22, the shoreside whiting fishery's incidental catch rate of nonwhiting species was just over 1 percent during 2007-2010, averaging 697 mt annually. The bottom trawl component, as mentioned above, engages in a variety of strategies with different targets. However, five species accounted for just over 90 percent of ex-vessel revenue during 2006-2010 (see Online Table 8): sablefish, 36 percent; Dover sole, 27 percent; petrale sole, 15 percent; thornyheads 9 percent; and rockfish 3 percent. Note that petrale sole was declared overfished in 2010 with a rebuilding plan implemented that requires reduced ACLs beginning in 2011 to rebuild the stock (see section 3.1.1.2).

Table 3-24 shows that 127 vessels participating in the shoreside trawl sector in 2008 could average $19,474 in accounting net revenues from the shoreside whiting fishery. Similarly, participation in nonwhiting trawl fisheries produced average accounting net revenues of $32,360. However, note that these estimates spread total revenues and total costs across all 127 vessels engaged in the shoreside trawl fishery that year and so are intended for comparison purposes only. Table 3-25 shows that in 2008 about 37 vessels actually participated in the shoreside whiting fishery while about 120 vessels made landings in the nonwhiting trawl fishery. (Note: 13 shoreside whiting vessels also participated in the at-sea mothership whiting sector and 28 participated in shoreside nonwhiting trawl fisheries.) Therefore the actual distribution of revenues, costs and accounting net revenues for vessels participating in the shoreside whiting sector is probably considerably more skewed than the averages shown in Table 3-24. Preliminary estimates for 2011 show 26 vessels participated in the shoreside whiting fishery, and 129 vessels were counted in the nonwhiting trawl sector.

Fixed Gear Fisheries

Fixed gear groundfish fisheries (vessels using longline and pot gear) are viewed in two different ways by fishery managers, (1) in terms of their permit status and (2) their fishing strategy. Limited entry groundfish permits can be endorsed for trawl gear or fixed gear (although note the discussion above about gear switching in the shoreside trawl fishery). Vessels associated with a fixed gear-endorsed permit are eligible for vessel-specific allocations of sablefish, the primary—and most valuable—target species in nonwhiting groundfish fisheries. These allocations are tied to the permit and provide catch opportunity during the primary season. Permits are assigned to one of three "tiers" based on the catch history associated with the permit. Furthermore, multiple permits can be "stacked" on a single vessel, thereby increasing the allocation to that vessel. Essentially, this is a tradable catch share program albeit with fairly "lumpy" shares in that trades only occur in terms of transferring the entire sablefish catch opportunity associated with a particular permit (and through the permit the allocation and participation right are intertwined, thereby augmenting the cost of a stackable permit).

“Open access” fixed gear vessels are not registered to a limited entry permit and do not have access to the vessel-specific allocations described above. This portion of the fishery is managed by DTLs for sablefish and periodic landing limits for other groundfish species. (Limited entry fixed gear vessels also may fish in this DTL fishery outside of the primary sablefish season described above.) These open access vessels pursue two distinct strategies, either fishing on the continental shelf in a “nearshore” fishery targeting rockfish, or offshore on the continental slope targeting sablefish (referred to by fishery managers as the “non-nearshore” fishery).

The fixed gear sectors accounted for an estimated 23.6 percent of coastwide groundfish revenue during the baseline period, or an average of $20.2 million per year (Table 3-23), with limited entry vessels accounting for about two-thirds of this amount. Estimated average accounting net revenues (“profits”) of vessels engaged in fixed gear fisheries in 2008 are shown in Table 3-24. These estimates were calculated using average ex-vessel revenues and vessel cost estimates collected by the NWFSC vessel cost-earnings survey. The table shows that 128 vessels participating in the limited entry fixed gear sector in 2008 could average $9,627 in accounting net revenues from the fishery. Participation in open access fixed gear fisheries produced average accounting net revenues of $4,450 for 231 participating vessels. Note that these estimates are intended for comparison purposes only. Table 3-25 shows that in 2008 about 135 vessels participated in limited entry fixed gear fisheries while 650 vessels made landings in the open access sector. The discrepancy in estimated numbers of open access sector participants between the two tables is the result of a much broader definition of participation used in Table 3-25, while the sample used to produce the estimates in Table 3-24 included mainly only larger vessels engaged in non-nearshore fisheries. Preliminary estimates for 2011 show 166 vessels participated in the limited entry fixed gear sector, and 682 vessels were counted in the open access fixed gear sector.

Other Fisheries Catching Groundfish

Groundfish are caught in a variety of other circumstances including by vessels targeting species other than groundfish and catching groundfish incidentally (referred to by managers as the “incidental open access sector”), vessels targeting groundfish pursuant to an EFP, research catches, and treaty tribe fisheries (discussed below). With the exception of tribal fisheries, these catches are negligible from a socioeconomic standpoint, but can be very important to fishery managers in terms of accounting for overfished species catch because ACLs for these stocks tend to be very low, imposing constraints on target fisheries. Table 3-25 shows between 537 and 274 vessels landed groundfish caught incidentally each year between 2005 and 2011. In 2011, a preliminary estimate of 284 vessels were counted in the groundfish incidental open access sector.

Ex-vessel Prices and Fuel Costs for Commercial Groundfish Fisheries

Figure 3-2 shows trends in average ex-vessel prices for groundfish species in inflation-adjusted dollars over 2004-2011. The figure shows that, with the exception of sablefish, average ex-vessel prices during the period for most groundfish species categories have been fairly flat or slightly declining. However, preliminary results for 2011 show ex-vessel prices may be trending higher for several species categories including petrale sole, Dover sole, thornyheads, other flatfish, and other groundfish. Most striking is the upward trend in ex-vessel price for sablefish, more than doubling in inflation-adjusted terms between 2004 and 2011 (including a big jump in 2011). Some of this rise is attributable to strong export demand for sablefish. There was also a noticeable shift in 2011, the first year under trawl individual quotas, toward increased landings of sablefish caught using fixed gear. Fixed gear-caught sablefish command higher prices than trawl-caught fish, thereby contributing to the higher observed average ex-vessel price for this species in 2011. Also noteworthy is the upward trend in the average ex-vessel price for Pacific whiting, which has more than doubled since 2004, driven by strong export demand for headed-and-gutted product. Relatively high ex-vessel prices for groundfish, driven primarily by demand from overseas, has somewhat offset the effect of flat or reduced harvests of major groundfish species over the period.

Figure 3-3 shows the trend in inflation-adjusted state average prices of #2 marine diesel fuel over 1999-2011. The figure shows a steady increase in inflation-adjusted state average prices over the period with the exception of the economic downturns occurring during the early 2000s and from 2008 to 2009. While 2011 state average prices for #2 marine diesel fuel were at or below levels observed in 2008, prices were still more than double their 2000 levels in inflation-adjusted terms, and trending sharply upward since 2009.

Table 3-23. Groundfish ex-vessel revenue (inflation adjusted), 2005-2010, by fishery sector (top panel) and year-to-year percent change in revenue (bottom panel); no change =0%. Landings from PFMC area only. (Source: PacFIN vdrfd table, 10/31/11.)

Sector	2005	2006	2007	2008	2009	2010	Ann. Avg.	Pct Total
At-sea catcher processors	$9,428,186	$10,134,108	$11,080,172	$24,517,340	$4,011,936	$9,546,576	$11,453,053	13.3%
At-sea mothership catcher vessels	$5,728,696	$6,930,776	$7,123,228	$15,400,000	$2,844,808	$6,169,777	$7,366,214	8.6%
Shoreside whiting trawl	$12,157,911	$13,606,554	$12,039,922	$11,891,171	$5,531,348	$10,033,034	$10,876,657	12.7%
Shoreside nonwhiting bottom trawl	$23,943,395	$24,390,064	$26,308,400	$32,115,396	$30,866,692	$25,344,495	$27,161,407	31.6%
Limited entry fixed gear	$11,418,091	$12,439,155	$10,785,736	$12,578,395	$15,844,988	$17,740,842	$13,467,868	15.7%
Open access nearshore	$3,096,647	$3,034,965	$3,290,257	$3,356,919	$3,158,253	$2,720,686	$3,109,621	3.6%
Open access non nearshore	$3,399,327	$3,337,553	$2,047,886	$2,984,962	$4,828,147	$5,405,164	$3,667,173	4.3%
Tribal mothership catcher vessels	$2,964,756	$795,621	$846,248	$3,467,174	$1,257,675	$2,222,099	$1,925,596	2.2%
Tribal shoreside whiting	$1,347,541	$3,646,851	$2,868,530	$3,779,512	$1,066,915	$201,363	$2,151,785	2.5%
Tribal shoreside nonwhiting	$3,900,363	$3,554,376	$3,347,305	$3,778,853	$4,958,073	$4,898,182	$4,072,859	4.7%
All other groundfish revenue	$842,465	$620,477	$515,764	$477,750	$520,590	$1,184,642	$693,615	0.8%
Coastwide Total	**$78,227,378**	**$82,490,500**	**$80,253,447**	**$114,347,473**	**$74,889,425**	**$85,466,860**	**$85,945,847**	100.0%
Sector	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Max**	**Min**
At-sea catcher processors		7%	9%	121%	-84%	138%	138%	-84%
At-sea mothership catcher vessels		21%	3%	116%	-82%	117%	117%	-82%
Shoreside whiting trawl		12%	-12%	-1%	-53%	81%	81%	-53%
Shoreside nonwhiting bottom trawl		2%	8%	22%	-4%	-18%	22%	-18%
Limited entry fixed gear		9%	-13%	17%	26%	12%	26%	-13%
Open access nearshore		-2%	8%	2%	-6%	-14%	8%	-14%
Open access non nearshore		-2%	-39%	46%	62%	12%	62%	-39%
Tribal mothership catcher vessels		-73%	6%	310%	-64%	77%	310%	-73%
Tribal shoreside whiting		171%	-21%	32%	-72%	-81%	171%	-81%
Tribal shoreside nonwhiting		-9%	-6%	13%	31%	-1%	31%	-9%
All other groundfish revenue		-26%	-17%	-7%	9%	128%	128%	-26%
Coastwide Total		**5%**	**-3%**	**42%**	**-35%**	**14%**	**42%**	**-35%**

Table 3-24. Estimated average accounting net revenue per vessel for vessel types participating in West Coast shoreside groundfish fisheries in 2008.*

Vessel Type	Vessel Count	Average Revenue from Groundfish	Average Reported Costs	Average Accounting Net Revenue
Shoreside Whiting	127	78,896	59,422	19,474
Shoreside Nonwhiting Trawl	127	264,885	232,525	32,360
Shoreside LE Fixed Gear	128	87,050	77,423	9,627
Shoreside Open Access	231	35,370	30,920	4,450

*Source: NWFSC vessel cost-earnings survey information summarized in *Estimating Net Revenue in a Commercial Fishery: An Application to the West Coast Groundfish Fishery*, Northwest Fisheries Science Center, January 2012.

Table 3-25. Counts of vessels participating in groundfish fishery sectors: 2005-2011.*

Groundfish Sector	2005	2006	2007	2008	2009	2010	2011
Catcher-Processors	6	9	9	8	6	7	9
Mothership whiting CVs	17	20	20	19	19	22	18
Shoreside whiting trawl CVs	29	37	39	37	34	36	26
Nonwhiting trawl CVs	123	122	121	120	117	105	129
Limited Entry fixed gear	126	132	136	135	139	140	166
Open Access fixed gear	670	764	696	650	660	578	682
Incidental Open Access	537	462	449	274	280	294	284
Total vessels participating in groundfish fisheries	**1,232**	**1,219**	**1,178**	**1,011**	**1,025**	**965**	**1,041**
Vessels participating in both shoreside whiting and nonwhiting fisheries	20	27	27	28	26	24	14
Vessels participating in both shoreside and at-sea whiting fisheries	7	12	15	13	13	15	13

* Source: PacFIN. Vessel counts for 2011 are preliminary.

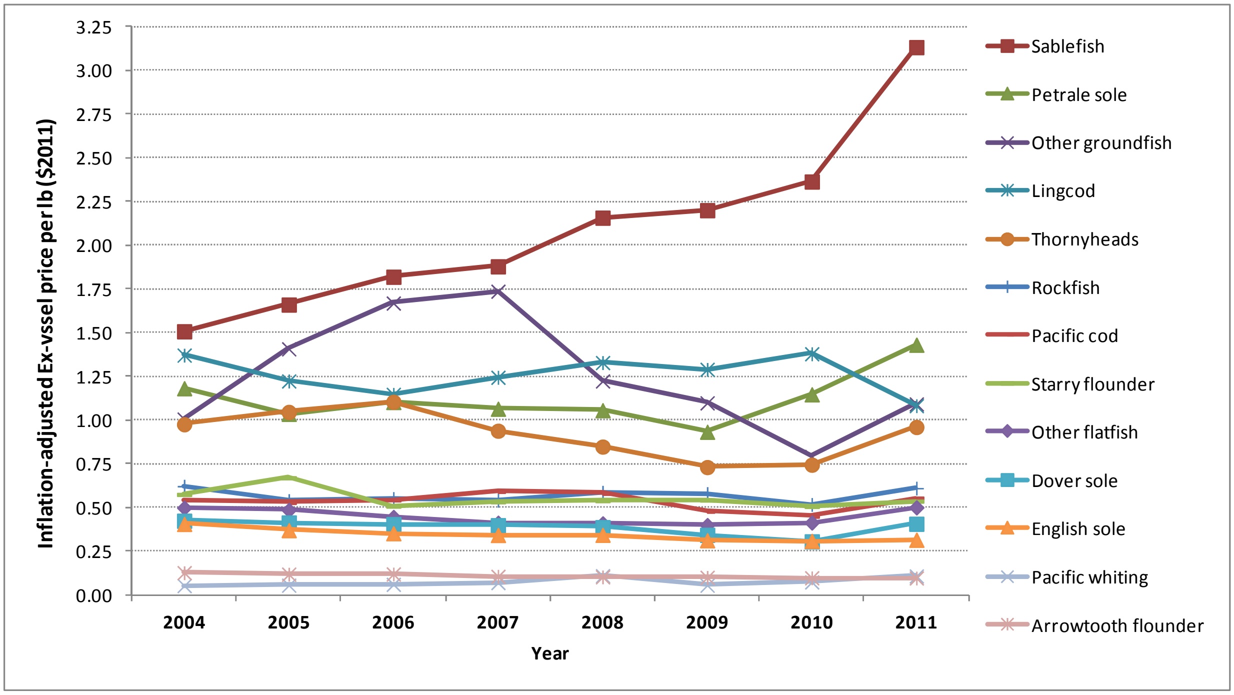


Figure 3-2. Average price per pound for groundfish species and species groups in inflation-adjusted dollars, 2004-2011. (source: PacFIN; and BEA http://www.bea.gov/national/xls/gdplev.xls)

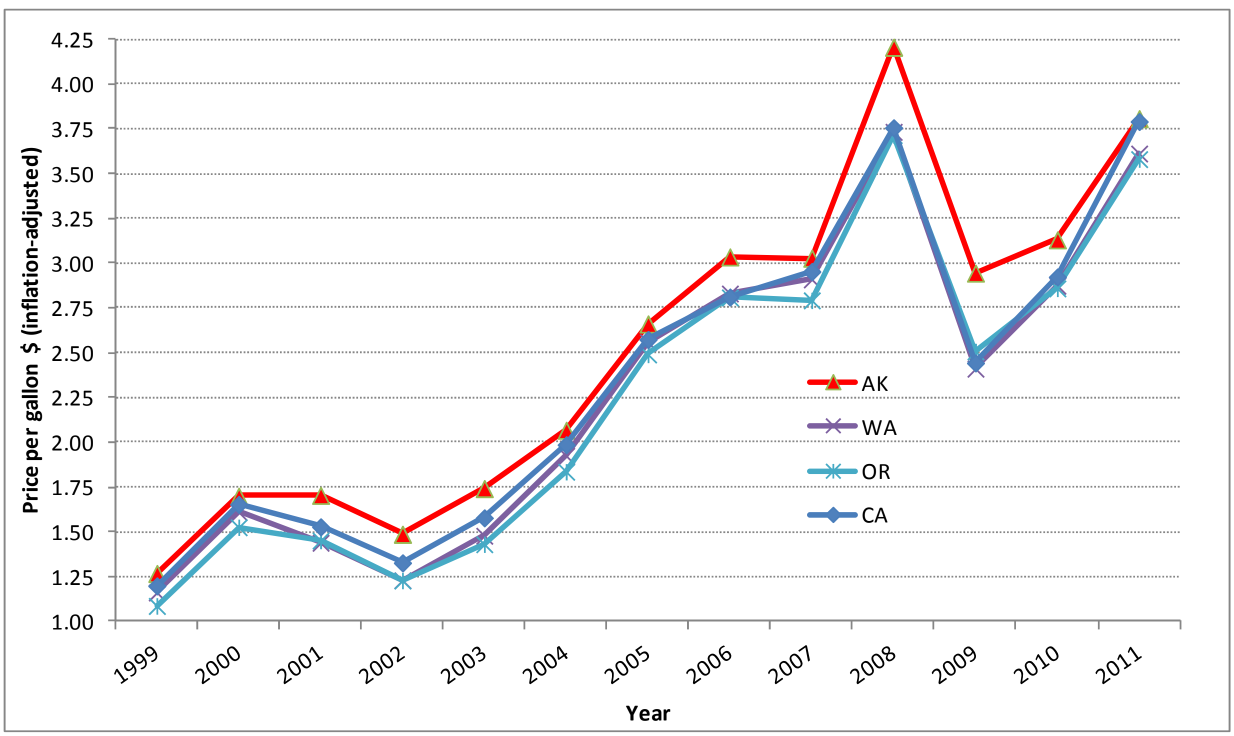


Figure 3-3. Inflation-adjusted state average before-tax cash price per gallon based on the purchase of 600 gallons of #2 marine diesel. (Source: PSMFC EFIN http://www.psmfc.org/efin/data/fuel.html#Data; and BEA http://www.bea.gov/national/xls/gdplev.xls)

3.2.1.2 Landing Patterns in the Shorebased IFQ Fishery in 2011

The following information is based on a preliminary report prepared by Sean Matson, NMFS Northwest Region (NWR), drafted in February 2012.

According to preliminary data, in 2011 (the first year under IFQ management), overall nonwhiting IFQ species landings were down compared with the historical average, and revenues were up; for the directed shoreside whiting fleet, both landings and revenues were up. Retention rates were generally much higher than in the past. Although the fishery got off to a slow start in 2011, it finished with the month of December having the highest monthly landings of 2011, and higher landings than any other December during the baseline period of 2006-2010. Monthly nonwhiting fleet revenues were higher than the highest observed value for same month in the baseline period for August, September, October and December of 2011.

The 2011 IFQ fishery may have gotten off to a slow start early in the year as many harvesters participated in the Dungeness crab fishery (in contrast to this winter's Dungeness crab fishery which was delayed, offering little distraction from IFQ sector fishing during December). Harvesters apparently made a final push for landings in December, perhaps feeling relatively more secure that their QP for bycatch species were sufficient to last the year. Except for landings in December, which were 71 percent higher than the historical average, and June's, which equaled the historical average, landings in the remaining months of 2011 were below the average observed during the 2006-10 baseline period. Although landings were lower, revenues in 2011 were up by 14 percent in the nonwhiting portion of the shoreside IFQ fishery, compared to the historical average. Nonwhiting fishery participation decreased slightly, with 10 fewer vessels fishing in 2011 compared to 2010. Astoria, Newport, and Westport were the dominant ports for IFQ landings in 2011, and Astoria was the only port to increase its share of trawl fishery landings compared to 2010. Fixed gear accounted for 6 percent of nonwhiting IFQ landings by weight but 22.4 percent of revenues, mainly driven by the high price received for fixed gear-caught sablefish (39 percent of sablefish IFQ landings were made using fixed gear). Shoreside whiting landings and revenue both increased dramatically, with landings up by 40 percent and revenues up by 121 percent compared to the historical average.

Retention rates for the nonwhiting IFQ fleet were much higher in 2011 compared with previous years. Discards accounted for 4.77 percent of nonwhiting IFQ fleet catch. When combined with whiting catch, the overall discard rate was 1.3 percent. Catch of rebuilding species was generally lower than in 2010, with the exception of canary rockfish, which increased by 0.4 mt (to 2.7 mt), however, still well below the fishery's allocation of 25.9 mt. Catch of most other rebuilding species declined by two-thirds or more with the exception of petrale sole, which is managed as a target species under its rebuilding plan. Similar declines in overfished species bycatch were recorded in the whiting IFQ fishery.

3.2.1.3 Tribal Groundfish Fisheries

Section 5.2.7 of the 2008 SAFE document, sections 2.2.1.1 and 7.2.6 of the 2009-2010 Groundfish Harvest Specifications FEIS, and section 3.15 of the Amendment 20 FEIS describe tribal fisheries. Section 6.2.5 in the Groundfish FMP describes the special status of these fisheries. Several Pacific Northwest Indian tribes have treaty rights to fish for groundfish in their usual and accustomed fishing grounds. The Federal government has accommodated these fisheries through a regulatory process described at 50 CFR 660.50.

Management and Regulation

Under treaty arrangements, tribes manage fisheries prosecuted by their members. Their management is coordinated through the Council process so catches can be accounted for when developing management measures. West coast treaty tribes in Washington State have formal allocations for sablefish, black rockfish, and Pacific whiting. For other species without formal allocations, the tribes propose trip limits to the Council, which the Council tries to accommodate while ensuring that catch limits are not exceeded. Whether formally allocated or not, tribal catches are accounted through set-asides, which are amounts taken “off the top” of the overall catch limit.

Landings and Revenue

Because tribes have sovereign rights to manage their fisheries, the tribal sectors do not have an equivalent regulatory dimension like the commercial sectors discussed above. These sectors have been identified more for data presentation purposes, although they do relate to target strategy.

The Makah tribe participates in whiting fisheries with both a mothership and shorebased component. Figure 3-4 compares commercial and treaty whiting landings. On average, the treaty fisheries have accounted for 12 percent of total whiting landings and at-sea deliveries since 2005, generating an average of about $4 million (inflation-adjusted) per year.

Table 3-26 shows the distribution of revenue by gear type for the Tribal nonwhiting sector. This sector is defined by groundfish landings other than whiting and thus includes a variety of gear types. Hook-and-line gear represents by far the largest portion of average annual revenue for the 2005-2010 period at 63 percent, followed by bottom trawl, accounting for 17 percent. In terms of species composition characterized in terms of revenue from groundfish, sablefish accounts for 74 percent during the 2005-2010 period, followed by rockfish at 12 percent (Figure 3-5). This is similar to the commercial nonwhiting sectors (especially fixed gear) where sablefish is usually the most important component of nonwhiting revenues.

Fleet size by tribe is depicted in Table 3-27. While all four coastal tribes have longline fleets, only Makah currently has a trawl fleet. Table 3-28 shows recorded landings of groundfish species by treaty tribes from 2005 to 2010, and Table 3-29 shows associated groundfish revenues for those same years. Note that, beginning in 2008, the tribes have been using their own Treaty Online Catch Accounting System (TOCAS) database to record fish ticket landings. Since 1999, Pacific whiting have comprised the vast bulk of tribal landings. It is also worth noting that overall groundfish landings and revenue have been reduced in recent years due to increasing restrictions designed to rebuild overfished rockfish. The Makah Tribe’s trawl fleet has reduced from 10 vessels to 5 active (8 eligible) vessels due in part to reduced markets. Buyers in Neah Bay have reduced the number of trucks taking fish to processors since the Limited Entry trawl closure of the area shoreward of the RCA north of Cape Alava went into place.

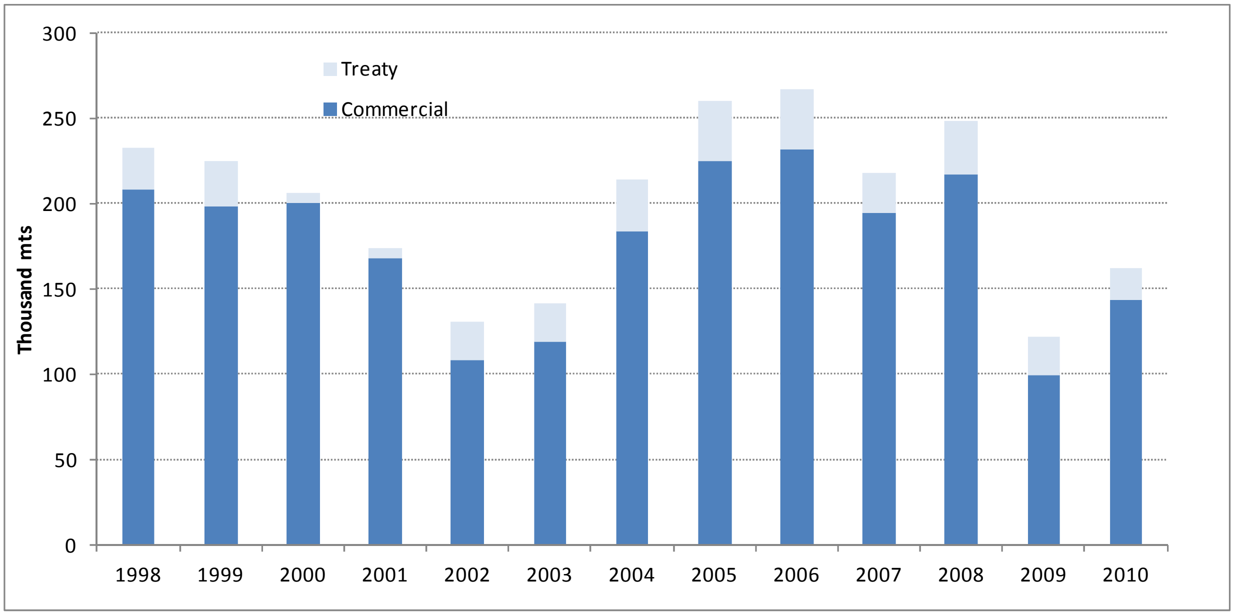


Figure 3-4. Commercial and Tribal whiting landings, thousand mt, 1998-2010.

Table 3-26. Total ex-vessel revenue by gear group for the Tribal nonwhiting shoreside sector, inflation adjusted (2010) $1,000s, 2005-2010.

Year	Hook-and-Line	Net	Pot	Shrimp Trawl	Groundfish Trawl	Total
2005	$3,720	$0	$35	$1,107	$1,381	$6,244
2006	$3,646	$0	$588	$994	$884	$6,110
2007	$3,701	$0	$460	$668	$956	$5,785
2008	$4,334	$0	$565	$492	$873	$6,264
2009	$4,439	$0	$294	$158	$1,203	$6,094
2010	$3,438	$9	$790	$725	$1,070	$6,031
Average	*$3,879.65*	*$1.53*	*$455.25*	*$690.62*	*$1,060.94*	*$6,087.99*

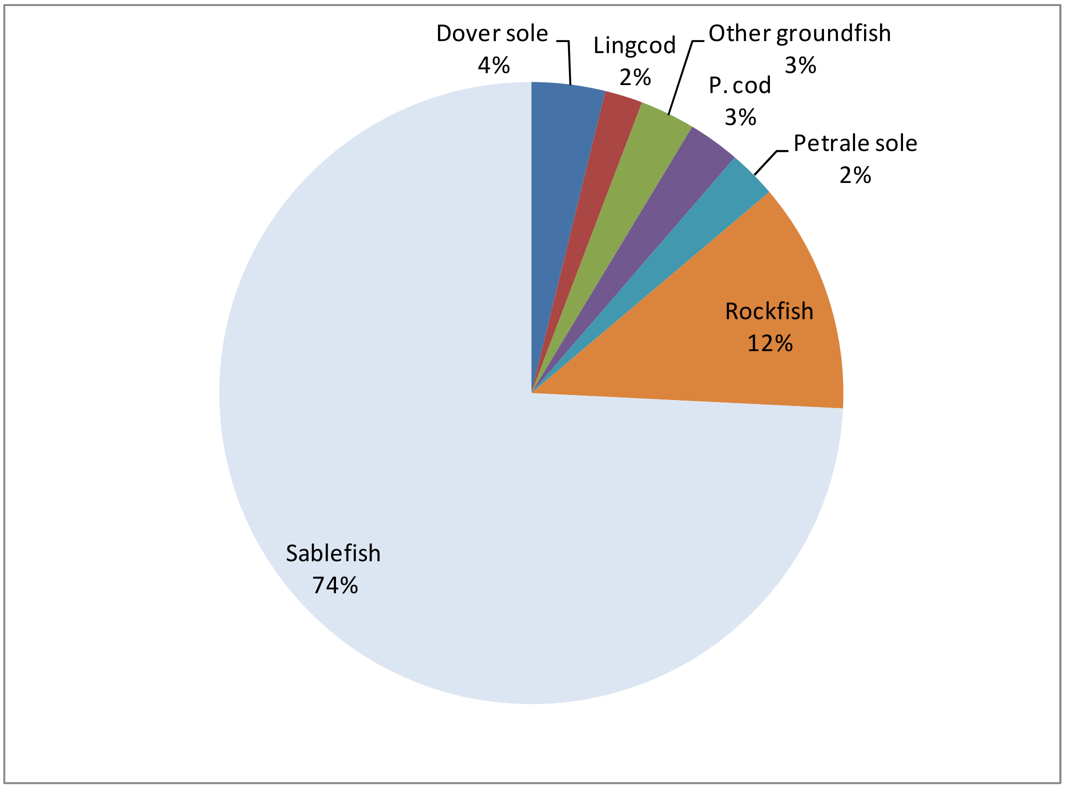


Figure 3-5. Distribution of groundfish ex-vessel revenue by species for the Tribal nonwhiting sector, 2005-2010.

Table 3-27. 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')	5 (95'-124')	5 (49'-62')	45	Neah Bay
Hoh	0	-	-	0	N/A
Quileute	8 (45’-68’)	-	-	8	La Push
Quinault	15(38'-62')	-	-	15	West Port

Table 3-28. Groundfish landings (lbs) in treaty fisheries (PacFIN and TOCAS databases): 2005-2010.

Group	Species	2005	2006	2007	2008	2009	2010
Flatfish	Arrowtooth Flounder	349,100	438,300	495,700	43,986	18,335	7,332
	Dover Sole	319,600	492,500	668,800	509,936	280,967	122,360
	English Sole	145,200	92,700	146,500	78,437	201,368	137,486
	Petrale Sole	65,400	58,200	99,100	96,797	153,131	67,288
	Rex Sole	30,200	45,400	49,200	80,913	63,423	31,344
	Rock Sole	5,100	2,500	7,100	6,134	1,457	7,077
	Unsp. Flatfish	64,300	66,200	19,300	5,928	5,422	91
	Unspecified Sanddab	2,600	17,500	30,600	420	26,007	658
	Sand Sole	1,000	40	400		368	19
	Starry Flounder	2,800	100	1,100		11	35
Flatfish Total		985,300	1,213,464	1,517,800	822,551	750,489	373,690
Rockfish	Nom. Black Rockfish		100		35		81
	Nom. Canary Rockfish	9,500	6,400	3,200	7,711	16,983	18,145
	Canary Rockfish						
	Nom. Darkblotched Rockfish	200	300	200			
	Unsp. Pop Group	7,500	6,300	4,500	1,288	382	447
	Unsp. Rockfish				10	1,854	1,060
	Widow Rockfish						
	Nom. Widow Rockfish	63,000	21,800	2,600	28,965	74,763	103,106
	Nom. Yelloweye Rockfish	1,800	1,100	1,000	535	574	800
	Yelloweye Rockfish						
	Nom. Yellowtail Rockfish	1,195,200	378,800	163,100	408,200	976,526	1,189,643
	Yellowtail Rockfish						
	Unsp. Shelf Rockfish	20,600	15,000	5,500	3,572	3,451	20,386
	Unsp. Near-Shore Rockfish	500	600	300	360	104	3
	Unsp. Slope Rockfish	63,300	63,100	70,200	43,048	80,074	55,027
Rockfish Total		1,361,600	493,500	250,600	493,724	1,154,711	1,388,698
Other Groundfish	Spiny Dogfish	13,100	169,300	249,300	200,276	65,019	15,203
	Lingcod	65,900	99,000	104,900	137,735	83,424	72,612
	Pacific Cod	272,800	78,500	100,000	58,416	324,331	541,750
	Sablefish	1,542,900	1,475,900	1,137,900	723,894	887,107	826,014
	Unspecified Skate	51,600	85,700	123,700	103,497	88,248	28,843
	Longnose Skate						4,799
	Shortspine Thornyhead	23,800	47,400	84,800	79,773	67,623	36,071
	Longspine Thornyhead	400					
	Walleye Pollock	43,200	1,900	2,500	36		1,163
Other Groundfish Total		2,013,700	1,957,700	1,803,100	1,303,627	1,515,751	1,526,455
	Pacific Whiting	75,743,442	78,133,229	66,528,214	70,342,172	49,341,153	40,244,973
TOTAL	All Groundfish Species	80,104,042	81,797,893	70,099,714	72,962,074	52,762,103	43,533,816

Table 3-29. Ex-vessel revenue ($) from treaty groundfish landings (PacFIN and TOCAS databases): 2005-2010.

Group	Species	2005	2006	2007	2008	2009	2010
Flatfish	Arrowtooth Flounder	36,375	40,111	48,564	4,399	1,797	389
	Dover Sole	112,660	180,174	244,343	188,676	91,033	46,034
	English Sole	46,979	30,693	48,531	25,649	66,854	46,744
	Petrale Sole	66,263	61,407	105,891	97,184	140,268	73,725
	Rex Sole	12,641	15,898	17,216	27,591	20,993	10,042
	Rock Sole	1,744	768	2,486	2,208	516	2,548
	Unsp. Flatfish	21,296	20,100	5,801	2,134	1,887	28
	Unspecified Sanddab	667	6,152	10,990	110	8,374	171
	Sand Sole	630	22	244	0	272	14
	Starry Flounder	854	34	370	0	4	10
Flatfish Total		300,109	355,367	484,436	347,952	331,998	179,706
Rockfish	Nom. Black Rockfish						
	Nom. Canary Rockfish	4,239	2,912	1,598	4,364	10,292	10,262
	Canary Rockfish				0	0	
	Nom. Darkblotched Rockfish	62	105	90	0	0	
	Unsp. Pop Group	3,445	3,945	1,927	741	177	245
	Unsp. Rockfish				4	1,205	468
	Widow Rockfish				0	0	
	Nom. Widow Rockfish	29,949	10,757	1,146	13,005	27,064	54,550
	Nom. Yelloweye Rockfish	1,876	1,042	1,094	395	389	160
	Yelloweye Rockfish				0	0	
	Nom. Yellowtail Rockfish	569,781	179,024	77,415	180,833	397,446	565,339
	Yellowtail Rockfish				0	0	
	Unsp. Shelf Rockfish	8,323	6,500	2,537	1,779	1,746	10,396
	Unsp. Near-Shore Rockfish	248	297	151	198	58	1
	Unsp. Slope Rockfish	27,835	28,872	35,257	23,806	37,635	24,281
Rockfish Total		645,758	233,454	121,215	225,125	476,011	665,701
Other Groundfish	Spiny Dogfish	2,120	29,723	37,872	39,054	10,338	275
	Lingcod	44,537	75,339	84,129	108,260	65,988	55,897
	Pacific Cod	123,505	42,225	54,775	38,730	155,030	242,368
	Sablefish	2,440,889	2,638,997	2,435,147	1,683,777	2,223,090	2,338,197
	Unspecified Skate	6,896	12,256	20,090	22,562	15,708	4,251
	Longnose Skate						864
	Shortspine Thornyhead						22,739
	Longspine Thornyhead	258					
	Walleye Pollock	6,277	441	380	5	0	303
Other Groundfish Total		2,640,129	2,830,957	2,697,024	1,953,176	2,504,980	2,664,895
	Pacific Whiting	3,787,172	4,687,994	4,656,975	7,526,612	2,763,105	1,945,987
TOTAL	All Groundfish Species	7,373,168	8,107,772	7,959,650	10,052,864	6,076,094	5,456,289

3.2.1.4 Recreational Fisheries

Section 7.1.3 of the 2009-2010 Groundfish Harvest Specifications FEIS describes west coast recreational fisheries. Recreational fisheries are an important part of fishery-related economic activity. Table 3-30 shows recreational angler trips (combining both charter and private) by region and the percent of those trips that were targeted for bottomfish or groundfish. Figure 3-6 displays the number of marine angler boat trips by state and year during 2007-2010; participation has declined modestly over the time period, chiefly due to reduced effort in California.

Table 3-30. Recreational marine angler boat trips, charter and private combined, and percent of trips for groundfish (bottomfish): 2007-2010 (Source: RecFIN and GMT state reps).

Region		2007	2008	2009	2010
Washington Total	Total Trips	130,659	94,443	163,728	141,749
	% Groundfish	16.6%	21.5%	10.8%	13.8%
La Push-Neah Bay	Total Trips	20,820	15,400	21,298	22,744
	% Groundfish	23.6%	27.7%	19.5%	30.0%
Westport	Total Trips	45,944	37,547	55,299	55,443
	% Groundfish	33.6%	39.0%	22.6%	20.3%
Ilwaco-Chinook	Total Trips	63,895	41,496	87,131	63,563
	% Groundfish	2.0%	3.4%	1.1%	2.3%
Oregon Total	Total Trips	190,230	133,624	186,553	165,398
	% Groundfish	35.0%	54.1%	38.5%	46.6%
Astoria	Total Trips	14,115	5,545	12,972	11,554
	% Groundfish	1.5%	5.3%	1.7%	3.7%
Tillamook	Total Trips	34,336	24,089	34,621	31,000
	% Groundfish	24.6%	42.3%	22.4%	34.4%
Newport	Total Trips	67,659	51,595	70,581	64,980
	% Groundfish	39.5%	55.5%	38.4%	48.1%
Coos Bay	Total Trips	40,518	24,986	34,598	26,420
	% Groundfish	27.8%	47.0%	34.6%	44.4%
Brookings	Total Trips	33,602	27,409	33,781	31,444
	% Groundfish	59.6%	78.0%	73.4%	73.2%
California Total	Total Trips	1,108,250	938,266	986,822	964,944
	% Groundfish	46.7%	52.7%	57.6%	58.6%
North Coast: Humboldt and Del Norte	Total Trips	48,280	28,290	55,828	60,609
	% Groundfish	40.7%	69.5%	59.3%	55.3%
North-Central Coast: Sonoma and Mendocino	Total Trips	32,367	10,826	20,111	24,255
	% Groundfish	36.2%	91.1%	79.1%	34.9%
North-Central Coast: San Mateo through Marin	Total Trips	164,716	153,575	150,577	166,478
	% Groundfish	28.8%	26.4%	32.4%	26.7%
South-Central Coast: San Luis Obispo through Santa Cruz	Total Trips	126,397	79,112	90,337	118,388
	% Groundfish	54.8%	81.0%	75.7%	65.8%
South Coast: Ventura and Santa Barbara	Total Trips	82,269	80,441	59,271	54,957
	% Groundfish	65.6%	69.8%	71.4%	74.1%
South Coast: San Diego through Los Angeles	Total Trips	654,223	586,023	610,698	540,257
	% Groundfish	48.2%	52.0%	58.9%	66.8%
Combined Washington-Oregon-California Total	Total Trips	1,429,139	1,166,334	1,337,103	1,272,091
	% Groundfish	42.4%	50.4%	49.2%	52.1%

Table 3-31 provides counts of charter vessels. The totals are substantially lower than what was reported for 2005 (PFMC 2008a), when the coastwide total was 524. However, this discrepancy represents a difference in the method of enumeration, as the numbers in Table 3-31 reflect only those charter vessels participating in groundfish trips. Information provided in Figure 3-7 demonstrates the seasonality of recreational fishing trips in recent years. As would be expected, participation is higher during warmer months. The number of marine angler trips peaks in the summer, but the seasonal concentration is more pronounced in northern areas. For example, Washington State recorded no trips in January-February or November-December, and 65 percent of trips were in July-August; while in Southern California the proportions for the same periods were 7 percent, 8 percent and 31 percent, respectively.

Table 3-31. Average number of charter vessels involved in groundfish trips from West Coast Ports: 2008-2010*.

State/District	2008	2009	2010
WASHINGTON	78	78	78
La Push-Neah Bay	15	15	15
Westport	35	35	35
Ilwaco-Chinook	28	28	28
OREGON	82	82	71
Astoria	13	13	10
Tillamook	13	13	12
Newport	30	30	28
Coos Bay	16	16	11
Brookings	10	10	10
CALIFORNIA	310	298	298
North Coast: Humboldt and Del Norte	10	15	12
North-Central Coast: Sonoma and Mendocino	15	10	15
North-Central Coast: San Mateo through Marin	61	58	58
South-Central Coast: San Luis Obispo through Santa Cruz	24	20	22
South Coast: Ventura and Santa Barbara	33	37	30
South Coast: San Diego through Los Angeles	167	158	161
WA-OR-CA TOTAL	470	458	447

* Note: Counts for California ports include all CPFVs that landed a federally-managed groundfish. This results in higher counts than reported in some previous documents where totals may have included only those CPFVs landing rockfish species.

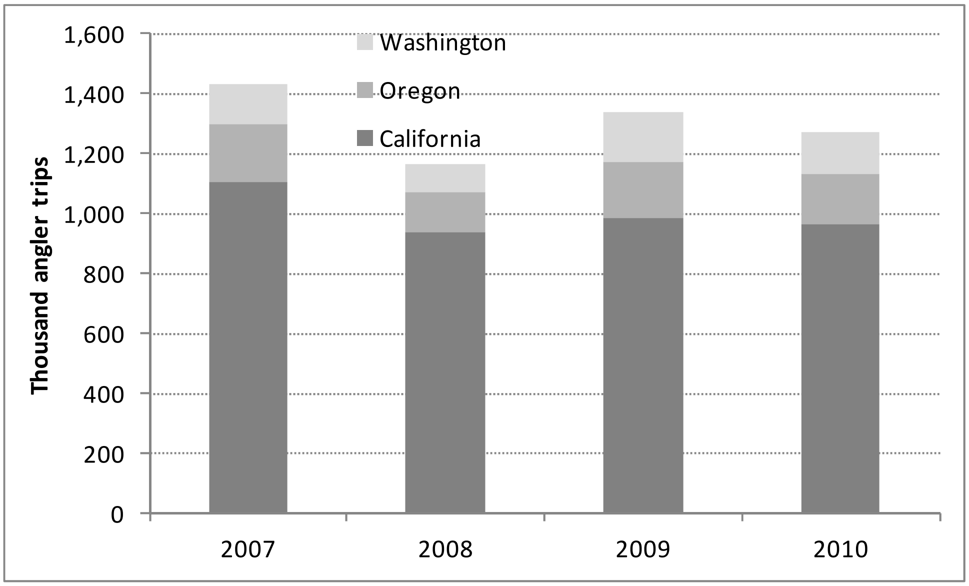


Figure 3-6. Total marine angler boat trips by state, 2007-2010.

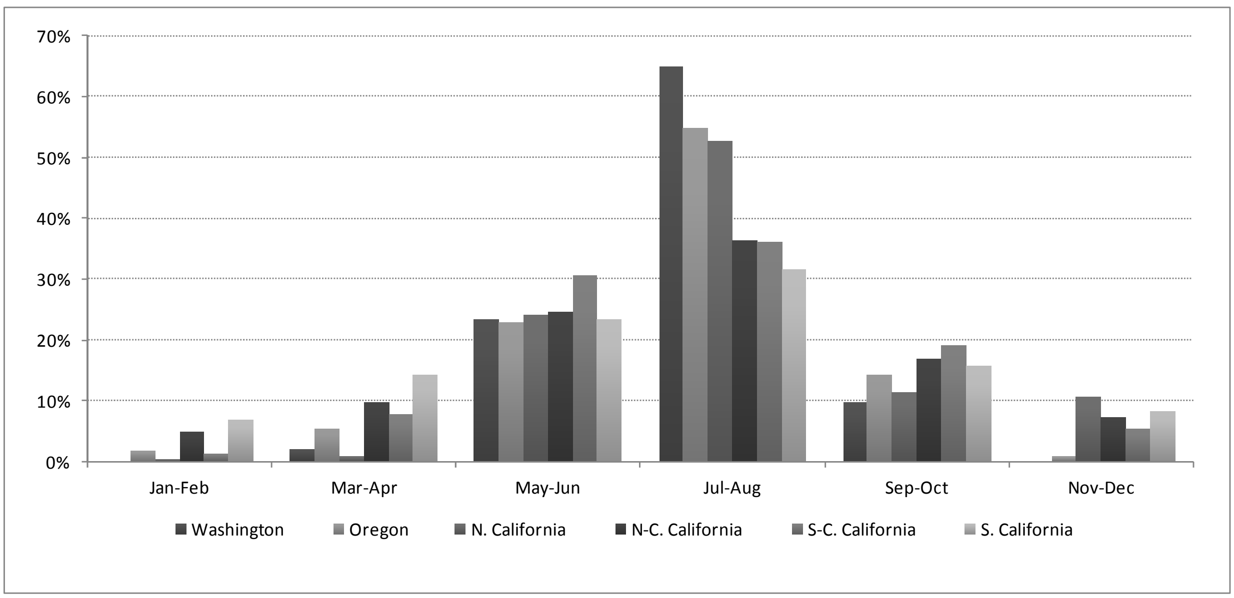


Figure 3-7. Seasonal distribution of marine angler boat trips by region in 2007-2010.

3.2.2 Fishing Communities

Fishing communities are described below in terms of the port groups used in the IO Pac model used in Chapter 4 to project income impacts from the integrated alternatives (Figure 3-8). The 14 port groups used by the IO Pac model have been grouped under 10 headings or regions for the purpose of description. For each region the ports and counties are listed and fishery and demographic characteristics described. These regional headings are:

- Washington State
    1. Puget Sound
    2. The Washington Coast

- Oregon:
    3. Astoria and Tillamook (including any landings at other Columbia River ports in Oregon)
    4. Newport
    5. Coos Bay and Brookings
- California[31]:
    6. Crescent City and Eureka
    7. Fort Bragg; Bodega Bay
    8. San Francisco
    9. Santa Cruz, Monterey, and Morro Bay
    10. Santa Barbara, Los Angeles, and San Diego

3.2.2.1 Summary of Descriptive Statistics

Commercial Fishery Characteristics

The following tables and figures illustrate commercial fishery characteristics in the port groups:

- Table 3-34 shows the distribution of revenue from all fisheries landings by major species group (but note aquaculture was not excluded in the underlying PacFIN query).
- Table 3-35 shows engagement and dependence on groundfish for ports based on ex-vessel revenue during the baseline period. Engagement is measured as the percentage of coastwide groundfish revenue generated in the port, while dependence shows the percentage of total fishery revenue accounted for by groundfish within each port.
- Table 3-37 shows the primary groundfish fishery sector, the sector accounting for the largest proportion of ex-vessel revenue in the port group, and that proportion as a percent of total groundfish ex-vessel revenue.
- Table 3-38 provides information on fishery participation by fishery sector and port group based on counts of vessels making landings during the baseline period.
- Figure 3-11 and Figure 3-12 show trends in groundfish ex-vessel revenue in the port groups during the baseline period.
- Table 3-39 and Table 3-40 show groundfish ex-vessel revenue values (nominal dollars) during the baseline period by port group and sector (Table 3-39) and species (Table 3-40).

Recreational Fishery Characteristics

Table 3-30 can be used to develop metrics similar to commercial fishery engagement and dependence by ranking regions according to the proportion of marine angler trips and the percent of those trips that are groundfish-directed. Similarly, Table 3-31 can be used to calculate the proportion of charter vessels engaged in groundfish recreational fishing in each region and rank them accordingly.

Community Characteristics

As part of the 2007-08 and 2011-12 groundfish harvest specifications, EIS analyses were carried out to determine community vulnerability (see Appendix E to PFMC 2006). Table 3-41 through Table 3-43

[31] These California regions are intended to approximately correlate with state reporting regions for recreational fisheries.

present selected demographic characteristics, which serve as proxy indicators for potential environmental justice communities of concern (See Section 6.3.8, EO 12898). The first two tables present data from the U.S. Census Bureau's 2005-2009 American Community Survey 5-year estimates, while the last table presents employment data from the Bureau of Labor Statistics for the baseline period. They may also be used to supplement past rankings of community vulnerability. The tables highlight which counties fall either above or below the applicable state's value for the characteristic, depending on the characteristic. The following indicators may be found in the tables:

- Completed high school
- Median household income
- White alone, not Hispanic or Latino
- Below poverty level
- Annual unemployment rate, 2005-2010

Table 3-44 uses rankings of the Social Vulnerability Index developed by the Hazards and Vulnerability Research Institute at the University of South Carolina to rate west coast counties by their vulnerability to adverse impacts.[32] The Index (SoVI® 2005-09) is primarily based on 2005-2009 American Community Survey data from the U.S. Census Bureau and uses principal components analysis to develop scores based on 31 indicators.[33] All U.S. counties have been scored, but for the purposes of this EIS only the west coast counties comprising the IO Pac port groups are compared to each other (for a description of these port groups seeLeonard and Watson 2011). West coast counties are grouped into high, medium, low categories based on their rank by score, with the top-ranked 20 percent grouped as high, and the bottom 20 percent as low. For comparison, groundfish dependence and engagement rankings are presented for landings grouped by counties. Table 3-45 summarizes rankings of recreational groundfish fishery dependence and engagement by marine recreational regions using source data from Table 3-30 and Table 3-31.

3.2.2.2 Overview of Groundfish Landings Coastwide

Figure 3-9 shows the distribution of total fisheries revenue during the baseline period by major species group. Groundfish, at 17 percent, follows crab in terms of its share of total coastwide revenue.

Table 3-32 and Table 3-33 summarize the uniformity of the distribution of groundfish ex-vessel revenue across sectors and ports using the Gini coefficient.[34]

The Gini coefficient is a measure of the statistical dispersion of a data distribution ranging between 0 and 1. A value of 0 indicates that all data points in a distribution are identical while a value of 1 indicates the maximum degree of diversity in the data set. This statistic is often used to measure national-level income distribution where a value of 0 indicates that everyone receives the same income, and a value of 1 would indicate that virtually all income goes to one individual. Its use here is not intended to imply any particular policy objective (e.g., a more uniform distribution of ex-vessel

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[32] See http://webra.cas.sc.edu/hvri/products/sovi.aspx for more information.

[33] According to the SoVI website "In SoVI® 2005-09, seven significant components explain 69% of the variance in the data. These components include race and class; extreme wealth; elderly residents; Hispanic ethnicity; care dependent females; Native American ethnicity; and service industry employment." Detailed information on these components can be found at http://webra.cas.sc.edu/hvri/docs/SoVI0509_factors.pdf.

[34] To calculate the Gini coefficient the following online software was used: Wessa, P. (2011), Free Statistics Software, Office for Research Development and Education, version 1.1.23-r7, URL http://www.wessa.net/. (© All rights reserved. Academic license for non-commercial use only.) Note: Since the data series contained zeroes, which cause undefined mathematical operations in the Gini coefficient calculation formula, a constant term 1.0E-6 (0.000001) was added to every value.

revenue) but merely to describe the uniformity of the distribution of groundfish ex-vessel revenue among West Coast ports and between fisheries sectors within those ports. The source data used to calculate the Gini coefficients in Table 3-33 are the same as those used to prepare Table 3-39.

Table 3-32 displays and ranks the uniformity of the distribution of groundfish revenue across ports for each of five directed groundfish sectors. Table 3-32 shows the Gini coefficient across West Coast port groups for total ex-vessel revenue landed in all five groundfish sectors combined was approximately 0.5. Revenues from two sectors were relatively more evenly distributed across ports than this (Non-Nearshore Open Access and Limited Entry Fixed Gear), while ex-vessel revenues from three sectors were relatively less evenly distributed (Shoreside Whiting, Nearshore Open Access, and Shoreside Nonwhiting Trawl). Of the five groundfish sectors, ex-vessel revenues from the Limited Entry Fixed Gear and Non-Nearshore Open Access (fixed gear) sectors were the most uniformly distributed across ports (i.e., every port group had at least some landings from the Limited Entry Fixed Gear and Non-Nearshore Open Access sectors, and no port group dominated). Conversely, ex-vessel revenue from Shoreside Whiting was the least uniformly distributed with more than 90 percent of all Shoreside Whiting revenues landed in only three port groups.

Table 3-33 ranks the uniformity of groundfish revenues landed by the five directed groundfish sectors in each port. Table 3-33 shows the Gini coefficient across groundfish sectors for total ex-vessel revenues landed in all West Coast port groups combined was approximately 0.4. However the distribution of groundfish sector ex-vessel revenue was relatively less uniform than this in every West Coast port group. Groundfish landings revenues in Los Angeles and San Diego were concentrated in relatively few sectors (i.e., Limited Entry Fixed Gear lands approximately 90 percent of groundfish revenues in those ports), whereas landings revenues in Brookings, Crescent City and Bodega Bay are much more uniformly distributed among the five sectors (i.e., at least four of the five sectors is present in each port and no one sector lands more than 50 percent of groundfish revenues).

The difference in Gini coefficient rankings between ports like Eureka, Fort Bragg and Crescent City is that Eureka derived nearly two-thirds (63 percent) and Fort Bragg more than three-quarters (77 percent) of groundfish revenue from nonwhiting trawl landings; whereas Bodega Bay derived no more than 44 percent of groundfish revenue from any one sector (nonwhiting trawl landed the largest component of groundfish revenues).

3.2.2.3 Puget Sound

Ports and Counties

Puget Sound ports and counties: Everett (Snohomish), Seattle (King), Blaine (Whatcom), Tacoma (Pierce), Olympia (Thurston), Bellingham Bay (Whatcom), Shelton (Mason), Anacortes (Skagit), La Conner (Skagit), Friday Harbor (San Juan), Other north Puget Sound ports (Island)

Commercial Fishery Characteristics

During the 2005-10 baseline period, shellfish was the primary source of revenue across all fisheries in Puget Sound, and Puget Sound ranked first coastwide in terms of total fishery landings.

Puget Sound is not very engaged in groundfish fisheries, ranking 15th out of 18 ports. It is also only moderately dependent on groundfish, with only 5.3 percent of revenues coming from those species.

Sablefish is the most important groundfish species in terms of revenue share during the baseline period at 66 percent (Table 3-35), and limited entry fixed gear is the most important groundfish fishery sector, accounting for 51 percent of revenue (Table 3-37, see also Table 3-40 for a more detailed breakdown by species). Twenty-eight unique vessels in the limited entry fixed gear sector made landings during the baseline period (Table 3-38) followed by directed open access with 11 vessels.[35] Puget Sound ranks second coastwide in terms of the amount of revenue earned by limited entry fixed gear sector Table 3-39) at $1.7 million per year on average during the baseline period.

Figure 3-11 shows groundfish revenue trends in the Washington port groups. Puget Sound revenue has declined during the baseline period from over $4 million to about $2 million.

Recreational Fishery Characteristics

Recreational catch is not reported for this region because Puget Sound waters are outside the Pacific Council management area.

Community Characteristics

None of the counties in the Puget Sound port group were rated vulnerable in either the 2006 or 2010 analyses. Table 3-44 shows none of these counties have a high-ranked SoVI score. Only Whatcom County is ranked as highly engaged.

Looking at the statistics shown in Table 3-41 and Table 3-42, Mason and Skagit were either above or below the Washington State value for three of them, the highest frequency for Puget Sound counties.

Four counties have had unemployment rates above the state rate in more than one year in the baseline period (Table 3-43): Pierce, Mason, Skagit, and Island. Of these, unemployment rates in Snohomish County only exceeded the statewide average in 2009 and 2010, after the 2008 financial crisis and ensuing recession. Pierce and Thurston Counties have had persistent unemployment, while Island County actually had higher unemployment relative to the statewide rate preceding the recession.

Overall, the Puget Sound region comprises urbanized counties (Snohomish, King, and Pierce) with higher household incomes, lower poverty rates, and a greater working age population, and semi-rural or rural counties where incomes are lower and higher poverty rates.

3.2.2.4 Washington Coast

Ports and Counties

North Washington coast ports and counties: Neah Bay (Clallam), Port Angeles (Clallam), Sequim (Clallam), Port Townsend (Jefferson, East), La Push (Clallam)

South and central Washington coast ports and counties: Copalis Beach (Grays Harbor), Grays Harbor (Grays Harbor), Westport (Grays Harbor), Willapa Bay (Pacific), Ilwaco/Chinook (Pacific), Other Columbia River ports (Clark)

[35] "Directed open access" is a broader sector category than the open access fixed gear fisheries (nearshore and offshore) discussed in the previous section, including other legal gear types. However, in most cases this designation corresponds closely to a combination of the nearshore and offshore open access sectors.

Groundfish Landings and Primary Fisheries

The North Washington Coast group includes ports in the Straits of Juan de Fuca, and, like Puget Sound, shellfish is the most important species group in terms of total fishery revenue in the baseline period. In the South and Central Puget Sound port group, Dungeness crab is the most important species (indicated by the crab species group), accounting for almost half of total fisheries revenue (Table 3-34), and ranks second coastwide in terms of total fisheries revenue.

These port groups are moderately dependent on groundfish, ranking eighth and tenth respectively (Table 3-35) while the South and Central Washington Coast port group is, in relative terms, highly engaged in groundfish fisheries, ranking third while the North Washington Coast ranks sixth out of 19 port groups.

Like Puget Sound, sablefish is the most commercially important groundfish species in the North Washington Coast port group area, accounting for almost 70 percent of groundfish revenue or $2.8 million per year on average during the baseline period. The North Washington Coast port group is where the bulk of treaty tribe landings occur and their landings represent the largest share of revenue, accounting for 72 percent of total groundfish revenue during the baseline period.

Pacific whiting is the primary groundfish revenue earner in the South and Central Washington Coast port group, accounting for 61 percent of revenue, reflected by the port and processing infrastructure in Westport and Ilwaco. Table 3-40 groups Pacific whiting for Washington because of a confidentiality requirement. The state averaged $5.5 million in revenue per year from whiting with a large majority of the landings occurring in the South Washington Coast area (this includes treaty tribe landings). Limited entry fixed gear is an also important fishery, averaging almost $1.5 million annually during the baseline period, making the South and Central Washington Coast the third ranking port group coastwide for revenue from this sector.

The trend in groundfish ex-vessel revenue has been variable but relatively flat in the Washington Coast port groups during the baseline period (Figure 3-11). North Washington Coast revenue fluctuated around $4 million; the South Washington Coast shows higher revenues but somewhat more volatility, likely due to the importance of Pacific whiting, with revenue varying between $6.8 and $10.8 million.

Recreational Fishery Characteristics

Ilwaco-Chinook is the largest recreational port on the Washington Coast and ranks fifth coastwide in terms of number trips and number of charter vessels making groundfish trips (Table 3-45). However, only 2 percent of angler trips are groundfish-directed so it ranks last among reporting regions in terms of engagement in groundfish recreational fisheries. Westport ranks first in terms of charter vessels involved in groundfish angling.

Recreational trips are much more seasonal on the Washington Coast compared to regions farther south. Figure 3-7 indicates that little or no recreational fishing occurs from November to April, which is unsurprising given the exposure of this coast to inclement weather coming out of the North Pacific.

Community Characteristics

The following Washington counties have been rated vulnerable or most vulnerable in the previous two analyses.

- Clallam (vulnerable 2006)
- Grays Harbor (vulnerable 2010, most vulnerable 2006)
- Pacific (vulnerable 2010, most vulnerable 2006)

Clallam and Pacific counties have high SoVI scores and Clallam and Grays Harbor counties rank high for commercial groundfish engagement (see Table 3-44).

All counties in this region except for Clark County have median household incomes below the statewide value and a poverty rate above the statewide value. Clallam, Jefferson, and Clark counties have school completion rates above the state value. In general these counties have relatively small nonwhite/Hispanic populations with only Jefferson County below the statewide value for the proportion of the population that is white alone (Table 3-41 and Table 3-42). All the counties in this port group had unemployment above the statewide rate during the baseline period (Table 3-43).

By these measures the Washington Coast region is one of the more economically distressed areas on the west coast. Clallam County (particularly the port of Neah Bay) is likely more vulnerable to adverse impacts of groundfish fishery management changes.

3.2.2.5 Astoria-Tillamook

Ports and Counties

Astoria ports and counties: Astoria (Clatsop), Gearhart/Seaside (Clatsop), Cannon Beach (Clatsop), Columbia River pseudo port code (None)

Tillamook ports and counties: Tillamook/Garibaldi (Tillamook), Nehalem Bay (Tillamook), Netarts Bay (Tillamook), Pacific City (Tillamook)

Groundfish Landings and Primary Fisheries

The Astoria and Tillamook port groups contrast with respect to groundfish engagement and dependence. In Astoria, groundfish is the primary species group, accounting for 31 percent of overall fisheries ex-vessel revenue and ranking fifth terms of groundfish dependence. Astoria ranks first in terms of engagement, having the largest share of coastwide groundfish revenue. The nonwhiting trawl sector accounts for the largest share of groundfish revenue at 69 percent. Astoria ranks first in terms of the share of coastwide ex-vessel revenue from this sector and ranks third in terms of shoreside whiting. Sablefish accounted for the largest share of groundfish ex-vessel revenue during the baseline period, although, at 30 percent, its share is lower than other ports in Washington and Oregon where sablefish accounted for more than half of revenue (Table 3-36).

Tillamook depends on the Dungeness crab fishery to a great degree, with 67 percent of revenue coming from this species (Table 3-34). Tillamook ranks fourteenth for groundfish dependence and last among the port groups for groundfish engagement, accounting for just 0.3 percent of coastwide groundfish revenue. The directed open access sector accounts for the largest share of groundfish ex-vessel revenue landings with 87 percent.

In 2010, nominal groundfish ex-vessel revenue in Astoria, at $9.3 million, was almost the same as it was in 2005. In the intervening years revenue rose to a high of $12.1 million in 2008. Tillamook groundfish ex-vessel revenue is comparatively small, varying between $121,000 and $211,000.

Recreational Fishery Characteristics

Astoria ranks 14th in terms of its share of recreational angler trips coastwide (Table 3-45). Tillamook, although relatively insignificant in terms of commercial groundfish fisheries, had more than double the number of angler trips of Astoria in 2010 and just over a third of these were groundfish-directed. In contrast, less than 4 percent of the trips from Astoria were groundfish-directed. Ilwaco-Chinook in Washington and Astoria are at the mouth of the Columbia River, a major area for recreational salmon fishing, accounting for the relative unimportance of recreational groundfish in these ports that are otherwise of major importance in commercial groundfish fisheries. Tillamook had the same number of charter vessels engaged in groundfish trips as Astoria in 2010, although, at 10 each, these ports rank rather low in terms of coastwide share.

Community Characteristics

Clatsop County (Astoria / Columbia River port group) was rated vulnerable in the 2006 analysis and Tillamook County was rated vulnerable in the 2010 analysis. Both counties have high-ranking SoVI scores and Clatsop county ranks high in terms of groundfish commercial fishery engagement and dependence (Table 3-44).

All of the counties in the Oregon port groups exceed the statewide value for poverty rate and fall below the statewide household median income. The white population in these counties range from 85.7 percent to 90.7 percent compared to a statewide rate of 80.4 percent. Tillamook County had an unemployment rate above the statewide rate in 2005 and 2006, but both counties had unemployment rates below the statewide value from 2008-2010 when the financial crisis and ensuing recession triggered unemployment growth nationally.

Given the importance of groundfish fisheries in Clatsop county and social vulnerability, this region is likely more vulnerable to adverse impacts of groundfish fishery management changes.

3.2.2.6 Newport

Ports and Counties

Newport ports and counties: Depoe Bay (Lincoln), Newport (Lincoln), Waldport (Lincoln)

Groundfish Landings and Primary Fisheries

Newport is moderately dependent on groundfish ex-vessel revenue, ranking sixth coastwide, but highly engaged, ranking second coastwide (with 15 percent of total ex-vessel revenue coming from groundfish landings). As with most of the ports in Oregon and Northern California, crab accounts for the greatest share of total ex-vessel revenue (Table 3-34). Sablefish accounts for the largest share of groundfish ex-vessel revenue (44 percent), as is the case with most of the port groups, although this share falls in the mid-range, ranking eighth out of the 14 ports where sablefish is the primary groundfish species (Table 3-36). At $3.6 million per year on average, Pacific whiting trails only sablefish as a groundfish revenue earner, followed by Dover sole at $802,000 (Table 3-40).

At 38 percent of groundfish revenue, shoreside nonwhiting trawl (now a component of the shoreside IFQ fishery) accounts for the largest share of groundfish revenue. However, from a coastwide perspective, Newport is also a major port for shoreside whiting trawl (also now part of the IFQ fishery), ranking second, and limited entry fixed gear, ranking first, while nonwhiting trawl revenue ranks third coastwide (Table 3-39).

Groundfish revenues have increased in Newport during the baseline period from $8.5 million to $10.5 million in 2010.

Recreational Fishery Characteristics

In 2010 Newport ranked fourth coastwide in terms of total recreational angler trips and sixth (out of 14 regions) in terms of percent that were groundfish-directed. It ranks fourth coastwide in terms of the number of charter vessels involved in recreational groundfish. These metrics show that Newport is the most important recreational groundfish port in all of Washington and Oregon.

Community Characteristics

Lincoln County was rated most vulnerable in the 2010 analysis and vulnerable in the 2006 analysis, has a high-ranked SoVI score and high groundfish fishery engagement and dependence.

As with all Oregon coastal counties, Lincoln County falls below the statewide value for median family income (Table 3-42).

Given the importance of groundfish fisheries and social vulnerability indicators, Lincoln County (the port of Newport) is likely more vulnerable to the adverse impacts of management changes.

3.2.2.7 Coos Bay – Brookings

Ports and Counties

Coos Bay ports and counties: Florence (Lane), Winchester Bay (Douglas), Charleston/Coos Bay (Coos), Bandon (Coos)

Brookings ports and counties: Port Orford (Curry), Gold Beach (Curry), Brookings (Curry)

Groundfish Landings and Primary Fisheries

Comparing dependence and engagement rankings (Table 3-35) for these two port groups show their differences: Coos Bay ranks fourth for engagement (9.1 percent) and seventh for dependence (26 percent) while Brookings ranks third for dependence (38.7 percent) and seventh for engagement (5.6 percent). In both ports, sablefish accounts for just over half of groundfish ex-vessel revenue (Table 3-36). As with all the ports between Newport and Monterey, the shoreside IFQ fishery (limited entry nonwhiting trawl) is the principal groundfish fishery (Table 3-37). Coos Bay averaged $3.8 million from this fishery during the baseline period, ranking second coastwide, while Brookings earned $1.4 million (Table 3-39). Brookings ranks second coastwide in average annual earnings from the directed open access sector at $1.2 million, and fifth for the limited entry fixed gear sector at $922,000 average annual revenue, just behind Coos Bay at $1.3 million (Table 3-39). The relative importance of the directed open access sector is evidenced by the revenues earned from rockfish landings, $434,000 per year, putting it third coastwide (Table 3-40).

Both port groups show modest increases in groundfish ex-vessel revenue during the baseline period (Figure 3-11). Coos Bay shows an increase from 2005 with the highest value in 2008 at $6.8 million, although revenues were down only slightly in 2009 and 2010. In Brookings, groundfish ex-vessel revenue reached its maximum during the baseline period in 2009 at $4.5 million, but revenue in 2010 was only marginally lower (although, note no inflation adjustment was applied).

Recreational Fishery Characteristics

Brookings ranks second coastwide in terms of the percent of recreational angler trips that were groundfish-directed in 2010 at 73 percent. Otherwise these regions rank in the lower middle in coastwide comparison in terms of their engagement in recreational groundfish fisheries.

Community Characteristics

Coos County was rated vulnerable in the 2010 analysis and most vulnerable in the 2006 analysis. Coos and Curry Counties have high-ranking SoVI scores and rank high for groundfish engagement and dependence. Both Lane and Douglas counties encompass towns and cities in the Willamette valley, which are likely demographically different from coastal communities. For that reason, county demographics are less representative. Curry County was rated vulnerable in both the 2010 and 2006 analyses. Curry County in particular is extremely economically depressed, because of declines in the timber industry in the region.

As noted previously, all the Oregon coastal counties are worse off than the statewide value in terms of median household income and poverty rate as shown in Table 3-41 and Table 3-42. Both Douglas and Coos counties have high school graduation rates below the statewide value. Douglas County ranked second coastwide in terms of its unemployment rate in 2010 and first in terms of the rate for the entire baseline period (Table 3-43).

Southwestern Oregon ports in Coos and Curry Counties are likely vulnerable to adverse impacts, given these indicators.

3.2.2.8 Crescent City – Eureka (North Coast)

Ports and Counties

Crescent City ports and counties: Crescent City (Del Norte)

Eureka ports and counties: Eureka (Humboldt), Fields Landing (Humboldt), Trinidad (Humboldt), Other Humboldt County ports (Humboldt)

Groundfish Landings and Primary Fisheries

Crescent City and Eureka derive the highest share of total fisheries revenue from crab (accounting for 79 percent in Crescent City, the largest in-port share for a primary species group coastwide, see Table 3-34), but Eureka ranks fourth coastwide in terms of groundfish dependence and fifth in terms engagement in groundfish fisheries, ahead of Crescent City at eleventh for both statistics.

Crescent City has a more diverse species portfolio measured by ex-vessel revenue; although sablefish has the largest share, it accounts for just 29 percent. Rockfish accounts for the second largest share followed by Pacific whiting (Table 3-40). Crescent City is an important port for the directed open access sector, ranking fifth coastwide. In Crescent City, this fishery sector has higher annual average revenue than the limited entry fixed gear sector. The relatively high level of revenue from rockfish in Crescent City likely reflects the prominence of the directed open access sector (Table 3-40).

As with all the ports in Oregon excepting Tillamook, nonwhiting trawl (part of the shoreside IFQ fishery) generates the largest share of ex-vessel revenue among groundfish fishery sectors. In Eureka, it accounts for 77 percent of groundfish revenue, the second highest share for any fishery sector within a port (behind Tillamook where directed open access accounts for 87 percent) (Table 3-37). Eureka ranks fourth in terms of its share of coastwide nonwhiting trawl revenue (Table 3-39).

Groundfish ex-vessel revenue increased in these port groups at least through 2008, with subsequent declines (Figure 3-11). Crescent City fared poorly, ending the baseline period lower than at the outset, with 2010 revenues slightly greater than $1.2 million.

Recreational Fishery Characteristics

The North Coast marine region (Humboldt-Del Norte) is mid-ranking in terms of the recreational metrics presented in Table 3-30 and Table 3-31. The only more northerly regions that had more angler trips in 2010 were Ilwaco-Chinook and Newport, but Humboldt-Del Norte had a higher proportion of groundfish trips then those two regions at 55 percent.

Community Characteristics

Del Norte County was rated most vulnerable in 2010 and vulnerable in the 2006 analysis; Humboldt County was rated vulnerable in 2010 and most vulnerable in 2006. It has a high-ranking SoVI score relative to other west coast counties.

Del Norte County is above/below the statewide average for three of four demographic statistics (high school completion, median household income, poverty rate) and Humboldt for two (median household income, poverty rate).

Del Norte County's unemployment rate was above the statewide value in all years during the baseline period. Humboldt and Mendocino counties had lower values than the statewide rate in the last two or three years of the baseline period, although still above 10 percent in 2009 and 2010.

These ratings suggest that this region could be disproportionately affected by adverse socioeconomic impacts stemming from changes in groundfish fishery management.

3.2.2.9 Fort Bragg – Bodega Bay (North-Central Coast)

Ports and Counties

Fort Bragg ports and counties: Fort Bragg (Mendocino), Albion (Mendocino), Point Arena (Mendocino), Other Mendocino County ports (Mendocino)

Bodega Bay ports and counties: Bodega Bay (Sonoma), Point Reyes (Marin), Tomales Bay (Marin), Other Sonoma, Marin County outer coast (Marin), Sausalito (Marin)

Groundfish Landings and Primary Fisheries

Fort Bragg is highly dependent on groundfish, which, at 47 percent of total fisheries ex-vessel revenue, accounts for the largest share (Table 3-34 and Table 3-35) while Bodega Bay ranks very low for groundfish dependence and engagement. Like most other ports, sablefish accounts for the largest share of groundfish ex-vessel revenue in this region. Sablefish has the high share of groundfish ex-vessel revenue among port groups at 52 percent (Table 3-36). Nonwhiting trawl revenue in Fort Bragg ranks fifth respectively in terms of their share of coastwide revenue from this sector, and directed open access ranks third (Table 3-39). Although the absolute dollar amounts are small, in Bodega Bay, the directed open access sector, at $92,000 on average annually is almost as big a contributor as trawl (Table 3-39).

Fort Bragg appears to have fared well in terms of revenue changes, increasing from $2.9 million in 2005 to $4.1 million in 2009, and then declining slightly to just under $4 million in 2010. Bodega Bay shows a modest increase from a very low level, reaching $366,000 in 2010 (Figure 3-12).

Recreational Fishery Characteristics

The Sonoma and Mendocino recreational reporting region ranks in the bottom half of regions in terms of the measures of recreational groundfish fishery engagement and dependence (Table 3-45).

Community Characteristics

Mendocino County was rated most vulnerable in both 2010 and 2006. This county also had median household income below the statewide value and a poverty rate above that value. Sonoma and Marin Counties are not economically vulnerable.

3.2.2.10 San Francisco (North Central Coast)

Ports and Counties

San Francisco ports and counties: San Francisco (San Francisco), Richmond (Contra Costa), Berkeley (Alameda), Oakland (Alameda), Alameda (Alameda), Other San Francisco Bay, Alameda (San Mateo), Princeton/Half Moon Bay (San Mateo)

Groundfish Landings and Primary Fisheries

Central and Southern California groundfish contributed 13 percent of coastwide groundfish revenue during the baseline period (Table 3-35); all of the ports in these regions rank in the bottom half in terms of engagement. The ports in the Central California region are moderately to not very engaged in groundfish fisheries as shown in Table 3-35.

As with most other ports, sablefish is the major contributor to groundfish ex-vessel revenue, although it represents a smaller absolute proportion of total groundfish revenue than in most ports in Oregon and Washington (Table 3-36). Rockfish and thornyheads are also important contributors to groundfish revenue (Table 3-40).

Shoreside nonwhiting trawl is dominant in San Francisco, where it accounts for 68 percent of groundfish revenue (Table 3-37). In Monterey, the combined contribution of limited entry fixed gear and directed open access exceeds the trawl contribution (Table 3-39).

Groundfish ex-vessel revenue fluctuated in San Francisco over the 2005-10 time period, reaching a peak of $1.9 million in 2008 but declining to $1.4 million in 2010 (Figure 3-12).

Recreational Fishery Characteristics

The San Mateo-Marin region ranks second coastwide in terms of the number of angler trips in 2010, but a relatively small proportion were groundfish-directed, ranking it eleventh in terms of dependence. This region also ranks second in terms of the number of charter vessels involved in groundfish trips.

Community Characteristics

All the counties in this region have relatively low-ranked SoVI scores.

This region encompasses four counties with several major population agglomerations. For this reason, county demographic characteristics may not accurately represent the characteristics of fishery participants. Nonwhites and Hispanics represent a larger proportion of the population in these counties compared to the coastal areas in Northern California, Oregon, and Washington, but only Alameda County has a white non-Hispanic percentage smaller than the statewide value (Table 3-41).

3.2.2.11 Monterey – Morro Bay (South-Central Coast)

Ports and Counties

Monterey ports and counties: Santa Cruz (Santa Cruz), Monterey (Monterey), Moss Landing (Monterey), Other Santa Cruz, Monterey County ports (Monterey)

Morro Bay ports and counties: Morro Bay (San Luis Obispo), Avila (San Luis Obispo), Other San Luis Obispo County ports (San Luis Obispo)

Groundfish Landings and Primary Fisheries

Morro Bay ranks first coastwide in terms of dependence on groundfish with 66 percent of total in-port ex-vessel revenue coming from this source. Except for Morro Bay, where sablefish accounts for the largest share of groundfish ex-vessel revenue at 48 percent, thornyheads are the major groundfish revenue earner. Open access and limited entry fixed gear fisheries are primary in these ports.

Groundfish ex-vessel revenue increased substantially in Morro Bay in 2008 through 2010 (Figure 3-12). This was due, first, to increased harvest opportunity for sablefish in this region of the coast (an increase in the OY for sablefish south of 36° N. latitude) beginning in 2008, and second, the implementation of a fishery authorized under an EFP by The Nature Conservancy in 2007, which allowed vessels operating under limited entry trawl permits The Nature Conservancy owns to fish with fixed gear.

In Monterey, groundfish ex-vessel revenue declined slightly between 2005 and 2010, ending at $1.5 million.

Recreational Fishery Characteristics

San Luis Obispo-Santa Cruz ranks third in terms of total angler trips and fourth with respect to the engagement metric of percent groundfish-directed. (Note that San Luis Obispo is grouped with the Southern California port group areas in this narrative.)

Community Characteristics

Monterey County was rated vulnerable in the 2006 analysis.

Monterey County falls above/below the statewide values for all demographic metrics shown in Table 3-41 and Table 3-42, although close to the statewide value for median household income and poverty rate, considering the margins of error. Santa Cruz and Monterey Counties have had annual unemployment rates above the statewide value during the baseline period.

3.2.2.12 Santa Barbara – Los Angeles – San Diego (South Coast)

Ports and Counties

Santa Barbara ports and counties: Santa Barbara (Santa Barbara), Ventura (Ventura), Port Hueneme (Ventura), Oxnard (Ventura), Other Santa Barbara, Ventura County (Santa Barbara)

Los Angeles ports and counties: San Pedro (Los Angeles), Terminal Island (Los Angeles), Long Beach (Los Angeles), Wilmington (Los Angeles), Newport Beach (Orange), Dana Point (Orange), Other Los Angeles, Orange County ports (Los Angeles)

San Diego ports and counties: San Diego (San Diego), Oceanside (San Diego), Other San Diego County ports (Riverside),

Groundfish Landings and Primary Fisheries

The port groups in Southern California are not big participants in groundfish fisheries (Table 3-34).

Groundfish revenue increased in Santa Barbara from about half a million dollars in 2008 to almost $1.5 million in 2010. Groundfish revenue in Los Angeles and San Diego remained fairly constant at under $1 million annually (with Los Angeles slightly exceeding that level in 2010).

Recreational Fishery Characteristics

Southern California is the most important region measured by the volume of marine angler trips and dependence on groundfish-directed trips. If one includes the regions from Santa Cruz southward, Southern California accounts for more than half of the angler trips in 2010 (as noted above, the recreational reporting regions do not divide precisely into the groupings used in this narrative, but it is likely that ports from San Luis Obispo south accounted for close to or somewhat more than 50 percent of all trips). A large proportion of these trips were groundfish-directed, ranging from 66 to 74 percent in 2010. The San Diego-Los Angeles region ranked second in 2010 in terms of the size of the charter vessel fleet involved in groundfish fishing.

Community Characteristics

Los Angeles was rated vulnerable in the 2006 analysis.

As with the San Francisco region, this region includes several sizable metropolitan areas, so county demographics are likely not very representative of the population directly affected by the proposed action. Los Angeles County stands out in comparison to statewide demographics, having a lower high school completion rate, median household income, white and not Hispanic proportion of the population, and a higher poverty rate. San Luis Obispo and Santa Barbara Counties also have median household incomes below the statewide value.

Los Angeles County had annual unemployment rates above the statewide rate from 2008 to 2010, while Riverside County had higher unemployment in all baseline years (note that Riverside is not a coastal county).

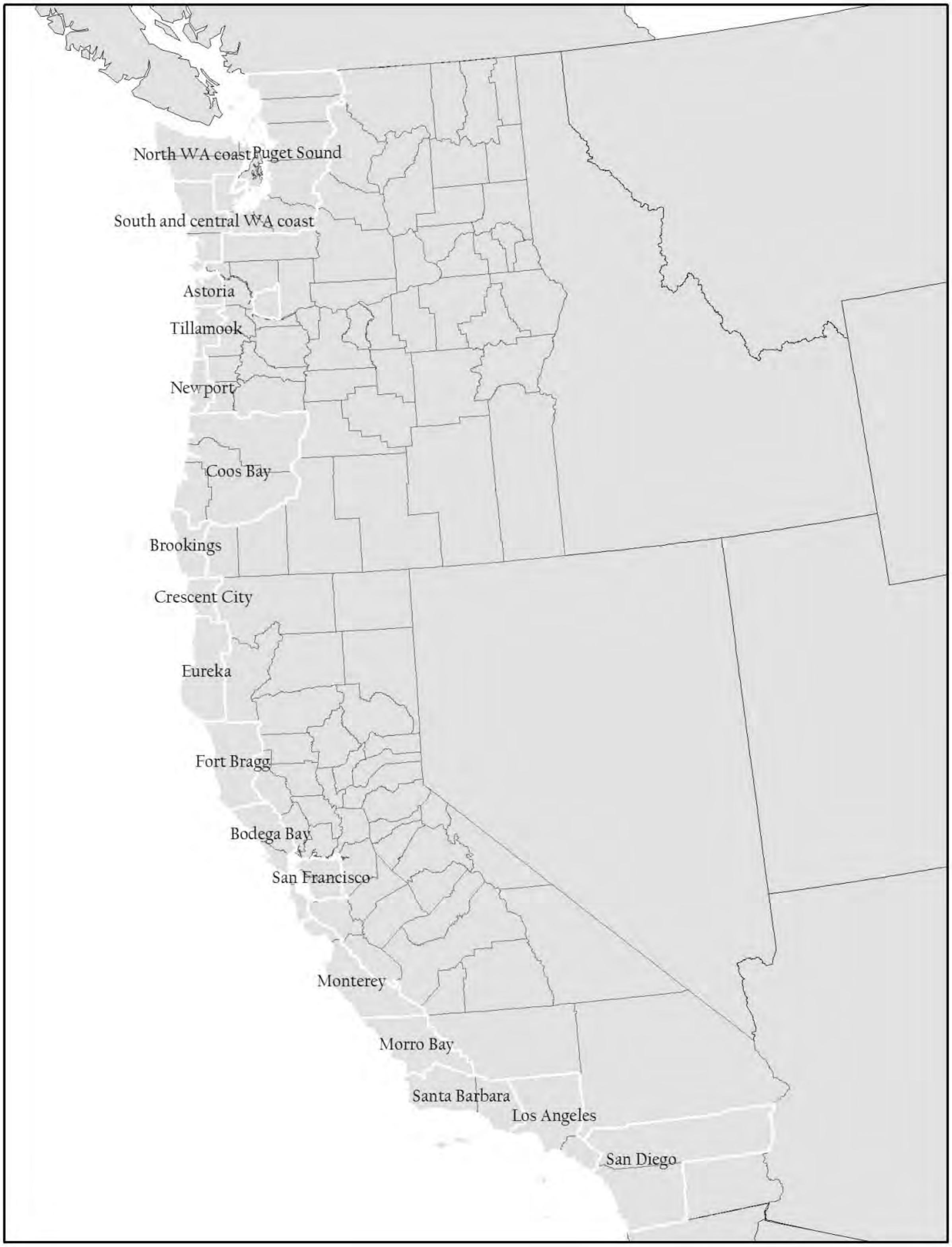

Figure 3-8. IOPac port group areas.

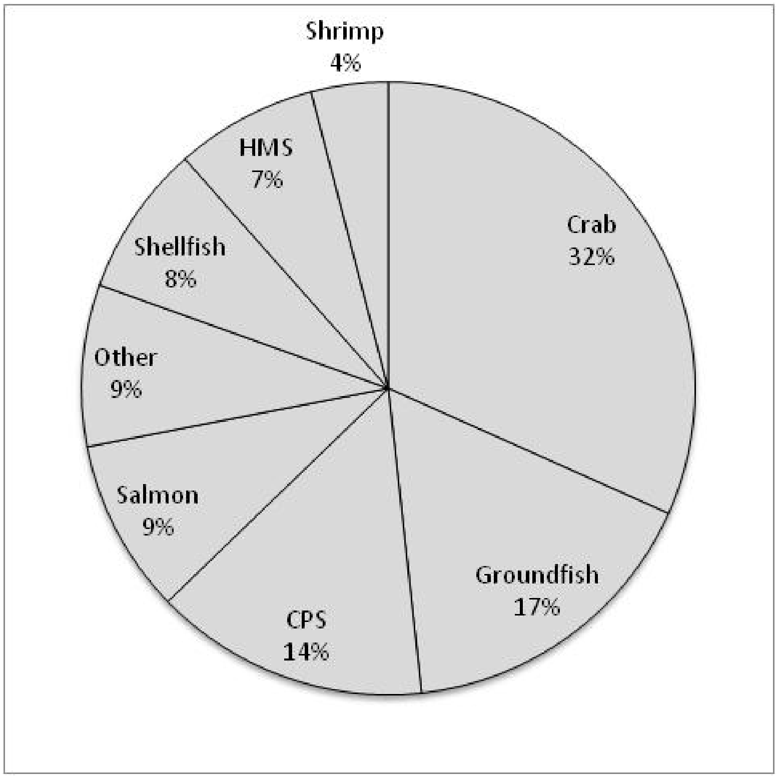

Figure 3-9. Percent of total coastwide revenue, 2005-2010, for PacFIN management groups.

Table 3-32. Distribution of groundfish ex-vessel revenue among ports by groundfish fishery sector, using Gini coefficient. Ranking is from least uniform (1) to most uniform (5) distribution.

Sector	Gini Coefficient	Rank
Shoreside Whiting	0.793776	1
Nearshore (Open Access)	0.658254	2
Shoreside Nonwhiting Trawl	0.581555	3
Non-Nearshore (Open Access)	0.475151	4
Limited Entry Fixed Gear	0.434103	5
Overall	**0.497688**	

Table 3-33. Distribution of ex-vessel revenue among groundfish fishery sectors within port groups, using Gini coefficient. Ranking is from least uniform (1) to most uniform (16) distribution.

IOPac Port Group	Gini Coefficient	Rank
Los Angeles	0.800569	1
San Diego	0.787843	2
Eureka	0.696875	3
Columbia River (Oregon) and Tillamook	0.68853	4
Puget Sound	0.676638	5
San Francisco	0.661487	6
Coos Bay	0.657463	7
Fort Bragg	0.625947	8
Santa Barbara	0.560524	9
Morro Bay	0.544447	10
Newport	0.533204	11
Washington Coastal and Columbia River	0.520348	12
Monterey	0.510701	13
Brookings	0.483263	14
Crescent City	0.4811	15
Bodega Bay	0.474385	16
Overall	**0.399135**	

Table 3-34. Primary species group (PacFIN management group), percent of total ex-vessel revenue in port group from primary species group (dependence), and port group's coastwide rank for total ex-vessel revenue (total fishery engagement), based on landings 2005-2010.

Port Group	Primary spp. group	Percent of total ex-vessel revenue in port group	Port group rank total ex-vessel revenue
Puget Sound	Shellfish	35.0%	1
North WA coast	Shellfish	28.5%	8
South and central WA coast	Crab	49.0%	2
Astoria	Groundfish	31.4%	3
Tillamook	Crab	67.2%	18
Newport	Crab	41.8%	6
Coos Bay	Crab	42.1%	7
Brookings	Crab	50.6%	12
Crescent City	Crab	78.7%	9
Eureka	Crab	57.2%	11
Fort Bragg	Groundfish	47.0%	14
Bodega Bay	Crab	71.9%	16
San Francisco	Crab	60.6%	10
Monterey	CPS	57.1%	13
Morro Bay	Groundfish	66.0%	17
Santa Barbara	CPS	61.0%	4
Los Angeles	CPS	75.0%	5
San Diego	Other	58.7%	15
No port group	Shellfish	35.3%	19
Coastwide	Crab	31.7%	

Table 3-35. Dependence and engagement in commercial groundfish fishing port group based on ex-vessel revenue 2005-2010.

	Dependence		Engagement	
	Percent	**Rank**	**Percent**	**Rank**
Puget Sound	4.68%	15	5.27%	8
North WA coast	23.66%	8	6.40%	6
South and central WA coast	14.98%	10	14.45%	3
Astoria	31.43%	5	16.66%	1
Tillamook	5.11%	14	0.27%	18
Newport	30.87%	6	14.81%	2
Coos Bay	25.98%	7	9.14%	4
Brookings	38.73%	3	5.57%	7
Crescent City	13.95%	11	2.91%	11
Eureka	33.61%	4	6.60%	5
Fort Bragg	46.97%	2	5.17%	9
Bodega Bay	4.51%	16	0.37%	17
San Francisco	12.43%	12	2.52%	12
Monterey	17.55%	9	2.43%	13
Morro Bay	66.03%	1	3.80%	10
Santa Barbara	2.10%	18	1.11%	15
Los Angeles	2.94%	17	1.41%	14
San Diego	11.11%	13	1.10%	16

Note: Less than 0.01% of landings, averaging about $723,000 per year, was not classified in a port group and has been omitted from the table.

Table 3-36. Primary groundfish species or species group and percent of groundfish ex-vessel revenue in port group from primary species or species group, based on landings 2005-2010.

Port Group	Primary groundfish spp. group	Percent of groundfish ex-vessel revenue in port group
Puget Sound	Sablefish	66.1%
North WA coast	Sablefish	69.3%
South and central WA coast	Pacific Whiting	60.6%
Astoria	Sablefish	29.7%
Tillamook	Rockfish	51.5%
Newport	Sablefish	44.2%
Coos Bay	Sablefish	51.0%
Brookings	Sablefish	52.5%
Crescent City	Sablefish	29.2%
Eureka	Sablefish	41.3%
Fort Bragg	Sablefish	51.8%
Bodega Bay	Sablefish	31.9%
San Francisco	Sablefish	31.5%
Monterey	Sablefish	44.6%
Morro Bay	Sablefish	48.4%
Santa Barbara	Thornyheads	32.0%
Los Angeles	Thornyheads	63.1%
San Diego	Thornyheads	69.2%
Coastwide	Sablefish	42.6%

Table 3-37. Primary groundfish fishery sector and percent of groundfish ex-vessel revenue for sector in port group, based on landings 2005-2010.

Port Group	Primary Fishery Sector	Percent of groundfish ex-vessel revenue in port group
Puget Sound	Limited Entry Fixed Gear	50.5%
North WA coast	Treaty Shoreside Nonwhiting Groundfish	71.8%
South and central WA coast	Shoreside Whiting	39.4%
Astoria	Shoreside Nonwhiting Trawl	69.0%
Tillamook	Directed Open Access	86.8%
Newport	Shoreside Nonwhiting Trawl	37.5%
Coos Bay	Shoreside Nonwhiting Trawl	65.3%
Brookings	Shoreside Nonwhiting Trawl	40.4%
Crescent City	Shoreside Nonwhiting Trawl	45.6%
Eureka	Shoreside Nonwhiting Trawl	77.3%
Fort Bragg	Shoreside Nonwhiting Trawl	62.7%

Bodega Bay	Shoreside Nonwhiting Trawl	43.1%
San Francisco	Shoreside Nonwhiting Trawl	67.7%
Monterey	Shoreside Nonwhiting Trawl	40.3%
Morro Bay	Directed Open Access	71.6%
Santa Barbara	Directed Open Access	51.9%
Los Angeles	Limited Entry Fixed Gear	87.3%
San Diego	Limited Entry Fixed Gear	84.6%
Coastwide total	Shoreside Nonwhiting Trawl	41.4%

Table 3-38. Number of unique vessels making at least one groundfish landing by sector and port group, 2005-2010.

<table>
<tr><th></th><th>Shoreside Whiting</th><th>Shoreside Nonwhiting Trawl</th><th>Limited Entry Fixed Gear</th><th>Directed Open Access</th><th>Incidental Open Access</th></tr>
<tr><td>Puget Sound</td><td></td><td>10</td><td>28</td><td>11</td><td>3</td></tr>
<tr><td>North WA coast</td><td></td><td>10</td><td>22</td><td>40</td><td>30</td></tr>
<tr><td>South and central WA coast</td><td>22</td><td>13</td><td>37</td><td>114</td><td>48</td></tr>
<tr><td>Astoria</td><td>22</td><td>42</td><td>18</td><td>57</td><td>52</td></tr>
<tr><td>Tillamook</td><td></td><td>3</td><td></td><td>85</td><td>63</td></tr>
<tr><td>Newport</td><td>20</td><td>31</td><td>29</td><td>134</td><td>128</td></tr>
<tr><td>Coos Bay</td><td>4</td><td>32</td><td>29</td><td>155</td><td>123</td></tr>
<tr><td>Brookings</td><td></td><td>15</td><td>23</td><td>154</td><td>41</td></tr>
<tr><td>Crescent City</td><td>14</td><td>15</td><td>9</td><td>58</td><td>14</td></tr>
<tr><td>Eureka</td><td rowspan="9">9</td><td>22</td><td>9</td><td>73</td><td>3</td></tr>
<tr><td>Fort Bragg</td><td>9</td><td>9</td><td>113</td><td>19</td></tr>
<tr><td>Bodega Bay</td><td>3</td><td>3</td><td>51</td><td>28</td></tr>
<tr><td>San Francisco</td><td>22</td><td>12</td><td>156</td><td>69</td></tr>
<tr><td>Monterey</td><td>11</td><td>15</td><td>163</td><td>71</td></tr>
<tr><td>Morro Bay</td><td rowspan="4">9</td><td>13</td><td>224</td><td>66</td></tr>
<tr><td>Santa Barbara</td><td>14</td><td>137</td><td>92</td></tr>
<tr><td>Los Angeles</td><td>34</td><td>93</td><td>72</td></tr>
<tr><td>San Diego</td><td>19</td><td>55</td><td>44</td></tr>
</table>

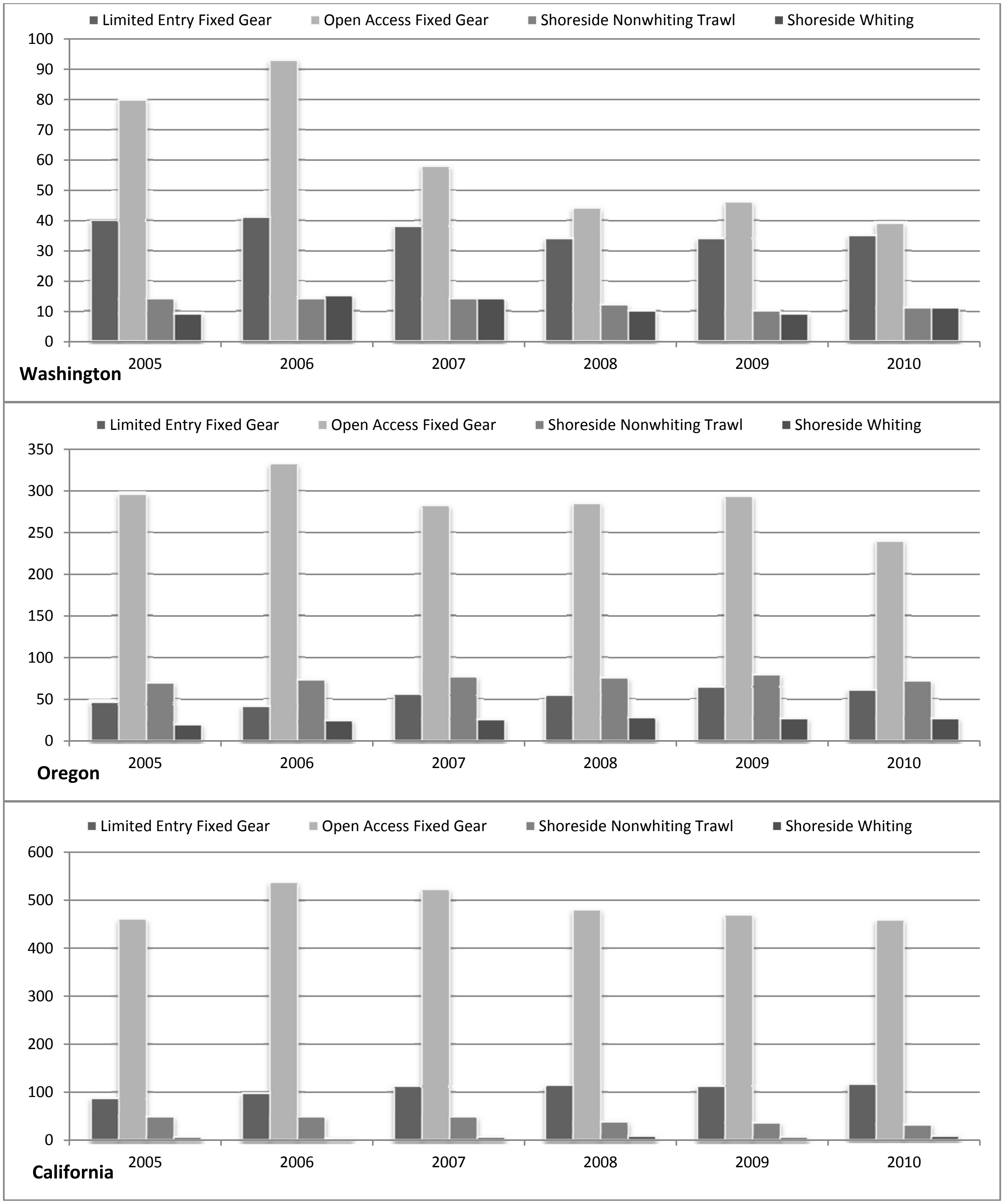

Figure 3-10. Number of vessels making at least one groundfish landing, by year, in Washington, California, and Oregon.

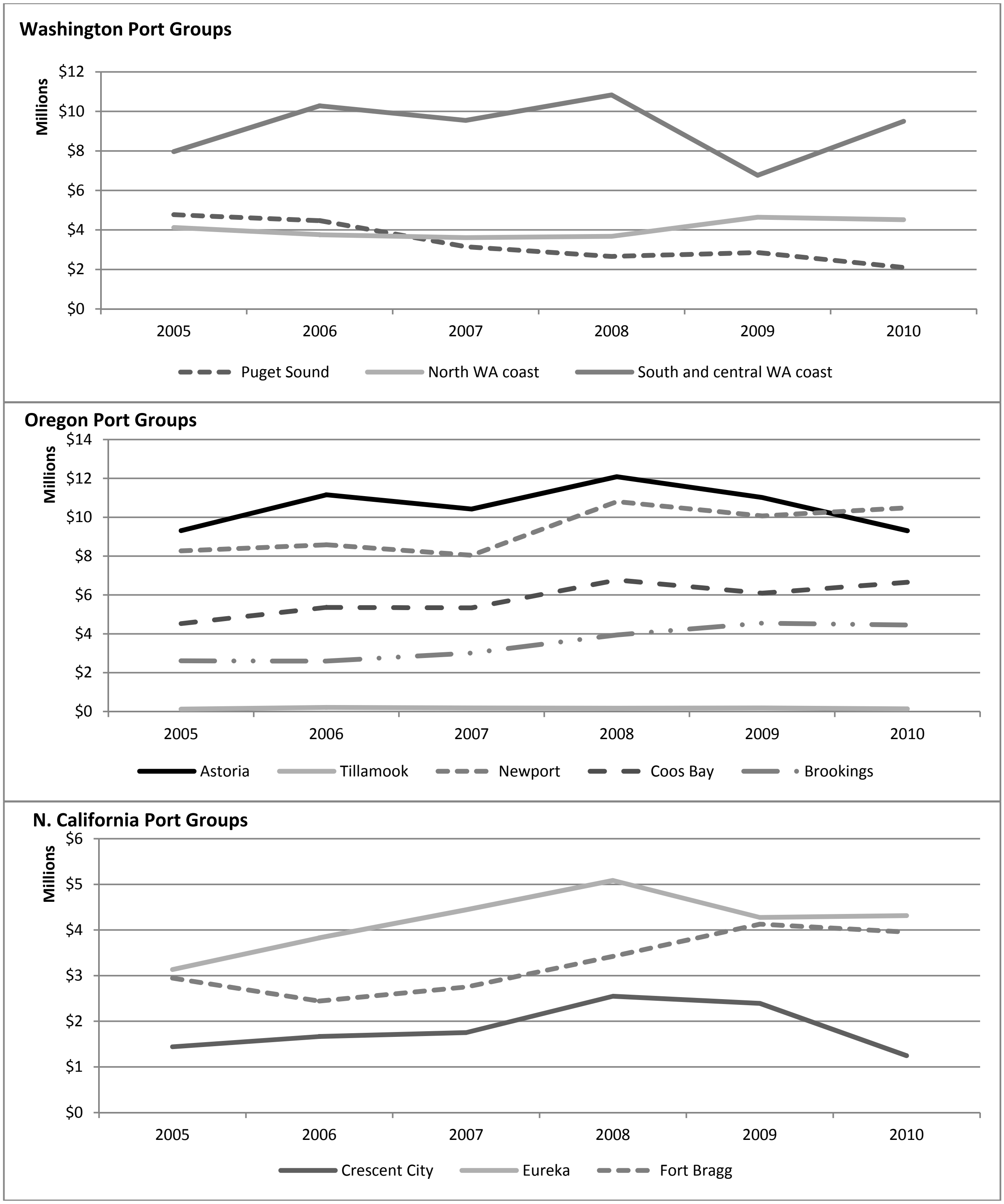

Figure 3-11. Annual groundfish ex-vessel revenue, 2005-2010, in Washington, Oregon, and Northern California port groups.

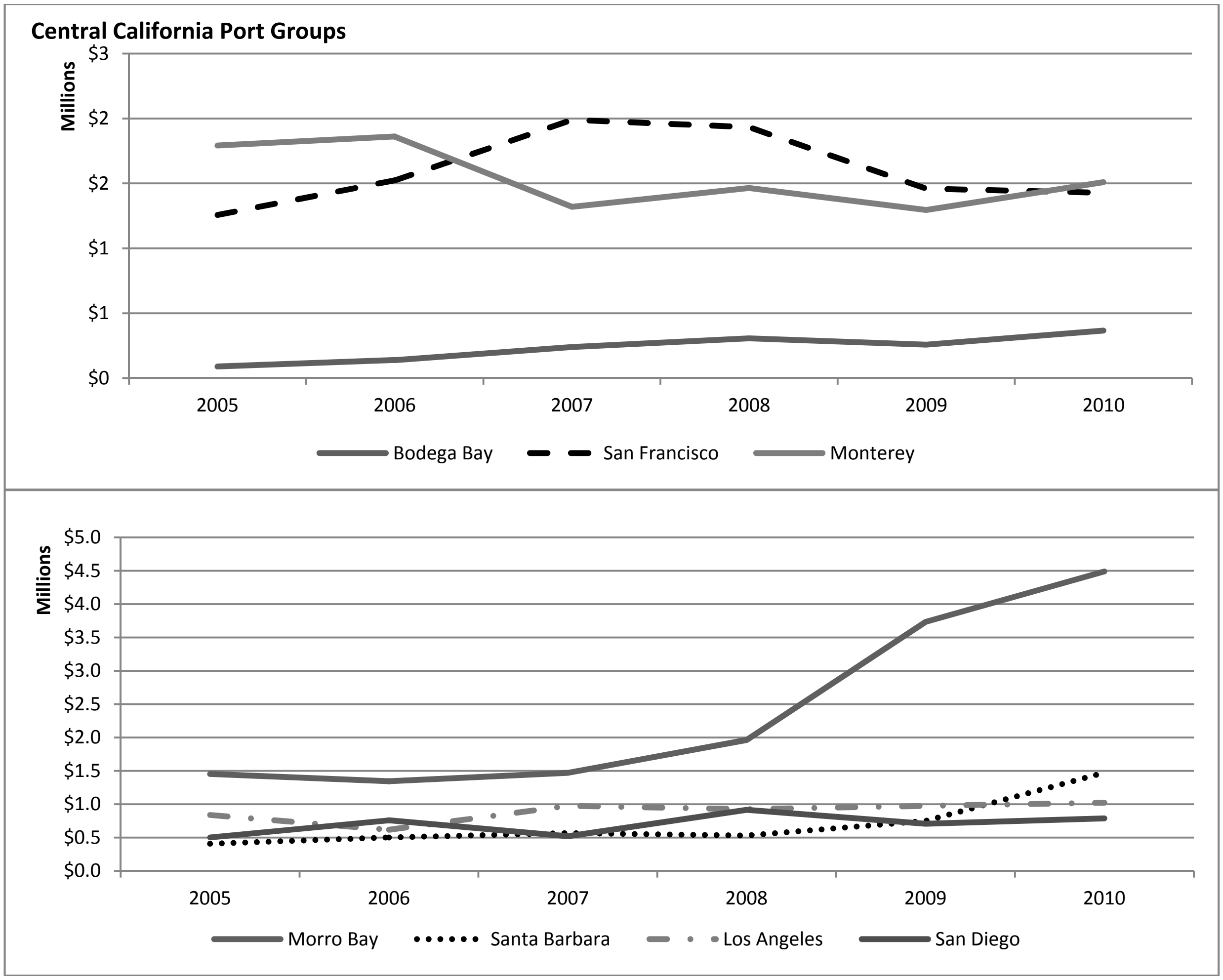

Figure 3-12. Annual groundfish ex-vessel revenue, 2005-2010, in Central and Southern California port groups.

Table 3-39. Average annual groundfish ex-vessel revenue ($1,000 nominal), 2005-2010, by sector and port group, and rank of port group.

<table>
<tr><th></th><th colspan="2">Shoreside Whiting</th><th colspan="2">Shoreside Nonwhiting Trawl</th><th colspan="2">Limited Entry Fixed Gear</th><th colspan="2">Directed Open Access</th><th colspan="2">Incidental Open Access</th></tr>
<tr><th></th><th>Ann Av.</th><th>Rank</th><th>$1,278</th><th>Rank</th><th>Ann Av.</th><th>Rank</th><th>Ann Av.</th><th>Rank</th><th>Ann Av.</th><th>Rank</th></tr>
<tr><td>Puget Sound</td><td rowspan="3">$3,601</td><td rowspan="3">1</td><td>$179</td><td>7</td><td>$1,684</td><td>2</td><td>$14</td><td>18</td><td>*</td><td>17</td></tr>
<tr><td>North WA coast</td><td>$640</td><td>13</td><td>$783</td><td>6</td><td>$104</td><td>13</td><td>$1</td><td>14</td></tr>
<tr><td>South and central WA coast</td><td>$7,278</td><td>10</td><td>$1,483</td><td>3</td><td>$314</td><td>8</td><td>$13</td><td>4</td></tr>
<tr><td>Astoria</td><td>$2,485</td><td>3</td><td>$21</td><td>1</td><td>$658</td><td>8</td><td>$95</td><td>14</td><td>$13</td><td>5</td></tr>
<tr><td>Tillamook</td><td>$0</td><td>--</td><td>$3,514</td><td>15</td><td>$0</td><td>--</td><td>$146</td><td>12</td><td>$2</td><td>13</td></tr>
<tr><td>Newport</td><td>$3,405</td><td>2</td><td>$3,780</td><td>3</td><td>$2,245</td><td>1</td><td>$164</td><td>11</td><td>$16</td><td>3</td></tr>
<tr><td>Coos Bay</td><td>$408</td><td>4</td><td>$1,423</td><td>2</td><td>$1,259</td><td>4</td><td>$316</td><td>7</td><td>$18</td><td>2</td></tr>
<tr><td>Brookings</td><td></td><td>--</td><td>$839</td><td>6</td><td>$923</td><td>5</td><td>$1,169</td><td>2</td><td>$2</td><td>11</td></tr>
<tr><td>Crescent City</td><td>$283</td><td>5</td><td>$3,232</td><td>9</td><td>$318</td><td>13</td><td>$397</td><td>5</td><td>*</td><td>16</td></tr>
<tr><td>Eureka</td><td rowspan="9">$253</td><td rowspan="9">6</td><td>$2,053</td><td>4</td><td>$452</td><td>12</td><td>$239</td><td>10</td><td>*</td><td>18</td></tr>
<tr><td>Fort Bragg</td><td>$100</td><td>5</td><td>$562</td><td>10</td><td>$636</td><td>3</td><td>$2</td><td>12</td></tr>
<tr><td>Bodega Bay</td><td>$1,082</td><td>14</td><td>$39</td><td>17</td><td>$92</td><td>16</td><td>$1</td><td>15</td></tr>
<tr><td>San Francisco</td><td>$620</td><td>8</td><td>$214</td><td>16</td><td>$254</td><td>9</td><td>$4</td><td>9</td></tr>
<tr><td>Monterey</td><td>$1,278</td><td>11</td><td>$486</td><td>11</td><td>$413</td><td>4</td><td>$2</td><td>10</td></tr>
<tr><td>Morro Bay</td><td rowspan="4">$194</td><td rowspan="4">12</td><td>$265</td><td>15</td><td>$1,724</td><td>1</td><td>$6</td><td>8</td></tr>
<tr><td>Santa Barbara</td><td>$294</td><td>14</td><td>$366</td><td>6</td><td>$18</td><td>1</td></tr>
<tr><td>Los Angeles</td><td>$778</td><td>7</td><td>$78</td><td>17</td><td>$9</td><td>7</td></tr>
<tr><td>San Diego</td><td>$590</td><td>9</td><td>$95</td><td>15</td><td>$11</td><td>6</td></tr>
</table>

*Less than $1,000.

Table 3-40. Average annual groundfish ex-vessel revenue ($1,000 nominal), 2005-2010, by species group and port group.

<table>
<tr><th></th><th>Pacific Whiting</th><th>Sablefish</th><th>Lingcod</th><th>Other Roundfish</th><th>Rockfish</th><th>Thornyheads</th><th>Dover Sole</th><th>Petrale Sole</th><th>Arrowtooth Flounder</th><th>Misc. Groundfish</th><th>Other Flatfish</th><th>Total</th><th>Rank</th></tr>
<tr><td>Puget Sound</td><td rowspan="3">$5,542.2</td><td>$2,202.4</td><td>$13.4</td><td>$85.8</td><td>$46.5</td><td>$37.0</td><td>$315.8</td><td>$285.3</td><td>$87.9</td><td>$170.6</td><td>$89.2</td><td>$3,334.0</td><td>8</td></tr>
<tr><td>North WA coast</td><td>$2,809.7</td><td>$88.0</td><td>$191.0</td><td>$442.3</td><td>$43.3</td><td>$159.7</td><td>$125.7</td><td>$30.2</td><td>$45.4</td><td>$119.3</td><td>$4,054.7</td><td>6</td></tr>
<tr><td>S. / Cen. WA coast</td><td>$2,957.0</td><td>$13.5</td><td>$10.3</td><td>$145.6</td><td>$35.8</td><td>$196.5</td><td>$119.0</td><td>$45.5</td><td>$58.1</td><td>$24.6</td><td>$9,148.0</td><td>3</td></tr>
<tr><td>Astoria</td><td rowspan="2">$2,428.6</td><td rowspan="2">$3,149.3</td><td rowspan="2">$79.3</td><td rowspan="2">$124.7</td><td rowspan="2">$291.9</td><td rowspan="2">$428.2</td><td rowspan="2">$2,061.9</td><td rowspan="2">$1,241.2</td><td rowspan="2">$337.0</td><td rowspan="2">$157.5</td><td rowspan="2">$417.3</td><td rowspan="2">$10,716.7</td><td rowspan="2">1</td></tr>
<tr><td>Tillamook</td></tr>
<tr><td>Newport</td><td>$3,357.0</td><td>$4,147.5</td><td>$52.6</td><td>$1.5</td><td>$119.4</td><td>$319.1</td><td>$801.5</td><td>$358.7</td><td>$44.5</td><td>$123.2</td><td>$48.9</td><td>$9,374.0</td><td>2</td></tr>
<tr><td>Coos Bay</td><td>$404.0</td><td>$2,955.1</td><td>$45.1</td><td>$5.9</td><td>$56.3</td><td>$306.9</td><td>$1,076.4</td><td>$615.1</td><td>$40.0</td><td>$143.2</td><td>$141.0</td><td>$5,789.3</td><td>4</td></tr>
<tr><td>Brookings</td><td>$0.0</td><td>$1,850.6</td><td>$86.1</td><td>$354.4</td><td>$433.8</td><td>$134.1</td><td>$452.5</td><td>$161.9</td><td>$2.2</td><td>$12.2</td><td>$39.2</td><td>$3,527.0</td><td>7</td></tr>
<tr><td>Crescent City</td><td>$280.8</td><td>$537.3</td><td>$40.4</td><td>$21.5</td><td>$402.0</td><td>$98.4</td><td>$278.0</td><td>$116.1</td><td>$1.8</td><td>$3.8</td><td>$60.7</td><td>$1,840.8</td><td>11</td></tr>
<tr><td>Eureka</td><td>$240.4</td><td>$1,727.6</td><td>$23.2</td><td>$0.7</td><td>$66.4</td><td>$418.3</td><td>$1,023.9</td><td>$496.1</td><td>$9.0</td><td>$40.8</td><td>$133.5</td><td>$4,179.8</td><td>5</td></tr>
<tr><td>Fort Bragg</td><td rowspan="8">$2.4</td><td>$1,696.7</td><td>$46.2</td><td>$50.3</td><td>$327.4</td><td>$291.3</td><td>$507.1</td><td>$304.7</td><td rowspan="8">$0.5</td><td>$16.3</td><td>$33.5</td><td>$3,273.7</td><td>9</td></tr>
<tr><td>Bodega Bay</td><td>$74.3</td><td>$6.2</td><td>$3.2</td><td>$67.4</td><td>$1.1</td><td>$4.1</td><td>$70.5</td><td>$1.0</td><td>$5.0</td><td>$232.8</td><td>17</td></tr>
<tr><td>San Francisco</td><td>$503.2</td><td>$31.2</td><td>$5.0</td><td>$239.7</td><td>$98.5</td><td>$190.4</td><td>$368.9</td><td>$13.4</td><td>$147.9</td><td>$1,598.5</td><td>12</td></tr>
<tr><td>Monterey</td><td>$687.3</td><td>$15.3</td><td>$37.9</td><td>$247.8</td><td>$270.0</td><td>$53.1</td><td>$138.6</td><td>$39.8</td><td>$49.5</td><td>$1,540.1</td><td>13</td></tr>
<tr><td>Morro Bay</td><td>$1,165.0</td><td>$37.1</td><td>$158.9</td><td>$866.4</td><td>$81.7</td><td>$23.7</td><td>$59.0</td><td>$2.6</td><td>$14.1</td><td>$2,408.4</td><td>10</td></tr>
<tr><td>Santa Barbara</td><td>$192.1</td><td>$5.1</td><td>$42.2</td><td>$212.9</td><td>$225.7</td><td>$0.6</td><td>$0.4</td><td>$10.6</td><td>$14.7</td><td>$704.7</td><td>15</td></tr>
<tr><td>Los Angeles</td><td>$201.8</td><td>$3.1</td><td>$2.3</td><td>$75.6</td><td>$562.7</td><td>$0.6</td><td>$0.0</td><td>$16.3</td><td>$28.2</td><td>$891.7</td><td>14</td></tr>
<tr><td>San Diego</td><td>$145.6</td><td>$1.6</td><td>$4.1</td><td>$52.9</td><td>$483.5</td><td>$0.0</td><td>$0.0</td><td>$10.4</td><td>$0.2</td><td>$698.3</td><td>16</td></tr>
</table>

Table 3-41. Selected demographic characteristics of port group counties (values in bold italic are less than the statewide value in each state): Percent completed high school, median household income, percent white alone.

		Completed High School		Median Household Income		White Alone, Not Hispanic or Latino	
State	County	Percent	Margin of Error (+/-)	Median	Margin of Error (+/-)	Percent	Margin of Error (+/-)
Washington	Snohomish	90.5	0.4	$64,780	$685	78.2	0.1
	King	91.8	0.2	$67,246	$477	***68.6***	0.1
	Whatcom	90.3	0.7	***$47,812***	$1,345	84	0.1
	Pierce	89.7	0.4	$56,773	$641	***73.4***	0.1
	Thurston	92.2	0.5	$59,453	$1,106	80.9	0.1
	Mason	***87.3***	1.2	***$49,081***	$1,919	84.4	0.2
	Skagit	***86.5***	0.8	***$53,094***	$1,084	79.4	0.1
	San Juan	94.9	0.8	***$51,392***	$1,713	92.9	0.2
	Island	94.1	0.7	***$56,138***	$1,482	85.9	0.2
	Clallam	90.4	0.8	***$44,342***	$1,645	86.1	0.1
	Jefferson	93.8	1.1	***$46,183***	$2,033	***61.9***	0.4
	Grays Harbor	***84.4***	1.2	***$41,618***	$1,674	83.6	0.1
	Pacific	***85.6***	1.6	***$39,045***	$1,542	85.8	0.1
	Clark	90.7	0.4	$58,095	$926	84	0.1
	Statewide	89.4	0.1	$56,384	$246	75.5	0.1
Oregon	Clatsop	90.1	1.3	***$40,426***	$1,897	88.5	0.3
	Tillamook	89.1	1.5	***$38,851***	$1,918	88.2	0.1
	Lincoln	90	1.1	***$38,170***	$2,182	85.7	0.1
	Lane	89.7	0.6	***$42,852***	$685	86.2	0.1
	Douglas	***85.8***	0.8	***$40,324***	$1,156	90.7	0.1
	Coos	***86.3***	1.2	***$36,754***	$1,536	88.6	0.1
	Curry	91.2	1.7	***$36,175***	$2,603	89.9	0.2
	Statewide	88.3	0.2	$49,033	$272	80.4	0.1
California	Del Norte	***79.7***	2.2	***$38,408***	$4,044	67.4	0.2
	Humboldt	89.9	0.7	***$39,124***	$1,423	79.1	0.1
	Mendocino	83.4	1.3	***$43,404***	$1,169	71	0.1
	Sonoma	86.1	0.4	$63,848	$1,070	68.9	0.1
	Marin	92.2	0.5	$87,728	$1,569	75	0.1
	San Francisco	85.6	0.3	$70,040	$1,023	44.6	0.1
	Contra Costa	88.1	0.3	$77,838	$718	51.2	0.1
	Alameda	85.7	0.3	$68,863	$672	***37.1***	0.1
	San Mateo	88.4	0.4	$84,426	$1,031	45.7	0.1
	Santa Cruz	85.2	0.6	$64,349	$1,232	62.9	0.1
	Monterey	***70.9***	0.6	***$59,693***	$1,049	***35.7***	0.1
	San Luis Obispo	87.9	0.6	***$55,555***	$1,442	73.3	0.1
	Santa Barbara	80.8	0.5	***$59,350***	$1,060	52.5	0.1
	Ventura	82.3	0.4	$74,828	$968	51.9	0.1
	Los Angeles	***75.5***	0.2	***$54,828***	$244	***28.9***	0.1
	Orange	83	0.2	$73,738	$438	46.7	0.1
	San Diego	85.2	0.2	$62,901	$455	51.2	0.1
	Riverside	***79***	0.3	***$58,155***	$455	42.5	0.1
	Statewide	80.5	0.1	60,392	$154	42.5	0.1

Sources: U.S. Census Bureau 2005-2009 American Community Survey 5-Year Estimates, Geographic Comparison Tables GCT1501. Percent of People 25 Years and Over Who Have Completed High School (Includes Equivalency)

GCT1901. Median Household Income (In 2009 Inflation-Adjusted Dollars)
GCT0209. Percent of the Total Population Who Are White Alone, Not Hispanic or Latino

Table 3-42. Selected demographic characteristics of port group counties (values in bold italic are more than the statewide value in each state): Percent below poverty level.

		Below Poverty Level	
State	**County**	**Percent**	**Margin of Error (+/-)**
Washington	Snohomish	8.2	0.4
	King	9.7	0.3
	Whatcom	***15.4***	1
	Pierce	11.6	0.4
	Thurston	10	0.8
	Mason	***15.1***	2.1
	Skagit	***12.4***	1.4
	San Juan	9.5	1.1
	Island	7.7	1.1
	Clallam	***14.1***	1.6
	Jefferson	***12.8***	1.7
	Grays Harbor	***15.9***	1.5
	Pacific	***16.5***	2.7
	Clark	10.5	0.6
	Statewide	11.8	0.2
Oregon	Clatsop	***12.6***	1.6
	Tillamook	***15.4***	2.3
	Lincoln	***17.3***	1.5
	Lane	***16.2***	0.6
	Douglas	***13.7***	1.2
	Coos	***16.5***	1.4
	Curry	***13.7***	2
	Statewide	13.6	0.2
California	Del Norte	***19.4***	3.2
	Humboldt	***18.2***	1.3
	Mendocino	***16.3***	1.3
	Sonoma	9.6	0.7
	Marin	6.4	0.5
	San Francisco	11.5	0.4
	Contra Costa	8.6	0.3
	Alameda	10.9	0.3
	San Mateo	7.2	0.4
	Santa Cruz	12.7	0.8
	Monterey	***13.3***	0.7
	San Luis Obispo	***13.6***	0.8
	Santa Barbara	***13.8***	0.6
	Ventura	9	0.5
	Los Angeles	***15.4***	0.2
	Orange	9.6	0.3
	San Diego	11.5	0.2
	Riverside	12.3	0.4
	Statewide	13.2	0.1

Sources: U.S. Census Bureau 2005-2009 American Community Survey 5-Year Estimates, Geographic Comparison Tables GCT1701. Percent of People Below Poverty Level in the Past 12 Months (For Whom Poverty Status is Determined)

Table 3-43. Annual unemployment rate, 2005-2010, average rate for the period, and change in rate over the period. Each county's rank is shown for the period average and change in rate. Bold italic indicates counties above the state unemployment rate in each year.

State	County	Annual 2005	Annual 2006	Annual 2007	Annual 2008	Annual 2009	Annual 2010	2010 Rank	Average	Rank	Change 05-10	Rank
WA	Snohomish	5.1%	4.6%	4.3%	***5.5%***	***9.9%***	***10.3%***	25	6.7%	24	4.8%	18
	King	4.7%	4.2%	3.9%	4.7%	8.5%	8.8%	38	5.8%	35	3.8%	30
	Whatcom	5.0%	4.5%	4.1%	5.0%	8.5%	8.8%	37	6.0%	33	3.5%	33
	Pierce	***5.9%***	***5.1%***	***4.7%***	***5.7%***	***9.7%***	***9.9%***	27	6.9%	22	3.8%	28
	Thurston	5.0%	4.6%	4.3%	5.0%	7.9%	8.2%	40	5.9%	34	2.8%	38
	Mason	***6.5%***	***5.8%***	***5.8%***	***7.0%***	***10.7%***	***11.1%***	17	7.8%	12	4.3%	23
	Skagit	***5.9%***	***5.1%***	***4.7%***	***5.7%***	***10.1%***	***10.4%***	23	7.0%	19	4.2%	24
	San Juan	4.4%	3.8%	3.4%	3.7%	6.7%	7.0%	41	4.8%	39	2.3%	39
	Island	***5.9%***	***5.1%***	***4.9%***	5.5%	8.9%	9.4%	34	6.6%	25	3.0%	37
	Clallam	***6.5%***	***5.8%***	***5.8%***	***7.1%***	***10.0%***	***10.4%***	24	7.6%	16	3.6%	31
	Jefferson	***5.6%***	***5.0%***	***4.7%***	***5.5%***	8.9%	***9.7%***	28	6.5%	28	3.3%	34
	Grays Harbor	***7.5%***	***6.9%***	***7.0%***	***7.7%***	***13.2%***	***13.3%***	5	9.3%	3	5.7%	8
	Pacific	***7.1%***	***6.4%***	***6.7%***	***7.6%***	***12.7%***	***12.8%***	6	8.9%	7	5.7%	7
	Clark	***6.4%***	***5.7%***	***5.6%***	***7.1%***	***13.2%***	***13.7%***	3	8.7%	9	6.9%	3
	Statewide	5.5%	4.9%	4.6%	5.5%	9.3%	9.6%					
OR	Clatsop	5.8%	5.0%	4.7%	5.2%	9.0%	9.4%	33	6.6%	26	3.2%	35
	Tillamook	***6.2%***	***5.5%***	4.9%	5.5%	9.4%	9.7%	29	6.9%	21	3.2%	36
	Lincoln	***7.0%***	***6.0%***	***5.5%***	***6.6%***	10.5%	10.8%	20	7.8%	15	3.5%	32
	Lane	6.2%	***5.4%***	***5.2%***	***6.7%***	***12.2%***	***11.1%***	16	7.8%	13	6.0%	6
	Douglas	***8.3%***	***7.5%***	***7.7%***	***9.8%***	***15.5%***	***14.6%***	2	10.6%	1	7.2%	2
	Coos	***7.6%***	***6.8%***	***6.6%***	***8.2%***	***12.9%***	***12.6%***	11	9.1%	4	5.3%	12
	Curry	***7.0%***	***6.8%***	***6.5%***	***8.1%***	***13.0%***	***12.7%***	9	9.0%	6	6.0%	5
	Statewide	6.2%	5.3%	5.2%	6.5%	11.1%	10.8%					
CA	Del Norte	***7.5%***	***6.9%***	***7.5%***	***8.7%***	***12.1%***	***13.3%***	4	9.4%	2	4.6%	20
	Humboldt	***6.1%***	***5.5%***	***5.9%***	***7.2%***	10.9%	11.5%	12	7.9%	11	4.8%	17
	Mendocino	***5.8%***	***5.2%***	***5.5%***	6.8%	10.3%	11.4%	13	7.5%	17	4.5%	21
	Sonoma	4.5%	4.0%	4.3%	5.7%	9.6%	10.5%	22	6.4%	29	5.2%	13
	Marin	3.9%	3.5%	3.6%	4.7%	7.7%	8.3%	39	5.3%	38	3.8%	29
	San Francisco	5.0%	4.2%	4.2%	5.2%	8.9%	9.5%	32	6.2%	31	3.9%	27
	Contra Costa	4.9%	4.3%	4.7%	6.1%	10.2%	11.2%	15	6.9%	20	5.3%	10
	Alameda	5.1%	4.4%	4.7%	6.1%	10.5%	11.3%	14	7.1%	18	5.4%	9
	San Mateo	4.3%	3.7%	3.8%	4.8%	8.4%	8.9%	36	5.7%	37	4.1%	25
	Santa Cruz	***6.3%***	***5.6%***	***5.9%***	***7.3%***	***11.3%***	***12.7%***	8	8.2%	10	5.0%	16
	Monterey	***7.3%***	***6.9%***	***7.1%***	***8.4%***	***11.8%***	***12.8%***	7	9.1%	5	4.5%	22
	S.L. Obispo	4.3%	3.9%	4.3%	5.7%	9.0%	10.2%	26	6.3%	30	4.7%	19
	Santa Barbara	4.4%	4.0%	4.3%	5.4%	8.4%	9.4%	35	6.0%	32	4.1%	26
	Ventura	4.8%	4.3%	4.9%	6.2%	9.9%	10.8%	19	6.8%	23	5.1%	15
	Los Angeles	5.4%	4.8%	5.1%	***7.5%***	***11.5%***	***12.6%***	10	7.8%	14	6.1%	4
	Orange	3.8%	3.4%	3.9%	5.3%	8.9%	9.6%	31	5.8%	36	5.1%	14
	San Diego	4.3%	4.0%	4.5%	6.0%	9.6%	10.5%	21	6.5%	27	5.3%	11
	Riverside	5.4%	***5.0%***	***6.0%***	***8.5%***	***13.4%***	***14.7%***	1	8.9%	8	8.0%	1
	Statewide	5.4%	4.9%	5.3%	7.2%	11.3%	12.4%					

Source: Bureau of Labor Statistics Local Area Unemployment Statistics, http://www.bls.gov/lau/data.htm).

Table 3-44. Social vulnerability index (SoVI®) score, commercial fishery dependence, and commercial fishery engagement by west coast county.

County	SoVI Score (05-09)	Social Vulnerability	Commercial Fishery Dependence	Commercial Fishery Engagement
Snohomish County	-4.39975	Low	Medium	Medium
King County	-4.63664	Low	Medium	Medium
Whatcom County	-1.22105	Medium	Medium	High
Pierce County	-2.4916	Medium	Low	Low
Thurston County	-2.89112	Medium	Low	Low
Mason County	-0.59943	Medium	Low	Low
Skagit County	-1.74547	Medium	Low	Low
San Juan County	-0.75748	Medium	Low	Low
Island County	-1.08993	Medium	No Data	
Clallam County	1.45343	High	Low	High
Jefferson County	0.02889	Medium	Low	Low
Grays Harbor County	1.30431	Medium	Medium	High
Pacific County	2.49583	High	Medium	Medium
Clark County	-3.78089	Low	Low	Medium
Clatsop County	2.36172	High	High	High
Tillamook County	2.15736	High	Medium	Medium
Lincoln County	2.11204	High	High	High
Lane County	-0.19003	Medium	Medium	Low
Douglas County	0.83856	Medium	Medium	Medium
Coos County	2.15145	High	High	High
Curry County	3.01841	High	High	High
Del Norte County	3.2841	High	Medium	Medium
Humboldt County	0.69833	Medium	High	High
Mendocino County	0.5345	Medium	High	Medium
Sonoma County	-2.93115	Medium	Medium	Medium
Marin County	-7.01293	Low	Medium	Medium
San Francisco County	-3.47169	Medium	Medium	Medium
Contra Costa County	-5.0063	Low	Medium	Low
Alameda County	-4.4121	Low	Medium	Medium
San Mateo County	-6.16214	Low	Medium	Medium
Santa Cruz County	-3.89318	Low	Medium	Medium
Monterey County	-0.38232	Medium	High	Medium
San Luis Obispo County	-1.27458	Medium	High	Medium
Santa Barbara	-0.70066	Medium	Medium	Medium

County				
Ventura County	-5.07062	Low	Medium	Medium
Los Angeles County	-1.44344	Medium	Medium	Medium
Orange County	-5.10959	Low	Medium	Medium
San Diego County	-2.639	Medium	Medium	Medium
Riverside County	-1.38897	Medium	No Data	

Table 3-45. Engagement and dependence metrics for recreational fisheries. Table shows rank by marine recreational region in terms of share of total angler trips in 2010, percent of angler trips in 2010 that were groundfish-directed, and number of charter vessels involved in groundfish trips.

Region		Angler Trips		Charter Vessels
		Engagement	Dependence	
La Push-Neah Bay	*Washington Coast*	13	10	8
Westport		7	12	1
Ilwaco-Chinook		5	14	5
Astoria		14	13	10
Tillamook		10	9	10
Newport		4	6	4
Coos Bay		11	7	7
Brookings		9	2	13
North Coast: Humboldt and Del Norte	*Northern California*	6	5	14
North-Central Coast: Sonoma and Mendocino		12	8	12
North-Central Coast: San Mateo through Marin	*Central California*	2	11	2
South-Central Coast: San Luis Obispo through Santa Cruz		3	4	8
South Coast: Ventura and Santa Barbara	*Southern California*	8	1	6
South Coast: San Diego through Los Angeles		1	3	2

Chapter 4 Impacts of the Alternatives

Chapter 4 examines the environmental and economic consequences that are expected to result from the adoption of each of the alternatives. Section 4.1.1 addresses the biological consequences of ACL alternatives, section 4.1.4.2 addresses the biological consequences of the integrated alternatives, and section 4.2 addresses the socioeconomic consequences. The effects of each alternative are compared to the environmental baseline (No Action) in order to assess the effects of each alternative. Broader issues such as the cumulative effects of the Pacific Coast groundfish fishery are addressed in section 4.3.

4.1 Biological Consequences

Section 4.1 first considers the consequences of the alternatives on the biological environment. Section 4.1.1 considers the biological effects on all the groundfish stocks. The OFLs and ABCs for all groundfish stocks and stock complexes are addressed in section 4.1.1.1. The productivity and susceptibility assessment of stocks to overfishing are discussed in section 4.1.1.2. The biological consequences of ACLs and associated management measures as they affect overfished groundfish species are discussed in section 4.1.1.3. ACL alternatives considered for nonoverfished species managed with stock-specific harvest specifications are described in section 4.1.1.4. Effects of the alternatives on groundfish species managed in stock complexes are discussed in section 4.1.1.5.

4.1.1 Effects on Groundfish Species

As discussed in Chapter 2, a holistic or integrated approach was taken in the development of eight alternatives in this EIS, plus the No Action alternative as a ninth alternative. Each alternative includes harvest specifications for all stocks managed under the Pacific Coast groundfish FMP plus a suite of management measures that are intended to keep the fishing mortality of all groundfish stocks within the those specifications. Because the OFL and ABC specifications do not vary between the integrated alternatives, the biological consequences of these parameters are addressed first by assessing the risk of overfishing relative to the proposed OFLs and ABCs for all groundfish stocks and stock complexes using the best available scientific information (section 4.1.1.1). Alternative P* and ABC values are discussed in relation to the risk of overfishing.

The ACLs for only two of the overfished species vary between the integrated alternatives, as do the management measures or AMs necessary to constrain the catch of all species, including overfished species to the specified ACLs. The differences in the biological effects between the integrated alternatives are primarily related to the different overfished species ACLs (detailed in section 2.1.3.1). For most nonoverfished groundfish stocks and stock complexes, a single ACL for each stock was carried forward into the integrated alternatives. However, alternative ACLs for two nonoverfished species (i.e., longnose skate and widow rockfish) were considered. The biological consequences of the alternative ACLs for individual nonoverfished species are further addressed in section 4.1.1.4. The biological consequences of the alternative ACLs for nonoverfished species that are included within a complex of stocks are discussed in section 4.1.1.5. Relative to the integrated alternatives, this EIS considers the effect of the groundfish harvest on the groundfish species in the FMP with respect to two biological indicators of resource health (stock productivity and fishing mortality). The effects associated with two other biological indicators, genetic structure and prey availability, are not differentiated between ACL alternatives; such effects are considered cumulative. In the case where these indicators are important attributes in deciding a stock's ACL, they are directly discussed (e.g., prey availability as a consideration in deciding the shortbelly rockfish ACL).

Stock Productivity

- Are fishing practices likely to change the reproductive success of groundfish stocks?
- Are fishing operations likely to interfere with or disturb spawning and reproductive behavior or juvenile survival rates such that it raises concern about a stock's ability to maintain its biomass at or above B_{MSY}?

Fishing Mortality

- Are harvest levels likely to result in overfishing?
- For healthy and precautionary zone stocks, are harvest levels likely to remove a portion of the spawning population from the stock such that the stock is likely to become overfished?
- For overfished stocks, are harvest levels likely to rebuild the stock in as short a time possible?

Genetic structure

- Are changes in the time and location of fishing likely to result in changes to the genetic structure of the groundfish populations?
- Will fishing on particular substocks or targeting fish with certain characteristics (e.g., large size) alter the genetic structure of the population over time?

Prey availability

- Is harvesting likely to change the availability of groundfish that are prey species such that it could affect the survival of species that prey on them?

4.1.1.1 OFLs and ABCs for All Groundfish Stocks and Stock Complexes

A primary goal of the groundfish FMP is to rebuild to or maintain spawning stock biomass of each groundfish stock and stock complex at or above B_{MSY}. For the nonoverfished groundfish stocks, this EIS considers the projected fishing mortality relative to vulnerability to overfishing and becoming overfished. For overfished stocks, this EIS considered the projected fishing mortality relative to the time necessary to rebuild the stock to B_{MSY}.

The OFLs define the point above which overfishing occurs on a stock. The ABC is a reduction from the OFL to account for scientific uncertainty in the estimate of OFL. The ACL, which is set at the ABC level or lower, defines the upper limits on allowable total catch (retained plus discarded catch) for a fishing year. The ACLs are set for each species or species complex in the fishery, including overfished species, nonoverfished target species, and nontarget species. The management measures developed for each integrated alternative are structured such that the projected total catch, based on the best available data, do not exceed the ACLs for any stock or stock complex.

Overfishing occurs whenever a stock or stock complex is subjected to a rate or level of fishing mortality that is above the stock's capacity to produce MSY (an estimate of the largest average annual catch or yield that can be taken over the long term under prevailing ecological and environmental conditions). This level is also referred to as MFMT in the FMP. Under FMP provisions, OFLs for all species will be set based on the MFMT. None of the 2013 or 2014 OFLs would be set higher than the MFMT or its proxy applied to a stock's abundance. The corresponding ABCs will be set below the OFLs, and the ACLs will be set at or below the ABCs. The groundfish management measures, including those in the proposed rule, are designed to keep harvest levels within specified ACLs.

The OFLs projected from older stock assessments are biased low (i.e., underestimated) since the projections assume annual removals of the entire projected OFL when actual removals are often much less. For some stocks, such as overfished species and those that reside almost entirely on the continental shelf within the core of the RCAs, these biased OFLs have little impact on fisheries since ACLs are usually much lower (e.g., overfished rockfish) or the ACL cannot be effectively attained (e.g., shelf species). However, this bias can effectively limit ACL options and directly affect fisheries for some species. For example, OFLs for arrowtooth flounder and English sole are projected from older assessments and the biased OFLs are substantially lower than the No Action 2012 OFLs for these species. This is due to the fact that a substantial portion of the assessed spawning biomass for both stocks is comprised of a strong 1999 year class which has a diminished influence on the projected 2013 biomass since these are fast-growing stocks with high natural mortality rates. Assuming the entire OFL is removed each year when projecting 2013 and 2014 OFLs therefore has a substantial effect on these two stocks in particular in that the calculated OFLs, ABCs, and ACLs are less than they would be if actual total mortalities updated through 2010[36] were used in the projections. The SSC has noted this bias and intends to develop new OFL projection methodologies in time for the next assessment and management cycle. The effect of this bias on 2013 and 2014 OFLs is discussed below for those stocks where there is a higher potential of directly affecting ACLs and fisheries.

There was concern expressed that the SPR harvest rates used to determine OFLs for elasmobranchs in general and longnose skate and spiny dogfish specifically are too aggressive given the relatively low productivity of elasmobranchs. The SSC recommended that new proxy F_{MSY} harvest rates should be contemplated for elasmobranchs like longnose skate and spiny dogfish for the 2015-2016 management cycle once a planned meta-analysis of elasmobranch MSY harvest rates is completed next year. The SSC noted that the short-term consequences of managing these stocks using an SPR harvest rate of 45 percent will not likely cause any harm to these stocks, despite indications that the proxy harvest rate may be too aggressive in the long term for elasmobranchs. Both stocks are currently at healthy levels of abundance, and the concern regarding managing these stocks using a proxy SPR of 45 percent is that these stocks might experience overexploitation if they are harvested at that rate over a long period of time. Effective harvest rates on these stocks have been well below a 45 percent SPR. In the case of spiny dogfish, relative exploitation rates (catch/summary biomass) were estimated to have hovered around one percent, and the effective SPR is estimated to have been well above the current SPR of 45 percent during the last 10 years. (Note that there is an inverse relationship between F, the instantaneous harvest rate, and SPR – as SPR goes up, F goes down; i.e., an SPR of 100 percent = no fishing or F = 0.)

As discussed in Chapter 2, the amount by which OFL was reduced to get the ABC for each stock was determined based on the SSC's recommended sigma value and the Council's choice of overfishing risk policy, or P*. Alternative P* values and the associated reduction values for the SSC's recommended sigma values are described in section 2.1.2. Lower P* values are associated with larger reductions from OFL and correspondingly smaller ABC values, and thus a lower risk of the catch of a stock exceeding the "true" OFL, or the OFL which would be determined but for scientific uncertainty regarding that value. However, as will be described in subsequent sections, the projected impacts of the integrated alternatives on the nonoverfished stocks are in general substantially lower than the ABCs or the ACLs for these

36 Total mortality estimates of landings plus dead discards (in most cases) are provided by the NWFSC approximately one year after the end of a fishing season. Therefore, total mortality estimates through the 2010 fishing season are available for analysis for most sectors (the exception is the 2011 total mortality estimates for the at-sea whiting and shoreside IFQ sectors are available for analysis).

stocks, because of the management measures necessary to keep the catch of the overfished species below their rebuilding ACLs. Therefore, in general, the practical impact of the integrated alternatives with respect to the nonoverfished species involves a very low risk of overfishing, and this would be the case even if the ABCs or ACLs for the nonoverfished species were higher or lower. An exception to this is the Minor Nearshore Rockfish North complex, which, as is discussed later in this document, has historically been harvested at levels near its OY/ACL.

As explained in section 2.1.2, most of the proposed 2013-2014 ABCs for stocks and stock complexes are calculated using the same basis (i.e., sigma and P* values) as used to decide the No Action 2012 ABCs. The exceptions to this are the proposed ABCs for lingcod, sablefish, widow rockfish, and yelloweye rockfish; and for those stocks managed in stock complexes contributing an ABC value to the complex ABC - blackgill rockfish, greenspotted rockfish, and spiny dogfish.

The change in the basis for the lingcod ABCs was due to the Council's recommendation to shift the management line to 40º10' N. latitude and the SSC's recommended methodology for calculating the resultant ABCs. The 2013 and 2014 lingcod ABCs are based on a stratification of the relative biomass north and south of 40º10' N. latitude rather than north and south of the Oregon-California border at 42º N. latitude, as was done to determine the 2012 lingcod ABC. The same sigma and P* values were used to determine the 2012 and 2013-2014 lingcod ABCs; however, these sigmas were applied north and south of 42º N. latitude before the ABCs were apportioned north and south of 40º10' N. latitude using the estimated 48 percent biomass apportionment methodology described in sections 2.1.1 and 2.1.3 as recommended by the SSC. Since the portion of the lingcod stock south of 42º N. latitude was categorized as a category 2 stock and the northern portion of the stock as a category 1 stock on the basis of the 2009 assessment, the reconfigured stock north of 40º10' N. latitude is considered a mix of category 1 and 2 "stocks." This is the basis for the SSC recommendation to apportion the ABCs as well as the OFLs using the average relative biomass from trawl survey biomass estimates rather than applying separate P* values to the re-stratified north and south OFLs.

The change in the basis to decide the sablefish ABC was based on a lower P* value than used to determine the No Action 2012 ABC because the Council recommends a more precautionary harvest limit for the stock. The Council is recommending a P* of 0.4 to determine the 2013-2014 coastwide sablefish ABCs rather than the 0.45 used to calculate the No Action 2012 ABC. If the Council had decided the same P* of 0.45 to calculate 2013-2014 sablefish ABCs, the ABCs would be approximately 300 mt higher than the preferred ABCs (Table 4-1). The 2013-2014 ABCs are substantially lower than the No Action ABC of 8,242 mt since the new sablefish harvest specifications are based on the new 2011 assessment (Stewart, *et al.* 2011b) and the 2012 harvest specifications were based on the 2007 assessment (Schirripa 2008). While assessment results were not substantially different in the 2011 assessment relative to the 2007 assessment, below average recruitments in recent years have led to a reduced spawning biomass and a lower depletion level in 2011. Therefore, lower OFLs and a slower rebuilding of the population are predicted in this assessment. This result led the Council to recommend more precautionary management of the sablefish stock by specifying a lower P*.

Table 4-1. Alternative coastwide 2013-2014 sablefish ABCs (in mt) based on alternative overfishing probabilities (P*s) compared to the No Action 2012 ABC.

No Action 2012 ABC	Preferred ABCs		Alternative ABCs	
P* = 0.45	P* = 0.4		P* = 0.45	
2012	2013	2014	2013	2014
8,242	6,045	6,535	6,330	6,843

The proposed widow rockfish ABC is based on a change to the sigma value used to calculate the ABC; the same P* value of 0.45 was used. The SSC recommended a larger value of sigma (0.41) derived from the base model and low state of nature in the widow rockfish decision table (He, *et al.* 2011). This approach is intended to better represent uncertainty in stock-recruit steepness, which is considered the major source of uncertainty in the widow rockfish assessment. To calculate the new sigma value for widow rockfish, the ending biomass from the base and low states of nature were assumed to represent the 0.5 and 0.125 points along a log-normal distribution (given that they were chosen to represent 50 percent and 25 percent of the probability distribution, respectively). The high state of nature was not included because P* only pertains to the uncertainty in the direction below the base model. To calculate sigma, the natural log of the ratio of ending biomass in the base state to that in the low state was calculated and the ratio was then divided by 1.15 to determine sigma.

Modifications to the basis for deciding the yelloweye, blackgill, and greenspotted ABCs were based on a change to the stock category for these stocks. Yelloweye rockfish was changed from a category 1 stock to a category 2 stock upon the realization that recruitment deviations were not estimated in the assessment. This change results in a larger sigma value which defines a larger ABC buffer even if the P* value is unchanged (Table 2-5). Likewise, recruitment deviations were not estimated in the 2011 assessments for blackgill and greenspotted rockfish and the SSC consequently categorized these stocks as category 2 stocks. In the case of blackgill rockfish, the stock category changed from a category 1 to a category 2 stock since recruitment deviations were estimated in the older 2005 assessment (Helser 2006). Greenspotted rockfish changed from a category 3 to a category 2 stock since the 2011 assessment was the first one conducted for the stock.

The proposed spiny dogfish ABCs have a completely different basis than the No Action ABC. For one, the 2013-2014 ABCs were derived from OFLs based on a full assessment conducted in Stock Synthesis 3 (Gertseva and Taylor 2011), while the 2012 ABC was derived from an OFL determined using DBSRA, since the stock had not yet been the subject of a full assessment (PFMC and NMFS 2011). The sigmas applied for the No Action and proposed 2013-2014 ABCs were also different; in 2012, the stock was an unassessed category 3 stock, and was re-categorized as a category 2 stock by the SSC on the basis of the first assessment for this stock in 2011. Lastly, the P* value for the No Action ABC was 0.4, while the Council decided a P* of 0.3 for the 2013 and 2014 ABC contribution of spiny dogfish to the Other Fish complex. The more precautionary P* for the 2013 and 2014 spiny dogfish contribution to the Other Fish complex ABCs was decided in recognition of the uncertain catch history of the stock which are largely discarded in west coast fisheries. The Council also expressed the need for precaution in managing the stock in the next management cycle, pending an SSC meta-analysis of elasmobranch F_{MSY} harvest rates contemplated for next year.

4.1.1.2 Productivity and Susceptibility Assessment of Stocks to Overfishing

The vulnerability to potential overfishing of a stock to the fishery for each groundfish stock in the FMP was defined as a first step in assisting with two specific tasks set forth in the FMP: 1) to define species as either “in the fishery” or as an “ecosystem component,” and 2) identify stock complexes. In addition, the vulnerability scores were considered when prioritizing stock assessments and determining data collection needs.

The Productivity-Susceptibility Assessment (PSA) approach of Patrick et al. (2009) was used to characterize vulnerability and has two components: 1) productivity as defined by life histories traits, and 2) susceptibility to current fishing practices. Each vulnerability component is comprised of several attributes (10 productivity and 12 susceptibility attributes) and the weighted mean score of all attributes defines the overall productivity and susceptibility score. Table 4-2 includes the vulnerability scores for all species in the FMP relative to the current fishery. Table 4-3 shows the vulnerability scores for currently overfished rockfish species relative to the fishery circa 1998. Scores are presented in two-dimensions, with productivity on the x-axis and susceptibility on the y-axis (Figure 4-1). Cope et al. (2011b) established vulnerability reference points of unassessed West Coast groundfish stocks to determine vulnerability groups as follows:

- V ≥2.2 indicate species of major concern.
- 2.0≤V<2.2 indicate species of high concern.
- 1.8≤V<2.0 indicate species of medium concern.
- V <1.8 indicate species of low concern.

Rockfish and elasmobranches showed the highest vulnerabilities (>2.0), with the deepest-residing members of those groups often the most vulnerable, though there were several species of nearshore rockfish (China, quillback, and copper rockfish) with some of the highest scored vulnerabilities. Flatfishes in general showed the lowest vulnerabilities.

In addition to scoring each productivity and susceptibility attribute, the quality of the data used for each score was also recorded (Table 4-2, Table 4-3, and Figure 4-2). Data quality is scored for each productivity and susceptibility attribute, with the overall data quality score calculated as the weighted mean of all attributes. A scoring scale of 1-5 was used, with the best data score being 5.

Recording the data quality can highlight vulnerability scores that can be improved with additional data or that should be interpreted with caution because of questionable data contribution. Data quality scores can also be used to justify future data collection on particular attributes.

In general, susceptibility was harder to score (lower data quality) than productivity. Flatfishes as a group had the least informed species, but elasmobranches and several rockfish species also showed low-quality data informing vulnerability scores (Table 4-2).

PSA analyses are anticipated to be re-done every biennial specifications cycle. Productivity scores are not expected to vary much over time since they are based on life history traits. However, susceptibility scores may vary based on changes in fishing practices and/or management, and an updated understanding of the stock's interaction with the fishery. As susceptibility scores change, so do the vulnerability scores.

Table 4-2. Overall scores and results of the Productivity and Susceptibility Assessment (PSA) ranked from most to least vulnerable to overfishing relative to the current west coast fishery based on the GMT's scoring.

Stock ID	Stock Name	Productivity	Susceptibility	Vulnerability
21	Copper rockfish	1.95	1.60	2.27
67	Rougheye rockfish	1.17	2.33	2.27
72	Shortraker rockfish	1.22	2.38	2.25
20	China rockfish	1.33	2.29	2.23
58	Quillback rockfish	1.31	2.43	2.22
61	Redstripe rockfish	1.31	2.33	2.16
22	Cowcod	1.25	2.00	2.13
77	Spiny dogfish	1.11	1.98	2.13
10	Bronzespotted rockfish	1.37	2.14	2.12
16	California skate	1.33	2.00	2.12
35	Greenblotched rockfish	1.28	2.24	2.12
2	Aurora rockfish	1.89	2.29	2.10

Stock ID	Stock Name	Productivity	Susceptibility	Vulnerability
76	Speckled rockfish	1.33	2.29	2.10
65	Rosethorn rockfish	1.19	2.05	2.09
81	Starry rockfish	1.25	2.14	2.09
7	Blackgill rockfish	1.22	2.08	2.08
84	Tiger rockfish	1.25	2.10	2.06
70	Sharpchin rockfish	1.36	2.24	2.05
86	Vermilion rockfish	1.22	2.02	2.05
87	Widow rockfish	1.31	2.16	2.05
18	Chameleon rockfish	1.39	2.20	2.03
3	Bank rockfish	1.28	1.88	2.02
55	Pink rockfish	1.33	2.14	2.02
60	Redbanded rockfish	1.28	2.05	2.02
74	Silvergray rockfish	1.22	1.95	2.02
75	Soupfin shark	1.11	1.71	2.02
8	Blue rockfish	1.22	2.16	2.01
17	Canary rockfish	1.61	2.43	2.01
43	Leopard shark	1.26	2.00	2.00
88	Yelloweye rockfish	1.22	1.92	2.00
4	Big skate	2.45	2.05	1.99
11	Brown rockfish	1.72	2.08	1.99
26	Dusky rockfish	1.75	1.76	1.99
36	Greenspotted rockfish	1.39	2.14	1.98
30	Flag rockfish	1.83	1.80	1.97
40	Honeycomb rockfish	1.36	2.10	1.97
89	Yellowmouth rockfish	1.61	2.38	1.96
5	Black rockfish	1.21	2.14	1.94
39	Harlequin rockfish	1.31	1.95	1.94
54	Petrale sole	1.70	2.44	1.94
83	Swordspine rockfish	1.33	2.00	1.94
9	Bocaccio	1.28	2.04	1.93
24	Darkblotched rockfish	1.39	2.24	1.92
34	Grass rockfish	1.61	2.29	1.89
66	Rosy rockfish	1.61	2.29	1.89
37	Greenstriped rockfish	1.28	1.76	1.88
90	Yellowtail rockfish	1.33	1.88	1.88
48	Olive rockfish	1.69	2.33	1.87
79	Squarespot rockfish	1.61	2.24	1.86
51	Pacific grenadier	1.44	1.95	1.82
56	Pinkrose rockfish	1.31	1.67	1.82
78	Splitnose rockfish	1.28	1.60	1.82
47	Mexican rockfish	1.50	2.00	1.80
73	Shortspine thornyhead	1.33	1.68	1.80
82	Stripetail rockfish	1.39	1.81	1.80
63	Rock greenling	1.78	2.29	1.77

Stock ID	Stock Name	Productivity	Susceptibility	Vulnerability
33	Gopher rockfish	1.56	2.00	1.76
85	Treefish	1.67	2.10	1.73
59	Ratfish	1.63	2.05	1.72
6	Black-and-yellow rockfish	1.83	1.68	1.70
50	Pacific ocean perch	1.44	1.67	1.69
53	Pacific whiting	2.00	2.36	1.69
13	Cabezon	1.33	2.48	1.68
45	Longnose skate	1.53	1.80	1.68
68	Sablefish	1.61	1.88	1.64
42	Kelp rockfish	1.83	2.12	1.62
41	Kelp greenling	1.83	2.04	1.56
44	Lingcod	1.75	1.92	1.55
25	Dover sole	1.36	2.57	1.54
27	Dwarf-red rockfish	1.06	1.88	1.54
46	Longspine thornyhead	1.47	1.16	1.54
29	Finescale codling	2.45	2.10	1.48
14	Calico rockfish	1.39	2.04	1.46
32	Freckled rockfish	1.80	1.96	1.44
57	Pygmy rockfish	1.78	1.71	1.42
64	Rock sole	1.95	1.95	1.42
15	California scorpionfish	1.28	0.00	1.41
19	Chilipepper	1.83	0.00	1.35
49	Pacific cod	2.11	2.00	1.34
62	Rex sole	2.05	1.86	1.28
31	Flathead sole	2.25	1.92	1.26
38	Halfbanded rockfish	2.00	1.76	1.26
52	Pacific sanddab	2.40	2.10	1.25
23	Curlfin sole	1.72	1.75	1.23
69	Sand sole	2.35	2.05	1.23
1	Arrowtooth flounder	1.33	2.05	1.21
28	English sole	2.30	2.05	1.19
12	Butter sole	1.78	1.76	1.18
71	Shortbelly rockfish	1.94	1.40	1.13
80	Starry flounder	2.15	1.60	1.04

Table 4-3. Retrospective Productivity and Susceptibility Assessment (PSA) vulnerability scores of currently overfished rockfish species ranked from most to least vulnerable to overfishing relative to stock status and the fishery circa 1998, based on the GMT's scoring.

Stock Name	Stock ID	Susceptibility	Vulnerability
Bocaccio	25_H	2.72	2.43
Canary	23_H	2.84	2.52
Cowcod	10_H	2.68	2.57
Darkblotched	51_H	2.76	2.39
POP	92_H	2.32	2.08
Yelloweye	18_H	2.80	2.53

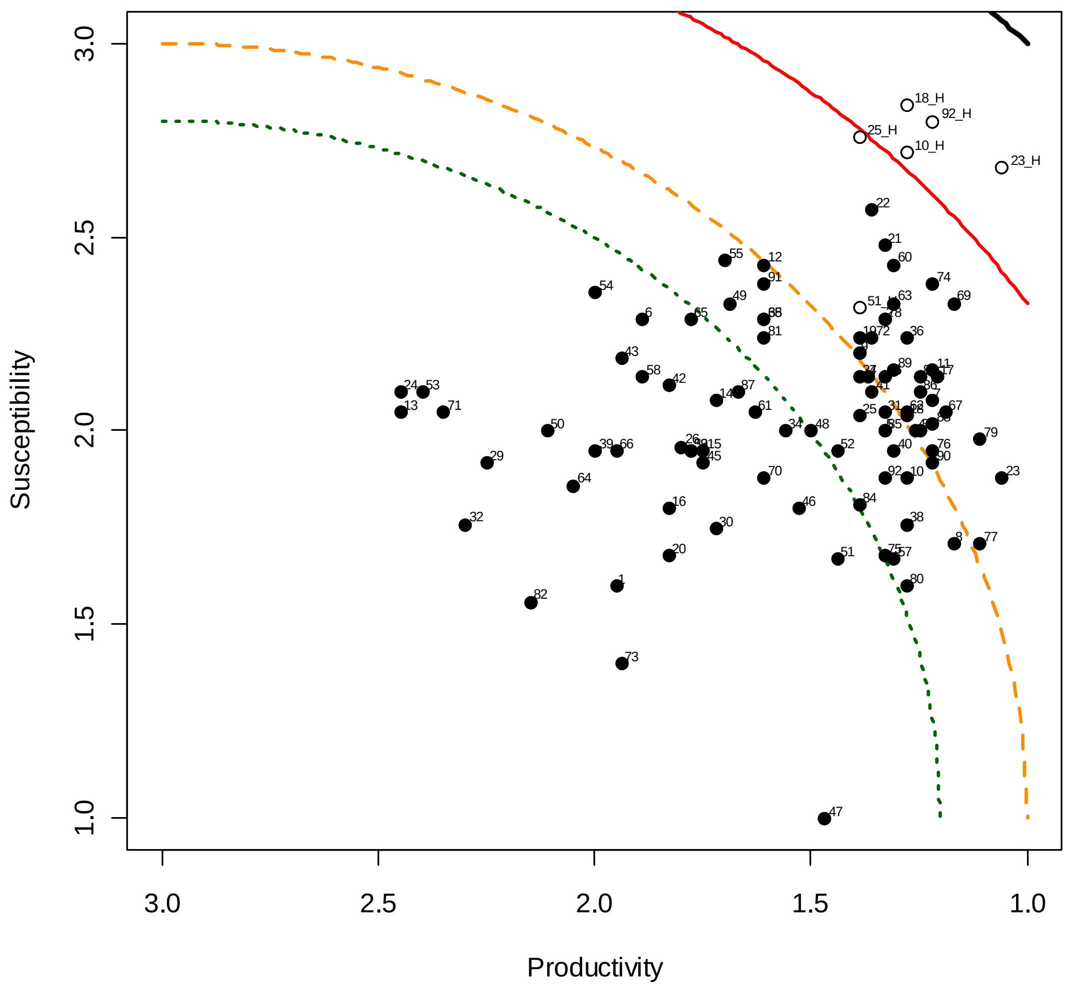

Figure 4-1. Productivity and Susceptibility Analysis (PSA) plot for species in the west coast groundfish FMP. Contours delineate areas of relative vulnerability (V, i.e. distance from the origin), with the highest vulnerability stocks above the solid red line (V = 2.2), high vulnerability above the orange broken line (V=2), medium vulnerability above the green dotted line (V=1.8) and the lowest vulnerability below the green dotted line. The maximum vulnerability (V=2.8) is indicated with the solid black line. Solid circles are based on current PSA scores. Open circles are based on PSA scores circa 1998. Numbers refer to the Stock ID in Table 4-2 and Table 4-3.

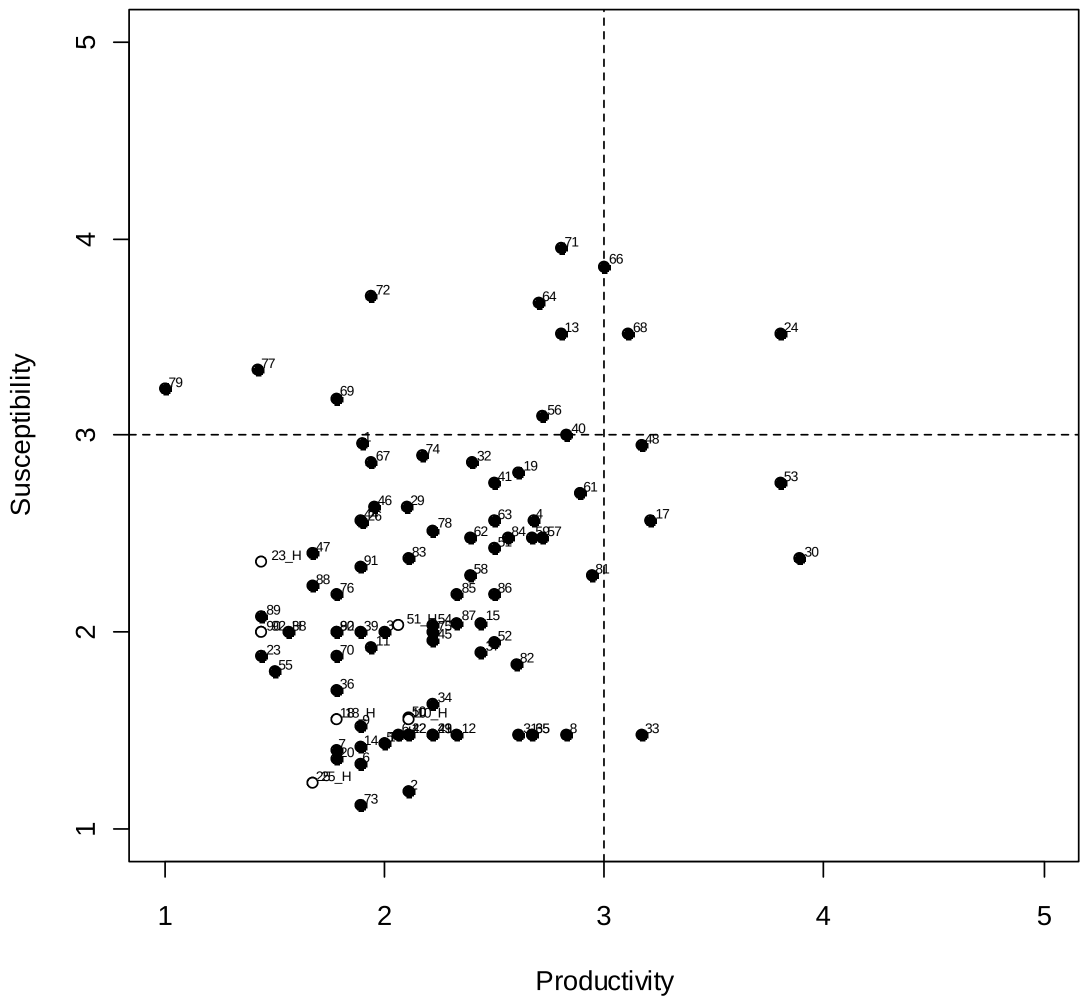

Figure 4-2. Data quality plots for the productivity and susceptibility scores in the PSA for each species (represented numerically in Table 4-2 and Table 4-3) in the west coast groundfish FMP. Higher scores indicate less data quality. Vertical and horizontal lines provide a general guide to relative data quality with values above 3 on either axis considered data-poor.

4.1.1.3 Effects of Overfished Species ACL Alternatives

The following groundfish species have been declared overfished and are currently being managed under rebuilding plans: bocaccio south of 40º10’ N. latitude, canary rockfish, cowcod south of 40º10’ N. latitude, darkblotched rockfish, POP north of 40º10’ N. latitude, petrale sole, and yelloweye rockfish. Widow rockfish was overfished and managed under a rebuilding plan through 2012. However, based on the results of the 2011 assessment, the coastwide widow rockfish has been successfully rebuilt (see section 4.1.1.4).

Changes to two rebuilding plans, those for canary rockfish and POP, are contemplated based on new assessments indicating the stocks will not likely rebuild in the time specified in their respective rebuilding plans. All rebuilding plans except for those for canary rockfish and POP are proposed to continue into the next management period. The following section provides the analysis and discussion of one ACL alternative for each of the species where rebuilding plan modifications are not proposed (e.g., bocaccio, cowcod, darkblotched, petrale sole, and yelloweye rockfish). Multiple ACL alternatives are analyzed and discussed for canary rockfish and POP since modifications to their respective rebuilding plans are necessary.

The analysis of the integrated alternatives focused on the tradeoffs to fishery sectors from the variation in canary and POP ACL alternatives, assuming all other stocks and stock complexes are managed to stay within the preferred ACLs and the preferred sector allocations. The effects of varying the canary and POP ACLs are estimated by the relative difference in the estimated mortality by fishing sector of each overfished stock under the integrated alternatives. Table 4-4 and Table 4-5 provide the projected total mortalities of overfished species under each integrated alternative in 2013 and 2014, respectively. There were two suites of integrated alternatives analyzed – one where the shoreward RCA boundary for commercial nearshore fisheries is more restrictive (a options) and one where trip limits for target species in the nearshore commercial fishery are more restrictive and the shoreward RCA boundary is at a deeper depth (b options). The Preferred Alternative is integrated alternative 1b; therefore, Table 4-4 and Table 4-5 show the total mortality projections for the b options so the other integrated alternatives are directly comparable to the preferred integrated alternative. Appendix B provides the total mortality projections for the a options in the integrated alternative analysis. Table 4-6 and Table 4-7 provide sector allocations and predicted percent attainment of preferred allocations of overfished species by sector under the integrated alternatives (b options) for 2013 and 2014, respectively.

The uncertainty in estimating total fishing mortality of overfished species is a consideration for the size of the buffer between projected total fishing mortality and the ACL in a rebuilding plan. It is important to note the estimates of total mortality of stocks and complexes in each fishing sector in the analysis of the integrated alternatives are imprecise (see Appendices A and C for more details on GMT projection models and the analysis of the integrated alternatives). The predicted total mortalities and percent attainment of the ACLs under the integrated alternatives should therefore be considered imprecise, and that imprecision is a consideration in the size of the buffer. (Note: the GMT is working on methods to quantify the uncertainty in the projected total mortalities of species for each sector impact projection model.) The SSC will review these methods before they are used to inform management decisions for the 2015-2016 management cycle. The percent difference from the highest projected total mortality of each overfished stock from the maximum estimated mortality under the integrated alternatives provides an index of the relative difference in the projected mortality between alternatives.

The analysis of the integrated alternatives provides limited insight into trawl IFQ needs since the impact projection model is only informed by one partial year (2011) of data (see Appendices A and C). Future quota needs for overfished species like canary will be uncertain until there are more years of observation of the performance of the IFQ fishery. The reliability of the trawl impact projection model should improve, which will better define the needs (for overfished species quota) of west coast fishing communities dependent on the trawl fishery.

The scale of fishing mortality impact projections of overfished species can vary from the percent of the projected attainment of overfished species ACLs estimated in the analysis of the integrated alternatives from unpredictable recruitment events as well. Projected total mortalities in rebuilding analyses used to inform alternative overfished species' ACLs assume average future recruitment or predict recruitment from a stock-recruitment relationship provided in a stock assessment. Projected recruitments are highly uncertain; actual recruitments into the fishery will affect the scale of overfished species mortalities predicted under the integrated alternatives.

A few results are evident in the analysis of the integrated alternatives: 1) the analysis only informs the ACL choice for canary rockfish and POP (since alternative ACLs for the other overfished species do not vary between the alternatives); 2) the integrated alternatives are not designed to inform the nonoverfished species ACL decision (see section 4.1.1.4 for more of an explanation on this point); 3) the allowable total mortality of canary rockfish affects all sectors of the groundfish fishery, while that for POP affects only the northern trawl fishery (both the at-sea whiting sectors and the shorebased IFQ sector); there are within-trawl (both sector and fleet) effects of alternatively varying the canary and POP ACLs (explained below in the canary and POP sections); and 4) differences in nontrawl sector impacts (both projected total mortality and socioeconomic impacts) are due solely to variation of the canary ACL across the integrated alternatives.

Given that the information from the analysis of the integrated alternatives is limited, the following discussion of potential biological impacts of alternative ACLs for each overfished species will distinguish ACL alternatives (denoted alphabetically) and integrated alternatives (denoted numerically). The analysis of both suites of alternatives is intended to inform all considerations for deciding the overfished species' ACLs.

The management measures developed for each integrated alternative are structured such that the projected total catch of each overfished stock does not exceed the ACLs. The performance of the management system to stay within specified annual OYs for overfished groundfish species in recent years (2005-2010) is discussed to better understand the ability to stay within 2013 and 2014 ACLs (Table 4-8). Total mortality estimates are not yet available for 2011; however, trawl catch data in the 2011 shorebased IFQ fishery are available (Table 4-9). Therefore, 2011 shorebased IFQ catch data for overfished species are further discussed in the sections below.

Table 4-4. Projected 2013 mortalities (landings plus discard mortalities in mt) by fishing sector of overfished west coast groundfish stocks under the integrated alternatives.

Sector	No Action Alt.	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Bocaccio S of 40º10' N. latitude									
Bocaccio ACL (mt)	274	320							
Set-Aside Totals	13.4	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IFQ	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
CP	NA	NA	NA	NA	NA	NA	NA	NA	NA
MS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nearshore	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5
Non-Nearshore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WA Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
OR Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
CA Rec	50.7	50.7	50.7	50.7	22.5	50.7	50.7	50.7	50.7
Grand Total	67.9	59.2	59.2	59.2	30.8	59.2	59.2	59.2	59.2
% of ACL	24.8%	18.5%	18.5%	18.5%	9.6%	18.5%	18.5%	18.5%	18.5%
% of max. projected mortality	14.6%	0.0%	0.0%	0.0%	-48.1%	0.0%	0.0%	0.0%	0.0%
Canary									
Canary ACL (mt)	107	116	101	116	48	216	101	147	147
Set-Aside Totals	20.0	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
IFQ a/	3.5	3.1	3.1	2.8	2.4	2.8	3.1	3.1	3.1
CP a/	4.8	7.5	6.3	7.5	2.3	15.0	6.3	9.8	9.8
MS a/	3.4	5.3	4.5	5.3	1.7	10.6	4.5	6.9	6.9
Nearshore	3.2	3.7	3.7	3.7	2.0	3.7	3.7	3.7	3.7
Non-Nearshore	2.0	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5
WA Rec	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
OR Rec	4.7	4.7	4.7	4.7	3.5	4.7	4.7	4.7	4.7
CA Rec	11.1	11.1	11.1	11.1	7.1	11.1	11.1	11.1	11.1
Grand Total	53.6	54.6	52.6	54.3	37.7	67.1	52.6	58.5	58.5
% of ACL	50.1%	47.1%	45.4%	46.8%	32.5%	57.8%	45.4%	50.5%	50.5%
% of max. projected mortality	-20.1%	-18.6%	-21.5%	-19.1%	-43.8%	0.0%	-21.5%	-12.7%	-12.7%
Cowcod S of 40º10' N. latitude									
Cowcod ACL (mt)	3	3							
Set-Aside Totals	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
IFQ	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CP	NA	NA	NA	NA	NA	NA	NA	NA	NA
MS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nearshore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
WA Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
OR Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
CA Rec	0.3	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
Grand Total	0.6	0.3	0.3	0.3	0.1	0.3	0.3	0.3	0.3
% of ACL	20.6%	11.2%	11.2%	11.2%	4.6%	11.2%	11.2%	11.2%	11.2%
% of max. projected mortality	83.4%	0.0%	0.0%	0.0%	-59.4%	0.0%	0.0%	0.0%	0.0%

Sector	No Action Alt.	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Darkblotched									
Darkblotched ACL (mt)	296	317							
Set-Aside Totals	18.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7
IFQ a/	55.2	49.1	49.1	38.9	43.0	38.9	49.1	49.1	49.1
CP a/	8.5	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
MS a/	6.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Nearshore	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2
Non-Nearshore	3.9	2.9	2.9	2.9	4.0	2.9	2.9	2.9	2.9
WA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
OR Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
CA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
Grand Total	92.5	86.6	86.6	76.4	81.5	76.4	86.6	86.6	86.6
% of ACL	31.3%	27.3%	27.3%	24.1%	25.7%	24.1%	27.3%	27.3%	27.3%
% of max. projected mortality	6.9%	0.0%	0.0%	-11.7%	-5.9%	-11.7%	0.0%	0.0%	0.0%
Pacific Ocean Perch N of 40º10' N. latitude									
POP ACL (mt)	183	150	150	74	247	74	222	150	222
Set-Aside Totals	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
IFQ a/	31.7	27.1	27.1	17.4	22.7	17.4	27.1	27.1	27.1
CP a/	10.2	10.2	10.2	10.2	12.9	10.2	11.5	11.5	10.2
MS a/	7.2	7.2	7.2	7.2	9.1	7.2	8.1	8.1	7.2
Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
Non-Nearshore	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
WA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
OR Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
CA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
Grand Total	62.3	57.6	57.6	47.9	57.8	47.9	59.8	59.8	57.6
% of ACL	34.1%	38.4%	38.4%	31.9%	38.5%	31.9%	39.9%	39.9%	38.4%
% of max. projected mortality	4.2%	-3.7%	-3.7%	-19.9%	-3.4%	-19.9%	0.0%	0.0%	-3.7%
Petrale Sole									
Petrale ACL (mt)	1,160	2,592							
Set-Aside Totals	65.4	74.8	74.8	74.8	74.8	74.8	74.8	74.8	74.8
IFQ	605.5	538.9	538.9	466.9	470.2	466.9	539.1	539.1	538.9
CP c/ MS c/	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
Non-Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
WA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
OR Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
CA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
Grand Total	675.9	618.7	618.7	546.7	550.0	546.7	618.9	618.9	618.7
% of ACL	58.3%	23.9%	23.9%	21.1%	21.2%	21.1%	23.9%	23.9%	23.9%
% of max. projected mortality	9.2%	0.0%	0.0%	-11.7%	-11.1%	-11.7%	0.0%	0.0%	0.0%

Sector	No Action Alt.	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Yelloweye									
Yelloweye ACL (mt)	17	18							
Set-Aside Totals	5.9	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
IFQ	0.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CP	b/	b/	b/	b/	b/	b/	b/	b/	b/
MS	b/	b/	b/	b/	b/	b/	b/	b/	b/
Nearshore	1.0	1.2	1.2	1.2	0.6	1.2	1.2	1.2	1.2
Non-Nearshore	0.8	0.6	0.6	0.6	0.2	0.6	0.6	0.6	0.6
WA Rec	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
OR Rec	2.5	2.5	2.5	2.5	1.6	2.5	2.5	2.5	2.5
CA Rec	3.2	3.4	3.4	3.4	3.1	3.4	3.4	3.4	3.4
Grand Total	15.8	15.9	15.9	15.9	13.8	15.9	15.9	15.9	15.9
% of ACL	93.2%	88.6%	88.6%	88.5%	76.4%	88.5%	88.6%	88.6%	88.6%
% of max. projected mortality	-0.6%	0.0%	0.0%	0.0%	-13.7%	0.0%	0.0%	0.0%	0.0%

a/ The allocated amounts of canary, darkblotched, and POP are provided for the whiting sectors (i.e., the catcher-processors (CP), motherships (MS) and the whiting portion of the Shorebased IFQ (IFQ) sector) under the integrated alternatives.

b/ Mortality projections are not made for this species and sector.

c/ A set-aside of 5 mt of petrale sole is specified to accommodate incidental bycatch in 2013 and 2014 at-sea whiting fisheries.

Table 4-5. Projected 2014 mortalities (landings plus discard mortalities in mt) by fishing sector of overfished west coast groundfish stocks under the integrated alternatives.

Sector	No Action Alt.	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Bocaccio S of 40º10' N. latitude									
Bocaccio ACL (mt)	274	337							
Set-Aside Totals	13.4	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IFQ	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
CP	NA	NA	NA	NA	NA	NA	NA	NA	NA
MS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nearshore	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5
Non-Nearshore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WA Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
OR Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
CA Rec	50.7	50.7	50.7	50.7	25.5	50.7	50.7	50.7	50.7
Grand Total	67.9	59.2	59.2	59.2	33.8	59.2	59.2	59.2	59.2
% of ACL	24.8%	17.6%	17.6%	17.6%	10.0%	17.6%	17.6%	17.6%	17.6%
% of max. projected mortality	14.6%	0.0%	0.0%	0.0%	-43.0%	0.0%	0.0%	0.0%	0.0%
Canary									
Canary ACL (mt)	107	119	104	119	49	220	104	151	151
Set-Aside Totals	20.0	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
IFQ a/	3.5	3.1	3.1	2.8	2.4	2.8	3.1	3.1	3.1
CP a/	4.8	7.7	6.6	7.5	2.5	15.3	6.6	10.1	10.1
MS a/	3.4	5.5	4.6	5.3	1.7	10.8	4.6	7.2	7.2
Nearshore	3.2	3.7	3.7	3.7	2.0	3.7	3.7	3.7	3.7
Non-Nearshore	2.0	1.6	1.6	1.6	1.1	1.6	1.6	1.6	1.6
WA Rec	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
OR Rec	4.7	4.7	4.7	4.7	3.5	4.7	4.7	4.7	4.7
CA Rec	11.1	11.1	11.1	11.1	7.4	11.1	11.1	11.1	11.1
Grand Total	53.6	55.1	53.1	54.4	38.3	67.7	53.1	59.2	59.2
% of ACL	50.1%	46.3%	44.6%	45.7%	32.2%	56.9%	44.6%	49.8%	49.8%
% of max. projected mortality	-20.8%	-18.6%	-21.5%	-19.7%	-43.4%	0.0%	-21.5%	-12.5%	-12.5%
Cowcod S of 40º10' N. latitude									
Cowcod ACL (mt)	3	3							
Set-Aside Totals	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
IFQ	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CP	NA	NA	NA	NA	NA	NA	NA	NA	NA
MS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nearshore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
WA Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
OR Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA
CA Rec	0.3	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
Grand Total	0.6	0.3	0.3	0.3	0.1	0.3	0.3	0.3	0.3
% of ACL	20.6%	11.2%	11.2%	11.2%	4.6%	11.2%	11.2%	11.2%	11.2%
% of max. projected mortality	83.4%	-0.1%	0.0%	0.0%	-59.4%	0.0%	0.0%	0.0%	-0.1%

Sector	No Action Alt.	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Darkblotched									
Darkblotched ACL (mt)	296	330							
Set-Aside Totals	18.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7
IFQ a/	55.2	49.0	49.1	38.9	43.0	38.9	49.1	49.1	49.0
CP a/	8.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
MS a/	6.0	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
Nearshore	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2
Non-Nearshore	3.9	3.1	3.1	3.1	4.4	3.1	3.1	3.1	3.1
WA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
OR Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
CA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
Grand Total	92.5	87.4	87.5	77.3	82.6	77.3	87.5	87.5	87.4
% of ACL	31.3%	26.5%	26.5%	23.4%	25.0%	23.4%	26.5%	26.5%	26.5%
% of max. projected mortality	5.8%	-0.1%	0.0%	-11.6%	-5.6%	-11.6%	0.0%	0.0%	-0.1%
Pacific Ocean Perch N of 40°10’ N. latitude									
POP ACL (mt)	183	153	153	76	251	76	226	226	153
Set-Aside Totals	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
IFQ a/	31.7	26.9	27.1	17.4	22.7	17.4	27.1	27.1	26.9
CP a/	10.2	10.2	10.2	10.2	13.1	10.2	11.7	11.7	10.2
MS a/	7.2	7.2	7.2	7.2	9.2	7.2	8.3	8.3	7.2
Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
Non-Nearshore	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
WA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
OR Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
CA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
Grand Total	62.3	57.4	57.6	47.9	58.1	47.9	60.2	60.0	60.0
% of ACL	34.1%	37.5%	37.7%	31.3%	37.9%	31.3%	39.4%	39.2%	39.2%
% of max. projected mortality	3.5%	-4.6%	-4.3%	-20.5%	-3.6%	-20.5%	0.0%	0.0%	0.0%
Petrale Sole									
Petrale ACL (mt)	1,160	2,652							
Set-Aside Totals	65.4	74.8	74.8	74.8	74.8	74.8	74.8	74.8	74.8
IFQ	605.5	536.5	538.9	466.9	470.2	466.9	539.1	539.1	536.5
CP c/ MS c/	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
Non-Nearshore	b/	b/	b/	b/	b/	b/	b/	b/	b/
WA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
OR Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
CA Rec	b/	b/	b/	b/	b/	b/	b/	b/	b/
Grand Total	675.9	616.3	618.7	546.7	550.0	546.7	618.9	618.9	616.3
% of ACL	58.3%	23.2%	23.3%	20.6%	20.7%	20.6%	23.3%	23.3%	23.2%
% of max. projected mortality	9.2%	-0.4%	0.0%	-11.7%	-11.1%	-11.7%	0.0%	0.0%	-0.4%

Sector	No Action Alt.	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Yelloweye									
Yelloweye ACL (mt)	17	18							
Set-Aside Totals	5.9	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
IFQ	0.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CP	b/	b/	b/	b/	b/	b/	b/	b/	b/
MS	b/	b/	b/	b/	b/	b/	b/	b/	b/
Nearshore	1.0	1.2	1.2	1.2	0.6	1.2	1.2	1.2	1.2
Non-Nearshore	0.8	0.7	0.7	0.7	0.2	0.7	0.7	0.7	0.7
WA Rec	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
OR Rec	2.5	2.5	2.5	2.5	1.6	2.5	2.5	2.5	2.5
CA Rec	3.2	3.4	3.4	3.4	3.0	3.4	3.4	3.4	3.4
Grand Total	15.8	16.0	16.0	16.0	13.7	16.0	16.0	16.0	16.0
% of ACL	93.2%	89.1%	89.1%	89.1%	75.8%	89.1%	89.1%	89.1%	89.1%
% of max. projected mortality	-1.2%	0.0%	0.0%	0.0%	-14.9%	0.0%	0.0%	0.0%	0.0%

a/ The allocated amounts of canary, darkblotched, and POP are provided for the whiting sectors (i.e., the catcher-processors (CP), motherships (MS) and the whiting portion of the Shorebased IFQ (IFQ) sector) under the integrated alternatives.

b/ Mortality projections are not made for this species and sector.

c/ A set-aside of 5 mt of petrale sole is specified to accommodate incidental bycatch in 2013 and 2014 at-sea whiting fisheries.

Table 4-6. Summary of 2013 sector allocations and predicted percent attainment of the allocation of overfished species by fishing sectors under the integrated alternatives.

Sector	No Action Alt.		Alt. 1b Pref.		Alt. 2b		Alt. 3b		Alt. 4b		Alt. 5b		Alt. 6b		Alt. 7b		Alt. 8b	
	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain
Bocaccio S of 40º10' N. latitude																		
Bocaccio ACL (mt)	274		320															
IFQ	60.0	5.5%	75.7	4.0%	See Pref. Alt. 1b	4.0%	See Pref. Alt. 1b	4.0%	See Pref. Alt. 1b	3.9%	See Pref. Alt. 1b	4.0%	See Pref. Alt. 1b	4.0%	See Pref. Alt. 1b	4.0%	See Pref. Alt. 1b	4.0%
CP	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
MS	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
Nearshore	0.7	71.4%	0.9	55.6%		55.6%		55.6%		33.3%		55.6%		55.6%		55.6%		55.6%
Non-Nearshore	57.9	0.0%	73.1	0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
WA Rec	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
OR Rec	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
CA Rec	131.0	38.7%	165.3	30.7%		30.7%		30.7%		13.6%		30.7%		30.7%		30.7%		30.7%
Canary																		
Canary ACL (mt)	107		116		101		116		48		216		101		147		147	
IFQ	26.2	13.2%	40.3	7.7%	34.2	9.1%	40.3	6.9%	12.8	18.9%	80.9	3.4%	34.2	9.2%	52.9	5.9%	52.9	5.9%
CP	4.8	100.0%	7.5	100.0%	6.3	100.0%	7.5	100.0%	2.3	100.0%	15.0	100.0%	6.3	100.0%	9.8	100.0%	9.8	100.0%
MS	3.4	100.0%	5.3	100.0%	4.5	100.0%	5.3	100.0%	1.7	100.0%	10.6	100.0%	4.5	100.0%	6.9	100.0%	6.9	100.0%
Nearshore	4.0	80.0%	6.2	59.7%	5.3	69.8%	6.2	59.7%	2.0	100.0%	12.5	29.6%	5.3	69.8%	8.2	45.1%	8.2	45.1%
Non-Nearshore	2.3	87.0%	3.6	41.7%	3.0	50.0%	3.6	41.7%	1.0	100.0%	7.2	20.8%	3.0	50.0%	4.7	31.9%	4.7	31.9%
WA Rec	2.0	45.0%	3.1	29.0%	2.6	34.6%	3.1	29.0%	0.9	100.0%	6.2	14.5%	2.6	34.6%	4.1	22.0%	4.1	22.0%
OR Rec	7.0	67.1%	10.9	43.1%	9.3	50.5%	10.9	43.1%	3.5	100.0%	21.9	21.5%	9.3	50.5%	14.3	32.9%	14.3	32.9%
CA Rec	14.5	76.6%	22.6	49.1%	19.2	57.8%	22.6	49.1%	7.1	100.0%	45.3	24.5%	19.2	57.8%	29.6	37.5%	29.6	37.5%

Sector	No Action Alt.		Alt. 1b Pref.		Alt. 2b		Alt. 3b		Alt. 4b		Alt. 5b		Alt. 6b		Alt. 7b		Alt. 8b	
	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain
Cowcod S of 40º10' N. latitude																		
Cowcod ACL (mt)	3		3															
IFQ	1.8	1.0%	1.9	0.9%		0.9%		0.9%		0.9%		0.9%		0.9%		0.9%		0.9%
CP	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
MS	NA	NA	NA	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA
Nearshore		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Non-Nearshore		a/		a/		a/		a/		a/		#VALUE!		a/		a/		a/
WA Rec	0.9	NA	1.0	NA		NA		NA		NA		NA		NA		NA		NA
OR Rec		NA		NA		NA		NA		NA		NA		NA		NA		NA
CA Rec		33.3%		20.0%		20.0%		20.0%		0.0%		20.0%		20.0%		20.0%		20.0%
Darkblotched																		
Darkblotched ACL (mt)	296		317															
IFQ	248.9	22.2%	268.0	18.3%		18.3%		14.5%		16.0%		14.5%		18.3%		18.3%		18.3%
CP	8.5	100.0%	8.6	100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
MS	6.0	100.0%	6.1	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%
Nearshore		1.4%		1.3%		1.3%		1.3%		0.7%		1.3%		1.3%		1.3%		1.3%
Non-Nearshore		27.9%		19.3%		19.3%		19.3%		26.7%		19.3%		19.3%		19.3%		19.3%
WA Rec	14.0	a/	15.0	a/		a/		a/		a/		a/		a/		a/		a/
OR Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
CA Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
Pacific Ocean Perch N of 40º10' N. latitude																		
POP ACL (mt)	183		150		150		74		247		74		222		222		222	
IFQ	119.5	26.5%	113.0	24.0%	113.0	24.0%	41.0	42.4%	200.0	11.3%	41.0	42.4%	179.0	15.2%	179.0	15.2%	179.0	15.2%
CP	10.2	100.0%	10.2	100.0%	10.2	100.0%	10.2	100.0%	12.9	100.0%	10.2	100.0%	11.5	100.0%	11.5	100.0%	11.5	88.7%
MS	7.2	100.0%	7.2	100.0%	7.2	100.0%	7.2	100.0%	9.1	100.0%	7.2	100.0%	8.1	100.0%	8.1	100.0%	8.1	88.9%
Nearshore		a/		a/		a/		a/		a/		a/		a/		a/		a/
Non-Nearshore		4.3%		2.9%		2.9%		6.7%		1.7%		6.7%		2.0%		2.0%		2.0%
WA Rec	7.0	a/	7.0	a/	7.0	a/	3.0	a/	12.0	a/	3.0	a/	10.0	a/	10.0	a/	10.0	a/
OR Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
CA Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/

Sector	No Action Alt.		Alt. 1b Pref.		Alt. 2b		Alt. 3b		Alt. 4b		Alt. 5b		Alt. 6b		Alt. 7b		Alt. 8b	
	Alloc	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**
Petrale Sole																		
Petrale ACL (mt)	1,160		2,592															
IFQ	1,054.6	57.4%	2,477.0	21.8%		21.8%		18.9%		19.0%		18.9%		21.8%		21.8%		21.8%
CP	5.0	100.0%	5.0	100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
MS		100.0%		100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%
Nearshore		a/		a/		a/		a/		a/		a/		a/		a/		a/
Non-Nearshore		a/		a/		a/		a/		a/		a/		a/		a/		a/
WA Rec	35.0	a/	35.0	a/		a/		a/		a/		a/		a/		a/		a/
OR Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
CA Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
Yelloweye																		
Yelloweye ACL (mt)	17		18															
IFQ	0.6	7.7%	1.0	4.0%		4.0%		3.5%		3.1%		3.5%		4.0%		4.0%		4.0%
CP	a/	a/	a/	a/		a/		a/		a/		a/		a/		a/		a/
MS	a/	a/	a/	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/
Nearshore	1.1	90.9%	1.2	100.0%		100.0%		100.0%		51.7%		100.0%		100.0%		100.0%		100.0%
Non-Nearshore	1.3	61.5%	1.1	54.5%		54.5%		54.5%		18.2%		54.5%		54.5%		54.5%		54.5%
WA Rec	2.6	92.3%	2.9	82.8%		82.8%		82.8%		82.8%		82.8%		82.8%		82.8%		82.8%
OR Rec	2.4	104.2%	2.6	96.2%		96.2%		96.2%		61.5%		96.2%		96.2%		96.2%		96.2%
CA Rec	3.1	103.2%	3.4	100.0%		100.0%		100.0%		91.2%		100.0%		100.0%		100.0%		100.0%

a/ Mortality projections are not made for this species and sector.

Table 4-7. Summary of 2014 sector allocations and predicted percent attainment of the allocation of overfished species by fishing sectors under the integrated alternatives.

Sector	No Action Alt.		Alt. 1b Pref.		Alt. 2b		Alt. 3b		Alt. 4b		Alt. 5b		Alt. 6b		Alt. 7b		Alt. 8b	
	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain	Alloc	% Attain
Bocaccio S of 40º10' N. latitude																		
Bocaccio ACL (mt)	274		337															
IFQ	60.0	5.5%	77.0	3.9%	See Pref. Alt. 1b	3.9%	See Pref. Alt. 1b	3.9%	See Pref. Alt. 1b	3.8%	See Pref. Alt. 1b	3.9%	See Pref. Alt. 1b	3.9%	See Pref. Alt. 1b	3.9%	See Pref. Alt. 1b	3.9%
CP	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
MS	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
Nearshore	0.7	71.4%	0.9	55.6%		55.6%		55.6%		33.3%		55.6%		55.6%		55.6%		55.6%
Non-Nearshore	57.9	0.0%	77.0	0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
WA Rec	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
OR Rec	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
CA Rec	131.0	38.7%	174.2	29.1%		29.1%		29.1%		14.6%		29.1%		29.1%		29.1%		29.1%
Canary																		
Canary ACL (mt)	107		119		104		119		49		220		104		151		151	
IFQ	26.2	13.2%	41.5	7.5%	34.2	9.1%	41.5	6.7%	12.8	18.9%	80.9	3.4%	34.2	9.2%	52.9	5.9%	52.9	5.9%
CP	4.8	100.0%	7.7	100.0%	6.6	100.0%	7.5	100.0%	2.5	100.0%	15.3	100.0%	6.6	100.0%	10.1	100.0%	10.1	100.0%
MS	3.4	100.0%	5.5	100.0%	4.6	100.0%	5.3	100.0%	1.7	100.0%	10.8	100.0%	4.6	100.0%	7.2	100.0%	7.2	100.0%
Nearshore	4.0	80.0%	6.4	57.8%	5.3	69.8%	6.4	57.8%	2.0	100.0%	12.5	29.6%	5.3	69.8%	8.2	45.1%	8.2	45.1%
Non-Nearshore	2.3	87.0%	3.7	43.2%	3.0	53.3%	3.7	43.2%	1.0	110.0%	7.2	22.2%	3.0	53.3%	4.7	34.0%	4.7	34.0%
WA Rec	2.0	45.0%	3.2	28.1%	2.6	34.6%	3.2	28.1%	0.9	100.0%	6.2	14.5%	2.6	34.6%	4.1	22.0%	4.1	22.0%
OR Rec	7.0	67.1%	11.2	42.0%	9.3	50.5%	11.2	42.0%	3.5	100.0%	21.9	21.5%	9.3	50.5%	14.3	32.9%	14.3	32.9%
CA Rec	14.5	76.6%	23.3	47.6%	19.2	57.8%	23.3	47.6%	7.1	104.2%	45.3	24.5%	19.2	57.8%	29.6	37.5%	29.6	37.5%

Sector	No Action Alt.		Alt. 1b Pref.		Alt. 2b		Alt. 3b		Alt. 4b		Alt. 5b		Alt. 6b		Alt. 7b		Alt. 8b	
	Alloc	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**
Cowcod S of 40º10' N. latitude																		
Cowcod ACL (mt)	3		3															
IFQ	1.8	1.0%	1.9	0.9%		0.9%		0.9%		0.9%		0.9%		0.9%		0.9%		0.9%
CP	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA
MS	NA	NA	NA	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA	See Pref. Alt. 1b	NA
Nearshore		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Non-Nearshore		a/		a/		a/		a/		a/		a/		a/		a/		a/
WA Rec	0.9	NA	1.0	NA		NA		NA		NA		NA		NA		NA		NA
OR Rec		NA		NA		NA		NA		NA		NA		NA		NA		NA
CA Rec		33.3%		20.0%		20.0%		20.0%		0.0%		20.0%		20.0%		20.0%		20.0%
Darkblotched																		
Darkblotched ACL (mt)	296		330															
IFQ	248.9	22.2%	279.0	17.6%		17.6%		14.0%		15.4%		14.0%		17.6%		17.6%		17.6%
CP	8.5	100.0%	9.0	100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
MS	6.0	100.0%	6.4	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%
Nearshore		1.4%		1.3%		1.3%		1.3%		0.7%		1.3%		1.3%		1.3%		1.3%
Non-Nearshore		27.9%		20.7%		20.7%		20.7%		29.3%		20.7%		20.7%		20.7%		20.7%
WA Rec	14.0	a/	15.0	a/		a/		a/		a/		a/		a/		a/		a/
OR Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
CA Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
Pacific Ocean Perch N of 40º10' N. latitude																		
POP ACL (mt)	183		153		153		76		251		76		226		226		226	
IFQ	119.5	26.5%	116.0	23.2%	113.0	24.0%	41.0	42.4%	200.0	11.3%	41.0	42.4%	179.0	15.2%	179.0	15.2%	179.0	15.1%
CP	10.2	100.0%	10.2	100.0%	10.2	100.0%	10.2	100.0%	13.1	100.0%	10.2	100.0%	11.7	100.0%	11.7	100.0%	11.7	87.2%
MS	7.2	100.0%	7.2	100.0%	7.2	100.0%	7.2	100.0%	9.2	100.0%	7.2	100.0%	8.3	100.0%	8.3	100.0%	8.3	86.7%
Nearshore		a/		a/		a/		a/		a/		a/		a/		a/		a/
Non-Nearshore		4.3%		2.9%		2.9%		6.7%		1.7%		6.7%		2.0%		2.0%		2.0%
WA Rec	7.0	a/	7.0	a/	7.0	a/	3.0	a/	12.0	a/	3.0	a/	10.0	a/	10.0	a/	10.0	a/
OR Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
CA Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/

Sector	No Action Alt.		Alt. 1b Pref.		Alt. 2b		Alt. 3b		Alt. 4b		Alt. 5b		Alt. 6b		Alt. 7b		Alt. 8b	
	Alloc	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**	**Alloc**	**% Attain**
Petrale Sole																		
Petrale ACL (mt)	1,160		2,592															
IFQ	1,054.6	57.4%	2,562.0	20.9%		21.0%		18.2%		18.4%		18.2%		21.0%		21.0%		20.9%
CP	5.0	100.0%	5.0	100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
MS		100.0%		100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%	See Pref. Alt. 1b	100.0%
Nearshore		a/		a/		a/		a/		a/		a/		a/		a/		a/
Non-Nearshore		a/		a/		a/		a/		a/		a/		a/		a/		a/
WA Rec	35.0	a/	35.0	a/		a/		a/		a/		a/		a/		a/		a/
OR Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
CA Rec		a/		a/		a/		a/		a/		a/		a/		a/		a/
Yelloweye																		
Yelloweye ACL (mt)	17		18															
IFQ	0.6	7.7%	1.0	4.1%		4.0%		3.5%		3.1%		3.5%		4.0%		4.0%		4.1%
CP	a/	a/	a/	a/		a/		a/		a/		a/		a/		a/		a/
MS	a/	a/	a/	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/	See Pref. Alt. 1b	a/
Nearshore	1.1	90.9%	1.2	100.0%		100.0%		100.0%		51.7%		100.0%		100.0%		100.0%		100.0%
Non-Nearshore	1.3	61.5%	1.1	63.6%		63.6%		63.6%		18.2%		63.6%		63.6%		63.6%		63.6%
WA Rec	2.6	92.3%	2.9	82.8%		82.8%		82.8%		82.8%		82.8%		82.8%		82.8%		82.8%
OR Rec	2.4	104.2%	2.6	96.2%		96.2%		96.2%		61.5%		96.2%		96.2%		96.2%		96.2%
CA Rec	3.1	103.2%	3.4	100.0%		100.0%		100.0%		88.2%		100.0%		100.0%		100.0%		100.0%

a/ Mortality projections are not made for this species and sector.

Table 4-8. Specified annual OYs (mt), estimated annual total mortality (mt), and percent of OY attainment of overfished west coast groundfish species, 2005-2010.

Species	Specified OYs, Estimated Total Mortality, and Percent of OY Attainment					
	2005 OY (mt)	**2006 OY (mt)**	**2007 OY (mt)**	**2008 OY (mt)**	**2009 OY (mt)**	**2010 OY (mt)**
Bocaccio S						
OY (mt)	307	308	218	218	288	288
Est. Mort. (mt)	75.1	61.3	67.0	47.0	71.0	72.0
% OY	24.5%	19.9%	30.7%	21.6%	24.7%	25.0%
Canary						
OY (mt)	46.8	47.1	44	44	105	105
Est. Mort. (mt)	48.7	57.0	46.0	41.0	38.0	43.0
% OY	104.1%	121.0%	104.5%	93.2%	36.2%	41.0%
Cowcod S						
OY (mt)	4.2	4.2	4	4	4	4
Est. Mort. (mt)	2.0	1.1	3.0	1.0	1.0	1.0
% OY	47.6%	26.2%	75.0%	25.0%	25.0%	25.0%
Darkblotched						
OY (mt)	269	294	290	330	301	330
Est. Mort. (mt)	123.9	193.3	285.0	253.0	285.0	332.0
% OY	46.1%	65.7%	98.3%	76.7%	94.7%	100.6%
POP N						
OY (mt)	447	447	150	150	189	200
Est. Mort. (mt)	76.2	80.3	157.0	131.0	181.0	159.0
% OY	17.0%	18.0%	104.7%	87.3%	95.8%	79.5%
Petrale a/						
OY (mt)	2,762	2,762	2,499	2,499	2,433	1,200
Est. Mort. (mt)	2,766	2,723	2,340	2,260	1,978	936
% OY	100.1%	98.6%	93.6%	90.5%	81.3%	78.0%
Yelloweye						
OY (mt)	26	27	23	20	17	14
Est. Mort. (mt)	15.7	12.2	19.0	12.0	11.0	8.0
% OY	60.4%	45.2%	82.6%	60.0%	64.7%	57.1%

a/ Petrale sole were not managed under a rebuilding plan during 2005-2010. Interim rebuilding measures (reduced OY and more restrictive management measures) were implemented in 2010 under emergency regulations.

Table 4-9. Allocations, total catch, and percent attainment of allocations of overfished IFQ species in the 2011 shorebased trawl fishery, ranked by percent attainment of allocations.

Species	Allocation (lbs)	Total catch (lbs)	Attainment
Petrale sole	1,920,226	1,788,031	93%
Pacific ocean perch N of 40°10' N. lat.	263,148	101,294	38%
Darkblotched rockfish	552,997	199,917	36%
Canary rockfish	57,100	8,125	14%
Yelloweye rockfish	1,323	128	10%
Bocaccio rockfish S of 40°10' N. lat.	132,277	11,715	9%
Cowcod S of 40°10' N. lat.	3,968	38	1%

Criteria for Evaluating Alternative ACLs for Overfished Species

The following discussion of ACL alternatives considers the effect on the individual overfished species as well as the projected impacts within the full mix of overfished stocks because of the interrelated nature of the groundfish fisheries. The biological impacts associated with alternative ACLs and under the integrated alternatives analyzed for overfished species are evaluated using the following criteria: stock productivity, fishing mortality, rebuilding duration (median time to rebuild), and the estimated probabilities of successfully rebuilding these stocks over time. Additionally, we discuss cumulative impacts associated with two biological indicators (genetic diversity and prey availability) that cannot be quantitatively assessed relative to alternative ACLs and integrated alternatives.

Stock Productivity Relative to Rebuilding Success

The predicted median times to rebuild overfished species (with 50 percent probability) relative to the amount of allowable harvest are determined in new rebuilding analyses recommended by the SSC and adopted by the Council in 2011. These rebuilding analyses evaluate allowable harvest vs. rebuilding duration relative to T_{MAX} and the target year to rebuild the stock (T_{TARGET}) in adopted rebuilding plans.

A mandate in the MSA is stock rebuilding cannot 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 U.S. participates dictate otherwise. Therefore, T_{MAX} is 10 years if T_{MIN} is less than or equal to 10 years. If T_{MIN} is greater than 10 years, T_{MAX} is equal to T_{MIN} plus one mean generation. Defining T_{MAX} with one mean generation 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 $T_{F=0}$, where all stock mortality is natural mortality. Stocks exhibiting low productivity will necessarily have longer predicted rebuilding periods due to longer mean generation times. Projections of different $T_{TARGETs}$ are determined from the productivity of the stock, its current status, and the allowable harvest (ACL).

Depending on the productivity of a particular species, fishing mortality or harvest rate will mean different things for different stocks. For fast-growing species (those with individuals that mature quickly and produce many young that survive to an age where they are caught in the fishery) a higher fishing mortality rate may be used. Fishing mortality rate policies must account for several complicating factors, including the capacity of mature individuals to produce young over time and the optimal stock size necessary for the highest level of productivity within that stock. The overfished species' ACL 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 (SPR = spawner per recruit at the current population level relative to that at the stock's unfished condition). 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 SPR. Given fishery selectivity patterns and basic life history parameters, there is a direct inverse relationship between F and SPR (Figure 4-3). 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.

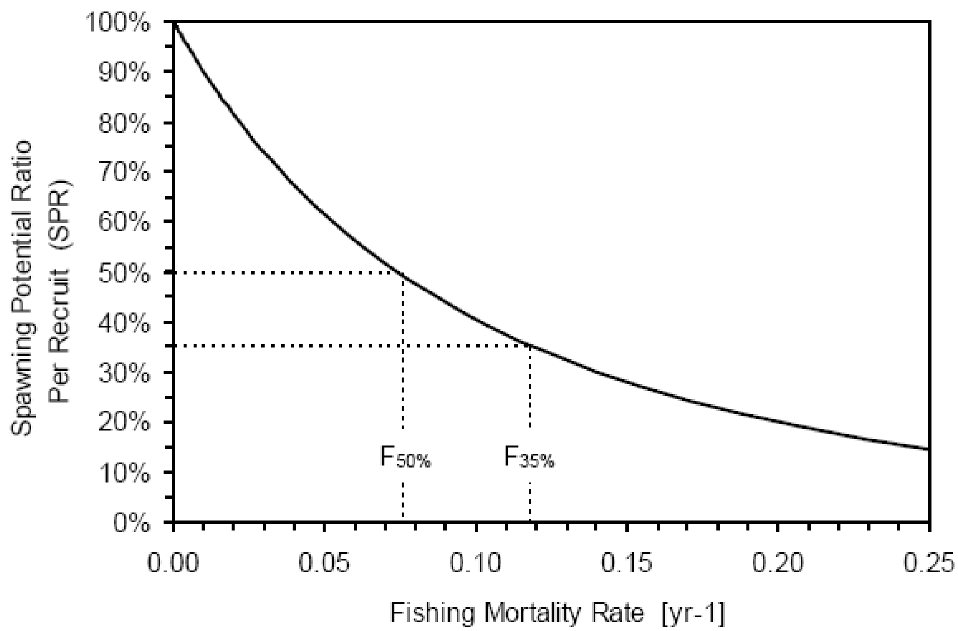

Figure 4-3. Relationship between spawning potential ratio (SPR) and instantaneous fishing mortality rate (F) for a hypothetical rockfish.

Based on the most recent round of assessments, each overfished species is estimated to be at a different level of spawning stock biomass relative to its unfished spawning stock biomass (relative level of depletion). 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 ACLs. The lower the relative depletion of a stock's spawning biomass, the more risk there is in deciding higher ACLs. Therefore, stocks below the MSST at the start of 2011; such as canary, cowcod, and yelloweye rockfish, are considered to have a higher sensitivity to higher fishing mortality rates.

Risks associated with increased ACLs are higher for stocks with greater uncertainty in fishing mortality estimates (catch and/or discard mortality). Stocks for which recreational fisheries account for a large percentage of total mortality are generally more susceptible to catch uncertainty than commercially-targeted species, and this uncertainty increases for stocks that are rarely observed by sampling programs.

Fishing Mortality

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 since commercial landings and discards are tracked much more closely. Commercial landings are recorded on fish receiving tickets, which are used to document the weight and ex-vessel 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 commercial discards estimated in directed groundfish fisheries estimated in the WCGOP. Recreational discards are estimated in the same recreational census programs used to monitor recreational landings. Sampling rates in these discard estimation programs vary by sector, with the limited entry trawl sector observed at the highest at-sea observer rates (100 percent of trips); limited entry fixed gear sablefish (~20-25 percent of trips observed); directed open access (~5 percent of trips observed); California commercial passenger fishing vessels (CPFV or California recreational charter); and California (non-CPFV), Oregon, and Washington recreational. The Makah Tribe, the most active tribe targeting groundfish on the west coast, observed their fisheries at a high rate because their groundfish fishery regulations require full retention of rockfish species. The Quileute and Quinault tribes may target whiting in 2013 and 2014.

A provision in the trawl rationalization program is that up to 10 percent of a permitee's quota surpluses and deficits can be carried over to the following year. The surplus carryover amount is proportionally reduced if the ACL changes from one year to the next. One question that needs to be addressed is whether application of the carryover provision will result in ACL overages and biological impacts to any of the stocks managed using trawl IFQs. In short, there are no substantial impacts associated with application of the carryover provision. While some stocks with a particularly high ACL attainment percentage in the fishery (e.g., petrale sole) may experience an occasional ACL overage if carryover amounts are fully issued, these overages are mitigated in the long run by the provision that all IFQ deficits need to be covered with quota in the following year. Therefore, over the course of a number of years, the trawl allocation will not be exceeded on average. As long as allocations are within sustainable harvest limits, the long-term average removals of the stock should result in stocks being maintained close to their respective B_{MSY} targets as envisioned in the management system. Occasional overages and underages of ACLs matter little, biologically speaking, for long-lived stocks like most of the overfished groundfish stocks on the west coast, as long as the long-term exploitation rates are within sustainable limits. However, total catch, including any carryover amount, is managed in a manner such that ACLs are not expected to be exceeded.

Rebuilding Duration

The MSA §304(e) requires overfished stocks to be rebuilt to the MSY biomass in a time period that is as short as possible, taking into account the status and biology of the overfished stocks, the needs of fishing communities, and the interaction of the overfished stock within the marine ecosystem. One criterion used to evaluate the rebuilding duration for an overfished species is $T_{F=0}$, which is the shortest time possible estimated to rebuild a stock. The needs of fishing communities are considered by allowing limited harvest of an overfished species. In general, allowing the harvest of an overfished species increases the rebuilding period relative to $T_{F=0}$.

A new rebuilding analysis was prepared for each overfished stock in 2011, except for cowcod, which is informed by the 2009 rebuilding analysis. The rebuilding analysis is used to project the status of the overfished resource into the future under a variety of alternative harvest strategies and to estimate the number of years it will take for the stock to reach B_{MSY} (or its proxy). Minimum requirements for rebuilding analyses in routine situations have been established by the SSC and are applied with a computer package developed by Dr. André Punt (University of Washington). The SSC encourages analysts to explore alternative calculations and projections that may more accurately capture uncertainties in stock rebuilding and which may better represent stock-specific concerns. In the event of a discrepancy between the calculations resulting from Dr. Punt's program, the SSC groundfish subcommittee reviews the issue and recommends which results to use. The SSC also encourages explicit consideration of uncertainty in projections of stock rebuilding, including comparisons of alternative states of nature using decision tables to quantify the impact of model uncertainty.

The rebuilding analyses include an estimation of B_0 (the unfished biomass); B_{MSY} or its proxy; the selection of a method to generate future recruitment; the specification of the mean generation time, or the number of years predicted for a spawning female to replace herself in the population; a calculation of the minimum possible rebuilding time from the first year rebuilding measures were implemented (T_{MIN}); and the identification and analysis of alternative harvest strategies and rebuilding times. Rebuilding analyses also estimate the median number of years needed to rebuild to the target stock size if all future fishing mortality is eliminated from the first year for which the Council is making a decision in the biennial specifications process ($T_{F=0}$), which in this proposed action is all harvest beginning in 2013. This will typically differ from T_{MIN}. T_{MIN} is defined as the median time for a stock to recover to the target stock size, starting from the time when a rebuilding plan was first implemented (usually the year after the stock was declared overfished) to when the target level is first achieved assuming no fishing-related mortality. Although no longer used directly in Council decision-making for overfished stocks, rebuilding analyses also report the maximum time to recovery recommended in NS1 guidelines (T_{MAX}), which is T_{MIN} plus one mean generation time.

Rebuilding Probabilities

Rebuilding analyses estimate the probability of successfully rebuilding the stock to the B_{MSY} target by T_{MAX} and by the target year specified in adopted rebuilding plans (T_{TARGET}). As stated above, T_{MAX} is defined as the minimum time a stock can rebuild biologically if no fishing-related mortality is allowed (T_{MIN}), plus one mean generation time. Mean generation time, or the predicted time it takes a spawning female to replace herself in the population, is a measure of relative stock productivity. The probability of rebuilding by T_{MAX} (P_{MAX}) is therefore one of the criteria used to evaluate risk of alternative harvest levels for overfished 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. Likewise, the probability of rebuilding by T_{TARGET} (P_{TARGET}) is an important criterion since it probabilistically measures the performance of management under the rebuilding plan to meet the goal of rebuilding the stock in the specified time. T_{TARGET} is typically chosen as the median time to rebuild the stock under a preferred rebuilding strategy, which at the outset is a 50 percent probability of successfully rebuilding by the target year. The SSC has stated it is important to increase the probability of rebuilding by T_{TARGET} above 50 percent, especially as one approaches the target year to better ensure rebuilding goals are met in a timely fashion. When a new assessment indicates an overfished stock has less than a 50 percent probability of rebuilding by T_{TARGET}, it compels consideration for modifying the rebuilding plan by changing T_{TARGET}.

Genetic Diversity

Frequently, a fish stock is a collection of somewhat genetically differentiated sub-stocks, with relatively low exchange rates of individuals and genes between the sub-stocks; fishing activity can have greater adverse impacts on some sub-stocks than on others. Geographic and temporal changes in harvest that lead to a detectable reduction in genetic diversity could jeopardize the ability of an overfished stock to rebuild to B_{MSY}. Localized depletion may be a concern if genetically important sub-populations are depleted within a distinct local region. This may be more of a concern for rockfish species that have a stock structure distributed within a relatively small region. In the long term, targeting fish with certain characteristics (such as large size) can also lead to selection for fish with certain characteristics (such as faster or slower growth rates) often not being the preferred characteristics for the species. In general, if fishing mortality is maintained below the OFL, the likelihood of adverse effects on genetic structure and reproductive success are reduced. The effects of ACL alternatives on genetic diversity and stock structure cannot be directly differentiated and is therefore not used as a criterion in evaluating ACL alternatives. Such effects are considered cumulative (see section 4.3 for more discussion relative to cumulative effects). Discussion of what is known regarding the genetic diversity of overfished west coast groundfish species is summarized in the 2011 and 2012 Harvest Specifications and Management Measures FEIS (PFMC and NMFS 2011).

Prey Availability

Harvesting activity may change the availability of a species as prey for other groundfish and nongroundfish species. However, there is relatively little information available on the prey relationships, particularly those involving larval or post-larval rockfish. Part of the reason is it is hard to distinguish larval rockfish. Genetic methods of identifying individual species are available in some cases but are expensive, and visual identification is not possible in most cases. Moreover, the predator-prey relationships are complex in that, for example, the same species may be a predator as well as a prey of another species at different life stages. The overall result is that fishing can increase or decrease the prey availability for both the fished species and others. The effects of ACL alternatives on prey availability cannot be directly differentiated and is therefore not used as a criterion in evaluating ACL alternatives. Such effects are considered cumulative (see section 4.3 for more discussion relative to cumulative effects). Discussion of what is known regarding the prey availability and such ecological interactions regarding overfished west coast groundfish species is summarized in the 2011 and 2012 Harvest Specifications and Management Measures FEIS (PFMC and NMFS 2011).

Bocaccio South of 40º10’ N. Latitude

The new 2011 stock assessment indicates that the overfished bocaccio stock south of 40º10’ N. latitude is showing steady progress towards rebuilding under the current rebuilding plan. The primary sources of data, parameter estimates, and relative abundance trends from the 2011 stock assessment were consistent with those from earlier assessments. Estimates of historical depletion and productivity changed moderately in the most recent model, which assumed less severe depletion in the recent historical period and greater productivity (steepness) in the base model. The bocaccio spawning stock depletion of 26 percent at the start of 2011 is above the MSST and 65 percent of the B_{MSY} target. Bocaccio spawning output in 2011 is estimated to be 41 percent of that in 1980, but 191 percent of the minimum in 1998.

One of the issues in the new bocaccio assessment was it was originally scheduled to be an update assessment where input data are updated from the previous assessment, but no change to the model structure is allowed. This enables an expedited review by the SSC since a more formal STAR panel review is not needed to vet alternative model structures and assumptions. The 2011 bocaccio update assessment indicated an extraordinarily large 2010 year class based on length composition data from the 2010 NWFSC trawl survey. If true, this would be the largest recruitment observed for the stock in over 50 years. The bocaccio STAT thought the result was improbable and recommended an alternative model structure for the assessment that did not comply with the rules of an update. Specifically, the STAT recommended the inclusion of a recruitment index of juvenile bocaccio power plant impingement rates in southern California, which was used in past assessments but not in the last full assessment in 2009. Further, the STAT recommended exclusion of the 2010 trawl survey length composition data which drove the result of such a strong 2010 recruitment event. After another review by the SSC at the

September mop-up panel and at their November meeting, the SSC recommended the revised bocaccio assessment recommended by the STAT. The major axis of uncertainty in the revised 2011 assessment is the strength of the 2010 year class. If the 2010 year class is truly as large as the original update suggested, then it will become evident in southern California fisheries in the next couple of years.

Stock Productivity Relative to Rebuilding Success

Bocaccio recruitment is highly variable with rare large year classes. Adult abundance is highly variable even in the absence of fishing (MacCall 2002). The new bocaccio stock assessment indicates that larval production, as a function of spawning output, has been increasing since a 1999 recruitment event and several subsequent year classes of moderate magnitude (i.e., 2003 and 2005 year classes) (Figure 4-4). Currently there is strong evidence for a relatively strong 2009 year class and a strong to very strong 2010 year class, which should accelerate the rate of rebuilding. The new assessment indicates the combination of the 2009 and 2010 year classes in the base model equate roughly (slightly less than) the net recruitment realized from the 1999 year class (the largest observed year class since 1989). By contrast, the 2010 year class estimated in the more optimistic model was nearly 10 times the recruitment of the 1999 year class. Although such optimism may be overly exuberant, there is some possibility that the magnitude of this recruitment could be substantially greater than currently estimated.

According to the decision table in the 2011 assessment, the bocaccio stock could rebuild as early as 2016 under the more optimistic scenario for recruitment of the 2010 year class and under an assumption the entire annual ACLs (calculated using the 77.7 percent SPR harvest rate) are attained. Under the base case and the more pessimistic recruitment scenarios, the stock should rebuild earlier than 2022, as evidenced by a higher than 50 percent probability of rebuilding by the 2022 target year. Although poorly understood, the stock assessment suggests that recovery may be taking place more rapidly in the south, and recovery in the central/northern California region may be dependent on an influx of fish from the southern area.

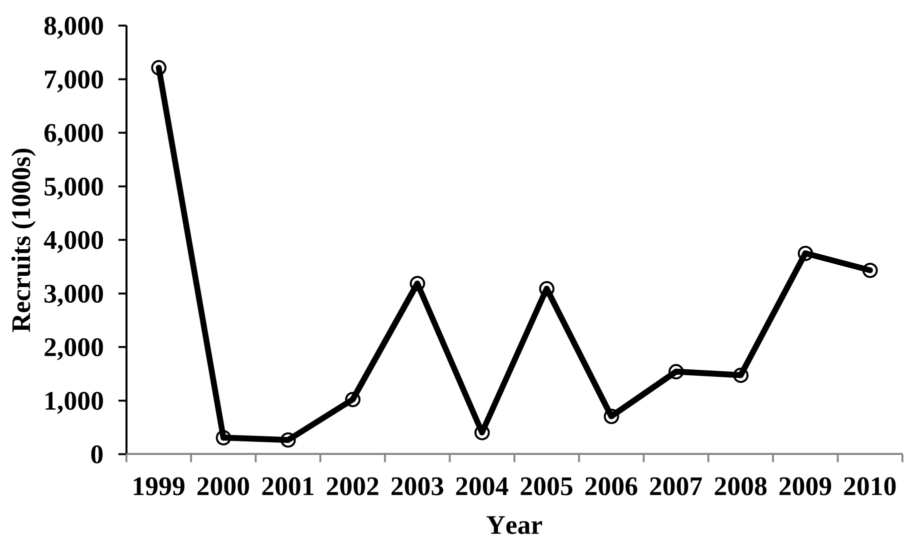

Figure 4-4. Estimated bocaccio recruitments, 1999-2010 (from Field 2011).

Fishing Mortality

The potential of a banner 2010 year class in the bocaccio stock is not entirely unexpected. Bocaccio stock production is characterized by high episodic recruitment and relatively rapid juvenile growth rates (Field, *et al.* 2009). Juvenile bocaccio also recruit to shallow waters and are consequently caught in nearshore recreational fisheries as evidenced by dramatic spikes in both catch rates and the percentage of the total southern California rockfish catch that is bocaccio following strong recruitment events. Unlike most rockfish species where recruitment to fisheries usually takes several years due to low growth rates, juvenile bocaccio can recruit to nearshore fisheries in California within a year or two of parturition. Recruitment of the strong 1999 year class complicated management of California fisheries in 2001-2003, as this unpredictable event could not be reacted to in time given the lag in reconciling recreational catch estimates. Most species' rebuilding analyses are able to project recruitment into affected fisheries in time to decide and implement responsive management measures that will not compromise rebuilding plans. However, the fast growth and unpredictable recruitment of bocaccio poses the unique problem of having to react to a large recruitment event in real time. This experience has led the Council to a strategy of adopting higher bocaccio OYs/ACLs and more conservative management measures that are predicted to result in catches much lower than these harvest limits. The rebuilding strategy has been formalized by deciding OYs/ACLs to determine rebuilding objectives and more stringent HGs for California. The buffer between the ACL (formerly the OY) and the HG accommodates the management uncertainty of an unforeseen recruitment event disrupting fisheries. Unlike an ACL, fisheries do not need to close upon attainment of an HG. The difference between the projected catch and the HG or ACL provides managers time to react to a strong recruitment to minimize mortality on bocaccio while minimizing disruptions to ongoing fisheries. This strategy has worked well to enhance bocaccio rebuilding, and may prove to also minimize harm to California fishing communities if the 2010 year class is indeed as strong as the more optimistic assessment model indicated.

Given that the current understanding is that the stock is rebuilding consistent with the rebuilding trajectories from the existing rebuilding plan, a single preferred ACL that maintains the current rebuilding plan was considered for the integrated alternatives in 2013 and 2014 (except the No Action alternative). Table 4-4 and Table 4-5 indicate the predicted bocaccio mortalities in 2013 and 2014 are 8.3-18.5 percent of the preferred bocaccio ACL under the integrated alternatives. The variation in bocaccio total mortality projections under the integrated alternatives is due solely to the effect of the variation in the canary allocation south of 40°10' N. latitude from alternative canary ACLs. The low canary 2013 and 2014 ACLs of 48 and 49 mt, respectively are predicted to reduce fishing opportunities in California between Pt. Conception and 40°10' N. latitude. These results do not inform the potential total mortality impacts associated with a strong bocaccio recruitment event since canary rockfish are much rarer south of Pt. Conception where bocaccio recruitment appears to occur. The preferred bocaccio ACL alternative is designed to create a harvestable surplus that maintains a large enough buffer to react to a large recruitment event with inseason management adjustments if the 2010 year class is greater than the revised base model in the assessment indicates.

Catch monitoring uncertainty is relatively high given the fact that a substantial amount of the total fishing mortality of bocaccio now occurs in the California recreational fishery, the sector with the largest bocaccio take in recent years. 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 Marine Recreational Fisheries Statistical Survey (MRFSS) program, a survey methodology designed to understand long-term national trends in marine recreational catch and participation. The higher uncertainty in monitoring California recreational catches also translates into higher uncertainty in projecting recreational total mortalities. The fact that a substantial portion of the current take of bocaccio is in the California recreational fishery is another consideration for a relatively larger buffer between the predicted mortalities of bocaccio and the preferred ACLs.

The preferred bocaccio ACL alternative maintains the strategy and policies of the adopted rebuilding plan. The strategy of adopting higher ACLs than the average total mortalities projected in association with preferred management measures in the rebuilding plan (i.e., the projected total mortalities in the analysis of the integrated alternatives) is better able to avoid unanticipated disruptions of ongoing fisheries, especially those south of Pt. Conception if there is a large recruitment event. A recruitment event as large as the 1999 year class recruitment to the fishery, which caused disruption of southern California recreational and commercial nearshore/shelf fisheries in 2001-2003, could create similar problems in the 2013-2014 management period if the ACL was substantially lower (and the SPR harvest rate substantially higher) than under the preferred ACL.

It is reasonable to assume that the total mortality of bocaccio in the shorebased IFQ sector will be higher in 2012 and in the next management cycle than the 9 percent attainment of the sector's bocaccio allocation in the 2011 fishery (Table 4-9). There was substantial under-attainment of shelf target species' quota in the first year of the California trawl IFQ fishery (see sections 4.1.1.4 and 4.1.1.5). It is likely that IFQ fishermen will discover ways to target more shelf species' quota as they become more comfortable with the system. This may increase bocaccio bycatch and total mortality. For example, if the entire preferred allocation of bocaccio were taken in the 2013 shorebased IFQ fishery, then the projected percent attainment of the ACL is predicted to increase from 19 percent to 42 percent. However, the amount of trawl shelf access north of Pt. Conception will likely be limited by the canary quota allocation. The analysis of the integrated alternatives provides limited insight into trawl IFQ needs since the impact projection model is only informed by one year (2011) of data (see Appendices A and C). Future quota needs for overfished species like bocaccio and canary will be uncertain until there are more years of observation of the performance of the IFQ fishery. The reliability of the trawl impact projection model should improve, which will better define the needs (for overfished species quota) of California fishing communities dependent on the trawl fishery.

The variation in the projected nontrawl bocaccio mortalities in the analysis of the integrated alternatives is due directly to the harvestable surplus of canary allocated to each sector. Projected bocaccio impacts do not vary across the integrated alternatives except for alternative 4a, which considers the lower canary ACLs of 48 mt and 49 mt in 2013 and 2014, respectively and results in a reduced bocaccio impact (~53 percent less bocaccio taken than under the other alternatives –Table 4-4). It has been evident in past management cycles that shelf fishing opportunities become more limited south of 40º10' N. latitude when canary OYs are less than 100 mt. Yelloweye is the stock that most limits west coast nontrawl shelf fishing opportunities north of Pt. Conception under the rebuilding plans currently in place.

The option of increasing the bocaccio daily bag limit in the California recreational fishery will increase projected total mortalities to the extent that there is increased targeting of bocaccio. There is anecdotal evidence of some southern California fishermen targeting bocaccio in one area to fill the bocaccio daily bag limit and then moving to other areas to target other species under the combined species' daily bag limit. Removing the bocaccio size limit is likely to have less of an effect on total mortality. Filling a bocaccio bag limit with smaller bocaccio will likely reduce total mortality in the recreational fishery relative to the current minimum size limit under the No Action alternative given the natural mortality rate for released bocaccio under a size limit restriction.

Rebuilding Duration

The 2013 and 2014 bocaccio ACL alternative is predicted to rebuild the stock by 2021, which is two years longer than the shortest time possible ($T_{F=0}$ = 2019) and one year earlier than T_{TARGET}. If the average future recruitment assumption in the 2011 assessment is correct, then bocaccio mortalities in the next management cycle under the preferred management measures should be well below the ACLs, which in turn predicts a shorter rebuilding period than the median time to rebuild of 2021. If there are larger recruitments than assumed in the assessment and the management system continues to perform well enough to stay within the preferred ACLs, that outcome will also enhance rebuilding progress.

Rebuilding Probabilities

Biomass projections and probabilities are based on the rebuilding analysis and the current understanding of productivity applied forward in time. Bocaccio rebuilding probabilities under the preferred ACL alternative are relatively high with a P_{MAX} of 90 percent and a 60 percent probability of rebuilding by the T_{TARGET} of 2022. These rebuilding probabilities are higher if bocaccio mortalities in the next management cycle (and beyond) stay well below the preferred ACLs as predicted or if larger than assumed recruitments occur and ACLs are not exceeded.

Canary Rockfish

The canary rockfish spawning stock depletion of 23.2 percent at the start of 2011 is below the MSST and 58 percent of the B_{MSY} target. Canary rockfish spawning biomass in 2011 is estimated to be 44.6 percent of that in 1980, but 213.4 percent of the minimum in 1999. Given the results of the new stock assessment, it is very unlikely (34.4 percent) that canary rockfish can rebuild by the T_{TARGET} specified in the No Action rebuilding plan.

The decrease in the estimated depletion of canary rockfish in 2011 relative to the status in 2009 is minor, yet substantial enough to require a change to the rebuilding plan. Depletion in 2011 dropped by 2.3 percent relative to 2009, due largely to a higher estimate of initial biomass of 7.1 percent (Figure 4-5). Relative ending year or current biomass increased by 4.7 percent between the 2009 and 2011 assessments. Therefore, the status change was due to the increase in the B_0 estimate rather than the current estimated biomass, and that change was largely due to revisions in the Oregon catch history of canary that occurred subsequent to the 2009 assessment. It is also noted that this change in depletion, while relatively minor, created this situation where the Council is contemplating a change to the rebuilding plan because the rebuilding plan is a very conservative one in that the target year has been set very close to the minimum time to rebuild the stock (Figure 4-6). It can be concluded from this analysis that the management performance of the rebuilding plan has been good and the stock has been rebuilding. The contemplated change in the canary T_{TARGET} is due to the change in the B_0 estimate and the fact that T_{TARGET} has been set very close to the minimum possible time to rebuild in recent management cycles.

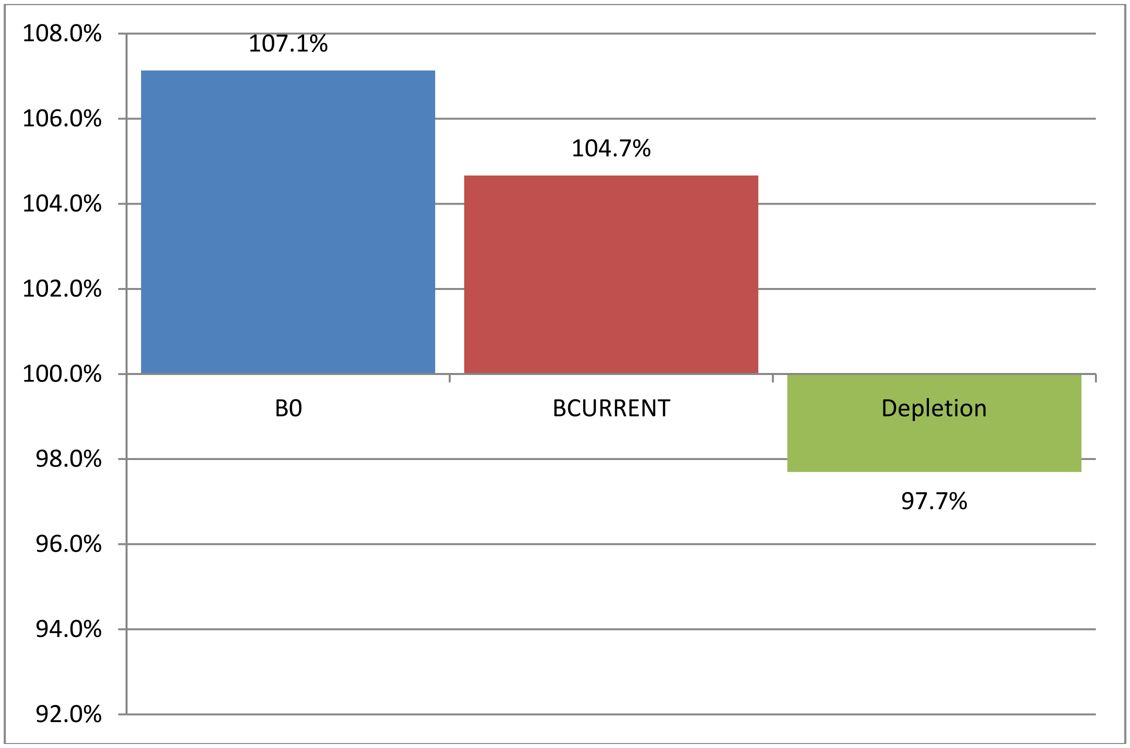

Figure 4-5. Relative change in initial biomass (B_0), current biomass, and depletion of canary rockfish between the 2009 and 2011 assessments.

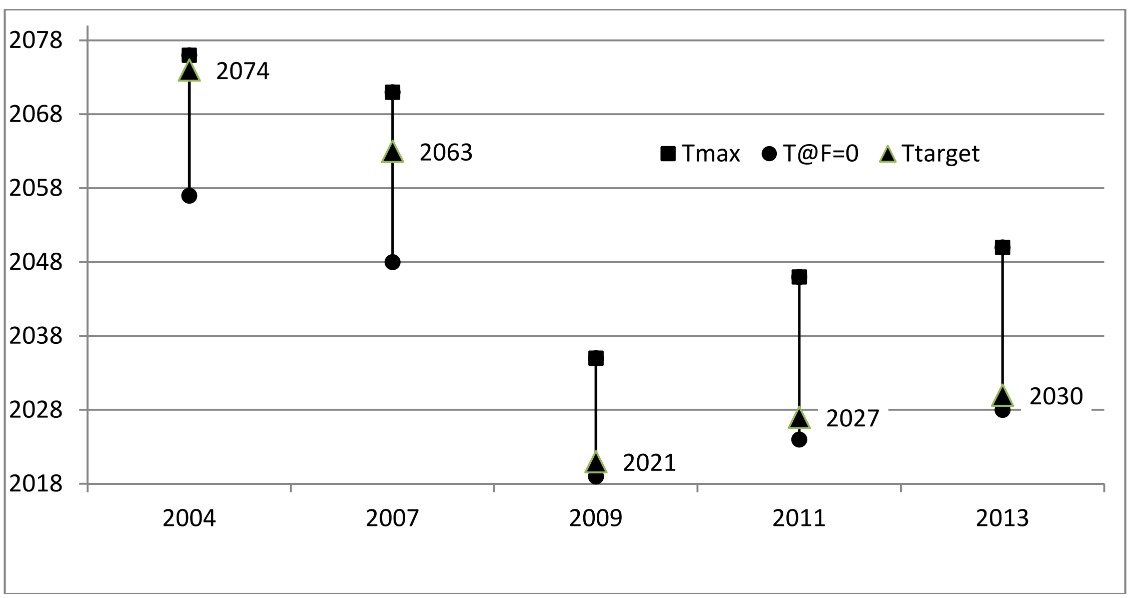

Figure 4-6. Canary rockfish rebuilding parameters (T_{MAX}, $T_{F=0}$, and T_{TARGET}) from rebuilding analyses. The chart illustrates the degree of variability in parameter estimates in successive rebuilding analyses and the policy choice of target year (depicted by triangles). The year on the x axis is the year the rebuilding plans were or, in the case of the 2011 rebuilding analysis, are expected to be implemented.

Stock Productivity Relative To Rebuilding Success

The deviation from T_{TARGET} is due primarily to changes in the understanding of stock productivity and depletion due to re-estimation of the time series of historical catches in Oregon. The changes represent fundamental revisions to our understanding of the status of this species. The change in canary rockfish status (i.e., depletion or the ratio of current biomass to initial biomass or B_0) from the 2011 assessment relative to the previous assessment conducted in 2009 is not due to a substantial reduction in the estimate of current biomass, but rather due to estimation of a much higher initial biomass in the 2011 assessment. Estimates of initial biomass are sensitive historical removals and the change in the historical Oregon time series of catches led to this higher B_0 estimate.

The projected increase in the canary rockfish biomass is very sensitive to the value for steepness (state of nature), and is projected to slow as recent (and largely below-average) recruitments begin to contribute to the spawning biomass. For the period 2000-2011, the spawning biomass is estimated to have increased from 11.2 percent to 23.2 percent of the unfished biomass level.

Fishing Mortality

Canary rockfish is caught coastwide in all sectors of the fishery. Canary rockfish mortality is managed using the following measures: prohibited retention in commercial fixed gear and recreational fisheries; small allocations to the limited entry trawl sectors to accommodate unavoidable bycatch; required use of selective flatfish trawl gear shoreward of the RCA north of 40º10’ N. latitude; required use of small footrope trawls shoreward of the RCA south of 40º10’ N. latitude, and RCA boundaries that limit fishing in areas of higher canary rockfish density.

Figure 4-7 shows the catch per tow of canary rockfish in the NMFS bottom trawl survey, which has been used as an index of the stock’s depth and latitudinal distribution. While there are instances of canary rockfish occurring south of Pt. Conception at 34º27’ N. latitude, they are largely distributed north of Pt. Conception with the greatest density in northern waters off Washington. They are most often found in depths from 50-100 fm, but they can occur in the 27-460 fm depth range (although they infrequently occur deeper than 250 fm).

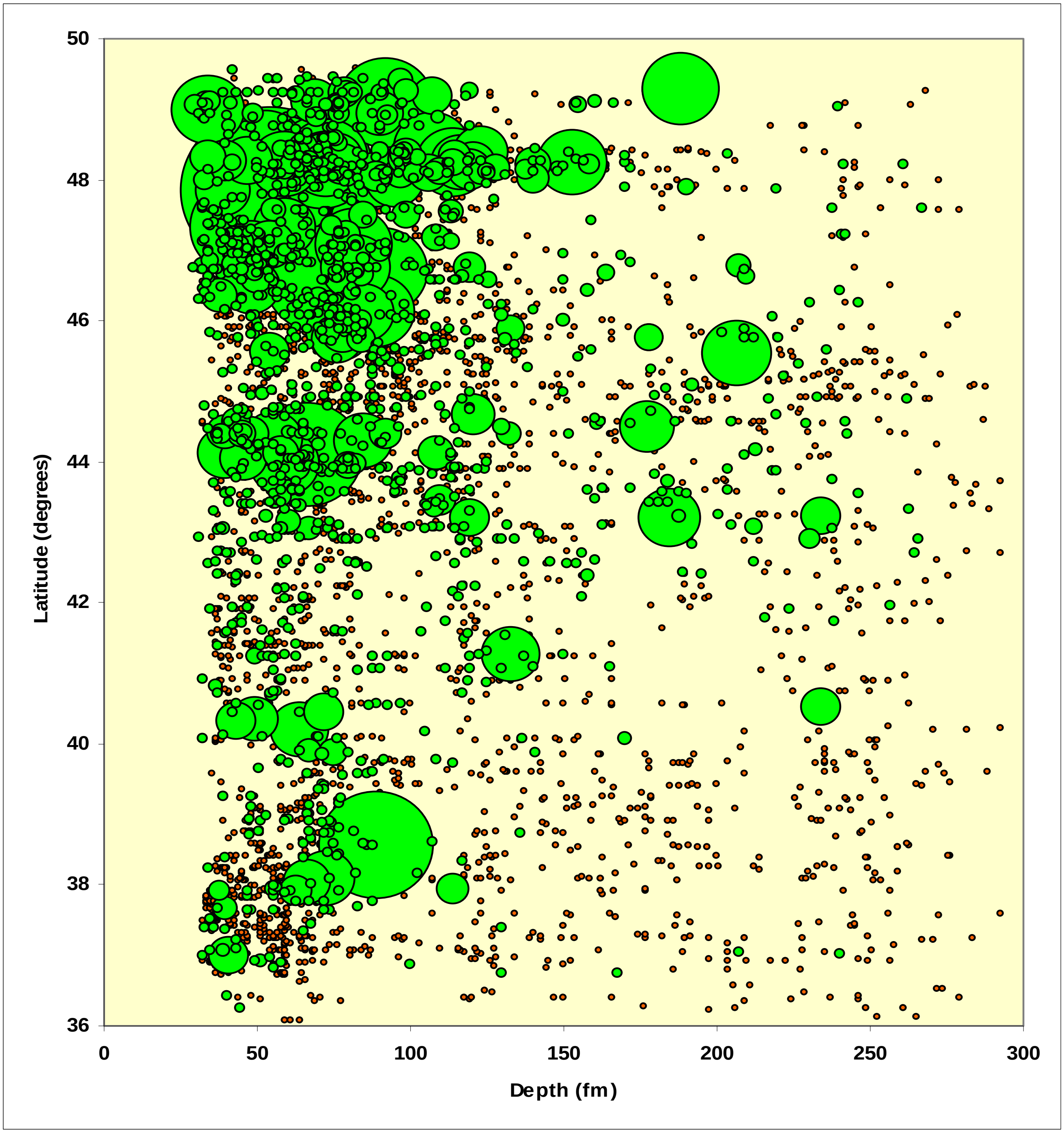

Figure 4-7. Catch per tow of canary rockfish in the NMFS triennial bottom trawl survey by latitude and depth (shaded circles are positive tows with their size proportional to CPUE, empty circles are negative tows).

The canary ACL alternatives decided for detailed analysis are depicted in Table 4-10.

Table 4-10. Alternative 2013 and 2014 canary rockfish ACLs relative to the ACL evaluation criteria.

Evaluation Criteria	No Action 2012 ACL (mt)	Alternative 2013 and 2014 ACLs (mt)					
		ACL Alt. a	ACL Alt. b; Int. Alt. 4	ACL Alt. c; Int. Alts. 2 & 6	ACL Alt. d; Int. Alts. 1 & 3 (FPA)	ACL Alt. e; Int. Alts. 7 & 8	ACL Alt. f; Int. Alt. 5
ACLs	107	0	48, 49	101, 104	116, 119	147, 151	216, 220
SPR harvest rate	89.5%	100.0%	95.1%	90.0%	88.7%	85.9%	80.3%
Rebuilding duration beyond $T_{F=0}$ (yrs.)	2	0	0	1	2	2	4
Rebuilding probability by T_{MAX} (P_{MAX})	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	74.9%
Rebuilding probability by current T_{TARGET} (P_{TARGET})	35.5%	48.2%	41.2%	36.4%	34.4%	31.7%	27.9%

In recent years, the total fishing mortality has been slightly above the OY, but well below the ABC. Catch overages were more frequent when the OY was less than 50 mt but, starting in 2009 when the OY was increased to above 100 mt, catch overages were no longer occurring (Table 4-8). Catch monitoring uncertainty in nontrawl fisheries is high, given that retention of canary is prohibited, which requires estimation of bycatch to assess total fishing mortality. A substantial amount of the total fishing mortality of canary occurs in recreational fisheries, the sector with the highest catch monitoring and projection uncertainty. The other source of high catch monitoring uncertainty in a sector with a relatively high canary bycatch was the estimation of canary discard mortalities in the nonwhiting trawl fishery prior to implementation of the trawl rationalization program in 2011. Of all the overfished species caught incidentally in trawls, impact projections of canary rockfish were the most uncertain. However, with mandatory 100 percent observer coverage in the rationalized trawl fishery, management using IFQs in the shoreside trawl sector, and total catch limits in the at-sea whiting sectors, catch monitoring uncertainty and accountability of canary rockfish catch in trawl fisheries has vastly improved.

The analysis of the integrated alternatives indicates how the variation of the canary ACL affects other fishing sectors and the predicted rebuilding progress of other overfished species. The percent of maximum projected mortality of each overfished species is an index of the influence of the canary ACL on the predicted progress of rebuilding progress for these species (Table 4-4 and Table 4-5). The amount of allowable canary harvest can directly affect predicted rebuilding progress of bocaccio and cowcod between Pt. Conception and 40º10’ N. latitude, and yelloweye rockfish, especially when the ACL is as low as 50 mt (ACL alternative b and integrated alternative 4a). There is a negligible effect for the slope rockfish species (darkblotched and POP) since the majority of the harvest of these species occurs outside the areas where most canary are known to occur. The same is true for petrale sole under the current management system since petrale sole are targeted by the shorebased IFQ fleet on the slope in the winter, late fall and early spring periods. Shelf targeting opportunities for petrale by the shorebased IFQ fleet in the summer and early fall periods are limited by the available amount of canary, as well as yelloweye, Pacific halibut IBQ, and, of course, petrale sole. While the amount of allowable canary bycatch has socioeconomic impacts to fishing communities dependent on the shelf trawl fishery (i.e., shoreward of the RCA), there is a negligible direct impact on the petrale sole stock across the range of canary ACLs analyzed.

What is not evident in the analysis of the integrated alternatives is the effect of a combination of low canary ACLs (i.e., <100 mt) and low POP ACLs (i.e., <150 mt) because such an integrated alternative was not explicitly analyzed. Coincident low canary and POP ACLs could result in limiting trawl fisheries to deeper waters outside the range of canary and POP. The low canary ACL negatively affects the smaller-sized trawlers that cannot safely fish the deeper slope areas, and are limited to fishing on the shelf shoreward of the RCA. The whiting fishery is especially challenged when canary and POP ACLs are both low because they have to avoid a larger area to target whiting without exceeding a canary or POP bycatch cap. When canary allocations are low, the whiting fleet tends to move to deeper waters to avoid canary at the expense of higher bycatch rates of darkblotched and POP. When POP allocations are low, the fleet targets whiting on the shelf to avoid that species. When both allocations are low, there are few areas the whiting fleets can go to safely target whiting.

The 2013 and 2014 canary mortalities predicted for the nontrawl sectors limits fishing opportunities shoreward of the nontrawl RCA north of Pt. Conception, especially under the low canary ACL (ACL alternative d; integrated alternative 4b). Canary and yelloweye are the primary species that limit fishing opportunities for the nearshore and recreational sectors. The percent attainment of the preferred canary allocation is relatively high for the nontrawl sectors (Table 4-6 and Table 4-7) and would be higher for the recreational and nearshore fisheries if not for the low allocation of yelloweye. It is clear from the analysis of the integrated alternatives and from past management experience that when canary ACLs/OYs are down in the 50 mt range, canary can limit shelf and nearshore fishing opportunities more than yelloweye at the level of harvest prescribed in the current rebuilding plan and under the Preferred Alternative yelloweye ACL.

It is reasonable to assume that the total mortality of canary in the shorebased IFQ sector will be higher in 2012 and in the next management cycle than the 14 percent attainment of the sector's allocation of canary in the 2011 fishery (Table 4-9). There was substantial under-attainment of shelf target species' quota in the first year of the shorebased IFQ fishery (see sections 4.1.1.4 and 4.1.1.5). It is likely that IFQ fishermen will discover ways to target more shelf species' quota as they become more comfortable with the system. This may increase canary bycatch and total mortality. For example, if the entire preferred allocation of canary were taken in the 2013 shorebased IFQ fishery, then the projected percent attainment of the ACL is predicted to increase from 47 percent to 79 percent under the Preferred Alternative (ACL alternative d and integrated alternative 1a). The amount of trawl shelf access north of Pt. Conception will likely be limited by the canary quota allocation. The analysis of the integrated alternatives provides limited insight into trawl IFQ needs since the impact projection model is only informed by one year (2011) of data (see Appendices A and C). Future quota needs for overfished species like canary will be uncertain until there are more years of observation of the performance of the IFQ fishery. The reliability of the trawl impact projection model should improve, which will better define the needs (for overfished species quota) of west coast fishing communities dependent on the trawl fishery.

Higher ACLs than the No Action 2012 ACL might allow more recreational fishing opportunity and more shelf fishing opportunity in the limited entry trawl IFQ fishery. There was very low attainment of trawl allocations of healthy shelf species in 2011 largely due to the limited allocation of canary rockfish, but also due to a limited allocation of yelloweye rockfish and a limited Pacific halibut IBQ. Now that widow rockfish is rebuilt, the trawl fishery may need a higher canary allocation to resume target fishing for widow and yellowtail rockfish. ACLs up to 150 mt (ACL alternative e and integrated alternatives 7b and 8b) might allow more fishing opportunities with a negligible cost in rebuilding duration relative to the preferred alternative.

Rebuilding Duration

The 2013 and 2014 canary rockfish ACL alternatives are all predicted to rebuild within four years of the shortest time possible ($T_{F=0}$ = 2028). Rebuilding is extended by two years from $T_{F=0}$ under the status quo SPR harvest rate (88.7 percent) used to determine the preferred ACL alternative (ACL alternative d; integrated alternative 1a). It is noted that ACL alternative e (integrated alternatives 7b and 8b) provides 2013 and 2014 ACLs approximately 30 mt higher than the PPA ACL alternative d, yet rebuilds in the same year as the preliminary preferred ACL alternative (Table 4-10), albeit with a somewhat lower probability. Some of the canary allocation concerns and socioeconomic impacts associated with constraints under the preferred rebuilding plan could be partially mitigated by the increased yields under ACL alternative e (integrated alternatives 7b and 8b).

Rebuilding Probabilities

The canary rebuilding probability (P_{MAX}) under all the ACL alternatives is 75 percent (74.9 percent for ACL alternative f) (Table 4-10). All the ACL alternatives have a probability of rebuilding by the current T_{TARGET} of 2027 of less than 50 percent, including the zero-harvest alternative (ACL alternative a) which has a 48.2 percent probability of rebuilding by then. This result has compelled consideration for modifying the current rebuilding plan and exploring a relatively wide range of ACL alternatives and associated rebuilding strategies.

Cowcod South of 40º10’ N. latitude

The most recent cowcod assessment was done in 2009 (Dick *et al*. 2009), and it indicated spawning biomass depletion was estimated to be 4.5 percent of the unfished level. Estimated spawning biomass depletion rates of cowcod under the range of alternative low- and high-productivity models in 2009 was between 3.8 percent and 21.0 percent of the unfished level. The poor precision of this estimate was due to a lack of data to inform estimates of stock productivity and conflicting information from fishery-dependent and fishery–independent data. The SSC did not recommend a new cowcod assessment until new data became available that would inform a new assessment and rebuilding analysis. Instead, the SSC recommended a cowcod status report be prepared in 2011 to evaluate management performance in keeping impacts within the specified rebuilding ACLs. The 2011 cowcod status report indicated that annual total mortalities since the 2009 assessment have been within the specified harvest limits mandated by the rebuilding plan (Dick, *et al.* 2011).

Scientific uncertainty is high for cowcod. The SSC categorized cowcod as a category 2 stock in the Conception area, where the assessment informs the OFL contribution, and as a category 3 stock in the Monterey area, where a catch-based approach (DBSRA) informs the OFL contribution. The cowcod assessment is considered one of the more data-poor assessments done for any west coast groundfish stock. Fishery-independent information is sparse for the cowcod assessment. The trawl survey cannot fish the high relief habitats where cowcod occur and trawl survey incursions into the CCAs are not allowed. Recent fishery-dependent information for cowcod is also lacking in the assessment since they are a prohibited species and they are rare in the observed or reported discard events, indicating cowcod bycatch occurs infrequently. The rebuilding plan strategy to avoid cowcod by prohibiting retention and closing critical habitats (i.e., the CCAs) where they are known to occur has effectively ended any signal or index of biomass for this stock. New nonextractive survey technologies are being explored to attempt to better monitor species like cowcod. Such technologies are needed to assess cowcod to avoid even the minimum mortality associated with research activities that extract and kill fish (e.g., the NWFSC trawl survey if it was conducted in the CCAs).

Stock Productivity Relative to Rebuilding Success

Cowcod stock productivity is assumed to be relatively low given the slow growth, late maturation, and longevity of the species. The mean generation time of 38 years for cowcod is estimated from the net maternity function. Key productivity parameters (e.g., stock-recruitment steepness, recruitment variability) are unknown for cowcod (Dick and Ralston 2009). Data in the assessment are insufficient to estimate these quantities for cowcod, so values used in the rebuilding analysis are based on meta-analysis of related species, adding to uncertainty in rebuilding progress. Assumed steepness in the assessment is 0.6.

Fishing Mortality

Because cowcod are substantially depleted and the stock's productivity is extremely low, an extremely low incidental harvest rate is necessary to achieve rebuilding progress. Tenets of the cowcod rebuilding plan are to prohibit harvest in all fisheries and to close the primary habitats where adult cowcod are known to occur. Closure of the CCAs in the southern California Bight in 2001 effectively reduced harvest to very low levels, a strategy anticipated to work well for reducing adult cowcod mortality given their sedentary nature.

Cowcod are primarily encountered in depths greater than 50 fm (Butler, *et al.* 2003). Though cowcod do occur from 20 fm to 267 fm (Love, *et al.* 2002), submersible surveys at the northern end of the Southern California Bight indicate that juvenile cowcod were most common from 49 fm to 82 fm, and adults were most common at depths of 66 fm to 115 fm (Butler, *et al.* 2003). These trends in the depth distribution were also observed in the proportion of catch by depth from the trawl fishery in the Southern California Bight where cowcod were predominantly encountered in depths deeper than 65 fm (Butler et al., 1999). Recent submersible surveys indicate that juvenile cowcod occur over a wide range of habitat types, at depths between 28 and 180 fm; they typically avoid soft sediment substrate, favoring hard substrate such as cobble and boulder fields or rock ridges (Love and Yoklavich 2008).

Catch monitoring uncertainty is high for cowcod. Retention of cowcod is prohibited, which requires estimation of bycatch to assess total mortality, and few cowcod have been observed by the WCGOP. Without observer data, the estimates of commercial discard are highly uncertain. This changed in 2011 for the limited entry trawl fishery upon implementation of the trawl rationalization program and mandatory 100 percent observer coverage. Recreational discard rates have not been thoroughly assessed. Recreational observer data are available for the CPFV fleets, but little is known about discard from private boats. In addition, a portion of the recreational rockfish catch has not been identified to species (the "rockfish genus" category in RecFIN) and is not included in current estimates of total fishing mortality for rockfish species. Cowcod are a small component of rockfish catch in recent years, but given the low OYs/ACLs, even a small fraction of cowcod in the total unidentified catch may influence management decisions. 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. Neither survey is designed to produce inseason catch nor effort estimates with the precision needed to manage to the low ACLs needed to rebuild cowcod.

Although current total fishing mortality estimates are highly uncertain, the CCAs appear to be effective at minimizing fishing mortality over offshore rocky habitat in the southern California bight. Available catch estimates and mortality reports suggest that landings have not exceeded the OY limits in recent years (Table 4-8). In most recent years the total estimated take of cowcod has been well below 3 mt. However, estimated take in 2007 was estimated to be 3 mt.

Analysis of the integrated alternatives shows no effect of the Preferred Alternative or any other integrated alternative on predicted cowcod mortality, other than integrated alternative 4a with the low canary ACL. The low canary ACL (48 and 49 mt in 2013 and 2014, respectively) limits the California recreational fishery to the point that only a trace take of cowcod is predicted. The change in predicted cowcod mortality in the California shorebased IFQ fishery from the range of canary ACLs analyzed in the analysis of the integrated alternatives (48-220 mt) is predicted to be negligible (Table 4-4, Table 4-5, Table 4-6, and Table 4-7).

Rebuilding Duration

The 2013 and 2014 cowcod ACL alternative is predicted to rebuild within eight years of the shortest time possible ($T_{F=0}$ = 2060). If the management system continues to keep cowcod mortalities below 1-2 mt as predicted, the stock is predicted to rebuild within two to four years of $T_{F=0}$.

Rebuilding Probabilities

Cowcod rebuilding probabilities under the one ACL alternative analyzed are relatively low with a P_{MAX} of 66.2 percent and a P_{TARGET} of 50 percent. Given our current understanding of stock status and productivity, these rebuilding probabilities are predicted to increase if the management system continues to keep cowcod mortalities under 2 mt.

Darkblotched Rockfish

The darkblotched rockfish spawning stock depletion of 30.2 percent at the start of 2011 is above the MSST, 270 percent of the minimum estimated depletion in 2001 (11.2 percent), and 75.5 percent of the B_{MSY} target. The 2011 rebuilding analysis indicates the darkblotched stock is rebuilding eight years ahead of schedule.

The 2011 darkblotched assessment was originally scheduled to be an update of the 2007 full assessment (Hamel 2008a), which informed the 2011-2012 biennial harvest specifications process). The updated darkblotched assessment presented to the SSC in June 2011 estimated depletion at the start of 2009 was 15.1 percent, whereas the comparable estimate from the 2009 update was 27.5 percent. Such a large change in stock status was unexpected. Further, the cause of the change could not be determined during the limited time available for review of the update. The Council therefore decided that the update should receive additional exploration and review at the September 2011 "mop-up" panel based on a limited set of analyses developed by the SSC.

Although the revised update conducted a thorough step-wise evaluation of the new and modified data used in the assessment, the analyses were not able to pinpoint the new data elements that fully accounted for the large drop in estimated depletion. An analysis of the influence of the stock-recruit steepness parameter indicated that the revised update model would have estimated steepness at an implausibly high value (1). The 2007 full assessment and the 2009 update fixed the steepness parameter at 0.6. For the revised 2011 update the SSC and the STAT agreed to fix the steepness at 0.76, the mean value of the most recent prior probability distribution from the meta-analysis of rockfish productivity conducted by Dr. Martin Dorn (Figure 4-8). Also, the SSC recommended that the decision table be structured with stock-recruitment steepness rather than natural mortality as the major axis of uncertainty. Results from the revised update assessment are reasonably consistent with results from the 2009 update. The estimate of depletion at the start of 2009 is 25.9 percent from the revised update, whereas it is 27.5 percent from the 2009 update. The revised update assessment estimates that depletion in spawning output was 30.2 percent at the start of 2011. The SSC endorsed the use of the 2011 darkblotched rockfish revised update assessment for status determination and management for 2013 and beyond.

Stock Productivity Relative to Rebuilding Success

As explained above, assumed steepness in the 2011 darkblotched assessment is 0.76 and, since it is fixed, very uncertain. Depletion of the stock and relative productivity are directly correlated with the assumed steepness. Lower steepness values would estimate more severe depletion and slower rebuilding, and higher steepness would estimate less severe depletion and faster rebuilding. When freely estimated with a prior, steepness was estimated at the implausibly high value of 1.0, which led to the recommendation to fix steepness at the mean value estimated for all assessed northeastern Pacific rockfish species (Figure 4-8).

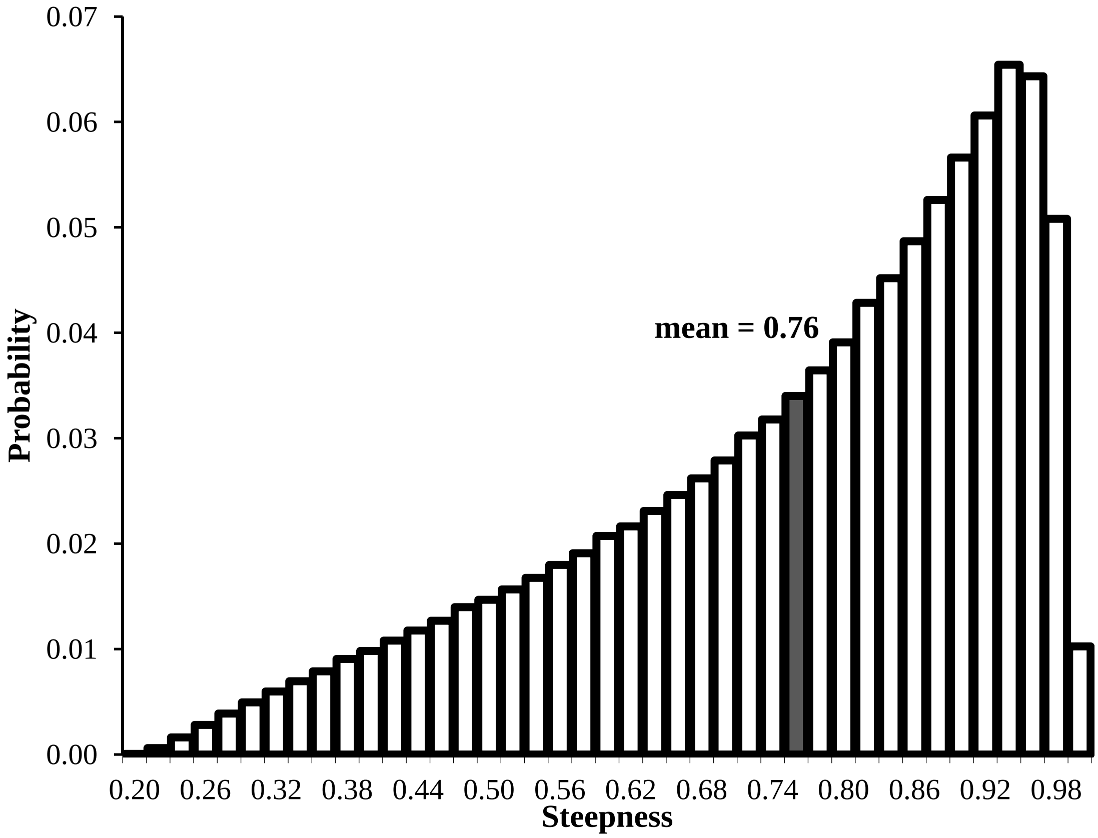

Figure 4-8. Distribution of rockfish stock-recruitment steepness parameters estimated from assessments in the Northeastern Pacific (from Dr. Martin Dorn, personal communication).

Fishing Mortality

Darkblotched rockfish are caught almost exclusively by groundfish trawl gear and predominantly bottom trawls operating on the outer continental shelf and slope north of 38º N. latitude between 100 and 200 fm. The main strategies used to control darkblotched rockfish catch mortality prior to implementation of the trawl rationalization program in 2011 were limited entry trawl trip limits for the northern and southern Minor Slope Rockfish complexes in which darkblotched rockfish are managed, bycatch limits in the Pacific whiting fisheries, and trawl RCAs. Under trawl rationalization, darkblotched mortality is controlled using IFQ management and RCAs in the shoreside sector, and sector-specific bycatch limits in the at-sea whiting sectors. None of the at-sea sector bycatch limits were exceeded in 2011, and the darkblotched impact in the 2011 shoreside trawl fishery was 199,917 lbs, or 36 percent of the IFQ allocation (Table 4-9).

Figure 4-9 shows the catch per tow of darkblotched rockfish in the NMFS bottom trawl survey, which has been used as an index of the stock's depth and latitudinal distribution. While the clustered distribution of darkblotched in

Figure 4-9 is informative, the apparent distribution is also affected by the survey sampling regime in that not all of the combined survey data is shown, zero-catch hauls are not shown, and the depths and latitudes sampled by all surveys have been irregular over time. Darkblotched rockfish are found north of 33º N. latitude in depths of 16-300 fm, with the core distribution in depths from 96 fm to 220 fm. 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 40.5º N. latitude in 200 fm. These large catches tended to contain larger than average fish (Rogers 2006). Closure of those areas might be used to further reduce darkblotched rockfish fishing mortality if needed.

Catch monitoring uncertainty is low for darkblotched since it a trawl-dominant species and the trawl fishery is subject to 100 percent observer coverage.

Analysis of the integrated alternatives shows that darkblotched mortalities are predicted to decrease under the lower POP ACLs (ACL alternative b; integrated alternatives 3a and 5a). This indicates that the darkblotched quota under the preferred ACL is more likely to impede trawl access to slope areas where darkblotched and POP are most abundant than the POP quota until the POP ACL is decreased to about 75 mt.

It is reasonable to assume that the total mortality of darkblotched in the shorebased IFQ sector will be higher in 2012 and in the next management cycle than the 36 percent attainment of the sector's allocation of darkblotched in the 2011 fishery (Table 4-9). There was under-attainment of some slope target species' quota in the first year of the shorebased IFQ fishery (e.g., Dover sole and the thornyheads - see sections 4.1.1.4 and 4.1.1.5). It is likely that IFQ fishermen will discover ways to target more slope species' quota as they become more comfortable with the system. This may increase darkblotched bycatch and total mortality. For example, if the entire preferred allocation of darkblotched were taken in the 2013 shorebased IFQ fishery, then the projected percent attainment of the ACL is predicted to increase from 27 percent to 96 percent under the Preferred Alternative (ACL alternative a and integrated alternative 1a). While this assumption does speak to the dependence of the trawl fishery on the allocation of darkblotched, it is an unlikely outcome since only a few fishermen have enough darkblotched and POP quota to access slope species in areas where slope rockfish, such as darkblotched and POP, are most abundant. Nevertheless, the amount of slope access north of 40º10' N. latitude will likely be limited by the darkblotched and POP quota allocations, although the available amount of sablefish for the DTS strategy (trawl targeting on Dover sole, sablefish, and thornyheads) will also influence the amount of nonwhiting trawl effort on the slope.

The analysis of the integrated alternatives provides limited insight into shorebased IFQ needs since the impact projection model is only informed by one year (2011) of data (see Appendices A and C). Future quota needs for overfished species like darkblotched will be uncertain until there are more years of observation of the performance of the IFQ fishery. The reliability of the trawl impact projection model should improve, which will better define the needs (for overfished species quota) of west coast fishing communities dependent on the trawl fishery.

Rebuilding Duration

The 2013 and 2014 darkblotched ACL alternative is predicted to rebuild within one year of the shortest time possible ($T_{F=0}$ = 2016).

Rebuilding Probabilities

Darkblotched rockfish rebuilding probabilities, both P_{MAX} and P_{TARGET}, are high at 100 percent under the preferred and only ACL alternative analyzed.

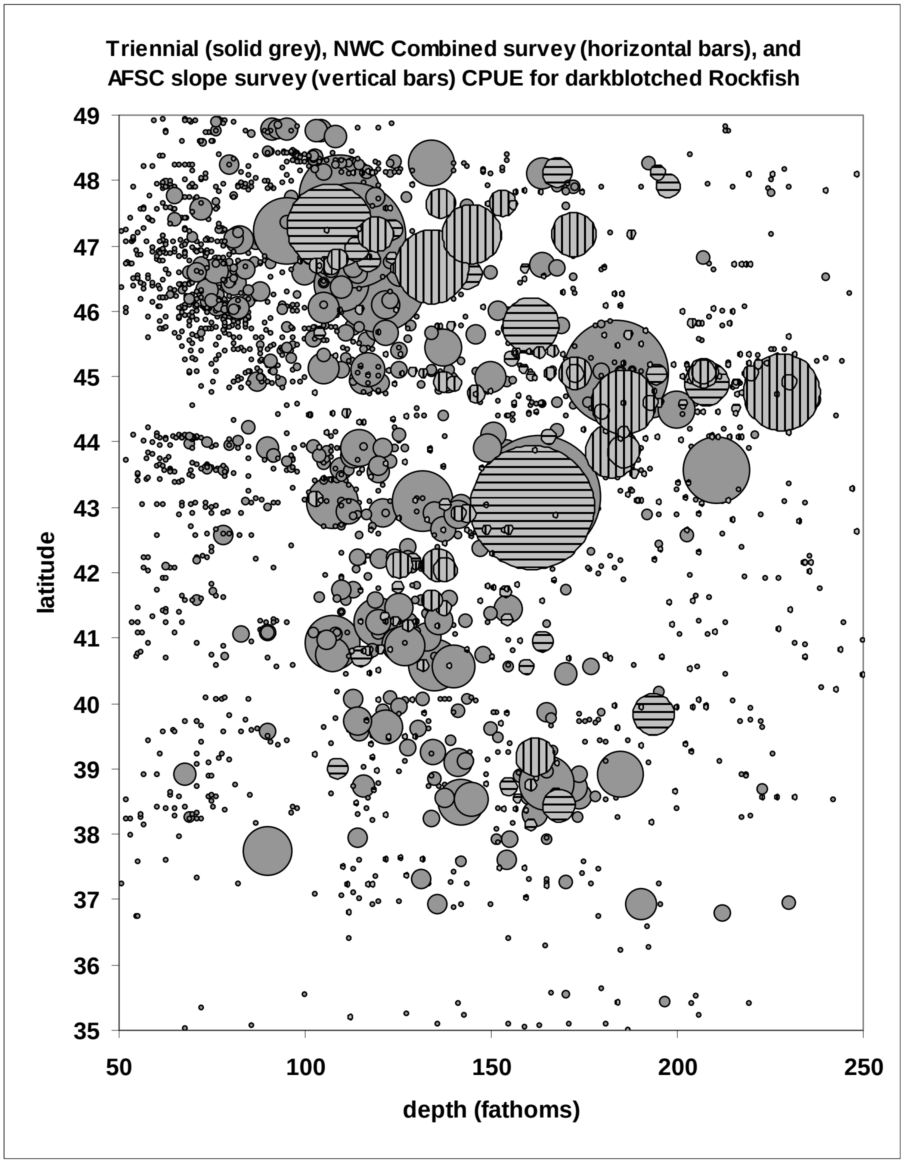

Figure 4-9. Index of west coast distribution of darkblotched rockfish by latitude and depth as determined by catch per tow in NMFS trawl surveys. Size of circle is proportional to darkblotched rockfish density at that location. Data from the NWFSC's West Coast Groundfish Survey Database and the AFSC Triennial Shelf and Slope Survey Database.

Pacific Ocean Perch North of 40º10' N. Latitude

The 2011 POP assessment applies to the U.S. west coast stock north of 40º10' N. latitude. POP are distributed north to the Bering Sea and west off of Japan, with the center of distribution in the Gulf of Alaska. They have also been observed as far south as Baja California but are sparse south of Cape Blanco, Oregon and rare south of 40º10' N. latitude.

The POP spawning stock depletion of 19.1 percent at the start of 2011 is below the MSST, 136.7 percent of the minimum estimated depletion in 1999 (14.0 percent), and 47.8 percent of the B_{MSY} target. This is a low level of depletion across the spectrum of overfished west coast rockfish species, being the second most depleted west coast groundfish stock (only cowcod has a lower estimated depletion rate). Summary (3+) biomass in 2011 is 25,482 mt, which is close to the estimate that a straight update of the old model would produce (26,839 mt). However, due to the much higher estimates of unfished summary biomass (119,914 mt) in the 2011 assessment, the 2011 depletion (19.1 percent) is much lower than the value would be (31.5 percent) in the update.

A major change in the outcome of the 2011 assessment is the change to the unfished equilibrium biomass (B_0) estimate. The very large recruitment estimate in the late 1950s seen in all previous assessments is not evident in the 2011 assessment. A major and unresolved problem in the assessment is that the stock became depleted in the mid- to late 1960s (due to a substantially large catch by foreign trawl fleets) before any survey data were available. Previous assessments assumed a large recruitment in the late 1950s provided the higher biomass to support the estimated removals by the foreign fleets without any data to support that assumption. The assumption in the 2011 assessment is that the large foreign fleet catch fished the biomass down to critical levels, thus resulting in a substantially larger B_0 estimate. The 2011 assessment also estimated a longer sequence of higher recruitment based on fitting to the data available for early years of the assessment period.

Much like the change in the status of canary rockfish, the change in our understanding of POP stock status is due primarily to a higher estimate of B_0 in 2011 relative to the previous assessment in 2009 (Figure 4-10). The change in our understanding of POP stock status in terms of the depletion ratio (current biomass/ initial biomass or B_0) in general can be attributed to changes in the estimation of B_0 or current biomass; the estimate of current biomass did not change substantially from the 2009 estimate.

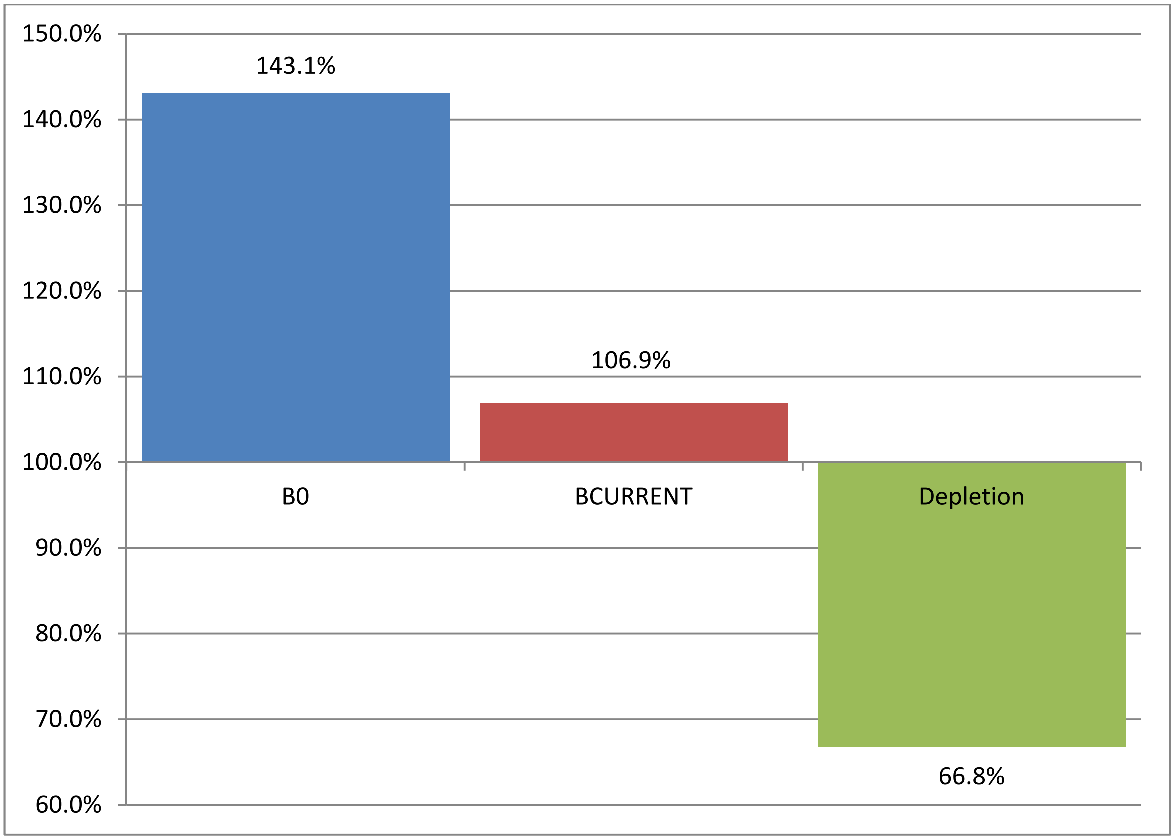

Figure 4-10. Relative change in initial biomass (B_0), current biomass and depletion for POP between the 2009 and 2011 assessments.

Stock Productivity Relative to Rebuilding Success

Stock-recruitment steepness was estimated external to the 2011 POP stock synthesis assessment base model at 0.4 (and then fixed in the model), which is low compared to steepness estimates from POP assessments conducted off Canada and Alaska. The 2011 assessment assumes no connectivity with the other assessed POP stocks in Canada and Alaska. POP off the U.S. West Coast (mostly Washington and Oregon) are at the southern end of the range where there are enough POP to be commercially important, and the numbers seen are likely related to movement across the Canadian border, as well as reproductive success (recruitment) and fishing mortality north of the border. Given there is no evidence of stock structure in the meta-population of POP in the northeast Pacific and larval distribution of slope rockfish tends to be geographically widespread, this assumption of no connectivity with northern stocks is questionable. It is plausible that steepness is higher than determined in the 2011 assessment, which would tend to estimate a less depleted and more productive stock. The major axis of uncertainty in the assessment is steepness, with states of nature ranging from a low steepness of 0.35 to a higher value of 0.55. If steepness was as high as 0.55, the POP stock would be on the verge of being rebuilt at the start of 2011 (depletion = 39.9 percent) and projected to be rebuilt at the start of 2012. Under the base case model with a steepness of 0.4 and continuing to manage POP using the 86.4 percent SPR harvest rate in the current rebuilding plan, the stock is projected to be rebuilt by 2051.

Recruitment trends estimated in the 2011 POP assessment indicate that, like most assessed rockfish, recruitment has been relatively lower in the last few decades compared to the 1950s and 1960s.

However, the 1999 and 2000 year classes are estimated to be above average and the 2008 year class recruitment, while uncertain, appears to be the largest in at least the past 50 years (Figure 4-11).

Fishing practices are unlikely to have any effect on stock productivity, given the low fishing mortality levels proposed. There is no indication that fishing operations are likely to substantially interfere with or disturb reproductive behavior or juvenile survival.

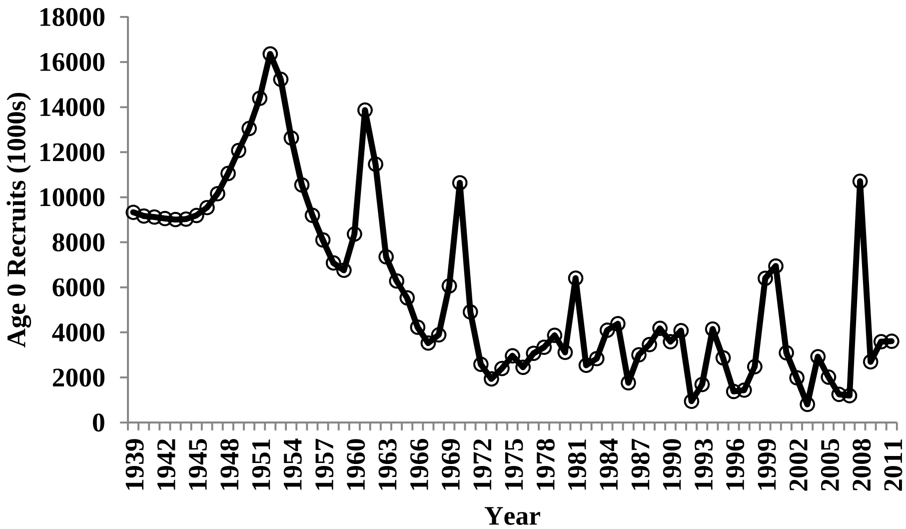

Figure 4-11. Time series of estimated (age 0) POP recruitments (Hamel and Ono 2011).

Fishing Mortality

POP are caught almost exclusively by groundfish trawl gear and predominantly bottom trawls operating on the outer continental shelf and slope north of 43º N. latitude. POP are distributed from 30-350 fm, with the core distribution between 110-220 fm.

According to the base model in the 2011 assessment, the fishing level has been below the proxy $F_{50\%}$ F_{MSY} harvest rate for the past 12 years (Figure 4-12), during which period the stock has begun to rebuild (Figure 4-13). The point estimates of summary (age 3+) biomass also show an upward trend over the past decade, increasing approximately 50 percent in that time.

Given the new assessment results and the change in our understanding of depletion and stock productivity, the Council is recommending a change to T_{TARGET} in the rebuilding plan. Table 4-11 shows the ACL/rebuilding plan alternatives analyzed for 2013 and beyond. The Council's preferred alternative is to maintain the SPR harvest rate of 86.4 percent in the current rebuilding plan and change T_{TARGET} to 2051, which is the new median year to rebuild under that harvest rate. This harvest rate equates to 2013 and 2014 ACLs of 150 mt and 153 mt, respectively, which approximates the No Action 2012 ACT of 157 mt. This level of harvest is intended to take into account the needs of fishing communities. An ACT is not likely needed for POP in 2013 and 2014 given the low management uncertainty for this trawl-dominant stock. An ACT was specified in 2011 and 2012 because it was not certain the trawl rationalization program would be implemented on time and there was concern about the "lightning strike" bycatch event in the 2007 shoreside whiting fishery that caused the OY to be exceeded (Table 4-8).

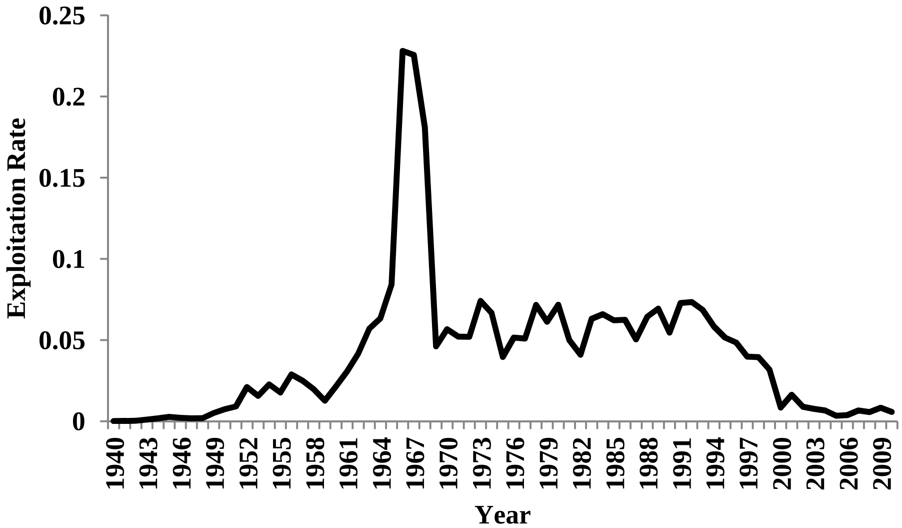

Figure 4-12. Time series of POP exploitation rates (catch/summary biomass) (Hamel and Ono 2011).

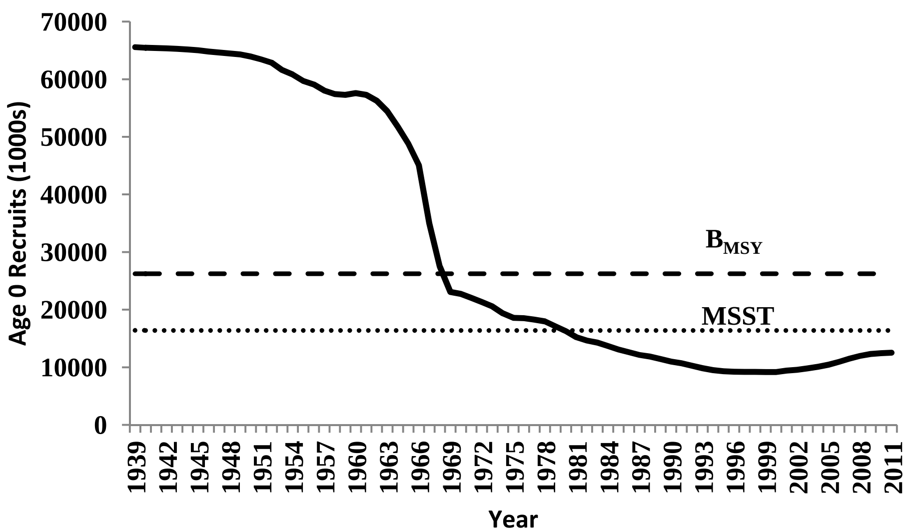

Figure 4-13. Time series of POP spawning biomass relative to the B_{MSY} target and the MSST, 1939-2011 (Hamel and Ono 2011).

Table 4-11. Alternative 2013 and 2014 POP ACLs relative to the ACL evaluation criteria.

Evaluation Criteria	No Action 2012 ACL (mt)	Alternative 2013 and 2014 ACLs (mt)				
		Alt. a	Alt. b; Int. Alts. 3 & 5	Alt. c; Int. Alts. 1, 2, & 8 (FPA)	Alt. d; Int. Alts. 6 & 7	Alt. e; Int. Alt. 4
ACLs	183	0	74, 76	150, 153	222, 236	247, 251
SPR harvest rate	83.9%	100.0%	92.9%	86.4%	80.9%	79.2%
Rebuilding duration beyond $T_{F=0}$ (yrs.)	11	0	3	8	14	17
Rebuilding probability by T_{MAX} (P_{MAX})	70.1%	85.5%	79.0%	73.0%	NA	62.0%
Rebuilding probability by current T_{TARGET} (P_{TARGET})	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%

Catch monitoring uncertainty is low for POP since it is a trawl-dominant species and the trawl fishery is subject to 100 percent observer coverage.

The analysis of the integrated alternatives indicates that the canary ACL decision has no influence on the predicted mortality of POP and the variation in the POP ACL directly affects trawl fishing opportunities. Darkblotched mortalities are predicted to decrease under the lower POP ACLs (ACL alternative b; integrated alternatives 3a and 5a). This indicates that the darkblotched quota under the preferred ACL is more likely to impede trawl access to slope areas where darkblotched and POP are most abundant than the POP quota until the POP ACL is decreased to about 75 mt. The lower POP ACL is not predicted to affect the rebuilding progress of the other overfished species other than darkblotched.

What is not evident in the analysis of the integrated alternatives is the effect of a combination of low canary ACLs (i.e., <100 mt) and low POP ACLs (i.e., <150 mt) because such an integrated alternative was not explicitly analyzed. Coincident low canary and POP ACLs could result in limiting trawl fisheries to deeper waters outside the range of POP and canary. The low canary ACL negatively affects the smaller-sized trawlers that cannot safely fish the deeper slope areas and are limited to fishing on the shelf shoreward of the RCA. The whiting fishery is especially challenged when canary and POP ACLs are lower because they have to avoid a larger area to target whiting without exceeding a canary or POP bycatch cap. When canary allocations are low, the whiting fleet tends to move to deeper waters where the bycatch of darkblotched and POP are higher. When POP allocations are low, the fleet targets whiting on the shelf to avoid that species. When both allocations are low, there are few areas the whiting fleets can go to safely target whiting.

It is reasonable to assume that the total mortality of POP in the shorebased IFQ sector will be higher in 2012 and in the next management cycle than the 38 percent attainment of the sector's allocation of POP in the 2011 fishery (Table 4-9). There was under-attainment of some slope target species' quota in the first year of the shorebased IFQ fishery (e.g., Dover sole and the thornyheads - see sections 4.1.1.4 and 4.1.1.5). It is likely that IFQ fishermen will discover ways to target more slope species' quota as they become more comfortable with the system. This may increase POP bycatch and total mortality. For example, if the entire preferred allocation of POP were taken in the 2013 shorebased IFQ fishery, then the projected percent attainment of the ACL is predicted to increase from 38 percent to 96 percent under the Preferred Alternative (ACL alternative a and integrated alternative 1a). While this assumption does speak to the dependence of the trawl fishery on the allocation of POP, it is an unlikely outcome since only a few fishermen have enough POP and darkblotched quota to access slope species in areas where slope rockfish, such as POP and darkblotched, are most abundant. Nevertheless, the amount of slope access north of 40º10’ N. latitude will likely be limited by the POP and darkblotched quota allocations, although the available amount of sablefish for the DTS strategy will also influence the amount of nonwhiting trawl effort on the slope.

The analysis of the integrated alternatives provides limited insight into shorebased IFQ needs since the impact projection model is only informed by one year (2011) of data (see Appendices A and C). Future quota needs for overfished species like POP will be uncertain until there are more years of observation of the performance of the IFQ fishery. The reliability of the trawl impact projection model should improve, which will better define the needs (for overfished species quota) of west coast fishing communities dependent on the trawl fishery.

Rebuilding Duration

The new 2011 POP rebuilding analysis estimates the shortest time to rebuild to the B_{MSY} target ($T_{F=0}$) to be 2043. The ACL alternatives other than ACL alternative a, which is the zero-harvest alternative, are predicted to rebuild 3-17 years beyond $T_{F=0}$ (Table 4-11). The preferred alternative (ACL alternative c) is predicted to rebuild eight years beyond $T_{F=0}$. If the total mortality of POP is able to remain below the harvest rate under ACL alternative b (~75 mt) as predicted in the GMT’s impact projections, then the stock is predicted to rebuild within three years of $T_{F=0}$.

Rebuilding Probabilities

All the ACL alternatives, including the zero-harvest alternative, have a 25 percent probability of rebuilding by the current T_{TARGET} of 2020 which is why a change to the rebuilding plan is contemplated (Table 4-11). The probabilities of rebuilding by T_{MAX} (P_{MAX}) vary between 62 percent and 85.5 percent across the range of ACL alternatives analyzed. The P_{MAX} under the Council’s preferred alternative is 73 percent. The probability of rebuilding the stock is higher if the total mortality of POP is able to remain below the harvest rate under ACL alternative b (~75 mt) as predicted in the GMT’s impact projections.

Petrale Sole

The petrale sole stock was declared overfished in 2010 based on the results of the 2009 assessment (Haltuch and Hicks 2009). A new full petrale sole assessment was done in 2011 (Haltuch, *et al.* 2011), which indicated the spawning stock depletion was 18 percent at the start of 2011 and therefore above the flatfish MSST of 12.5 percent. This level of depletion is 71.8 percent of the B_{MSY} target of 25 percent and 282.1 percent of the minimum biomass estimated in 1993. The base model in the new assessment estimates that spawning output dropped below the MSST during 1980, reached a minimum of 6 percent during 1993 and has been rising more or less steadily since, crossing above the MSST by the start of 2003 (Figure 4-14). Compared to the 2009 assessment, which estimated that depletion was 11.6 percent in 2009, the new stock assessment indicates a more optimistic view (depletion of 15.7 percent in 2009).

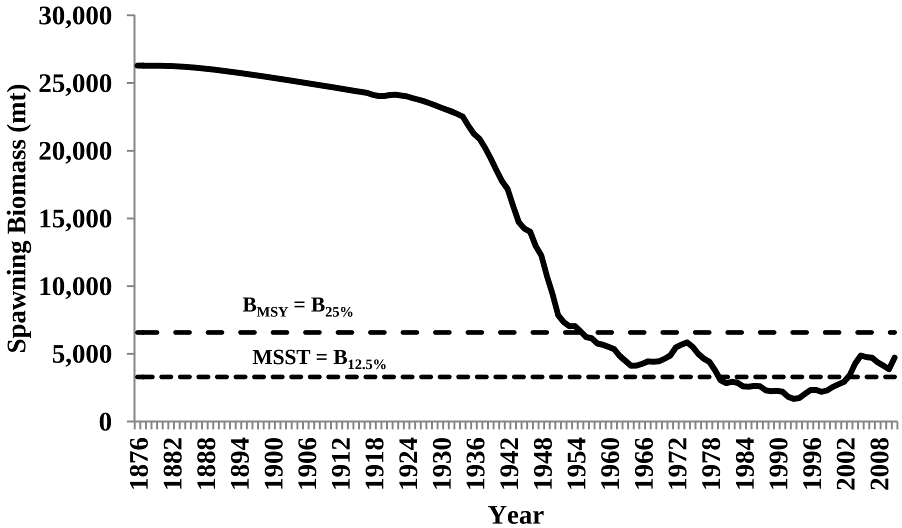

Figure 4-14. Petrale sole spawning biomass time series relative to the B_{MSY} target and MSST, 1876-2011 (Haltuch, *et al.* 2011).

As was the case for the 2009 assessment, the new assessment covers the stock of petrale sole off the entire U.S. west coast. There were no major changes in the model structure of the new assessment compared to the 2009 assessment. However, there were important changes in some input information including: revised ageing-error vectors, an estimated value for steepness (0.86) based on the Myers meta-analysis for pleuronectids, and estimated annual sex-specific natural mortality rates (0.16 for females, 0.18 for males) based on a prior probability distribution developed by Dr. Owen Hamel.

Petrale sole was categorized as a category 1 stock and the assessment is considered a relatively robust and data-rich assessment. Petrale occur in trawlable areas and are readily caught in the NMFS trawl survey. Catch data is also relatively rich in the assessment, despite the effect the high historical catches before good record-keeping has had on the estimate of high unfished biomass and low current depletion. The base case model fits the survey and compositional data very well and the assessment was considered thorough and technically sound by the STAR Panel and the SSC. Scientific uncertainty in estimating 2013 and 2014 petrale OFLs is relatively low. However, scientific uncertainty is much greater in estimates of unfished biomass and current depletion rate.

Stock Productivity Relative to Rebuilding Success

Petrale sole spawn during the winter at several discrete deepwater sites (270-460 m) off the U.S. west coast, from November to April, with peak spawning taking place from December to February (Best 1960; Castillo 1995; Garrison and Miller 1982; Gregory and Jow 1976; Harry 1959); (Castillo 1995; Love 1996; Reilly, *et al.* 1994); Moser, 1996 #377; Casillas, 1998 #25}. The petrale sole stock assessment and rebuilding plans are not spatially explicit. However, both analyses consider the seasonality of the catches by the fishery as the winter fishery focuses on spawning aggregations and the summer fishery exploits a mixed stock. Longer recovery times are expected when allowing the winter fishery to catch most of the fish as it focuses on spawning aggregations. No research has been done regarding spawning behavior and the impact of fishing on spawning aggregations.

Petrale have high stock productivity with an estimated stock-recruitment steepness of 0.86, which was based on a meta-analysis of flatfish species in the family *Pleuronectidae* (Myers, *et al.* 1999) and not estimated directly in the SS model. The time series of estimated recruitments shows a relationship with the decline in spawning biomass, punctuated by larger recruitments (Figure 4-15). The four weakest recruitments since 1939 are estimated to be from 1962, 1986, 1987, and 1992, while the four strongest recruitments since 1939 are estimated to be from 1939, 1966, 1998, and 2007. Until 2007, the most recent large recruitment event is estimated to be in 2006, and was smaller than the 1998 recruitment event.

The high stock productivity and the large recent recruitments contribute to a predicted quick recovery of the petrale sole stock. The 2011 petrale rebuilding analysis predicts the stock will be successfully rebuilt by the start of 2013, with an estimated depletion of 28 percent.

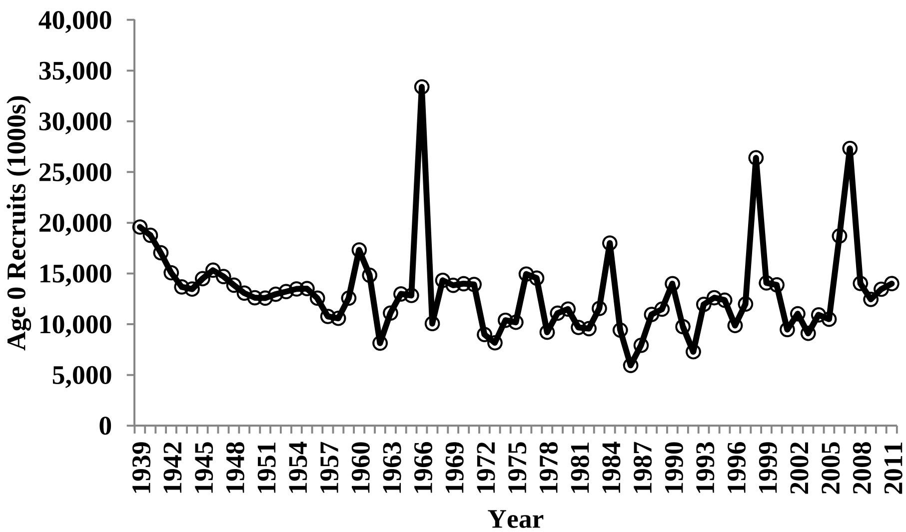

Figure 4-15. Time series of estimated (age 0) petrale sole recruitments, 1939-2011 (from (Haltuch, *et al.* 2011).

Fishing Mortality

Most of the petrale sole catch is made by deep-water demersal trawls at depths of 164-252 fm (PFMC 1996). 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. From the inception of the fishery in 1876 through the mid-1940s, the vast majority of catches occurred between March and October (the summer fishery), when the stock is dispersed over the continental shelf. The post-World War II period witnessed a steady decline in the amount and proportion of annual catches occurring during the summer months (March-October). Conversely, petrale catch during the winter season (November–February), when the fishery targets spawning aggregations, has exhibited a steadily increasing trend since the 1940s. Since the mid-1980s, catches during the winter months have been roughly equivalent to or exceeded catches throughout the remainder of the year. In 2009, catches of petrale sole began to be restricted due to declining stock size.

Petrale sole exhibit distinct seasonal depth migrations with higher abundance on the shelf during summer months and higher abundance in distinct spawning areas during winter months. Hence, RCA structures for this species could vary seasonally if RCA management is needed to control fishing mortality. The general pattern for petrale sole is a shallower depth distribution during periods 3 and 4 and a deeper depth distribution during periods 1 and 6. Petrale sole are typically in transition as they migrate between shallow and deeper depths during periods 2 and 5.

Petrale sole is a trawl-dominant species. Therefore, the uncertainty in catch monitoring and accounting is low, given the mandatory 100 percent observer coverage and near real-time reporting of total catches in the rationalized trawl fisheries.

Analysis of the integrated alternatives shows that petrale mortalities are not particularly influenced by the range of canary or POP ACLs analyzed. This is because petrale sole can be targeted outside the areas where these species are abundant. It is also evident from the analysis that the petrale ACL and the preferred allocation of petrale only affects fishing opportunities for the shorebased IFQ sector (Table 4-6 and Table 4-7).

The projected mortality of petrale sole in the shorebased IFQ sector in the analysis of the integrated alternatives (19-22 percent of the preferred allocation; Table 4-6) is counter-intuitive. Clearly, petrale sole can be effectively targeted while avoiding overfished rockfish species, as evidenced by the 93 percent attainment of the 2011 allocation in the shorebased IFQ fishery (Table 4-9). This speaks more to uncertainty in the shorebased IFQ impact projection model than to expected effects of the alternatives.

The analysis of the integrated alternatives provides limited insight into shorebased IFQ needs since the impact projection model is only informed by one year (2011) of data (see Appendices A and C). The ability to cleanly target petrale while avoiding overfished rockfish species will be uncertain until there are more years of observation of the performance of the IFQ fishery. The reliability of the trawl impact projection model should improve, which will better define the needs (for overfished species quota) of west coast fishing communities dependent on the trawl fishery.

Rebuilding Duration

The 2011 petrale rebuilding analysis predicts the stock will be rebuilt by 2013. Therefore, all the ACL alternatives considered, including the zero-harvest alternative, will rebuild in the same year as the shortest time possible.

Rebuilding Probabilities

The rebuilding probabilities (both P_{MAX} and P_{TARGET}) are high for the petrale sole ACL alternative analyzed (as well as the others ACL alternatives considered but not decided for detailed analysis) at 100 percent (Table 2-10). This is because the stock is predicted to be rebuilt by the start of 2013 regardless of 2013-2014 harvest specifications. The SSC is recommending a new assessment be done in 2013 to confirm that prediction.

Yelloweye Rockfish

The yelloweye rockfish spawning stock depletion was estimated at 21.4 percent of the unfished biomass at the start of 2011 and below the MSST of 25 percent. This is a low level of depletion across the spectrum of overfished west coast rockfish species, higher only than the estimated depletion rates for cowcod and POP. This level of depletion is 53.3 percent of the B_{MSY} target and 136 percent of the minimum biomass estimated in 2000.

Data for yelloweye rockfish are sparse and relatively uninformative, especially regarding current trends. Parameters that generally contribute substantial model uncertainty to stock assessments, including those defining steepness, natural mortality, and growth are estimated, but may be poorly determined due to the short time series of available data. Currently available fishery-independent indices of abundance are imprecise and not highly informative. It is unclear whether increased rates of recovery (or lack thereof) will be detectable without more precise survey methods applied over broad portions of the coast. Fishery data are also unlikely to produce conclusive information about the stock for the foreseeable future, due to retention prohibitions and active avoidance of yelloweye among all fleets.

The new yelloweye assessment and rebuilding analysis is predicted to be rebuilding seven years ahead of schedule. Therefore, the Council is not proposing a change to the rebuilding plan which specifies a T_{TARGET} of 2074 and an SPR harvest rate of 76 percent.

Stock Productivity Relative to Rebuilding Success

Yelloweye year class strength is modeled as a deterministic process in the 2011 assessment with no estimation of the size of individual year classes. Therefore, the decline in estimated recruitment tracks closely to that of the spawning output (Figure 4-16). The decline is especially pronounced given the low (and likely imprecise) estimate for steepness of the stock-recruit relationship in the base-case model (0.441). The low estimated steepness in the assessment results in a prediction of very little surplus production and consequently estimates of low yields at B_{MSY} (MSY is estimated to be 58 mt under the F_{MSY} proxy SPR harvest rate of 50 percent). This relatively low stock productivity also predicts a long mean generation time of 46 years and a slow recovery rate under the very low harvest rate specified in the yelloweye rebuilding plan, as well as the alternative harvest rates explored in the 2011 rebuilding analysis.

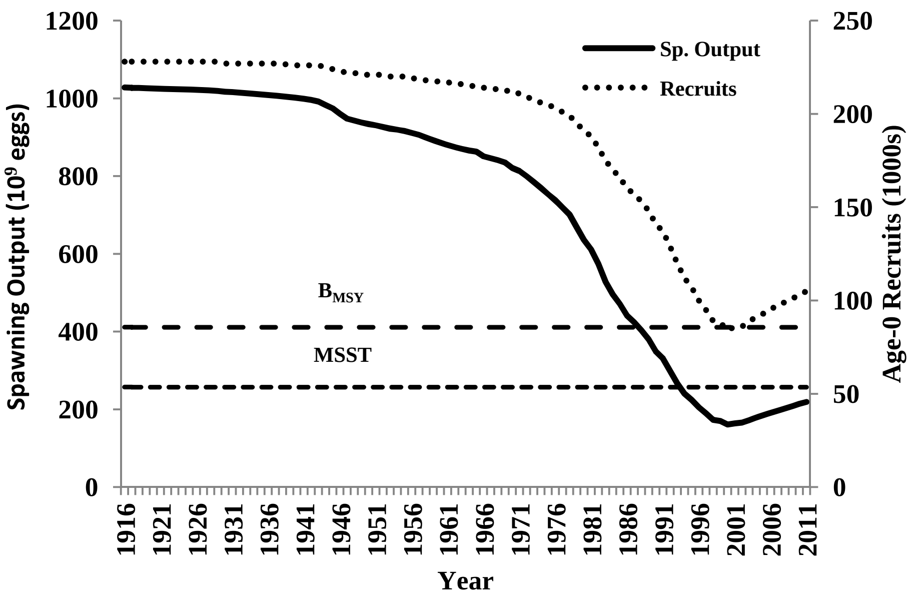

Figure 4-16. Time series of estimated yelloweye rockfish spawning output and recruitments for the base-case model in the 2011 assessment (Taylor and Wetzel 2011).

Fishing Mortality

Yelloweye rockfish are caught coastwide in all sectors of the fishery. Yelloweye are particularly vulnerable to hook-and-line gears, which are effective in the high relief habitats yelloweye reside. The current nontrawl RCA and the recreational depth closures are primarily configured based on yelloweye distribution and projected impacts in these hook-and-line fisheries. Small footrope trawls, including selective flatfish trawls, do not have the rollers and anti-chafing protection needed to fish in the high relief habitats yelloweye reside in. Mandating these gears for trawl efforts on the shelf shoreward of the trawl RCA, the configuration of the trawl RCA, and a small IFQ allocation of yelloweye are the primary strategies currently used to minimize trawl impacts on yelloweye. Yelloweye are also a bycatch species in the Pacific halibut fishery (Love, *et al.* 2002).

Yelloweye rockfish are mostly encountered north of 36º N. latitude. Yelloweye occur in depths from 25 to 475 m and are most commonly found at depths from 91 to 180 m (Love, *et al.* 2002).
Figure 4-17 shows the catch per tow of yelloweye rockfish in the NMFS bottom trawl survey, which has been used as an index of the stock's depth and latitudinal distribution.

Fishing mortality rates are estimated in the 2011 assessment to have been in excess of the current F_{MSY} harvest rate for rockfish (SPR = 50 percent) from 1976 through 1999. Relative exploitation rates (catch/biomass of age-8 and older fish) are estimated to have peaked at 12.7 percent in 1992, but have been at or less than 1.1 percent after 2001 (Figure 4-18). The F_{MSY} exploitation rate assuming the proxy SPR of 50 percent is 2.2 percent. Annual yelloweye harvest rates in the 1976-1999 period averaged over five times the estimated F_{MSY} and spawning biomass declined rapidly during that period (Figure 4-16).

The commercial RCAs substantially reduce yelloweye impacts. North of 40º10' N. latitude, the highest bycatch rates of yelloweye rockfish occur in waters less than 100 fm. Yelloweye rockfish have a patchy distribution and as such using fleetwide bycatch rates over a large area (north and south of 40º10' N. latitude) may misrepresent actual catch rates. North of Cape Alava, yelloweye bycatch rates are lowest inside of the 60 fm line; bycatch rates would increase substantially if shoreward RCAs were moved from the 60 fm line to the 75 fm line. The seaward boundary of the nontrawl RCA extends out to 150 fm year round south of 40º10' N. latitude. The seaward boundary of the nontrawl RCA north of 40º10' N. latitude is at 100 fm year round with a few exceptions where the seaward boundary is at 125 fm. Between 45º03.83' to 43º N. latitude the seaward is at 125 fm year round.

Area closures and a prohibition on retention are the main strategies used to minimize recreational yelloweye impacts. The California recreational fishery is subject to depth restrictions that are more restrictive in the northern management areas where yelloweye are more prevalent. CDFG evaluated and has available four potential YRCAs which include habitat in both state and Federal waters where high yelloweye encounter rates have been documented. If implemented, YRCAs are anticipated to reduce yelloweye impacts during the open fishing seasons in both the Northern Groundfish Management Area and the North-Central North of Pt. Arena Groundfish Management Area, possibly allowing for a longer fishing season. To date, these YRCAs have not been implemented but would remain available management measures that can be routinely implemented inseason if needed. Depth management is the main tool used for controlling yelloweye rockfish fishing mortality in the Washington and Oregon recreational fisheries.

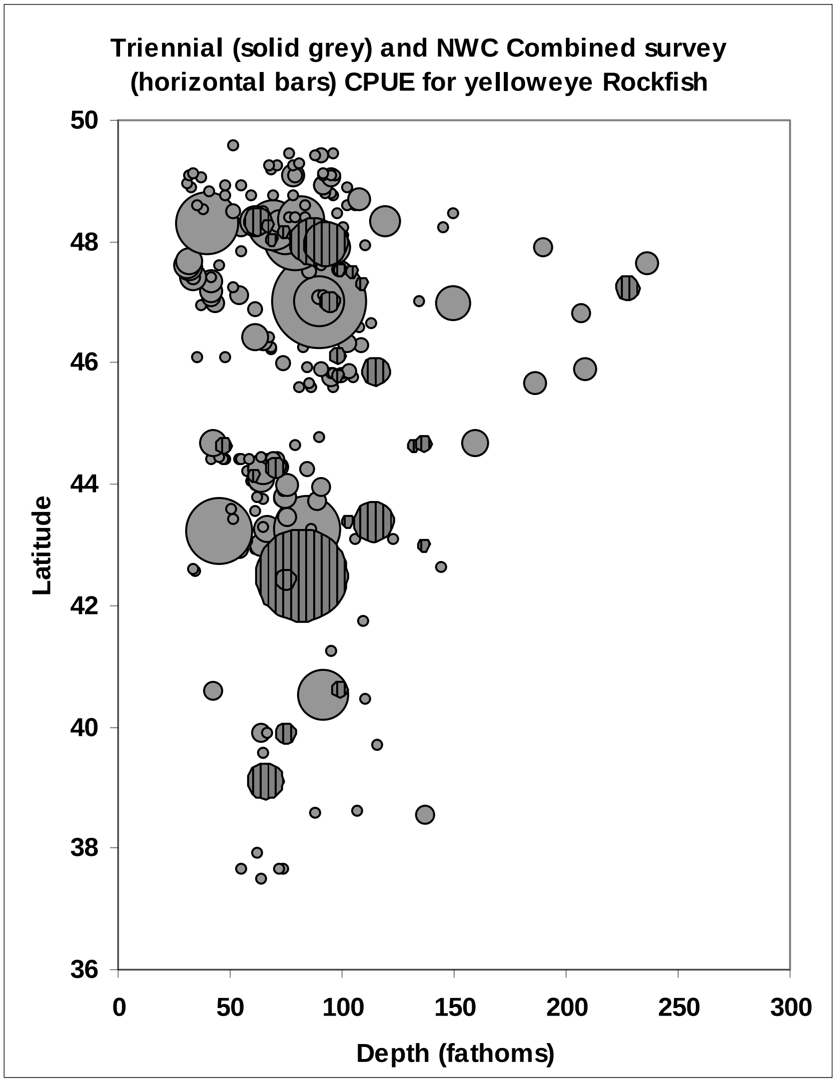

Figure 4-17. Index of west coast distribution of yelloweye rockfish by latitude and depth as determined by catch per tow in NMFS trawl surveys. Size of circle is proportional to yelloweye rockfish density at that location. Data from NWFSC's West Coast Groundfish Survey Database and the AFSC Triennial Shelf and Slope Survey Database.

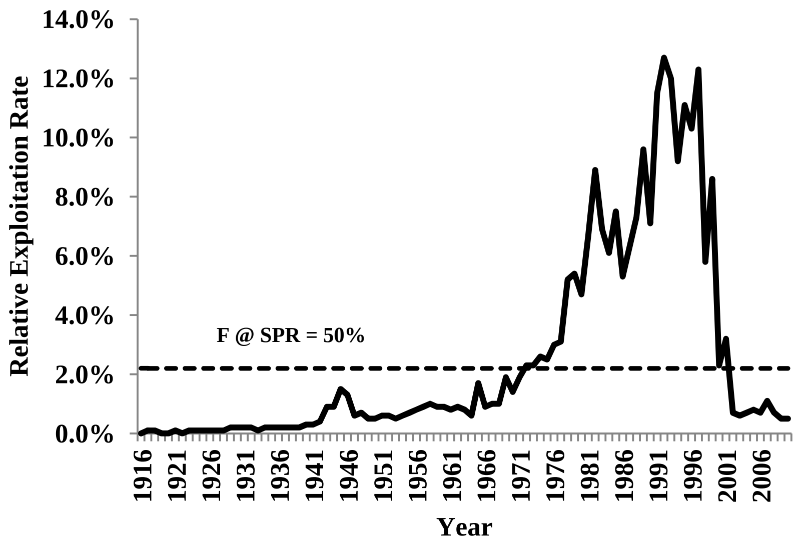

Figure 4-18. Time series of estimated relative exploitation rates (catch/biomass of age 8+ fish) of yelloweye rockfish, 1916-2010 (Taylor and Wetzel 2011).

Catch monitoring uncertainty is high given the relatively small contribution of yelloweye to rockfish market categories and the relatively large scale of recreational removals. In addition, since 2001, management restrictions have required nearly all yelloweye rockfish caught by recreational and commercial fishermen to be discarded at sea. Precisely tracking recreational catch inseason, especially in the California recreational fishery, has been a challenge.

The analysis of the integrated alternatives indicates how the variation of the canary ACL affects other fishing sectors and the predicted rebuilding progress of other overfished species. The percent of maximum projected mortality of each overfished species is an index of the influence of the canary ACL on the predicted progress of rebuilding for these species (Table 4-4 and Table 4-5). The amount of allowable canary harvest can directly affect predicted rebuilding progress of yelloweye rockfish, especially when the ACL is as low as 50 mt (ACL alternative b and integrated alternative 4a).

The 2013 and 2014 canary and yelloweye mortalities predicted for the nontrawl sectors limit fishing opportunities shoreward of the nontrawl RCA north of Pt. Conception, especially under the low canary ACL (ACL alternative d; integrated alternative 4a). Canary and yelloweye are the primary species that limit fishing opportunities for the nearshore and recreational sectors. The percent attainment of the preferred yelloweye allocation is relatively high for the nontrawl sectors and especially the nearshore and recreational sectors (Table 4-6 and Table 4-7). It is clear from the analysis of the integrated alternatives and from past management experience that when canary ACLs/OYs are down in the 50 mt range, canary can limit shelf and nearshore fishing opportunities more than yelloweye at the level of harvest prescribed in the current rebuilding plan and under the Preferred Alternative yelloweye ACL.

Rebuilding Duration

The shortest time to rebuild the coastwide yelloweye stock under a zero-harvest strategy (i.e., $T_{F=0}$) predicted in the 2011 rebuilding analysis is 2045. The one ACL alternative analyzed is predicted to extend rebuilding 22 years beyond $T_{F=0}$ and 7 years sooner than the current T_{TARGET} of 2074. Predicted yelloweye rebuilding progress under the range of integrated alternatives analyzed is not likely to vary substantially given the high percentage of the preferred yelloweye ACL predicted to be attained in the next management cycle (Table 4-4 and Table 4-5).

Rebuilding Probabilities

The ACL alternative analyzed has a predicted P_{MAX} of 72.9 percent and a probability of rebuilding by the target year of 2074 of 62.1 percent. The rebuilding probabilities do not vary substantially under the range of integrated alternatives analyzed.

4.1.1.4 Effects of ACL Alternatives for Nonoverfished Species Managed with Stock-Specific Harvest Specifications

For nonoverfished species where there was new scientific information including stock assessments or harvest policy changes, the Council considered more than one ACL prior to the development of the integrated alternatives. However, with the exception of longnose skate and widow rockfish, only a single ACL was brought forward for the development of the integrated alternatives. A range of alternatives for Pacific whiting are analyzed to understand the bycatch needs of the trawl sectors that target whiting; however, deciding 2013 and 2014 TACs for Pacific whiting occurs through the process established by the treaty agreement with Canada on Pacific Hake/whiting and the Whiting Act rather than through this proposed action. This section provides further information on the biological effects of the alternative TACs considered for nonoverfished species prior to the development of integrated alternatives. The biological effects in this section focus on the risk to the stock of becoming overfished.

Stock productivity and fishing mortality relative to projected biomass under the ACL alternatives are evaluated under biological impacts. Genetic diversity and prey availability are cumulative effects that cannot be differentiated across the ACL alternatives and are therefore only discussed below when the attribute was a major consideration in the ACL selection (e.g., prey availability in relation to the preferred shortbelly rockfish ACL). Discussion of what is known regarding the genetic diversity or prey availability and such ecological interactions regarding nonoverfished west coast groundfish species is summarized in the 2011 and 2012 Harvest Specifications and Management Measures FEIS (PFMC 2010a).

The performance of the management system to stay within specified annual OYs for currently nonoverfished groundfish species managed with stock-specific harvest specifications in recent years (2005-2010) is discussed to better understand the ability to stay within 2013 and 2014 ACLs (Table 4-12). Total mortality estimates are not yet available for 2011; however, trawl catch data in the 2011 trawl IFQ fishery are available (Table 4-13). Therefore, 2011 catch data for the trawl-dominant currently nonoverfished species managed with stock-specific harvest specifications are further discussed in the sections below.

Table 4-12. Specified annual OYs (mt), estimated annual total mortality (mt), and percent of OY attainment of nonoverfished west coast groundfish species managed with stock-specific harvest specifications, 2005-2010.

Species	Specified OYs, Estimated Total Mortality, and Percent of OY Attainment					
	2005	2006	2007	2008	2009	2010
Arrowtooth Flounder						
OY (mt)	5,800	5,800	5,800	5,800	11,267	10,112
Est. Mort. (mt)	3,706	3,105	3,099	3,409	5,443	4,090
% OY	63.9%	53.5%	53.4%	58.8%	48.3%	40.4%
Black RF (coastwide) a/						
OY (mt)	1,293	1,276	NA	NA	NA	NA
Est. Mort. (mt)	937	896	NA	NA	NA	NA
% OY	72.5%	70.2%	NA	NA	NA	NA
Black RF (CA & OR)						
OY (mt)	753	736	722	722	1,000	1,000
Est. Mort. (mt)	NA	NA	577	593	784	650
% OY	NA	NA	79.9%	82.1%	78.4%	65.0%
Black RF (WA)						
OY (mt)	540	540	540	540	490	464
Est. Mort. (mt)	NA	NA	260	156	207	199
% OY	NA	NA	48.1%	28.9%	42.2%	43.0%
Cabezon (CA)						
OY (mt)	69	69	69	69	69	79
Est. Mort. (mt)	80	106	42	39	51	47
% OY	116.4%	153.4%	61.4%	56.2%	73.9%	59.6%
CA scorpionfish b/						
OY (mt)	NA	NA	175	175	175	155
Est. Mort. (mt)	NA	NA	68	65	70	67
% OY	NA	NA	38.7%	37.0%	40.0%	43.0%
Chilipepper S						
OY (mt)	2,000	2,000	2,000	2,000	2,885	2,447
Est. Mort. (mt)	97	126	128	151	311	376
% OY	4.9%	6.3%	6.4%	7.6%	10.8%	15.3%
Dover sole						
OY (mt)	7,476	7,564	16,500	16,500	16,500	16,500
Est. Mort. (mt)	7,507	7,730	10,227	11,820	12,546	10,952
% OY	100.4%	102.2%	62.0%	71.6%	76.0%	66.4%

Species	Specified OYs, Estimated Total Mortality, and Percent of OY Attainment					
	2005	2006	2007	2008	2009	2010
English sole						
OY (mt)	3,100	3,100	6,237	6,237	14,326	9,745
Est. Mort. (mt)	1,222	1,336	914	436	501	311
% OY	39.4%	43.1%	14.7%	7.0%	3.5%	3.2%
Lingcod						
OY (mt)	2,414	2,414	6,170	6,170	5,278	4,829
Est. Mort. (mt)	890	952	706	574	581	450
% OY	36.9%	39.5%	11.4%	9.3%	11.0%	9.3%
Longnose skate c/						
OY (mt)	NA	NA	NA	NA	1,349	1,349
Est. Mort. (mt)	NA	NA	NA	NA	1,455	1,387
% OY	NA	NA	NA	NA	107.9%	102.8%
Longspine thornyhead (coastwide) d/						
OY (mt)	2,461	2,461	2,696	NA	NA	NA
Est. Mort. (mt)	750	854	928	NA	NA	NA
% OY	30.5%	34.7%	NA	NA	NA	NA
Longspine thornyhead N						
OY (mt)	NA	NA	2,220	2,220	2,231	2,175
Est. Mort. (mt)	NA	NA	NA	1,445	1,582	1,719
% OY	NA	NA	NA	65.1%	70.9%	79.0%
Longspine thornyhead S						
OY (mt)	NA	NA	476	476	395	385
Est. Mort. (mt)	NA	NA	NA	18	20	26
% OY	NA	NA	NA	3.7%	5.1%	6.7%
Pacific cod						
OY (mt)	1,600	1,600	1,600	1,600	1,600	1,600
Est. Mort. (mt)	864	385	101	39	248	346
% OY	54.0%	24.1%	6.3%	2.4%	15.5%	21.7%
Pacific whiting						
OY (mt)	269,069	269,545	242,591	269,545	135,939	193,935
Est. Mort. (mt)	261,212	267,707	215,340	250,205	122,165	165,717
% OY	97.1%	99.3%	88.8%	92.8%	89.9%	85.4%
Sablefish (coastwide) e/						
OY (mt)	7,761	7,634	5,933	5,933	*NA*	*NA*
Est. Mort. (mt)	6,543	6,470	5,545	6,078	*NA*	*NA*
% OY	84.3%	84.7%	93.5%	102.4%	*NA*	*NA*

Species	Specified OYs, Estimated Total Mortality, and Percent of OY Attainment					
	2005	2006	2007	2008	2009	2010
Sablefish N						
OY (mt)	7,486	7,363	5,723	5,723	7,052	6,471
Est. Mort. (mt)	NA	NA	NA	NA	6,625	6,167
% OY	NA	NA	NA	NA	93.9%	95.3%
Sablefish S						
OY (mt)	275	271	210	210	1,371	1,258
Est. Mort. (mt)	NA	NA	NA	NA	776	1,039
% OY	NA	NA	NA	NA	56.6%	82.6%
Shortbelly RF						
OY (mt)	13,900	13,900	13,900	13,900	6,950	6,950
Est. Mort. (mt)	NA	NA	1	9	9	7
% OY	NA	NA	0.0%	0.1%	0.1%	0.1%
Shortspine thornyhead (coastwide) d/						
OY (mt)	999	1,018	2,055	NA	NA	NA
Est. Mort. (mt)	796	853	1,194	NA	NA	NA
% OY	79.7%	83.8%	58.1%	NA	NA	NA
Shortspine thornyhead N						
OY (mt)	NA	NA	1,634	1,634	1,608	1,591
Est. Mort. (mt)	NA	NA	NA	1,313	1,557	1,308
% OY	NA	NA	NA	80.4%	96.8%	82.2%
Shortspine thornyhead S						
OY (mt)	NA	NA	421	421	414	410
Est. Mort. (mt)	NA	NA	NA	172	167	173
% OY	NA	NA	NA	40.9%	40.3%	42.1%
Splitnose S						
OY (mt)	461	461	461	461	461	461
Est. Mort. (mt)	237	162	143	177	203	140
% OY	51.5%	35.1%	31.1%	38.4%	44.0%	30.3%
Starry Flounder f/						
OY (mt)	NA	NA	890	890	1,004	1,077
Est. Mort. (mt)	NA	NA	30	21	28	38
% OY	NA	NA	3.3%	2.3%	2.8%	3.6%
Widow						
OY (mt)	285	289	368	368	522	509
Est. Mort. (mt)	199	214	259	238	195	173
% OY	69.8%	74.0%	70.4%	64.7%	37.4%	34.0%

Species	Specified OYs, Estimated Total Mortality, and Percent of OY Attainment					
	2005	2006	2007	2008	2009	2010
Yellowtail N						
OY (mt)	3,896	3,681	4,548	4,548	4,562	4,562
Est. Mort. (mt)	935	493	389	476	751	955
% OY	24.0%	13.4%	8.6%	10.5%	16.5%	20.9%

a/ Black rockfish have been managed with stock-specific harvest specifications north and south of the Columbia River through this period; however, only coastwide catches were reported in 2005 and 2006 NWFSC total mortality reports. Therefore, the OYs depicted in this table are the sum of north and south OYs specified in regulations.

b/ California scorpionfish was first managed with stock-specific harvest specifications in 2007. Prior to 2007, California scorpionfish was managed under the Minor Nearshore Rockfish South complex.

c/ Longnose skate was first managed with stock-specific harvest specifications in 2009. Prior to 2009, longnose skate was managed under the Other Fish complex.

d/ Shortspine and longspine thornyheads were managed with stock-specific harvest specifications north and south of 34º27’ N. latitude beginning in 2007 and coastwide prior to 2007. The 2007 NWFSC total mortality report only reported coastwide catches of thornyheads; the OYs in the table are the sum of the north and south OYs for both species in 2007.

e/ Sablefish have been managed with stock-specific harvest specifications north and south of 34º27’ N. latitude through this time period; however, only coastwide catches were reported in NWFSC total mortality reports through 2008. Thereafter, area-specific catches of sablefish have been reported. The 2005-2008 sablefish OYs depicted in this table are the sum of north and south OYs specified in regulations.

f/ Starry flounder was first managed with stock-specific harvest specifications in 2007. Prior to 2007, starry flounder was managed under the Other Flatfish complex.

Table 4-13. Allocations, total catch, and percent attainment of allocations of nonoverfished IFQ species in the 2011 shoreside trawl fishery, ranked by percent attainment of allocations.

Species	Allocation (lbs)	Total catch (lbs)	Attainment
Pacific whiting	204,628,442	200,984,738	98%
Sablefish North of 36º N.	5,613,719	5,285,233	94%
Sablefish South of 36º N.	1,170,390	1,009,688	86%
Shortspine thornyheads North of 34º27' N.	3,156,138	1,572,543	50%
Longspine thornyheads North of 34º27' N.	4,334,839	2,116,811	49%
Widow rockfish	755,348	303,681	40%
Dover sole	49,018,682	17,252,397	35%
Pacific halibut (IBQ) North of 40º10' N.	257,524	65,349	25%
Yellowtail rockfish North of 40º10' N.	6,821,455	1,629,140	24%
Pacific cod	2,502,247	556,690	22%
Chilipepper rockfish South of 40º10' N.	3,252,370	685,026	21%
Arrowtooth flounder	27,406,105	5,476,847	20%
Shortspine thornyheads South of 34º27' N.	110,231	18,579	17%
Lingcod	4,107,873	627,839	15%
Splitnose rockfish South of 40º10' N.	3,045,245	60,905	2%
Starry flounder	1,471,586	25,924	2%
English sole	41,166,808	298,215	1%

Arrowtooth Flounder

The last full stock assessment of arrowtooth flounder (Kaplan and Helser 2008) estimated the spawning biomass to be at 79 percent of the estimated unfished spawning biomass at the start of 2007. Scientific uncertainty in the arrowtooth flounder assessment is relatively high. The SSC categorized the arrowtooth stock as a category 2 species since highly uncertain historical discards and estimates of natural mortality make this a less certain assessment than those for other assessed stocks.

Stock Productivity

Arrowtooth flounder are a very productive stock with high growth rates, high natural mortality rates, and a high stock-recruitment steepness. A mean flatfish steepness of 0.8 was determined in a 2010 meta-analysis conducted by the SSC and described in the 2011-2012 specifications FEIS (PFMC 2010a). A steepness of 0.902 was assumed in the 2007 arrowtooth flounder assessment based on a flatfish meta-analysis conducted by Dr. Martin Dorn. Arrowtooth received a relatively high productivity score of 1.95 in the PSA analysis (Table 4-2).

The 2007 assessment estimated strong recruitments for most years between 1998 and 2007, with a particularly strong recruitment of the 1999 year class. That year class has dominated the population and fishery for the last ten years but is now diminished through high natural mortality. However, the 2007 assessment projects a very healthy stock through 2018 under catch streams much higher than has been realized since then.

Fishing Mortality

The target F_{MSY} SPR harvest rate for arrowtooth is 30 percent. The 2007 assessment estimated annual SPR harvest rates between 1997 and 2006 of 49-75 percent, substantially lower than the target. The arrowtooth ACL/OY has never been exceeded (Table 4-9 and Table 4-12).

Only one 2013 and 2014 arrowtooth flounder ACL alternative is considered, which sets ACLs equal to the specified ABCs. This is the same basis for deciding the No Action 2012 ACL. However, the 2013 and 2014 ACLs are substantially lower than the No Action ACL due to the OFL being biased low. The 1999 year class has been dominant in the population in the last ten years and is now a very minor component of the spawning biomass with the high natural mortality of the stock. The reason the OFL projected from the 2007 assessment is biased low is that the OFL projections assume the annual removal of the entire projected OFL rather than the average ACL/OY or average catch. Catch of arrowtooth has always been much lower than the OFL (Table 4-12); therefore, the current exploitable biomass upon which the OFL is based, is much higher than projected. The SSC and Council will explore better projection rules for future management cycles, but for now, the biased OFLs (and hence the lower ABCs/ACLs) are proposed for 2013-2014. The No Action ACL cannot be considered in 2013 and 2014 since it is considerably higher than the projected OFLs.

Arrowtooth flounder are a trawl-dominant species and are not particularly valuable. Given that arrowtooth are caught on the northern shelf where Pacific halibut, darkblotched rockfish, and yelloweye rockfish are caught incidentally to arrowtooth, this is not a species with a high attainment since valuable quota for these highly constraining species would have to be invested to target arrowtooth. About 20 percent of the arrowtooth quota was attained in the 2011 fishery (Table 4-9). Management uncertainty is low with the 100 percent observer coverage for the trawl fleet under trawl rationalization. Given the low management uncertainty and the potential for under-attainment of quota, the preferred ACLs are not expected to result in any stock concerns. The PSA vulnerability score of 1.21 indicates a low concern of overfishing.

Black Rockfish off California and Oregon

Black rockfish off California and Oregon are a healthy stock with biomass above the target level of 40 percent. Spawning biomass depletion is projected to remain healthy through 2016 under the 1,000 mt constant catch strategy implemented since 2009 (Table 4-14). This is the only ACL alternative analyzed in detail in this EIS and is the same as the No Action 2012 ACL.

Stock Productivity

The 2007 southern black rockfish assessment assumed a steepness of 0.6 based on the Dorn meta-analysis of rockfish steepness done at that time. The revised Dorn rockfish steepness meta-analysis now predicts a mean steepness of 0.76 (Figure 4-8). The PSA productivity score of 1.33 indicates a stock of moderate productivity.

The 2007 assessment estimated above-average recruitments in the 1990s (with particularly strong recruitments in 1994 and 1999), 2000, 2001, and 2007; and below-average recruitments during 2002-2006. These recruitments are projected to keep the stock healthy under the 1,000 mt constant catch strategy implemented in 2009 (Table 4-14).

Fishing Mortality

The nearshore commercial and recreational fisheries that take black rockfish are managed well in California and Oregon, and ACLs/OYs have not been exceeded (Table 4-12). Stock depletion is likely higher than projected in Table 4-14 since the entire ACL has not been removed. The PSA vulnerability score of 1.94 indicates a stock of medium concern for overfishing.

Table 4-14. Projected spawning biomass and depletion of southern black rockfish assuming the base model in the 2007 assessment under the 1,000 mt constant catch strategy.

Year	Total Catch (mt)	Spawning Biomass (mt)	Depletion (%)
2007	696	3,227	70.5
2008	696	3,293	71.9
2009	1,000	3,284	71.7
2010	1,000	3,153	68.9
2011	1,000	2,972	64.9
2012	1,000	2,776	60.6
2013	1,000	2,601	56.8
2014	1,000	2,469	53.9
2015	1,000	2,384	52.1
2016	1,000	2,338	51.1

Black Rockfish off Washington

The black rockfish stock off Washington is healthy and is projected to remain healthy under the level of harvest proposed for 2013 and 2014. Only one ACL alternative is proposed that sets the 2013 and 2014 ACLs equal to the ABCs. This is the same basis used to decide the No Action 2012 ACL. The preferred ACLs are slightly less than the No Action ACL since the OFL is trending down slightly in projections due to the average recruitment assumption posited in the 2007 assessment.

Stock Productivity

The 2007 assessment assumed a steepness 0.6 in the stock-recruitment relationship of the northern black rockfish stock based on the Dorn prior (as was done in the southern black rockfish assessment). Steepness may be even higher based on the revised Dorn prior (Figure 4-8). The PSA productivity score of 1.33 indicates a stock of moderate productivity.

The assessment estimates strong recruitments in the 1990s (including strong recruitments in 1994 and 1999 as also estimated in the southern assessment) and above-average recruitments from 2002-2006.

Fishing Mortality

Total mortality of black rockfish off Washington has consistently been well-below established ACLs/OYs (Table 4-12). The stock is targeted in the Washington recreational fishery; however, that fishery is tightly regulated to minimize darkblotched and yelloweye rockfish impacts. There is also a relatively low tribal take of black rockfish off Washington. There are no commercial nearshore fisheries off Washington. The PSA vulnerability score of 1.94 indicates a stock of medium concern for overfishing.

Cabezon off California

The most recent cabezon assessment was done in 2009. The 2009 assessment modeled two California sub-stocks, and also evaluated the population as a coastwide California stock. The SSC recommended combining the results of the area models for the two California sub-stocks of cabezon for use in deciding statewide harvest specifications. The assessment estimates a healthy spawning biomass of cabezon off California at the start of 2009 of 48.3 percent of unfished biomass.

Stock Productivity

The 2009 cabezon assessment assumed a steepness of 0.7 for all models. The PSA productivity score of 1.72 indicates a stock of relatively high productivity.

Recruitment deviations were estimated from 1970-2006 for both of the assessed substocks. Recruitment patterns are distinctly different for the substocks occurring north and south of Pt. Conception at 34º27’ N. latitude. Large recruitment events in the 1970s and 1990s in the north and the south have increased spawning biomass to healthy levels. Interannual variation in recruitment is greater in the north. The large increase in biomass in the south was driven by a large 1999 recruitment, the largest seen in the time series. Large recruitments in the southern substock are estimated immediately after major El Niño events (e.g., 1984 and 1994 recruitments). Recruitment events for the northern substock appear to lag large recruitments in the south by a year.

Fishing Mortality

Exploitation of the southern cabezon substock began in the 1960s and caused a substantial decline in stock biomass. The large recruitments discussed above and a reduction in exploitation rates in the late 1990s and 2000s caused the substock to rebound to healthy levels. Exploitation in the north also increased in the 1960s, although fishing pressure was not as great. The spawning biomass of the northern substock declined, although not as dramatically as in the south. The stock rebounded with good recruitment and a reduction in fishing pressure. The depletion of the two substocks was estimated to be 45 and 60 percent in the northern and southern substocks, respectively at the start of 2009.

The cabezon stock(s) off California were first assessed in 2003, and OYs were first specified in 2004. Specified OYs were exceeded in each year through 2006, but a reduction in cumulative landing limits adequately reduced fishing mortality starting in 2007. The percent of OY attainment ranged from 56 to 74 percent in the 2007-2010 period (Table 4-12).

Only one ACL alternative is proposed that sets the 2013 and 2014 ACLs equal to the ABCs. This is the same basis used to decide the No Action 2012 ACL. The preferred ACLs are slightly less than the No Action ACL since the OFL is trending down slightly in projections due to the average recruitment assumption posited in the 2009 assessment. Both substocks are projected to remain healthy under these harvest limits.

The PSA vulnerability score of 1.68 indicates a low risk of overfishing.

Cabezon off Oregon

The 2009 assessment of the Oregon sub-stock of cabezon was the first ever for cabezon in Oregon waters. Only one index of abundance was used for modeling the Oregon cabezon sub-stock (the Oregon Recreational Boat Survey or ORBS CPUE index). The Oregon model was robust to almost all data and parameter manipulation trials except the removal of the ORBS survey. Removal of the only abundance index causes the population to drop sharply below the overfished level and absolute biomass to be much smaller than in the base case. The 2009 assessment indicated a healthy stock status for Oregon cabezon at 52.4 percent depletion at the start of 2009. Unlike the assessments for the California sub-stocks, the assessment of the Oregon cabezon sub-stock does not show recent increases in spawning biomass. While the uncertainty in the estimated depletion level of the Oregon sub-stock is generally low, uncertainty in the estimated spawning biomass is high.

Stock Productivity

Steepness in the 2009 assessment of the Oregon substock of cabezon was assumed to be 0.7. Recruitment in the Oregon substock of cabezon was estimated to be less dynamic than that for the California substocks. The PSA productivity score of 1.72 indicates a stock of relatively high productivity.

The assessment estimates large recruitments in 1999 and 2004. Uncertainty in estimating recruitment for the Oregon substock is less than the recruitment estimation for the California substocks.

Fishing Mortality

Cabezon exploitation in Oregon started in the 1970s and caused the biomass to decline. However, exploitation was not excessive and the estimated spawning biomass has always been above the B_{MSY} target.

Only one ACL alternative is proposed that sets the 2013 and 2014 ACLs equal to the ABCs. This is the same basis used to decide the No Action 2012 ACL. The preferred ACLs are slightly less than the No Action ACL since the OFL is trending down slightly in projections due to the average recruitment assumption posited in the 2009 assessment. The stock is projected to remain healthy under these harvest limits.

The PSA vulnerability score of 1.68 indicates a low risk of overfishing.

California Scorpionfish

California scorpionfish were assessed in 2005 (Maunder, *et al.* 2006) in the southern California Bight south of Point Conception at 34º27’ N. latitude to the U.S.-Mexico border. The stock assessment indicated the California scorpionfish stock was healthy with an estimated spawning stock biomass of 79.8 percent of its initial, unfished biomass in 2005.

In most years, 99 percent or more of the landings occur in the southern California ports. The California nearshore FMP includes California scorpionfish. The stock is managed by the state under provisions for improved fishery monitoring and research data collection.

Stock Productivity

A steepness value of 0.7 was assumed for California scorpionfish in the 2005 assessment. The PSA productivity score of 1.83 indicates a stock of relatively high productivity, especially for a rockfish.

The assessment noted a high recruitment variation in the stock and recruitments in the 1990s and early 2000s were estimated to be substantially above average. Relatively large recruitment events were estimated starting in 1984.

Fishing Mortality

A substantial but unknown portion of the stock occurs in Mexican waters. The exploitation of the stock in Mexican waters is unknown and the connectivity of that stock with the U.S. stock in the Southern California Bight is also unknown.

Commercial catch records for scorpionfish were available beginning in 1928. Commercial catches were the dominant removals until the 1990s when the recreational catch became dominant. High catches and low recruitments in the 1950s and 1960s precipitated a decline in biomass. Stock biomass has been on an increasing trend since the mid-1970s.

Only one ACL alternative is proposed that sets the 2013 and 2014 ACLs equal to the ABCs. This is the same basis used to decide the No Action 2012 ACL. The preferred ACLs are slightly less than the No Action ACL since the OFL is trending down slightly in projections due to the average recruitment assumption posited in the 2005 assessment. The stock is projected to remain healthy under these harvest limits.

The PSA vulnerability score of 1.41 indicates a low risk of overfishing.

Chilipepper Rockfish South of 40°10' N. Latitude

The last full assessment of chilipepper rockfish was conducted in 2007 (Field 2008). The 2007 assessment indicated the stock was healthy with a spawning stock biomass estimated to be at 70 percent of its initial, unfished biomass in 2006.

Stock Productivity

Steepness in the 2007 assessment was fixed at 0.57, which was the mean of the prior probability distribution in the base model. Since steepness was thought to be poorly specified in the model, this parameter was chosen as the major axis of uncertainty. The decision table projected outcomes for a low productivity and a high productivity model using steepness values of 0.34 and 0.81, respectively. The PSA productivity score of 1.83 indicates a stock of relatively high productivity, especially for a rockfish.

There have been strong recruitments estimated for the stock in the late 1960s, early 1970s, and very strong recruitments in 1984 and 1999. The 1999 year class was the biggest recruitment event in the assessment time series, causing spawning biomass to increase substantially in the last ten years.

Fishing Mortality

Chilipepper rockfish have been one of the most important commercial target species in California since the late 1800s and was also a recreational target in southern California waters. Catches and exploitation rate has declined substantially since the early 1990s. While chilipepper has always been an important target species in California, the exploitation rate has rarely exceeded the F_{MSY} target of a 50 percent SPR. Exploitation rates declined substantially since the late 1990s with the implementation of more restrictive management measures to rebuild depleted stocks.

There is little concern that fishing in 2013 and 2014 will have any negative impacts on the chilipepper rockfish stock since the center of the stock's distribution is in the core RCA. Chilipepper ACLs/OYs have been substantially underharvested since implementation of the RCAs in 2003. The annual total mortality in 2005-2009 averaged less than 9 percent of OYs (Table 4-12).

The PSA vulnerability score of 1.35 indicates a low risk of overfishing.

Dover Sole

The new Dover sole assessment conducted in 2011 indicates the stock is healthy with an increasing abundance trend. Spawning stock biomass depletion was estimated to be 83.7 percent of unfished biomass at the start of 2011. The 2011 Dover sole assessment is data-rich and the species is readily tracked in the NMFS trawl survey (most survey tows are positive for Dover).

Stock Productivity

Steepness in the 2011 Dover sole assessment was fixed at 0.8, the mean steepness estimated in the SSC's 2010 meta-analysis of flatfish productivity (PFMC 2010a). While the 2011 assessment was considered data-rich, estimates of steepness are uncertain partly because the stock has not been fished to low levels to understand potential recruitment at low spawning biomass. The PSA productivity score of 1.8 indicates a stock of relatively high productivity.

There is little information regarding recruitment prior to 1960. Estimates of recruitment appear to oscillate between periods of low recruitment and periods of high recruitment. The five largest recruitments were predicted in the years 2000, 1992, 1988, 1965, and 1991. The five smallest recruitments were predicted in 2003, 2002, 2004, 2006, and 1974.

Fishing Mortality

The spawning biomass of Dover sole reached a low in the mid-1990s before beginning to increase throughout the last decade. The estimated depletion has remained above the 25 percent biomass target and it is unlikely that the stock has ever fallen below this threshold. Throughout the 1970s, 1980s, and 1990s the exploitation rate and SPR generally increased, but never exceeded the SPR 30 percent F_{MSY} target. Recent exploitation rates on Dover sole have been much lower than F_{MSY}, even after management increased catch levels in 2007.

Only one ACL alternative is proposed that sets the 2013 and 2014 ACL equal to the No Action ACL of 25,000 mt. The preferred 2013 and 2014 ACL is substantially lower than the ABCs. Given the productivity of the stock and constraints on fishing, projections assuming a 25,000 mt constant annual catch predict the stock would remain above the target B_{MSY} level in the next ten years even under the more pessimistic and less likely low state of nature in the assessment decision table (Table 4-15). Higher ACLs than the preferred No Action ACL were initially considered but rejected from more detailed analysis since the current market is projected to limit the take of Dover sole in the next management cycle to less than 25,000 mt. Higher ACLs are predicted to be sustainable; Table 4-15 indicates that future mortalities as high as the OFL (above the allowable ACL maximum of the ABC) would maintain the stock above the target level of $B_{25\%}$ under the most likely base case model in the 2011 assessment. The effective limit of Dover sole in the 2013 and 2014 shorebased IFQ fishery is likely to be driven by the sablefish allocation, which is decreasing relative to No Action. Sablefish quota is needed to target Dover sole and the other DTS species using trawl gear. Sablefish IFQ quota is also used in a single-species target fishery using fixed gears. The competition and price for sablefish quota is affected by Asian sablefish demand and supply from north Pacific fisheries outside the west coast EEZ (e.g., BC and the Gulf of Alaska fisheries). It may be the case that the supply and demand of west coast Dover sole will remain limited until there is an increased harvestable surplus of sablefish above the levels provided under the No Action and preferred ACLs.

Dover sole is a trawl-dominant species managed using IFQs in the rationalized fishery. Despite Dover sole being an important target species, only 35 percent of the 2011 quota was attained in the IFQ fishery (Table 4-13).

The PSA vulnerability score of 1.54 indicates a low risk of overfishing.

Table 4-15. Projected spawning biomass and depletion of Dover sole under three catch streams and two states of nature (the low state of nature and base case models) analyzed in the 2011 stock assessment, from Hicks and Wetzel (2011).

Catch Stream	Year	Catch (mt)	State of nature: Low $M_f = 0.110$ $M_m = 0.125$ Spawning biomass (mt)	Low Depletion	Base case $M_f = 0.117$ $M_m = 0.142$ Spawning biomass (mt)	Base case Depletion
OFL	2013	90,411	240,029	70.20%	377,601	80.40%
	2014	75,517	195,784	57.20%	329,856	70.20%
	2015	64,885	158,399	46.30%	289,873	61.70%
	2016	57,488	127,579	37.30%	257,379	54.80%
	2017	52,453	102,664	30.00%	231,515	49.30%
	2018	49,065	82,887	24.20%	211,283	45.00%
	2019	46,768	67,323	19.70%	195,619	41.60%
	2020	45,158	54,995	16.10%	183,484	39.10%
	2021	43,964	45,020	13.20%	173,995	37.00%
	2022	43,017	36,676	10.70%	166,455	35.40%
Current ACL	2013	25,000	240,029	70.20%	377,601	80.40%
	2014	25,000	228,381	66.80%	362,668	77.20%
	2015	25,000	217,371	63.60%	348,791	74.20%
	2016	25,000	207,555	60.70%	336,770	71.70%
	2017	25,000	199,131	58.20%	326,838	69.60%
	2018	25,000	192,128	56.20%	318,967	67.90%
	2019	25,000	186,405	54.50%	312,909	66.60%
	2020	25,000	181,701	53.10%	308,280	65.60%
	2021	25,000	177,758	52.00%	304,702	64.80%
	2022	25,000	174,364	51.00%	301,870	64.20%
Status quo catches	2013	12,127	240,029	70.20%	377,601	80.40%
	2014	12,135	234,602	68.60%	368,952	78.50%
	2015	12,143	229,771	67.20%	361,268	76.90%
	2016	12,149	226,014	66.10%	355,274	75.60%
	2017	12,154	223,476	65.30%	351,155	74.70%
	2018	12,157	222,149	65.00%	348,848	74.20%
	2019	12,158	221,870	64.90%	348,089	74.10%
	2020	12,158	222,375	65.00%	348,485	74.20%
	2021	12,158	223,398	65.30%	349,654	74.40%
	2022	12,157	224,732	65.70%	351,296	74.80%

English Sole

The 2007 assessment of English sole estimated the spawning biomass to be at 116 percent of the exploited equilibrium level at the start of 2007. However, the influence of the strong 1999 year class on projected spawning biomass has diminished through natural and fishing mortality. The English sole assessment is relatively data-rich and this species is readily tracked in the trawl survey.

Stock Productivity

There is little evidence for a strong stock-recruitment relationship, with some of the largest recruitments occurring at moderate levels of spawning biomass. This corresponds to the relatively high estimate of steepness of 0.80 in the assessment. In general, recruitment deviations are well-informed by the data between 1940 and 2000.

Following two decades of low recruitments, strong year classes were estimated for 1995, 1998-2000, and 2002. The data indicate that the 1999 year class was the largest in the time-series.

The PSA productivity score of 2.25 indicates a very productive stock, which is true for most nearshore and shelf flatfishes.

Fishing Mortality

The estimated SPR for English sole has never been below the proxy target of 30 percent for flatfish. Exploitation rates were highest from the late 1940s to the early 1990s. Since 1992, the intensity of exploitation has been substantially less, resulting in higher SPR levels. This corresponds to a relative exploitation rate (catch/biomass of age 3 and older fish) history that is high from the late 1940s to the early 1990s, and steadily declining to very low levels over the last 15 years.

English sole are a trawl-dominant species. Management uncertainty is low with the 100 percent observer coverage for the trawl fleet under trawl rationalization. Very small amounts of English sole were landed in the 2011 IFQ fishery with only 1 percent of the quota attained. This is due to low trawl effort on the shelf since such efforts require investment of limited quota for Pacific halibut, darkblotched rockfish, and yelloweye rockfish.

Only one 2013 and 2014 English sole ACL alternative is considered, which sets ACLs equal to the specified ABCs. This is the same basis for deciding the No Action 2012 ACL. However, the 2013 and 2014 ACLs are substantially lower than the No Action ACL due to the OFL being biased low. The 1999 year class has been dominant in the population in the last ten years and is now a very minor component of the spawning biomass with the high natural mortality of the stock. The reason the OFL projected from the 2007 assessment is biased low is that the OFL projections assume the annual removal of the entire projected OFL rather than the average ACL/OY or average catch. Catch of English sole has always been much lower than the OFL; therefore, the current exploitable biomass upon which the OFL is based is much higher than projected. The SSC and Council will explore better projection rules for future management cycles, but for now, the biased OFLs (and hence the lower ABCs/ACLs) are proposed for 2013-2014. The No Action ACL cannot be considered in 2013 and 2014 since it is considerably higher than the projected OFLs.

The PSA vulnerability score of 1.19 shows a very low concern of overfishing on the stock.

Lingcod

The 2009 lingcod assessment modeled two west coast stocks, both of which were estimated to be healthy in 2009 with depletion rates of 74 and 62 percent, respectively for the southern and northern stocks.

Stock Productivity

Steepness was fixed at 0.8 in the 2009 assessment. The PSA productivity score of 1.75 indicates a stock of relatively high productivity.

Recruitments in the North were estimated from 1928-2007, with bias correction ramping in from 1950 to 1964 as data becomes informative. The base model indicates a very strong recruitment event in 1964, a secondary event in 1970, and recent relatively strong recruitments in 1999-2002, with fairly high recruitment in 2006 as well. Recruitments in the south were estimated from 1928-2007, with bias correction ramping in from 1960 to 1974 as data becomes informative. The base model indicates relatively strong recruitment events in 1976, 1983, and 1999-2003, similar to the period of increased recruitment in the north, with a very high but uncertain recruitment in 2007.

Fishing Mortality

Lingcod exploitation coastwide was above the target rate for most of the 1970s through the 1990s, driving the stock below the MSST and into an overfished condition. The stock was successfully rebuilt by 2006 based on good recruitments and very low fishing mortality rates. The SPR for northern lingcod has been above the proxy target of 45 percent (indicating fishing mortality rates below the target) since 1998, and in recent years has been far above that level. The SPR for the southern lingcod stock has been above the proxy target of 45 percent since 2001, and in recent years has been far above that level.

The Council only advanced the one lingcod ACL alternative with 2013 and 2014 ACLs north and south of 40º10’ N. latitude equal to the ABCs. The ABCs were decided using the same sigma and P* values used for the 2011 and 2012 ABC specifications. The only difference in the analytical basis for the No Action 2012 lingcod ACLs is these ACLs are stratified north and south of 42º N. latitude, whereas the proposed ACLs are stratified north and south of 40º10’ N. latitude (see next section for details).

The PSA vulnerability score for lingcod is 1.55, indicating a low risk of overfishing of the stock. It is likely that 2013 and 2014 total catches will be well-below the preferred lingcod ACLs since fishing on the shelf will be limited by the RCAs recommended under the proposed action.

Lingcod Management Line Shift

The Council recommended separate ACLs for the northern and southern stocks to be specified north and south of the management line at 40º10’ N. latitude. The most recent assessment conducted in 2009 provided two area assessments north and south of the California-Oregon border at 42º N. latitude, which was the basis for 2011 and 2012 harvest specifications. The recommended shift to the 40º10’ N. latitude management line is to not overly encumber the commercial fishing industry, which is required to fish within a single management area within one trip. Maintaining the lingcod management line at 42º N. latitude would create two management areas stratified at 40º10’ N. latitude and 42º N. latitude. This would especially burden vessels home ported out of Brookings, Crescent City, Eureka, and Ft. Bragg, since they would have to restructure their current fishing practices to avoid a violation of the management line crossover provisions.

Shifting the lingcod management line south to 40º 10’ N. latitude should not have negative biological impacts since Cape Mendocino is a natural biogeographic break in the California Current ecosystem. It is stated in the

2009 assessment that a management break at Cape Mendocino would be likely more biologically accurate than stratifying the assessment north and south of 42º N. latitude. In general, given the crossover provisions and the other regulations that foster area management strategies, the fewer latitudinal management lines there are, the less burdened the offshore commercial fishery will be. Two major biogeographic breaks occur on the west coast at Pt. Conception at 34º27' N. latitude and Cape Mendocino approximately at 40º10' N. latitude, and many stocks show differences north and south of these latitudes. These biogeographic breaks are probably the more appropriate latitudes to specify management lines, given how north-south physical processes such as current patterns tend to be different, creating stock differences for species affected by these different physical processes. The lingcod management line shift is therefore biologically responsible and less of a burden to industry. While not contemplated in this action, shifting the sablefish management line from 36º N. latitude to 34º27' N. latitude would likewise be an appropriate shift for the same reasons.

The lingcod STAT was asked to estimate the relative exploitable lingcod biomass north and south of 40º10' N. latitude to enable this management line shift. They evaluated the swept area biomass estimates calculated annually (2003-2010) from the NMFS NWFSC trawl survey, which indicated that 48 percent of the lingcod biomass for the stock south of 42º N. latitude occurred between 40º10' N. latitude and 42º N. latitude. Therefore, 48 percent of the 2013 and 2014 OFLs projected in the 2009 lingcod assessment for the southern lingcod stock were added to OFLs proposed for the stock north of 40º10' N. latitude. Likewise, 48 percent of the projected OFLs for the southern stock were subtracted from the OFLs proposed for the stock south of 40º10' N. latitude. Given that the trawl survey is the main fishery-independent tuning index of biomass in the assessment, using swept area biomass from the trawl survey to estimate relative biomass north and south of 40º10' N. latitude is appropriate.

Longnose Skate

The longnose skate stock is healthy based on the 2007 assessment, which projected a continued healthy status under the harvest levels specified since 2009 when the stock was removed from the Other Fish complex and first managed with stock-specific harvest specifications.

Stock Productivity

Steepness of the stock-recruitment curve was fixed at a value of 0.4, to reflect the K-type reproductive strategy of the longnose skate. Recruitments were deterministic in the assessment and recruitment deviations were not estimated. The PSA productivity score of 1.53 indicates a stock of moderate productivity.

Fishing Mortality

Historically, the exploitation rate for the longnose skate has been low. It reached its maximum level of 4.02 percent in 1981, which is below the proxy exploitation rate of 4.26 percent associated with an SPR of 45 percent. The actual MSY exploitation rate may be lower than that, but the SSC recommended continued use of the 45 percent proxy SPR for longnose skate until a meta-analysis of MSY harvest rates for elasmobranchs is conducted next year (this analysis is expected to inform OFLs for 2015 and beyond). The 2007 exploitation rate was estimated to be 1.25 percent.

There are two 2013-2014 ACL alternatives adopted for detailed analysis: the No Action ACL of 1,349 mt and the preliminary preferred ACL of 2,000 mt. Both alternatives are projected to maintain stock depletion above the $B_{40\%}$ target under the most likely base case model in the 2007 assessment. The $F_{45\%}$ catch stream with the 40-10 harvest control rule assumes annual harvests of 2,600-3,400 mt, yet still projects a healthy stock through 2018 (Table 4-16). The Council proposes the 2,000 mt ACL for longnose skate in recognition of increased targeting and demand which led to the 2009 and 2010 OYs being exceeded (Table 4-12). It is noted that the assessment assumed 50 percent of discarded longnose skate in the trawl fishery survive, a survival rate supported by research on skate discards (see Appendix C for more information). However, the reconciled total mortalities of longnose skate in 2010 fisheries does not apply a 50 percent survival of trawl discards and, in fact assumes 100 percent mortality of discards. If the 50 percent survival of trawl discards was applied to reconcile the total mortality of longnose skate in 2009 and 2010, the mortality would not have exceeded the specified OYs. Regardless, the recent upward trend in market demand, ex-vessel value, and landed catch of longnose skate would compel consideration for a higher ACL. The SSC recommended discard mortality assumptions be consistent between assessments and management. Although the discard mortality assumptions used in the longnose skate assessment are based on very limited information, they represent the best information available. The SSC recommended that this information be used for management of longnose skate. The biological risk of specifying the higher longnose skate ACL of 2,000 mt is low based on the PSA vulnerability score and the projected biomass and depletion in Table 4-16.

Gertseva (2007) provided the following evidence to assume a 50 percent discard mortality rate. To date, no studies have been conducted to estimate the mortality of discarded longnose skate or any other skate. In tagging studies conducted in Canada (Gordon McFarlane, Pacific Biological Station, Fisheries and Oceans Canada, pers. com.), tagged skates were recovered several times in trawl surveys, indicating that skates can survive trawl capture and on-deck sorting time. Anecdotal evidence from commercial fisheries also indicates that skates are generally durable, and can handle capture and release well. However, many factors, such as trawl time, handling techniques, and time spent on the deck certainly affect skate survival.

If the total fishing mortality of longnose skate was indeed greater than specified OYs in 2009 and 2010 (i.e., if discard mortality is assumed to be 100 percent), this outcome would compel a review of the AMs to insure this is not a chronic result since the FMP and NS1 guidelines require consideration of better AMs when ACLs/OYs are exceeded more often than one in four years. Detailed analysis and discussion of management and accountability measures for longnose skate are provided in Appendix C.

The PSA vulnerability score of 1.68 indicates a low risk of overfishing.

Table 4-16. Projected longnose skate spawning stock biomass and depletion under two catch streams assuming the base case model in the 2007 assessment (Gertseva and Schirripa 2008).

Forecast	Year	Q=0.83 BASE Total catch (mt)	Spawning Stock Biomass (mt)	Depletion
$F_{45\%}$ with 40-10 adjustment for base scenario	2009	3,428	4,673	66%
	2010	3,269	4,424	63%
	2011	3,128	4,195	60%
	2012	3,006	3,985	57%
	2013	2,902	3,794	54%
	2014	2,816	3,621	51%
	2015	2,745	3,465	49%
	2016	2,686	3,327	47%
	2017	2,638	3,206	46%
	2018	2,598	3,100	44%
50% increase in average 2004-2006 landings and discard mortality for base scenario	2009	1,349	4,673	66%
	2010	1,349	4,649	66%
	2011	1,349	4,624	66%
	2012	1,349	4,599	65%
	2013	1,349	4,572	65%
	2014	1,349	4,542	65%
	2015	1,349	4,509	64%
	2016	1,349	4,475	64%
	2017	1,349	4,439	63%
	2018	1,349	4,402	63%

Longspine Thornyhead

The most recent stock assessment (Fay 2006) indicated that the longspine thornyhead stock was healthy with an estimated spawning stock biomass at 71 percent of its initial, unfished biomass in 2005.

Stock Productivity

Annual deviations about this stock-recruitment curve were estimated for the years 1980 through 2002. The steepness parameter (h) was fixed at 0.75, and a likelihood profile over this parameter showed little sensitivity in the results to the value assumed for this parameter. The impact of recruitment variability on the biomass for longspine thornyhead is low due to the long-lived nature of the species. The bulk of the biomass for this stock is contained in a large number of old age-classes. Estimation of recruitment events is therefore difficult, and information is only really available to estimate recruitment for recent years when size-composition data from the slope surveys are available. Strong year classes were estimated for 1982-83 and 1992-93, although the absolute increase in numbers from the average recruitment in these years was small.

The PSA productivity score of 1.47 indicates a stock of moderate productivity.

Fishing Mortality

West coast longspine thornyhead are estimated to be well-above the management target and the current fishing mortality rate is substantially lower than the F_{MSY} proxy of $F_{50\%}$. Fishing mortality rates were estimated to be higher than $F_{50\%}$ in the 1990s during the expansion of the fishery, but have since declined to well-below this level.

Longspine thornyhead is a trawl-dominant species in the north and caught in association with Dover sole, shortspine thornyhead, and sablefish in the deep water DTS strategy. Under trawl rationalization with the 100 percent observer requirement, catch monitoring uncertainty is low. The trawl fishery is also restricted to operate in waters shallower than 700 fm, which is much shallower than the distribution of longspine. This substantially reduces any biological risk to the stock resulting from fishing pressure. Longspine thornyhead is not targeted in the Conception area and is caught in incidental amounts that are well-below the preferred ACLs.

Longspine thornyhead has been managed with separate ACLs/OYs north and south of Point Conception at 34º27’ N. latitude since 2007. The preferred 2013 and 2014 ACLs for longspine thornyhead are based on the same area stratification strategy used to manage the stock since 2007, and use the same basis for calculating the ACLs as was used to determine the No Action 2012 ACLs. The apportionment methodology assumed constant density throughout the Conception area and estimated 79 percent of the assessed coastwide biomass occurs north of Pt. Conception. The northern ACL was then reduced by 25 percent to account for relatively high assessment uncertainty. The southern ACL was reduced by 50 percent to account for relatively high assessment uncertainty and a paucity of survey data for the Conception area. Scientific uncertainty is typically considered when deciding the ABC; however, since the ABCs are coastwide and the two areas where ACLs are specified have differential scientific uncertainties, the scientific uncertainty adjustment is made in deciding the ACLs. The preferred ACLs are slightly less than the No Action ACLs since the OFL is trending down slightly in projections due to the average recruitment assumption posited in the 2005 assessment. The longspine thornyhead stock is projected to remain above the target $B_{40\%}$ level under this harvest regime. No other ACL alternatives for longspine thornyhead were decided for detailed analysis in this EIS.

The PSA vulnerability score of 1.54 indicates a low risk of overfishing.

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 40º10' N. latitude. Pacific cod have never been formally assessed on the U.S. west coast.

Stock Productivity

The PSA productivity score of 2.11 indicates a stock of relatively high productivity.

Fishing Mortality

The No Action OFL, ABC, and ACL for Pacific cod are recommended for 2013-2014 fisheries. The OFL of 3,200 mt is based on historical landings and the ACL 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) ACL 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 2013-2014 management period, which should maintain total catches well below the preferred ACL. There is little concern of biological risk to the Pacific cod under this harvest regime. Pacific cod are only available in harvestable amounts off northern Washington every four or five years on average. The effective fishing mortality rate for Pacific cod in west coast fisheries is therefore very low.

The PSA vulnerability score of 1.34 indicates a low risk of overfishing.

Pacific Whiting

The setting of the Pacific whiting TACs in 2013 and 2014 is not part of the proposed action in this EIS since the whiting TAC is set annually in an international forum as per the Agreement with Canada on Pacific Hake/Whiting. However, a range of whiting TACs is analyzed to understand the potential canary bycatch implications since the 2013-2014 canary ACLs are decided in this biennial specifications process. Canary rockfish bycatch limits were first imposed on the trawl whiting sectors by emergency action at the end of the 2004 season; however, beginning in 2005, a canary bycatch limit was implemented for the entire season. If the canary bycatch limit was projected to be attained inseason, the whiting season would close even if whiting quotas were not attained. Therefore, beginning in 2005, the whiting fleets had an incentive to avoid canary bycatch. From 2005-2008 the canary bycatch limit was shared by all three whiting sectors, and beginning in 2009 each sector had their own canary bycatch limit.

Table 4-17 depicts the canary bycatch and canary catch rate by trawl whiting sector in 2005-2010 (2011 canary bycatch data were not available for this analysis). To better understand the canary allocation needs by whiting sectors in 2013 and 2014, the 2005-2010 minimum, average, and maximum canary bycatch rates were applied to the alternative 2013-20014 whiting TACs depicted in Table 2-32. The 2011 whiting set-asides were first subtracted from the alternative TACs (17.5 percent of the TAC to the Makah Tribe; 16,000 mt to the Quileute Tribe; and 3,000 mt for research and incidental open access) before applying the sector whiting allocations (i.e., 42 percent to shoreside, 34 percent to catcher-processors, and 24 percent to motherships) (Table 4-18). The 2005-2010 minimum, average, and maximum canary bycatch rates were then multiplied by the alternative whiting sector allocation amounts to project 2013-2014 canary bycatch amounts by sector across the alternative whiting TACs (Table 4-19). These projected canary bycatch amounts are compared to the preferred 2013 and 2014 canary sector allocations depicted in Table 2-82. The comparison shows that the preferred canary allocations to the at-sea sectors are likely large enough to prevent substantial impacts since the highest 2005-2010 canary bycatch rates for these sectors applied to the highest whiting TAC project a lower canary bycatch than the allocations. The shoreside sector may be the most impacted depending on the size of future whiting TACs. The preferred shorebased sector (shoreside whiting plus shoreside nonwhiting vessels) canary allocation is 40.3 mt and 41.5 mt for 2013 and 2014, respectively. The highest projected canary bycatch under the maximum 2005-2010 canary bycatch rate and at the highest whiting TAC analyzed is 12 mt (Table 4-19), which represents about 30 percent of the preferred sector allocation. Shorebased vessels targeting whiting and nonwhiting groundfish species share the allocation and manage impacts using IFQs. As noted in the previous section, canary quota was not readily traded in the 2011 IFQ fishery and the canary allocation may limit fishing opportunities for that sector, especially if higher Pacific whiting TACs are decided in 2013 or 2014.

Table 4-17. Trawl whiting sector catch rates of canary rockfish by year, 2005-2010.

Year	Shoreside Whiting			Catcher-Processors			Motherships		
	Whiting Catch (mt)	Canary Catch (mt)	Canary Catch Rate (Canary/ Whiting)	Whiting Catch (mt)	Canary Catch (mt)	Canary Catch Rate (Canary/ Whiting)	Whiting Catch (mt)	Canary Catch (mt)	Canary Catch Rate (Canary/ Whiting)
2010	56,150	3.96	0.0000706	54,285	0.14	0.0000027	35,714	0.33	0.0000091
2009	38,276	1.78	0.0000465	34,552	0.23	0.0000067	24,044	0.61	0.0000254
2008	50,788	1.65	0.0000325	108,121	2.44	0.0000226	57,432	0.74	0.0000129
2007	73,300	2.02	0.0000276	73,260	0.35	0.0000047	47,811	1.62	0.0000339
2006	97,078	1.60	0.0000165	78,846	0.10	0.0000013	55,355	0.90	0.0000163
2005	97,574	2.20	0.0000225	78,890	0.30	0.0000038	48,531	0.70	0.0000144
2005-10 ave	68,861	2.20	0.0000320	71,326	0.59	0.0000083	44,815	0.82	0.0000182
2005-10 max	97,574	3.96	0.0000706	108,121	2.44	0.0000226	57,432	1.62	0.0000339
(year)	(2005)	(2010)	(2010)	(2008)	(2008)	(2008)	(2008)	(2007)	(2007)
2005-10 min	38,276	1.60	0.0000165	34,552	0.10	0.0000013	24,044	0.33	0.0000091
(year)	(2009)	(2006)	(2006)	(2009)	(2006)	(2006)	(2009)	(2010)	(2010)

Table 4-18. Alternative Pacific whiting TACs and sector allocations used in the 2013-2014 analysis of potential canary rockfish bycatch effects.

Whiting TAC Alt.	U.S. TAC (mt)	Set-Asides (mt)		Alt. Sector Allocations (mt)		
		Tribal	Research/ Inc. OA	SS	CP	MS
1	67,970	27,895	3,000	15,572	12,606	8,898
2	135,939	39,789	3,000	44,119	35,715	25,211
3	290,903	66,908	3,000	109,203	88,403	62,402
4	436,355	92,362	3,000	170,293	137,856	97,310

Table 4-19. Projected canary bycatch by whiting trawl sector in 2013-2014 assuming minimum, average, and maximum 2005-2010 canary bycatch rates and alternative U.S. whiting TACs.

Trawl Whiting Sector	Whiting TAC Alt.	Projected Canary Bycatch (mt) under Alternative 2005-2010 Bycatch Rates		
		Min.	Ave.	Max.
Shoreside	1	0.26	0.50	1.10
	2	0.73	1.41	3.11
	3	1.80	3.49	7.71
	4	2.81	5.45	12.02
Catcher-Processors	1	0.02	0.11	0.28
	2	0.05	0.30	0.81
	3	0.11	0.74	2.00
	4	0.17	1.15	3.12
Motherships	1	0.08	0.16	0.30
	2	0.23	0.46	0.85
	3	0.57	1.14	2.11
	4	0.89	1.77	3.30

Sablefish

A new coastwide sablefish stock assessment was conducted in 2011 (Stewart, *et al.* 2011b). The spawning stock biomass was estimated to be at 33 percent of its unfished biomass at the beginning of 2011. The coastwide abundance of sablefish was estimated to have dropped below the $B_{40\%}$ management target in 2009 and is currently declining steeply.

Stock Productivity

Steepness in the 2011 assessment was assumed to be 0.6. Efforts to estimate steepness led to implausible results, so the sensitivity of fixing steepness at 0.6 was analyzed. The estimated depletion was robust to varying steepness values; however, estimated MSY was sensitive to the steepness assumption.

The PSA productivity score of 1.61 indicates a stock of moderate productivity.

The cause of the declining trend in the sablefish population appears to be primarily due to relatively poor recruitments (Figure 4-19). Sablefish recruitment is estimated to be quite variable over the historical record; however, uncertainty in individual recruitment events is large. Within this variability, the average recruitment is estimated to have declined steadily between the 1970s and 2007. Recruitments during the 1980s were, on average, roughly an order of magnitude higher than the very poor recent cohorts estimated between 2002 and 2007. It appears that large 1999 and 2000 year classes briefly slowed the rate of stock decline between 2002 and 2005. An above-average 2008 cohort is currently moving through the population, however it has yet to mature, and therefore is not currently contributing to the trend in spawning biomass.

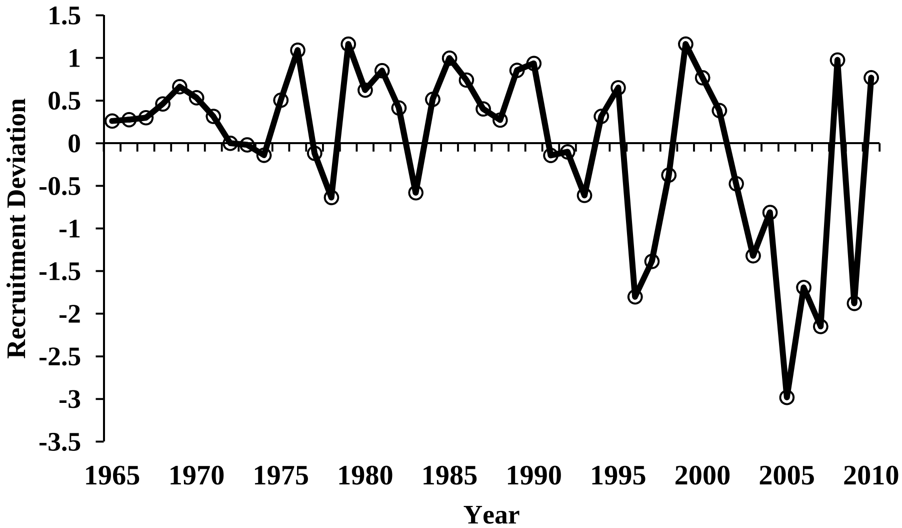

Figure 4-19. Time series of estimated recruitment deviations from the base model in the 2011 sablefish assessment.

Fishing Mortality

Sablefish are estimated to have been exploited at a modest level through the first half of the 20th century. Following a period of recruitments estimated to have been above average, but highly uncertain, the spawning stock biomass rebounded to nearly unexploited levels in the late 1970s. Large harvests during those years, and throughout the 1980s, are estimated to have caused the stock to decline nearly monotonically to the present (Figure 4-20). Fishing intensity remained below target SPR harvest rates from 1988 to 2008 (Figure 4-21). However, in retrospect both relative SPR and exploitation fraction are estimated to be increasingly rapidly over the last four years.

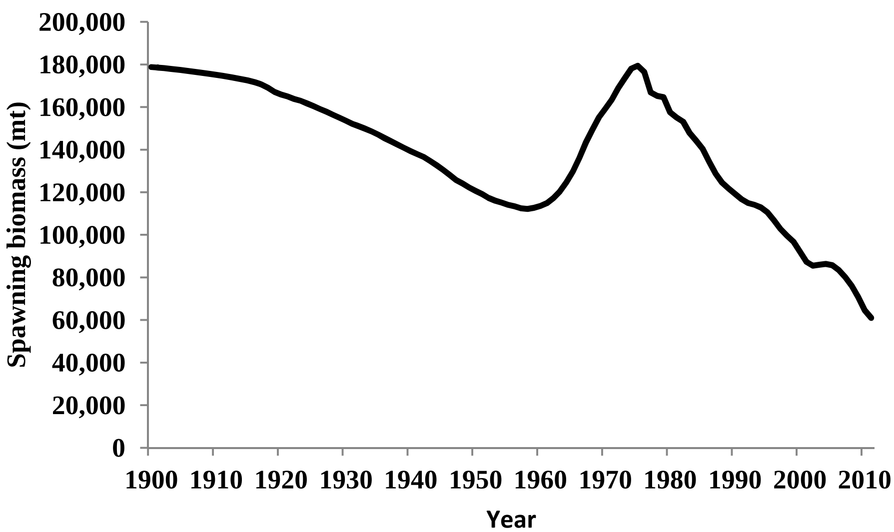

Figure 4-20. Estimated spawning biomass time-series (1900-2011) for the base-case model in the 2011 sablefish assessment.

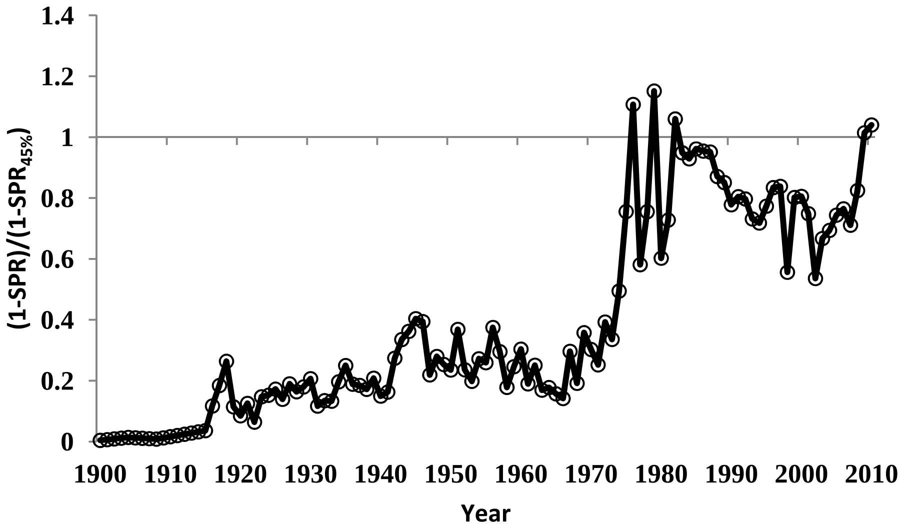

Figure 4-21. Time series of relative spawning potential ratio from the base model in the 2011 sablefish assessment.

One 2013-2014 ACL alternative is analyzed where the ACL is set based on a relatively conservative ABC (P* = 0.4) and application of the default 40-10 ACL control rule (Figure 2-1) since the stock is in the precautionary zone (i.e., below the B_{MSY} target but above MSST). The basis for the preferred 2013-2014 alternative differs from that of the No Action 2012 ACL in many ways. While the 40-10 rule was applied to determine the 2012 ACL, the ABC buffer was determined using a P* of 0.45 and therefore smaller in 2012. Further, there was a different apportionment of the coastwide biomass to determine ACLs north and south of 36º N. latitude. The sablefish STAT was asked to determine an appropriate apportionment. The STAT examined annual (2003-2010) swept area biomass estimates derived from the NMFS NWFSC trawl survey to determine that 26.4 percent of the coastwide sablefish biomass occurred south of 36º N. latitude. Therefore, 2013 and 2014 sablefish ABCs were apportioned north and south of 36º N. latitude, assuming 73.6 percent of the biomass occurred in the north and 26.4 percent occurred in the south. A 68:32 north:south apportionment using the 2003-2008 average estimated trawl survey swept area biomass was used to determine north and south ACLs in 2012. Additionally, a further 50 percent adjustment was made to the 2012 ACL south of 36º N. latitude to account for the greater scientific uncertainty in the south that could not be accommodated with a coastwide ABC. The 2011 sablefish STAT recommended there was no greater uncertainty in estimating biomass in the south relative to the north now that there are eight years of continuous trawl survey data available for the Southern California Bight. Therefore, a 50 percent reduction of the southern ACL is not proposed for 2013 and beyond.

The preferred 2013 and 2014 sablefish ACLs conditioned on continuation of the same ABC and ACL control rules project a slow increase in spawning biomass and depletion starting in 2013 (Table 4-20). Management uncertainty is relatively low for sablefish. The recreational take is negligible and the largest allocation is to the limited entry trawl sector, which is observed at a 100 percent rate and managed carefully with IFQs. The second largest sector is limited entry fixed gear and the primary sablefish fishery in that sector is observed at a relatively high 20-25 percent rate. The open access allocation is 9.4 percent of the fishery HG; that sector is observed at about a 5 percent rate. Sablefish catch is actively tracked inseason, and the stocks are subject to the most frequent inseason adjustments currently in the Council process.

Sablefish are the most valuable groundfish species on a per pound basis, and OY attainment is relatively high (Table 4-8 and Table 4-12). The sablefish catch exceeded the OY in 2007. The GMT determined there was an inseason catch tracking error which was fixed. Similar catch overages are not expected due to such tracking errors.

The PSA vulnerability score is 1.64, which predicts a low concern of overfishing.

Table 4-20. Projected spawning biomass and depletion of west coast sablefish under the Council's preferred harvest specifications for 2013-2014 (from Stewart et al. 2011).

Year	OFL (mt)	ACL (mt)	Spawning Biomass (mt)	Depletion
2011	*8,808*	*6,813*	60,957	33%
2012	*8,623*	*6,645*	57,606	32%
2013	6,621	5,451	56,271	31%
2014	7,171	5,909	56,358	31%
2015	7,857	6,512	57,066	31%
2016	8,526	7,121	58,015	32%
2017	9,107	7,662	58,969	32%
2018	9,563	8,097	59,821	33%
2019	9,898	8,424	60,550	33%
2020	10,094	8,629	61,174	34%
2021	10,191	8,745	61,732	34%
2022	10,273	8,847	62,258	34%

Shortbelly Rockfish

Shortbelly rockfish is a healthy and valuable forage species that is not targeted in any commercial or recreational fisheries. The PSA vulnerability score is 1.13, which indicates a low overfishing concern. Only one ACL alternative is analyzed in the EIS, which is the 50 mt No Action 2012 ACL. The 50 mt ACL recommended by the Council is intended to accommodate incidental catch while preventing the development of fisheries specifically targeting shortbelly rockfish. The Council recognized shortbelly rockfish for its value as a forage fish and the low ACL (relative to the ABC) is largely decided due to ecological considerations. The low level of fishing mortality of shortbelly rockfish is due to the fact the species is not targeted and only small amounts are incidentally caught.

Stock Productivity

Steepness was not estimated in the 2007 assessment and the mean value of 0.65 (i.e., Dorn prior at that time) was assumed. The PSA productivity score of 1.94 indicates a stock of relatively high productivity, among the highest for any west coast rockfish (Table 4-2).

Fishing Mortality

Fishing mortality is negligible, and incidental catches of shortbelly rockfish have averaged less than 10 mt in recent years (<0.1 percent of specified OYs; Table 4-12). The 50 mt ACL should accommodate incidental unavoidable bycatch and provide a substantial amount of surplus production for ecosystem needs given the stock's importance as forage for other species. This is a case where prey availability directly affected the ACL decision.

Shortspine Thornyhead

The most recent stock assessment (Hamel 2006b) estimated the shortspine thornyhead spawning stock biomass to be at 62.9 percent of its initial, unfished biomass in 2005.

Stock Productivity

Steepness was assumed to be 0.6 in the 2005 shortspine thornyhead assessment. The PSA productivity score of 1.33 indicates a stock of moderate productivity.

The recruitment pattern for shortspine thornyhead is based on length data only, with low survey selectivity for lengths corresponding to the first few ages. The slow growth of shortspine, however, with continuous length increases on the order of 1 cm/year, suggests that the data may be able to fit a general pattern of recruitment if there is adequate contrast between years, or especially between groups of years. The first year for which there are length composition data to support the estimate of recruitment is 1978; however, the data are relatively poor early on, and recruitments are estimated in this model for the years 1985 through 2000. It appears that the resulting pattern may represent smoothed recruitment over time, with good recruitment around the 1988-1990 period and poor recruitment around the 1994-1997 period.

Fishing Mortality

Overfishing ($F > F_{MSY}$) occurred in all years from 1984-1994, although the fishing mortality from 1995-2004 was less than F_{MSY}.

Shortspine thornyhead has been managed with separate ACLs/OYs north and south of Point Conception at 34º27’ N. latitude since 2007. The preferred 2013 and 2014 ACLs for shortspine thornyhead are based on the same area stratification strategy used to manage the stock since 2007 and use the same basis for calculating the ACLs as was used to determine the No Action 2012 ACLs. The apportionment methodology assumes constant density throughout the Conception area and estimated 66 percent of the assessed coastwide biomass occurs north of Point Conception and 34 percent of the biomass south of Point Conception. The SSC has recommended coastwide OFLs and ABCs for shortspine thornyhead since the 2005 assessment presents a coastwide model. However, the Council and NMFS have decided to apply a differential scientific uncertainty buffer in the ACL specified south of Point Conception. The preferred 2013 and 2014 ACLs of 1,540 mt and 1,525 mt, respectively for the stock north of 34º27’ N. latitude are calculated as 66 percent of the projected OFLs. The preferred 2013 and 2014 ACLs of 397 mt and 393 mt, respectively for the stock south of 34º27’ N. latitude are calculated as 34 percent of the projected OFLs with a further 50 percent reduction to account for scientific uncertainty. The greater assessment uncertainty for the portion of the stock south of Point Conception is largely due to the fact that a small proportion of the Conception area is surveyed in the NMFS trawl survey given the high proportion of untrawlable habitat and the prohibition of bottom trawling in the CCAs. While higher scientific uncertainty would conceptually be accommodated in specifying the ABC, the higher scientific uncertainty south of Point Conception is accommodated in consideration of the ACL for the shortspine thornyhead stock south of 34º27’ N. latitude since the SSC recommended a coastwide OFL and ABC. The preferred ACLs are slightly less than the No Action ACLs since the OFL is trending down slightly in projections due to the average recruitment assumption posited in the 2005 assessment. The shortspine thornyhead stock is projected to remain above the target $B_{40\%}$ level under this harvest regime. No other ACL alternatives for shortspine thornyhead were decided for detailed analysis in this EIS.

Management uncertainty is low for shortspine in the north since most of the catch is in the trawl fishery, which is now observed at a 100 percent rate. In the south, shortspine are mostly targeted in the limited entry fixed gear fishery which is observed at a 20-25 percent rate.

The percent of OY attainment in 2007-2010 for the stock north of 34º27’ N. latitude averaged 86 percent of specified OYs (Table 4-12) and 50 percent of the trawl IFQ allocation was attained in 2011 (Table 4-9). The percent attainment of OYs for the stock south of 34º27’ N. latitude averaged 41 percent of specified 2007-2010 OYs, and only 17 percent of the 2011 trawl IFQ allocation was attained. The risk of exceeding 2013 and 2014 ACLs is low, especially the ACLs in the south, given the dynamics of recent fisheries.

The PSA vulnerability score is 1.80, which is at the lowest end of the range for stocks of medium concern of overfishing.

Splitnose Rockfish South of 40º10’ N. latitude

A new splitnose rockfish assessment was done in 2009 (Gertseva, *et al.* 2009). Splitnose rockfish is a healthy stock with spawning depletion estimated at 66 percent of its unexploited level at the beginning of 2009.

Stock Productivity

Recruitment deviations were estimated for each year between 1960 and 2006, which is the period best informed by the data based on evaluation of the variance of the recruitment deviations. Steepness of the stock-recruitment curve was fixed at a value of 0.58, as estimated by the Dorn rockfish meta-analysis. The PSA productivity score of 1.28 indicates a stock of relatively low productivity.

Recruitments were estimated to be below average from the 1960s to the mid-1980s. Recent recruitments since the early 1990s have been above average, with the 1999 recruitment being the highest in the time series.

Fishing Mortality

Splitnose rockfish have been taken incidentally in fisheries such as the trawl fisheries targeting for POP, mixed slope rockfish and other deepwater targets, but have not been a commercial target species. The Council recommended that splitnose rockfish continue to be managed with stock-specific specifications south of 40º10’ N. latitude and within the Minor Slope Rockfish complex in the north.

Splitnose rockfish were lightly exploited until the 1940s, when the trawl fishery for the rockfish first became important. With the development of the POP fishery (a species with which splitnose rockfish co-occur), spawning output of splitnose rockfish began to decline. A sharp drop in the 1960s was associated with large harvests of POP by foreign trawl fleets operating in the current U.S. EEZ. In the 1980s and 1990s, splitnose rockfish spawning biomass continued to decrease as a result of relatively low recruitment and removal by domestic trawl and nontrawl fisheries, with a large portion of trawl catches being discarded. The spawning biomass reached its minimum size (35.8 percent of its unexploited level) after large domestic removals of 2,780 mt in 1998, when the increased availability of splitnose rockfish led to higher than usual removals off California where large aggregations of splitnose were encountered. Since 1999, the splitnose spawning output was estimated to have been increasing in response to below-average removals and above-average recruitment during the last decade.

The preferred 2013-2014 ACL alternative for splitnose sets the ACLs equal to the ABCs, which is the same basis used to determine the No Action 2012 ACL. The base case model in the 2009 assessment projects the stock will maintain a high biomass and depletion at catch streams substantially higher than these ACLs. A constant catch of 2,780 mt (i.e., equal to the recent year (1998) catch) is projected to increase spawning stock biomass in the next ten years. Regardless, splitnose are not targeted and OY attainment averaged 38 percent of specified 2005-2010 OYs (Table 4-12). Only 2 percent of the 2011 trawl IFQ allocation of splitnose was attained (Table 4-9).

The PSA vulnerability score is 1.82, which is at the low end of the range for stocks of medium risk of overfishing.

Starry Flounder

Starry flounder was assessed in 2005 (Ralston 2006) and both the northern (Washington and Oregon) and southern (California) populations were estimated to be above the target level of 40 percent of unfished spawning biomass (44 percent 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. The SSC categorized starry flounder as a category 2 stock due to a very uncertain catch history, a lack of age or size composition data, and poor tracking in the NMFS trawl survey.

Stock Productivity

In the assessment, recruitment was modeled assuming a steepness of 0.80 (the median value in the Myer's meta-analysis and recommended by the SSC in 2010). Recruitment deviations were estimated for the period 1970-2002 in the northern model and 1970-2003 in the southern model. Both stocks showed evidence of strong recruitment in the 1982-85 period, weak recruitment from the late 1980s into the early 1990s, and then strong recruitment in the mid-1990s.

The PSA productivity score of 2.15 indicates a very productive stock, which is true for most nearshore and shelf flatfishes.

Fishing Mortality

Similar exploitation histories were estimated for both starry flounder stocks. The southern stock declined during the 1970s apparently due to a high exploitation rate in the California trawl fishery. Depletion of the stock reached a minimum biomass close to the current flatfish MSST in the early 1980s, but recruitment from the huge 1982 year-class led to a rapid and dramatic increase in exploitable and spawning biomass, such that by 1987 spawning biomass was 17 percent greater than the unexploited level.

Exploitation rates were also high for the northern stock during the late 1970s, with stock biomass declining to below B_{MSY} in the early 1980s, but rebuilt to a population size substantially in excess of virgin conditions by 1990. Thus, there is a remarkable similarity in estimated population dynamics between the northern and southern models, in spite of complete independence of the data used to estimate model parameters.

Management uncertainty is relatively low due to a substantial trawl catch, where there is mandatory 100 percent observer coverage. Starry flounder are also caught in recreational fisheries where management uncertainty is greater. However, they are caught at 25-33 percent of the rate in recent recreational fisheries relative to trawl fisheries.

The preferred 2013-2014 ACL alternative for starry flounder sets the ACLs equal to the ABCs, which is the same basis used to determine the No Action 2012 ACL. The base case model in the 2005 assessment projects both stocks will maintain a high biomass above the target B_{MSY}. It is likely that projected biomass is higher than indicated in the assessment since actual catches have been less than specified harvest limits. Cumulative catch in 2007-2010 averaged 3 percent of the specified OYs (Table 4-12) and the 2011 trawl IFQ fishery caught only 2 percent of the allocation (Table 4-9).

The PSA vulnerability score of 1.02 for starry flounder is the lowest vulnerability scored for groundfish FMP species, indicating a low risk of overfishing.

Widow Rockfish

A new widow rockfish assessment was conducted in 2011 indicating the stock was successfully rebuilt with a spawning biomass depletion of 51 percent at the start of 2011 (He, *et al.* 2011), which is above the management target of 40 percent. The assessment indicated the estimated spawning stock biomass has increased steadily from a low of 30.6 percent at the start of 2001. The new assessment estimates that the relative spawning stock biomass never dropped below the 25 percent MSST.

Stock Productivity

The major axis of uncertainty in the new widow rockfish assessment is steepness, which defines the relative productivity of the stock. The SSC recommended fixing the steepness parameter at 0.76 in the assessment, due to the lack of information to reliably estimate steepness. The steepness parameter of 0.76 is the median value in the distribution of steepness parameters of assessed rockfish species in the (i.e., the Dorn prior; Figure 4-8). The decision table in the assessment was developed to bracket model uncertainty in widow rockfish productivity with alternative values of steepness. The 12.5 percent and 87.5 percent quantiles from the prior distribution on h translate into steepness values of 0.54 and 0.95, respectively. This range was considered reasonable to account for the uncertainty associated with steepness. It was, however, agreed by the STAT and the SSC to shift this range to a lower steepness value to (a) take account of the data which, while not greatly informative, did provide some evidence for a lower steepness value, and (b) provide continuity by considering the value of steepness used in the 2009 assessment (0.41). As a result, steepness values of 0.41 and 0.90 were used for the low and high states of nature in the assessment decision table.

The high uncertainty in the steepness of the stock-recruitment relationship and the lack of recent strong recruitments compels a precautionary approach to managing widow rockfish. If the pessimistic state of nature is correct ($h = 0.41$), then annual constant catches of up to 1,500 mt are projected to maintain spawning stock biomass above the MSST during the 10-year projection period (i.e., 2013-2022).

The base model in the 2011 widow assessment estimated a time series of recruitment of age-0 fish from 1948 to 2009. The highest recruitment occurred in 1970 (Figure 4-22). Recruitments remained generally low in the early 1990s and have been very low since 2001, as compared to the long-term average. As in the past widow assessments, uncertainties in estimation of recruitment remain high.

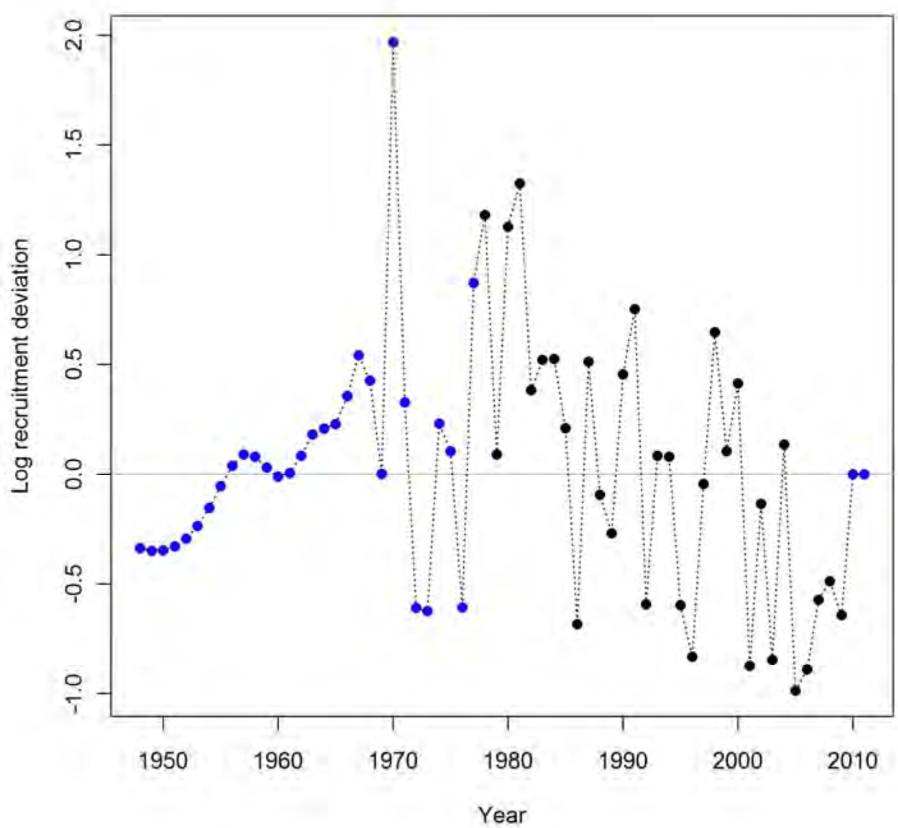

Figure 4-22. Time series of estimated recruitments from the base model in the 2011 widow rockfish assessment.

Fishing Mortality

Widow rockfish are caught mostly in midwater trawls used to target Pacific whiting and, before 2002, used to target widow and yellowtail rockfish. The exploitation rate was above the target SPR of 50 percent (i.e., $F<F_{MSY}$) until the late 1970s when trawl catches in the target midwater fishery increased to rates beyond the target. This continued until the stock was declared overfished and managed under a rebuilding plan. Harvest declined dramatically and the estimated SPR harvest rates increased rapidly above target F_{MSY}. The increase in biomass during the past decade was the result of reduced catches rather than strong year-classes.

Both widow rockfish ACL alternatives analyzed for 2013-2014 are projected to maintain spawning stock biomass at a healthy level above the 40 percent management target in the next ten years according to the base model (h = 0.76) in the 2011 assessment (Table 4-21). However, the stock is estimated to be below the management target under the more pessimistic state of nature where steepness is assumed to be lower (h = 0.41). A constant catch of 1,500 mt annually (the preferred ACL alternative) is the highest constant catch scenario analyzed that maintains the stock above the MSST of 25 percent in the next ten years under the more pessimistic state of nature. A constant catch of 2,500 mt is projected to drop spawning depletion to a nadir of 23 percent in 2017 before slowly rebuilding under the more pessimistic state of nature.

Both widow rockfish ACL alternatives provide some opportunity to target this healthy stock and healthy co-occurring yellowtail rockfish. The No Action ACL of 600 mt only accommodates unavoidable widow bycatch and does not provide adequate yield to resume a midwater trawl target fishery on widow and yellowtail rockfish. The preliminary preferred ACL alternative of 1,500 mt does provide some modest target opportunity but is lower than the catch of 2,300 mt realized in 2001, the last full year where targeting of widow and yellowtail rockfish was allowed. The ACL Alternative b of 2,500 mt does allow the same level of catch as 2001, assuming the fleet can avoid an excessive bycatch of darkblotched rockfish and other species that potentially constrain a midwater trawl fishery targeting widow and yellowtail rockfish.

Lower OYs specified in 2005-2010 were not exceeded as the fishery was managed to avoid widow bycatch and the percent of OY attainment decreased with time during that period (Table 4-12). The percent attainment of the 2011 IFQ allocation was 40 percent (Table 4-9). The at-sea whiting sectors have been better able to avoid widow rockfish in recent years with the lowest bycatch rates (widow catch/whiting catch) observed in the past couple of years (2009 for CPs and 2011 for MS; Appendix C).

Management uncertainty is low since widow rockfish is a trawl-dominant species and there is mandatory 100 percent observer coverage in trawl fisheries.

Table 4-21. Projected widow rockfish depletion and spawning biomass under two 2013-2014 ACL alternatives and two states of nature analyzed in the 2011 assessment (from Table ES8a in He et al. 2011).

ACL Alternative	Year	Catch (mt)	State of nature			
			h = 0.41		Base case (*h*=0.76)	
			Depletion (%)	Spawning biomass (mt)	Depletion (%)	Spawning biomass (mt)
Alt. a (PPA; constant catch = 1,500 mt)	2011	600	30.0	22,765	51.1	36,342
	2012	600	29.4	22,288	50.7	36,053
	2013	1,500	28.6	21,686	49.9	35,514
	2014	1,500	27.2	20,619	48.5	34,473
	2015	1,500	26.1	19,839	47.5	33,785
	2016	1,500	25.6	19,443	47.2	33,585
	2017	1,500	25.7	19,515	47.8	34,014
	2018	1,500	26.4	19,993	49.2	35,022
	2019	1,500	27.2	20,655	51.1	36,325
	2020	1,500	28.1	21,354	53.1	37,737
	2021	1,500	29.0	22,029	55.1	39,182
	2022	1,500	29.9	22,648	57.1	40,603
Alt. b (constant catch = 2,500 mt)	2011	600	30.0	22,765	51.1	36,342
	2012	600	29.4	22,288	50.7	36,053
	2013	2,500	28.6	21,686	49.9	35,514
	2014	2,500	26.4	20,046	47.7	33,896
	2015	2,500	24.7	18,729	45.9	32,663
	2016	2,500	23.5	17,838	44.9	31,957
	2017	2,500	23.0	17,460	44.9	31,922
	2018	2,500	23.1	17,520	45.7	32,499
	2019	2,500	23.4	17,783	47.0	33,398
	2020	2,500	23.8	18,089	48.4	34,429
	2021	2,500	24.2	18,364	49.9	35,513
	2022	2,500	24.5	18,565	51.4	36,589

Yellowtail Rockfish North of 40°10' N. Latitude

Stock Productivity

There is no obvious spawner-recruit relationship in the 2005 assessment. Recruitments were above average in the 1970s though 1980s and were at record lows in the 1990s until the large recruitment event in 1999. The average annual recruitment of age 4 fish was 7.6 million fish during 1995-2001, but increased to an average of 12.9 million during 2002-2004.

The PSA productivity score of 1.33 indicates a stock of moderate productivity.

Fishing Mortality

The preferred 2013-2014 ACL alternative for yellowtail rockfish sets the ACLs equal to the ABCs, which is the same basis used to determine the No Action 2012 ACL. The 2005 assessment projects the stock will maintain a high biomass and depletion at this level of catch. Actual removals have been much less with RCA protection. OY attainment averaged 14 percent of specified 2005-2010 OYs (Table 4-12). Only 24 percent of the 2011 trawl IFQ allocation of yellowtail rockfish was attained (Table 4-9).

The PSA vulnerability score is 1.88, which predicts a medium risk of overfishing.

4.1.1.5 Effects of ACL Alternatives for Stock Complexes

The vulnerability of a stock to overfishing is defined in the NS1 guidelines as a function of its productivity and its susceptibility to the fishery. The guidelines note that the "vulnerability" of fish stocks should be considered when: (1) deciding if a stock considered is to be "in the fishery" or if it is an EC stock; (2) considering the management of stocks managed within complexes and the need to re-structure the stock complexes; and (3) creating management control rules. The GMT and the NMFS Vulnerability Evaluation Work Group considered the productivity and susceptibility of each groundfish stock by providing PSA scores for each stock. The PSA structure and scoring is described above in section 4.1.1.2.

In the consideration of stock complex structure, a four-step approach for defining the relationship between fisheries and appropriate stock complexes was developed by Cope et al. (2011b) using the PSA score: (1) calculate PSA scores for each species in the FMP; (2) identify the overlap in distributions of each species based on latitude and depth range; (3) assign each species to the various fisheries; and (4) overlay the groupings onto the PSA plot. The GMT provided the PSA vulnerability scores for all of the Pacific coast groundfish and completed a cluster analysis based on latitude and depth to identify spatial overlaps. The results of the cluster analysis indicate that there is a need to adjust the assignment of FMP stocks to complexes.

The proposed action does not include the reorganization of the existing stock complexes for the 2013-14 cycle. However, the Council's advisory bodies recommended that further analysis be conducted for the purpose of reorganizing the complexes to the extent needed to account for the relative vulnerability of stocks in the complexes in future biennial cycles.

The performance of the management system to stay within specified annual OYs for stock complexes in recent years (2005-2010) is discussed to better understand the ability to stay within 2013 and 2014 ACLs (Table 4-22). Total mortality estimates are not yet available for 2011; however, trawl catch data in the 2011 trawl IFQ fishery are available (Table 4-23). Therefore, 2011 trawl catch data for the complexes with allocated IFQ (i.e., Minor Shelf Rockfish north and south, Minor Slope Rockfish north and south, and Other Flatfish) are known and discussed in the sections below.

Table 4-22. Specified annual OYs (mt), estimated annual total mortality (mt), and percent of OY attainment of west coast groundfish stock complexes, 2005-2010.

Species	Specified OYs, Estimated Total Mortality, and Percent of OY Attainment					
	2005 OY (mt)	2006 OY (mt)	2007 OY (mt)	2008 OY (mt)	2009 OY (mt)	2010 OY (mt)
Minor Nearshore RF (coastwide) a/						
OY (mt)	737	NA	NA	NA	NA	NA
Est. Mort. (mt)	590	NA	NA	NA	NA	NA
% OY	80.1%	NA	NA	NA	NA	NA
Minor Nearshore RF N						
OY (mt)	122	122	142	142	155	155
Est. Mort. (mt)	NA	96	133	97	63	75
% OY	NA	78.5%	93.6%	68.5%	40.6%	48.5%
Minor Shelf RF (coastwide) a/						
OY (mt)	1,682	NA	NA	NA	NA	NA
Est. Mort. (mt)	501	NA	NA	NA	NA	NA
% OY	29.8%	NA	NA	NA	NA	NA
Minor Shelf RF N						
OY (mt)	968	968	968	968	968	968
Est. Mort. (mt)	NA	104	153	75	70	77
% OY	NA	10.8%	15.8%	7.7%	7.2%	7.9%
Minor Slope RF (coastwide) a/						
OY (mt)	1,799	NA	NA	NA	NA	NA
Est. Mort. (mt)	435	NA	NA	NA	NA	NA
% OY	24.2%	NA	NA	NA	NA	NA
Minor Slope RF N						
OY (mt)	1,160	1,160	1,160	1,160	1,160	1,160
Est. Mort. (mt)	NA	283	522	484	517	562
% OY	NA	24.4%	45.0%	41.7%	44.6%	48.4%
Minor Nearshore RF S						
OY (mt)	615	615	564	564	650	650
Est. Mort. (mt)	NA	711	466	394	388	384
% OY	NA	115.6%	82.7%	69.9%	59.7%	59.0%

Species	Specified OYs, Estimated Total Mortality, and Percent of OY Attainment					
	2005 OY (mt)	**2006 OY (mt)**	**2007 OY (mt)**	**2008 OY (mt)**	**2009 OY (mt)**	**2010 OY (mt)**
Minor Shelf RF S						
OY (mt)	714	714	714	714	714	714
Est. Mort. (mt)	NA	334	365	212	273	251
% OY	NA	46.8%	51.2%	29.7%	38.2%	35.2%
Minor Slope RF S						
OY (mt)	639	639	626	626	626	626
Blackgill RF Est. Mort. (mt)	*90*	*123*	*51*	*72*	*136*	*152*
Est. Mort. (mt)	NA	256	149	189	231	183
% OY	NA	40.1%	23.8%	30.1%	36.9%	29.2%
Other Flatfish						
OY (mt)	4,090	4,090	4,884	4,884	4,884	4,884
Est. Mort. (mt)	1,965	1,962	1,649	1,040	1,565	1,144
% OY	48.1%	48.0%	33.8%	21.3%	32.0%	23.4%
Other Fish						
OY (mt)	7,300	7,300	7,300	7,300	5,600	5,600
Spiny dogfish Est. Mort. (mt)	*2,044*	*1,407*	*1,504*	*2,497*	*1,207*	*1,215*
Est. Mort. (mt)	6,424	4,242	4,516	5,339	2,514	2,231
% OY	88.0%	58.1%	61.9%	73.1%	44.9%	39.8%

a/ Area-specific OYs north and south of 40º10' N. latitude were specified for the minor nearshore, shelf, and slope complexes through this period. However, only coastwide catches of species in the minor nearshore, shelf, and slope rockfish complexes were reported in the 2005 NWFSC total mortality report. Therefore, the coastwide OYs for each assemblage are the sum of the north and south OYs specified in regulations.

Table 4-23. Allocations, total catch, and percent attainment of allocations of stock complexes managed with IFQs in the 2011 shoreside trawl fishery, ranked by percent attainment of allocations.

Species	Allocation (lbs)	Total catch (lbs)	Attainment
Minor Slope Rockfish North of 40º10' N.	1,828,779	318,390	17%
Other Flatfish	9,253,683	1,510,877	16%
Minor Slope Rockfish South of 40º10' N.	831,958	112,606	14%
Minor Shelf Rockfish North of 40º10' N.	1,150,813	32,646	3%
Minor Shelf Rockfish South of 40º10' N.	189,598	4,634	2%

Minor Nearshore Rockfish North of 40º10' N. latitude

The species comprising the Minor Nearshore Rockfish North complex are all unassessed species except for the portion of the blue rockfish stock occurring in waters off California (i.e., 40º10' N. latitude to the California-Oregon border at 42º N. latitude). All stocks other than blue rockfish off California are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for blue rockfish off California is based on a 2007 assessment (Key, *et al.* 2008) and is recommended as a category 2 stock based on relatively high assessment uncertainty.

Stock assessments have not yet been conducted for many of the nearshore species, due in part to the lack of available information. Thus the overall stock biomass and age structure is unknown. Most of the OFLs for component species were calculated on a coastwide basis and then apportioned north and south of 40°10' N. latitude into the respective nearshore complexes based on proportion of catches during 1983-1989 and 1993-1999. Biological impacts to the component stocks should be considered on both a coastwide level and within each management area where there is evidence of finer-scale stock structure. Current evidence suggests that population structuring, both genetically and biologically, may occur in many nearshore populations, but any short-term impacts to sub-populations under the preferred ACLs are unknown (Cope 2004; Gunderson, *et al.* 2008; Waples, *et al.* 2008).

The preferred northern Minor Nearshore Rockfish ACL is equal to the ABC of 94 mt and is less than the No Action ACL of 99 mt. The decrease in the ACL is due to a correction in a bias in calculating the No Action OFLs; 2013-2014 OFLs of component stocks calculated using DBSRA or DCAC were revised.

Concern was expressed regarding the potential for overfishing vulnerable species within the northern Minor Nearshore Rockfish complex, particularly China, copper, and quillback rockfish. These species were all identified as highly vulnerable with a major concern based on the PSA analysis (Table 4-24). All three of these species are structure-based, longer-lived, deeper-dwelling nearshore rockfish, and thus prone to serial depletion. Concern for these species could arise if catch allocated within the nearshore complex is shifted to these highly vulnerable species. State nearshore management plans and policies may adequately mitigate these risks.

Nearshore rockfish species are commercially landed under state permits in California and Oregon (Washington does not allow nearshore commercial fishing) and all commercial landings must be sorted. The states have catch accounting programs to actively monitor and manage these species inseason. Management uncertainty is therefore lower in the commercial fisheries for nearshore rockfish species. There is less monitoring for recreational fisheries that target or otherwise interact with these species.

The trip limits for the complex may be restructured inseason if necessary to limit take of a particular nearshore species to reduce the risk of overfishing that species or a constraining co-occurring species. Such action was taken in 2009 for blue rockfish in California based on the results of the 2007 assessment. The trip limit in northern California (between 42° N. latitude and 40°10' N. latitude was previously *"6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish"* and was restructured to *"7,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black rockfish"* as a means to limit take of blue rockfish and keep it within the statewide HG.

The states may also take inseason action independent of NMFS if necessary to prevent exceeding an ACL. Both the nearshore commercial and recreational fisheries will be constrained by the low availability of yelloweye in 2013 and 2014. As such, catches for both fisheries are not expected to increase and exceed the ACLs. Because the nearshore fisheries will be restricted in 2013-2014, it is unlikely that the ACL will be exceeded.

The blue rockfish stock off California north of 34º27' N. latitude was estimated to be at 29.7 percent of its unfished biomass in 2007 and is considered to be in the precautionary zone. During the 2009 and 2010 biennial specification process, the Council contemplated removing California blue rockfish from the northern (and southern) Minor Nearshore Rockfish complexes. Blue rockfish have been managed within both the northern and southern Minor Nearshore Rockfish complexes because of the interaction of blue rockfish with other nearshore species. When blue rockfish occur offshore they can be targeted separately from other nearshore rockfish, but those that occur inshore mix with other nearshore rockfish stocks. Blue rockfish are managed under the California nearshore management plan, which has mandatory sorting requirements for landed catch. Landings are routinely tracked and monitored, thereby reducing management uncertainty. For more efficient state management, blue rockfish remains a component of the northern and southern Minor Nearshore Rockfish complexes.

The risk of exceeding the preferred 2013-2014 ACL for the Minor Nearshore Rockfish North complex is low given how well the states manage the nearshore fisheries. While the percent of OY attainment has been high (i.e., 93.6 percent of the 2007 OY was attained), the average percent attainment of 2006-2010 OYs was only 62 percent (Table 4-22).

Table 4-24. The relative vulnerability of rockfish stocks managed in the Minor Nearshore Rockfish complex north of 40º10' N. latitude ranked by relative level of vulnerability within the complex.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Minor Nearshore Rockfish North	NA	NA
China	2.23	Major
Copper	2.27	Major
Quillback	2.22	Major
Blue (CA)	2.01	Med/High
Blue (OR & WA)	2.01	Med/High
Brown	1.99	Med
Grass	1.89	Med
Olive	1.87	Med
Black and yellow	1.70	Low
Calico	1.57	Low
Gopher	1.76	Low
Kelp	1.59	Low
Treefish	1.73	Low

Minor Shelf Rockfish North of 40º10' N. Latitude

The species comprising the Minor Shelf Rockfish North complex are all unassessed species except for chilipepper rockfish, which was assessed in 2007 (Field 2008); greenstriped rockfish, which was assessed in 2009 (Hicks, *et al.* 2009); and greenspotted rockfish in waters off California, which was newly assessed in 2011 (Dick, *et al.* 2011). All stocks other than chilipepper, greenstriped, and greenspotted rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock.

Apportionment of chilipepper, greenstriped, and greenspotted rockfish north and south of 40º10' N. latitude was requested of the respective STATs so that the appropriate OFL and ABC contributions to the northern and southern Minor Shelf Rockfish complexes can be made. The following methods, endorsed by the SSC, were used to apportion the biomass and harvest specifications of these component stocks:

- Chilipepper was apportioned 7 percent to the complex based on the average 1998-2008 assessed area catch;
- Greenstriped was apportioned 84.5 percent to the complex based on the mean of the 2003-2008

swept area biomass estimates north of 40°10’ N. latitude from the NMFS trawl survey;

- The northern stock of greenspotted rockfish in waters off California was apportioned 22.2 percent to the complex based on the average estimated catch proportion in the assessment for the stock occurring in the area between 40°10’ N. latitude and the California-Oregon border at 42° N. latitude.

The PSA analysis of the relative vulnerability of stocks to overfishing indicated that a number of the component rockfish stocks have a medium to high relative vulnerability to overfishing (Table 4-25). However, the RCAs implemented to reduce mortality on overfished species greatly protect shelf rockfish, leading to few concerns regarding overfishing.

Given that the preferred (and No Action) Minor Shelf Rockfish North ACL is well below the SSC-recommended OFL and the SSC-approved ABC, there is little risk of overfishing this complex. There will also be similar RCA protections for the core areas of the northern shelf in 2013 and 2014, as for prior years, which will limit access to shelf rockfish in general. This is evidenced by the 2006-2010 catches of northern Minor Shelf Rockfish being well under the specified OYs, averaging less than 10 percent of the specified OYs (Table 4-22). The Minor Shelf Rockfish North complex is also managed in the IFQ fishery. Only 3 percent of the 2011 IFQ allocation of the Minor Shelf Rockfish North complex was attained (Table 4-9).

The new greenspotted rockfish assessment indicates the stock occurring in waters off California north of Pt. Conception is in the precautionary zone with a 30.6 percent depletion at the start of 2011. This is a stock that was harvested at a rate higher than the proxy F_{MSY} harvest rate during an extended period (1970-1998), which drove the stock below the current MSST in 1990. The northern stock biomass hit a nadir in 1998 and has been increasing steadily since, with the protections implemented to minimize mortality on overfished shelf rockfish (e.g., implementation of the RCA). Application of the 40-10 rule for the northern stock in aggregate (i.e., the stock occurring in waters off California north of Pt. Conception) would determine an ACL greater than 30 mt; however, the recent estimated total mortality of northern greenspotted rockfish has been less than 1 mt. At this level of harvest, the stock is projected to reach target biomass by 2017. The continued implementation of the RCA makes it likely that this lower level of incidental fishing mortality will occur and stock biomass will increase without additional management measures.

Table 4-25. The relative vulnerability of rockfish stocks managed in the Minor Shelf Rockfish complex north of 40º10' N. latitude ranked by relative level of vulnerability within the complex.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Minor Shelf Rockfish North	NA	NA
Bronzespotted	2.12	High
Cowcod	2.13	High
Greenblotched	2.12	High
Redstripe	2.16	High
Speckled	2.10	High
Chameleon	2.03	Med/High
Pink	2.02	Med/High
Rosethorn	2.09	Med/High
Silvergray	2.02	Med/High
Tiger	2.06	Med/High
Vermilion	2.05	Med/High
Bocaccio	1.93	Med
Flag	1.97	Med
Greenspotted	1.98	Med
Greenstriped	1.88	Med
Harlequin	1.94	Med
Honeycomb	1.97	Med
Mexican	1.80	Med
Pinkrose	1.82	Med
Rosy	1.89	Med
Squarespot	1.86	Med
Stripetail	1.80	Med
Swordspine	1.94	Med
Freckled	1.55	Low
Halfbanded	1.38	Low
Puget Sound	1.59	Low
Pygmy	1.55	Low
Starry	1.02	Low

Minor Slope Rockfish North of 40º10' N. Latitude

The species comprising the Minor Slope Rockfish North complex are all unassessed species except for splitnose rockfish, which was assessed in 2009 (Gertseva, *et al.* 2009). All stocks other than splitnose rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution of splitnose rockfish to the complex (35.8 percent) is based on the average 1916-2008 proportion of the coastwide catch of splitnose occurring north of 40º10' N. latitude. The splitnose rockfish stock is categorized as a category 1 stock by the SSC.

The PSA analysis of the relative vulnerability of stocks to overfishing indicated that most of these rockfish stocks have a medium to high vulnerability to overfishing (Table 4-26). Aurora, rougheye, and shortraker rockfish are the stocks within the Minor Slope Rockfish North complex that are most at risk of overfishing. There is some concern regarding the most vulnerable species in the northern Minor Slope Rockfish complex, most notably rougheye rockfish, which the PSA analysis indicates is one of the two most vulnerable groundfish species to overfishing and a major concern for overfishing. While the PSA analysis indicates shortraker rockfish is also a major concern, it may be less susceptible to overfishing than scored. Recent examination of the available data to potentially use in a stock assessment for currently unassessed groundfish species indicates shortraker are much rarer in the trawl survey and fishery than the other slope species managed in the northern Minor Slope Rockfish complex. If they are truly rare off the west coast, then shortraker susceptibility to encounters with the fishery are lower, making them less vulnerable to overfishing. Of the three most vulnerable species in the complex, it appears there is much more data to inform an assessment of aurora rockfish. An assessment of any one of the most vulnerable species could better inform the vulnerability of these species and could potentially be used as an indicator stock for managing the other vulnerable species to reduce the risk of overfishing.

If future catches increase above these estimated component OFLs, the best remedy for addressing the risk of overfishing other than assessing these stocks may be the restructuring of complexes to aggregate species of similar vulnerabilities and distributions. While there was a consideration for restructuring the complexes this year, the Council considered but rejected doing so until the next management cycle when sufficient time and resources could be brought to bear on this task.

The preferred 2013 and 2014 ACL for northern Minor Slope Rockfish of 1,160 mt is the No Action 2012 ACL. Given that this ACL is well below the SSC-recommended OFL and the SSC-approved ABC, there is little risk of overfishing this complex. The 2006-2010 catches of northern Minor Slope Rockfish have been well under the preferred ACL, with the highest catch in that period (562 mt in 2010) only 48 percent of the ACL (Table 4-22). The average percent attainment of 2006-2010 OYs was 41 percent. The Minor Slope Rockfish North complex is also managed in the IFQ fishery. Only 17 percent of the 2011 IFQ allocation of the Minor Slope Rockfish North complex was attained (Table 4-9).

Table 4-26. The relative vulnerability of rockfish stocks managed in the Minor Slope Rockfish complex north of 40º10' N. latitude ranked by relative level of vulnerability within the complex.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Minor Slope Rockfish North	NA	NA
Rougheye	2.27	Major
Shortraker	2.25	Major
Aurora	2.10	High
Bank	2.02	Med/High
Blackgill	2.08	Med/High
Redbanded	2.02	Med/High
Sharpchin	2.05	Med/High
Yellowmouth	1.96	Med/High
Splitnose	1.82	Med

Minor Nearshore Rockfish South of 40º10' N. Latitude

The species comprising the Minor Nearshore Rockfish South complex are all unassessed species except for the portion of the blue rockfish stock occurring in waters off California north of Pt. Conception (i.e., 34º27' N. latitude to 40º10' N. latitude) and gopher rockfish north of Pt. Conception. All stocks other than the assessed portions of the blue and gopher rockfish stocks off California are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for blue rockfish off California is based on the 2007 assessment (Key, *et al.* 2008) and is recommended as a category 2 stock based on relatively high assessment uncertainty. The OFL contribution for gopher rockfish is based on the 2005 assessment (Key, *et al.* 2006), and is recommended as a category 1 stock by the SSC.

Stock assessments have not yet been conducted for many of the nearshore species, due in part to the lack of available information. Thus the overall stock biomass and age structure is unknown. Biological impacts to the component stocks should be considered on both a coastwide level and within each management area where there is evidence of finer-scale stock structure. Current evidence suggests that population structuring, both genetically and biologically, may occur in many nearshore populations, but any short-term impacts to subpopulations under the final preferred ACLs are unknown (Cope 2004; Gunderson, *et al.* 2008; Waples, *et al.* 2008).

Historically, harvest specifications for the southern Minor Nearshore Rockfish complex were set at a level that was not expected to constrain the fishery and a 50 percent precautionary OY reduction was applied to address scientific and management uncertainty. Management of the complex was designed to ensure that total take of all component species did not exceed the aggregate limit. Given the improved methods of calculating component species contributions to the complexes, management of complexes such as the Minor Nearshore Rockfish South complex is expected to be refined in future biennial cycles.

It is unlikely that the preferred 2013-2014 ACL for the Minor Nearshore Rockfish South complex will be exceeded. Nearshore rockfish species are commercially landed under state permits in California and all commercial landings must be sorted. The state has catch accounting programs to actively monitor and manage these species inseason. The state may also take inseason action independent of NMFS if necessary to prevent exceeding an ACL. Both the nearshore commercial and recreational fisheries will be constrained by the low availability of yelloweye in 2013 and 2014. As such, catches for both fisheries are not expected to increase and exceed the ACLs.

The trip limits for the complex may be restructured inseason if necessary to limit take of a particular nearshore species to reduce the risk of overfishing that species. Such action was taken in 2009 for blue rockfish in California, based on the results from a new assessment. The trip limit in northern California (between 42° N. latitude and 40°10' N. latitude was previously *"6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish"* and was restructured to *"7,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black rockfish"* as a means to limit take of blue rockfish and keep it within the statewide HG.

Concerns have been raised about overfishing component stocks within the minor nearshore complexes. When considering the risk of overfishing to the nearshore species, the biological impact to the stock must be considered. All rockfish comprising the nearshore complexes have longevities of at least 20 years, with many being much greater. Stocks with greater longevities are more resilient to short-term fluctuations in environmental conditions or fishing practices, assuming older individuals are retained in the population. If older individuals are not retained and the stock becomes overfished, rebuilding the stock would likely require a lengthy rebuilding period.

Particular concern was expressed regarding the potential for overfishing vulnerable species within the northern Minor Nearshore Rockfish complex, particularly China, copper, and quillback rockfish. These species were all identified as highly vulnerable with a major concern based on the PSA analysis (Table 4-27). All three of these species are structure-based, longer-lived, deeper-dwelling nearshore rockfish, and thus prone to serial depletion. Concern for these species could arise if catch allocated within the nearshore complex is shifted to these highly vulnerable species. As explained in further detail in Appendix C, state nearshore management plans and policies may adequately mitigate these risks.

The risk of exceeding the preferred 2013-2014 ACL for the Minor Nearshore Rockfish South complex is low, given how well California manages their nearshore fisheries. While the percent of OY attainment has been high (the 2006 OY was exceeded by about 16 percent), the average percent attainment of 2006-2010 OYs was only 77 percent (Table 4-22). No subsequent catch overage of the Minor Nearshore Rockfish South OY occurred after 2006.

Table 4-27. The relative vulnerability of rockfish stocks managed in the Minor Nearshore Rockfish complex south of 40º10' N. latitude ranked by relative level of vulnerability within the complex.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Minor Nearshore Rockfish South	NA	NA
China	2.23	Major
Copper	2.27	Major
Quillback	2.22	Major
Blue (assessed area)	2.01	Med/High
Blue (S of 34º27' N. latitude)	2.01	Med/High
Brown	1.99	Med
Grass	1.89	Med
Olive	1.87	Med
Black and yellow	1.70	Low
Calico	1.57	Low
Gopher (N of Pt. Conception)	1.76	Low
Gopher (S of Pt. Conception)	1.76	Low
Kelp	1.59	Low
Treefish	1.73	Low

Minor Shelf Rockfish South of 40º10' N. Latitude

The species comprising the Minor Shelf Rockfish South complex are all unassessed species except for greenstriped rockfish, which was assessed in 2009 (Hicks, *et al.* 2009) and greenspotted rockfish, which was newly assessed in 2011 (Dick, *et al.* 2011). All stocks other than greenstriped and greenspotted rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contributions for greenstriped and greenspotted rockfish are based on application of the proxy MSY harvest rate of $F_{50\%}$ to the projected exploitable biomass estimates in their respective assessments. Both the greenstriped and greenspotted stocks are categorized as category 2 stocks. The greenstriped stock categorization is based on relatively high assessment uncertainty due to uncertain estimates of historical discards (greenstriped rockfish are rarely landed due to their small size and lack of market value and desirability). The greenspotted stock categorization is based on the fact that annual recruitments are not estimated in the assessment since length and age composition data for greenspotted rockfish contain insufficient information to reliably resolve year-class strength. The greenstriped assessment was a coastwide assessment, and the harvest specifications were apportioned using the mean of the 2003-2008 swept area biomass estimates south of 40º10' N. latitude (15.5 percent) from the NMFS trawl survey. The northern greenspotted stock biomass (and projected OFLs) were apportioned 77.8 percent to the complex based on the average estimated catch proportion in the assessment for the stock occurring in the area between 34º27' N. latitude and 40°10' N. latitude. The entire biomass (and projected OFLs) from the assessment of the southern stock occurring south of 34º27' N. latitude were contributed to the complex.

The PSA analysis of the relative vulnerability of stocks to overfishing indicated that a number of the component rockfish stocks have a medium to high relative vulnerability to overfishing (Table 4-28). However, the RCAs implemented to reduce mortality on overfished species greatly protect shelf rockfish, leading to few concerns regarding overfishing.

Given that the preferred 2013-2014 ACL of 714 mt proposed for Minor Shelf Rockfish South is well below the SSC-recommended OFL and the SSC-approved ABC, there is little risk of overfishing this complex. There will also be similar RCA protections for the core areas of the southern shelf in 2013 and 2014, which will limit access to shelf rockfish in general. This is evidenced by the 2006-2010 catches of southern Minor Shelf Rockfish being well under the preferred ACL, averaging 40 percent of the specified OYs (Table 4-22). The Minor Shelf Rockfish South complex is also managed in the IFQ fishery. Only 2 percent of the 2011 IFQ allocation of the Minor Shelf Rockfish South complex was attained (Table 4-9).

The new greenspotted rockfish assessment indicates the stocks occurring in waters off California north and south of Pt. Conception are in the precautionary zone with a 30.6 percent depletion for the northern stock and a 37.4 percent depletion for the southern stock at the start of 2011. The northern stock was harvested at a rate higher than the proxy F_{MSY} harvest rate during an extended period (1970-1998), which drove the stock below the current MSST in 1990. Similarly, the southern stock was harvested at a rate above F_{MSY} during 1969-1998, which drove the stock below the MSST in 1984. The northern and southern stock biomasses hit their respective nadirs in 1998 and 1987, respectively and have been increasing steadily since with the protections implemented to minimize mortality on overfished shelf rockfish (e.g., implementation of the RCA). Application of the 40-10 rule for the northern stock in aggregate (i.e., the stock occurring in waters off California north of Pt. Conception) would determine an ACL greater than 30 mt; however, the recent estimated total mortality of northern greenspotted rockfish has been less than 1 mt. At this level of harvest, the stock is projected to reach target biomass by 2017. The continued implementation of the RCA makes it likely that this lower level of incidental fishing mortality will occur and stock biomass will increase without additional management measures. Application of the 40-10 rule for the southern stock would determine ACLs close to 40 mt while the recent estimated harvest has been about one third of that amount. The southern greenspotted rockfish stock is projected to attain target biomass by 2013 under existing management measures.

Table 4-28. The relative vulnerability of rockfish stocks managed in the Minor Shelf Rockfish complex north of 40º10' N. latitude ranked by relative level of vulnerability within the complex.

Stock Complex and Component Stocks	PSA Results Vulnerability	
	Score	Level
Minor Shelf Rockfish South	NA	NA
Bronzespotted	2.12	High
Greenblotched	2.12	High
Redstripe	2.16	High
Speckled	2.10	High
Chameleon	2.03	Med/High
Pink	2.02	Med/High
Rosethorn	2.09	Med/High
Silvergray	2.02	Med/High
Tiger	2.06	Med/High
Vermilion	2.05	Med/High
Flag	1.97	Med
Greenspotted	1.98	Med
Harlequin	1.94	Med
Honeycomb	1.97	Med
Swordspine	1.94	Med
Greenstriped	1.88	Med
Mexican	1.80	Med
Pinkrose	1.82	Med
Rosy	1.89	Med
Squarespot	1.86	Med
Stripetail	1.80	Med
Yellowtail	1.88	Med
Freckled	1.55	Low
Halfbanded	1.38	Low
Pygmy	1.55	Low
Starry	1.02	Low

Minor Slope Rockfish South of 40º10' N. Latitude

The species comprising the Minor Slope Rockfish South complex are all unassessed species except for bank rockfish, which was assessed in 2000 (Piner, *et al.* 2000), and blackgill rockfish, which was newly assessed in 2011 (Field and Pearson 2011). All stocks other than bank and blackgill rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for bank rockfish is based on the 2000 assessment and is recommended as a category 2 stock by the SSC. The OFL contribution for blackgill rockfish is based on the 2011 assessment and is also recommended as a category 2 stock by the SSC. Both OFLs are determined by applying the proxy harvest rate of $F_{50\%}$ to projected exploitable biomass.

There is some concern regarding the most vulnerable species in the southern Minor Slope Rockfish complex. The PSA analysis of the relative vulnerability of stocks to overfishing indicated that aurora rockfish has a high vulnerability to overfishing, and rougheye, and shortraker rockfish stocks have a major vulnerability to overfishing (Table 4-29). However, rougheye and shortraker rockfish are rare south of 40º10' N. latitude, and the vulnerability of these two species is really only a concern in managing the northern Minor Slope Rockfish complex. Aurora rockfish has an estimated probability of being subject to overfishing of 36 percent if catches are as high as they have been in recent years (PFMC and NMFS 2011). Given the rarity of rougheye and shortraker rockfish in the south, there is less risk and concern of overfishing component stocks in the southern Minor Slope Rockfish complex than there is in the north.

The preferred 2013 and 2014 ACLs of 618 mt and 622 mt, respectively for the southern Minor Slope Rockfish complex are slightly less than the No Action 2012 ACL of 626 mt. This is because the DBSRA and DCAC OFL estimates of component stocks were revised to correct a bias in calculating the No Action OFLs. The net effect is that the summed contribution of OFLs for the complex decreased slightly. After applying the status quo basis for deciding the ABCs, the No Action ACL was now slightly higher than the recalculated ABCs. Therefore, the Council decided to set the complex ACLs equal to the ABCs. The 2006-2010 catches of southern Minor Slope Rockfish have been well under the preferred ACLs, with the highest catch in that period (256 mt in 2006) only 40 percent of the specified OY (Table 4-22). The average percent attainment of 2006-2010 OYs was 32 percent. The Minor Slope Rockfish South complex is also managed in the IFQ fishery. Only 14 percent of the 2011 IFQ allocation of the Minor Slope Rockfish South complex was attained (Table 4-23).

The new blackgill rockfish assessment indicates the stock south of 40º10' N. latitude is in the precautionary zone with an estimated depletion of 30.2 percent at the start of 2011. The assessment estimates that the spawning output of blackgill rockfish was at high levels in the mid-1970s, began to decline steeply in the late 1970s through the 1980s, consistent with the rapid development and growth of the targeted fishery, and reached a low of approximately 18 percent of the unfished level in the mid-1990s. Since that time, catches have declined and spawning output has increased such that the current estimated larval production is 30 percent of the unfished level.

The preferred alternative is to continue to manage blackgill rockfish in the southern Minor Slope Rockfish complex and to manage total mortality of this component stock south of 40º10' N. latitude with 2013 and 2014 HGs of 119 mt and 122 mt, respectively. These HGs are the calculated ABCs under the Council's preferred P* of 0.45 for this category 2 stock. The HGs do not comport with ACLs calculated using the default 40-10 harvest control rule, which would have a further downward adjustment for this stock since it is in the precautionary zone. The 2013 and 2014 HGs in this case would be 106 mt and 110 mt, respectively (Table 4-30). The projected depletion in ten years under the preferred HGs assuming the ABC rule is 35.6 percent, which compares to a depletion in ten years of 36.0 percent under HGs assuming the 40-10 rule (Table 4-30). While application of the 40-10 rule is more precautionary, the biological consequences of applying the ABC rule rather than the 40-10 rule are negligible.

Table 4-29. The relative vulnerability of rockfish stocks managed in the Minor Slope Rockfish complex south of 40º10' N. latitude ranked by relative level of vulnerability within the complex.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Minor Slope Rockfish South		
Rougheye	2.27	Major
Shortraker	2.25	Major
Aurora	2.10	High
Bank	2.02	Med/High
Blackgill	2.08	Med/High
Redbanded	2.02	Med/High
Sharpchin	2.05	Med/High
Yellowmouth	1.96	Med
Pacific ocean perch	1.69	Low

Table 4-30. Projected spawning output and depletion of blackgill rockfish under alternative catch streams assuming the base model in the 2011 assessment.

Year	Assuming OFL Removals			Assuming ABC Removals			Assuming ABC Removals and a 40-10 Adjustment		
	Spawning output (larvae 10^6)	Depletion	Catch (mt)	Spawning output (larvae 10^6)	Depletion	Catch (mt)	Spawning output (larvae 10^6)	Depletion	Catch (mt)
2011	359,236	30.2%	279	359,236	30.2%	279	359,236	30.2%	279
2012	358,426	30.2%	275	358,426	30.2%	275	358,426	30.2%	275
2013	357,200	30.1%	130	357,200	30.1%	119	357,200	30.1%	106
2014	365,426	30.8%	133	366,214	30.8%	122	367,126	30.9%	110
2015	373,164	31.4%	135	374,764	31.6%	124	376,517	31.7%	114
2016	380,422	32.0%	137	382,853	32.2%	126	385,375	32.4%	117
2017	387,216	32.6%	139	390,491	32.9%	128	393,708	33.1%	120
2018	393,563	33.1%	140	397,692	33.5%	130	401,527	33.8%	123
2019	399,487	33.6%	142	404,472	34.1%	131	408,850	34.4%	125
2020	405,010	34.1%	143	410,850	34.6%	133	415,697	35.0%	128
2021	410,160	34.5%	144	416,848	35.1%	134	422,091	35.5%	130
2022	414,964	34.9%	145	422,490	35.6%	135	428,060	36.0%	132

Other Flatfish

The Other Flatfish complex is the most reasonably constructed complex since all the species have similar life history characteristics, distributions, and low relative vulnerabilities to overfishing (Table 4-31). A systematic overhaul of the Other Flatfish complex in 2004 for the 2005-2006 biennial specifications is documented in the 2005-2006 EIS documents (PFMC 2004).

All of the component stocks in the Other Flatfish complex are unassessed and are therefore category 3 stocks. OFLs for the component stocks were derived using catch-based methods such as DBSRA and DCAC.

The preferred 2013 and 2014 ACL for the Other Flatfish complex of 4,884 mt is the No Action 2012 ACL. Given that this ACL is well below the SSC-recommended OFL and the SSC-approved ABC, there is little risk of overfishing this complex. The 2005-2010 catches of Other Flatfish have been well under the preferred ACL, with the highest catch in that period (1,965 mt in 2006) only 48 percent of the specified OY (Table 4-22). The average percent attainment of 2005-2010 OYs was 34 percent. The Other Flatfish complex is also managed in the IFQ fishery. Only 16 percent of the 2011 IFQ allocation of the Other Flatfish complex was attained (Table 4-23).

Table 4-31. The relative vulnerability of stocks managed under the Other Flatfish complex.

Stock Complex and Component Stocks	PSA Results Vulnerability	
	Score	Level
Other Flatfish		
Butter sole	1.18	Low
Curlfin sole	1.23	Low
Flathead sole	1.03	Low
Pacific sanddab	1.25	Low
Rex sole	1.28	Low
Rock sole	1.42	Low
Sand sole	1.23	Low

Other Fish

The Other Fish complex is comprised of species with dissimilar life histories, distributions, and vulnerabilities to overfishing. The Other Fish complex has historically been the “accumulation complex” for all unassessed nonrockfish, nonflatfish species that are taken in groundfish fisheries. The No Action harvest specifications for the Other Fish complex do not have an analytical basis and many of the dissimilar component species have relatively high vulnerabilities to overfishing (Table 4-32). The GMT and SSC recommend a complete overhaul of the Other Fish complex. The recommended approach to doing this is consideration for adding new species related to the component species of the complex into the FMP and re-grouping species with similar vulnerabilities, ecological interactions, and distributions. This effort is anticipated in time for the next management cycle.

The only assessed stock managed in the Other Fish complex is spiny dogfish, which was assessed for the first time in 2011 (Gertseva and Taylor 2011). The assessment indicated the stock was currently healthy, with an estimated depletion of 63 percent of unfished biomass. The SSC endorsed the use of the 2011 spiny dogfish assessment as the best scientific information available for status determination and management in the Council process. The assessment results indicated that because of the longevity, low productivity, and other vital rates of the spiny dogfish stock, fishing at the F_{MSY} proxy level (SPR = 45 percent) is expected to severely reduce the spawning output of spiny dogfish over the long term. The STAR Panel suggested that the SSC may want to consider the appropriateness of using the current proxy harvest rate for spiny dogfish (Tsou, *et al.* 2011). The SSC concurred that the F_{MSY} proxy may be too aggressive for spiny dogfish and other elasmobranches managed under the FMP. However, the supporting data and analysis needed to recommend a more appropriate SPR (greater than the current proxy) are not currently available. The SSC noted that pertinent research is underway and should be completed in time for the SSC to recommend more appropriate reference points for elasmobranches prior to the next assessment cycle.

The other issue discussed with the SSC is the assumed discard mortality rate for spiny dogfish. The total mortality reports that produced the estimated total mortalities in Table 4-22 assumed 100 percent mortality of discarded spiny dogfish, which represents the bulk of the estimated total mortality of the west coast stock. However, the 2011 spiny dogfish assessment assumed some survival of discarded spiny dogfish. The SSC recommended discard mortality assumptions be consistent between assessments and management. Although the discard mortality assumptions used in the assessment are based on very limited information, they represent the best information available. The SSC recommended that this information be used for management of spiny dogfish. More discussion of the discard mortality of spiny dogfish is provided in Appendix C.

Table 4-32. The relative vulnerability of stocks managed under the Other Fish complex.

Stock Complex and Component Stocks	**PSA Results**	
	Vulnerability	
	Score	**Level**
Other Fish		
California skate	2.12	High
Leopard shark	2.00	High
Soupfin shark	2.02	High
Spiny dogfish	2.13	High
Big skate	1.99	Med
Pacific rattail	1.82	Med
Cabezon (WA)	1.68	Low
Finescale codling	1.48	Low
Kelp greenling	1.56	Low
Ratfish	1.72	Low

The 2013 and 2014 OFLs, ABCs, and ACLs proposed for the Other Fish complex, described in Section 2.1.3.3, are biased low (i.e., underestimated) due to missing OFL contributions from three of the stocks managed in the Other Fish complex and conservative OFL estimates for some of the component stocks as explained in more detail below.

Subsequent to the November 2011 Council meeting, methods were proposed to estimate OFL contributions for six of the seven stocks lacking an OFL estimate. The SSC endorsed the methods and OFL estimates for four of the six stocks lacking an OFL estimate at their March 2012 meeting. The endorsed methods were based on survey biomass and MSY harvest rates, although the SSC cautioned that several strong assumptions were made. Further evaluation of the methods would require a review of background materials used to estimate OFLs, such as the meta-analyses of the ratio of the MSY harvest rate to natural mortality rate. The SSC noted that methods used to derive these OFL estimates are a short-term solution for the Other Fish complex since the complex is expected to be restructured during the next management cycle. Further detail on the SSC-endorsed methods and those not endorsed for estimating OFLs for component stocks in the Other Fish complex follows.

The problem of missing OFLs was addressed in an analysis conducted by scientists from the NMFS Northwest and Southwest Fisheries Science Centers. OFLs for four species currently managed in the Other Fish complex were developed by applying approximate MSY harvest rates to estimates of stock biomass from the NWFSC West Coast Bottom Trawl Survey (Keller, *et al.* 2008). The approach of (Rogers, *et al.* 1996) was modified to estimate OFLs for Pacific grenadier, big skate, California skate, and spotted ratfish using the equation:

$$OFL = F_{MSY} * B_W,$$

where F_{MSY} is the fishing mortality rate that maximizes long-term yield, and B_W is an inverse-variance weighted average of recent survey biomass estimates. For all species, a simplifying assumption was made about survey catchability (q), namely that q = 1, which is likely to result in conservative estimates of OFL for species whose range extends beyond survey boundaries or that occupy habitats inaccessible to survey gear.

To estimate F_{MSY} for each species, the product of estimates for the natural mortality rate (M) and the ratio F_{MSY} /M were calculated. Natural mortality rates were obtained from the literature or estimated from maximum observed ages using Hoenig's method (Hoenig 1983). Maximum reported ages for Pacific grenadier and big skate were 73 and 26 years, respectively (Andrews, *et al.* 1999; McFarlane and King 2006). No published estimates of maximum age for California skate were found, so we assume a maximum age equal to that of big skate (26 years). Barnett (2008) reports a range for M of 0.17 – 0.26 for spotted ratfish based on reproductive output. For the ratio F_{MSY}/M, previous studies (e.g., (Cope, *et al.* 2011a) followed the suggestion of Walters and Martel (2004) that F_{MSY} = 0.8M for demersal groundfish in the northeast Pacific. The present analysis incorporates estimates of F_{MSY}/M, tailored to specific taxonomic groups, from a recent meta-analysis based on more than 200 species (Shijie Zhou, CSIRO; personal communication).

To propagate uncertainty in M and F_{MSY}/M into the OFL estimates, probability density functions were specified for each quantity (Table 4-33). For Pacific grenadier and the two skate species, we assumed M was lognormally distributed with a species-specific mean and a log-scale standard deviation of 0.4 (CV = 0.417; (Cope, *et al.* 2011a). Ageing methods for ratfish remain highly imprecise, so we assumed a uniform distribution of M over the range 0.17 – 0.26, following Barnett (2008). The meta-analysis of Zhou (pers. comm.) reports estimates of the posterior mean and standard deviation of the distribution of F_{MSY}/M for teleosts (mean = 0.87, SD = 0.05) and chondrichthyans (mean = 0.41, SD = 0.09). Given that there was little skewness in Zhou's posterior distributions for this quantity, we assume normal distributions for F_{MSY}/M.

Table 4-33. Assumed distributions for natural mortality (M) and F_{MSY}/ M by species, with associated coefficients of variation (CV) or standard deviations (SD). For spotted ratfish, bounds of the assumed uniform distribution on *M* are provided in place of a CV.

		Pacific grenadier	Big skate	California skate	Spotted ratfish
Natural Mortality, M yr^{-1}					
	Distribution	lognormal	lognormal	Lognormal	uniform
	Expected Value	0.053	0.162	0.162	0.215
	CV (range)	0.417	0.417	0.417	(0.17, 0.26)
F_{MSY}/M					
	Distribution	normal	normal	Normal	normal
	Expected Value	0.87	0.41	0.41	0.41
	SD	0.05	0.09	0.09	0.09

Trawl survey estimates of abundance were provided by NWFSC staff (A. Keller and B. Horness, personal communication) for the years 2003-2010. Estimates were stratified by year, depth, and INPFC area. Annual biomass and variance estimates were calculated as the sum of stratum-specific biomasses and variances within each year (Table 4-34, Figure 4-23). To reduce the effect of spurious annual estimates, we assume current biomass is the inverse-variance weighted average over the most recent three years (2008-2010). This approach assumes that no substantial changes in abundance occurred during this time period, which is not unreasonable for low-productivity stocks that are not primary targets of the fishery.

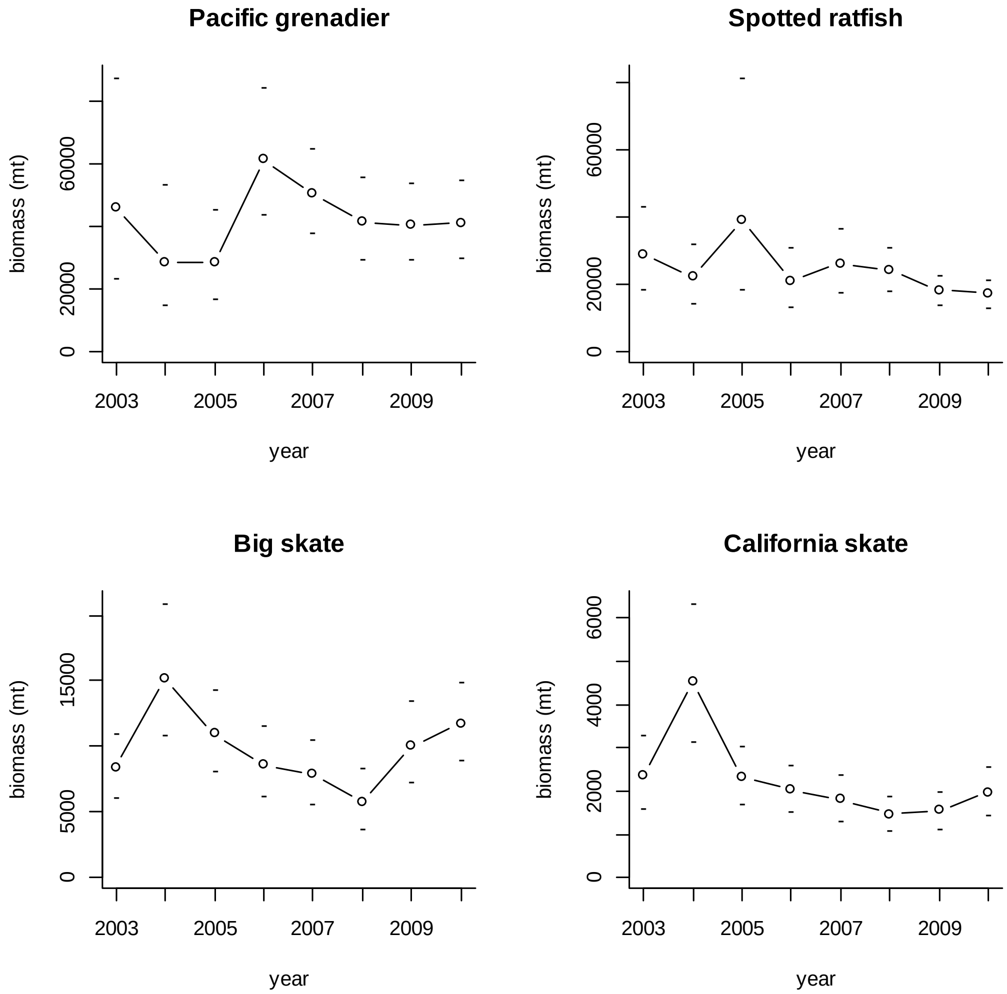

Figure 4-23. Time series of estimated survey biomass (mt), 2003-2010, with estimated 95% confidence intervals.

Table 4-34. Biomass estimates (mt) and associated coefficients of variation (CV) from the NWFSC trawl survey, by year and species.

Year	Pacific grenadier		Big skate		California skate		Spotted ratfish	
	Biomass	CV	Biomass	CV	Biomass	CV	Biomass	CV
2003	45,796	34.3%	8,331	14.6%	2,340	18.4%	28,895	21.5%
2004	28,564	33.3%	15,159	16.7%	4,516	17.6%	22,086	19.9%
2005	28,395	25.1%	10,943	14.3%	2,336	14.5%	39,262	39.0%
2006	61,292	16.7%	8,587	15.9%	2,025	13.8%	21,080	20.8%
2007	50,235	13.6%	7,844	15.7%	1,804	15.1%	26,030	18.2%
2008	41,205	16.3%	5,742	20.3%	1,463	14.0%	24,123	13.8%
2009	40,267	15.7%	10,070	15.3%	1,546	14.2%	18,151	12.7%
2010	41,007	15.3%	11,709	12.8%	1,975	14.6%	17,125	12.6%

OFL point estimates are typically based on the median of the OFL distribution, as this statistic represents the catch associated with a 50 percent probability of overfishing. Median OFLs for Pacific grenadier, big skate, California skate, and spotted ratfish are 1,720 mt, 513 mt, 96 mt, and 1,633 mt, respectively. Descriptions of the OFL distributions (mean, median, and selected percentiles) for the four species are provided in Table 4-35. Illustrations of prior distributions for M and F_{MSY}/M, along with derived distributions for weighted average biomass and OFL, are included in Figure 4-24 through Figure 4-27. All distributions were approximated using 1 million Monte Carlo draws.

Table 4-35. Summary statistics for distributions of OFL (mt) based on estimated survey biomass and MSY harvest rates.

Species	Mean	Percentile				
		2.5%	25%	50%	75%	97.5%
Pacific grenadier	1,873	763	1,299	1,720	2,274	3,871
Big skate	568	199	374	513	701	1,256
California skate	107	38	70	96	131	236
Spotted ratfish	1,661	894	1,358	1,633	1,935	2,581

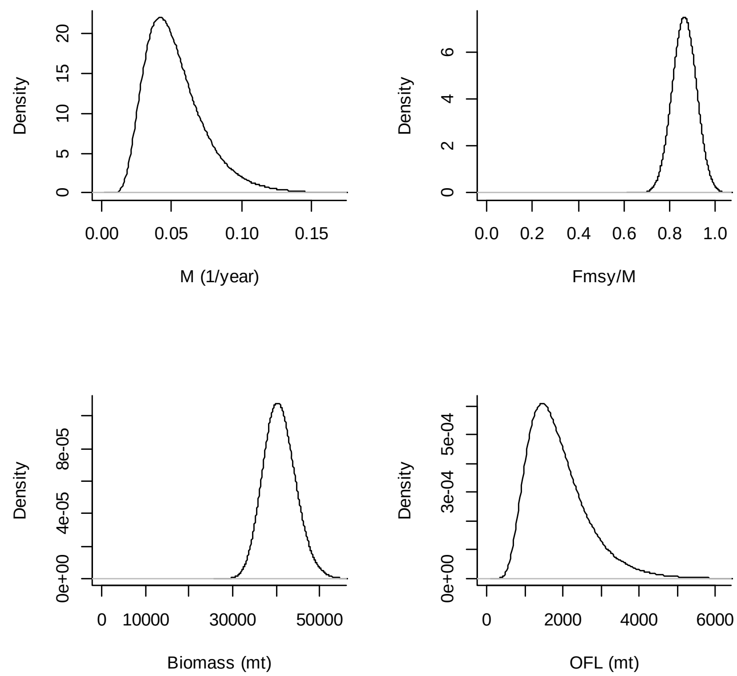

Figure 4-24. Assumed distributions for M and F_{MSY}/M (upper panels) and distributions of the weighted average survey biomass (2008-2010) and OFL (lower panels) for Pacific grenadier.

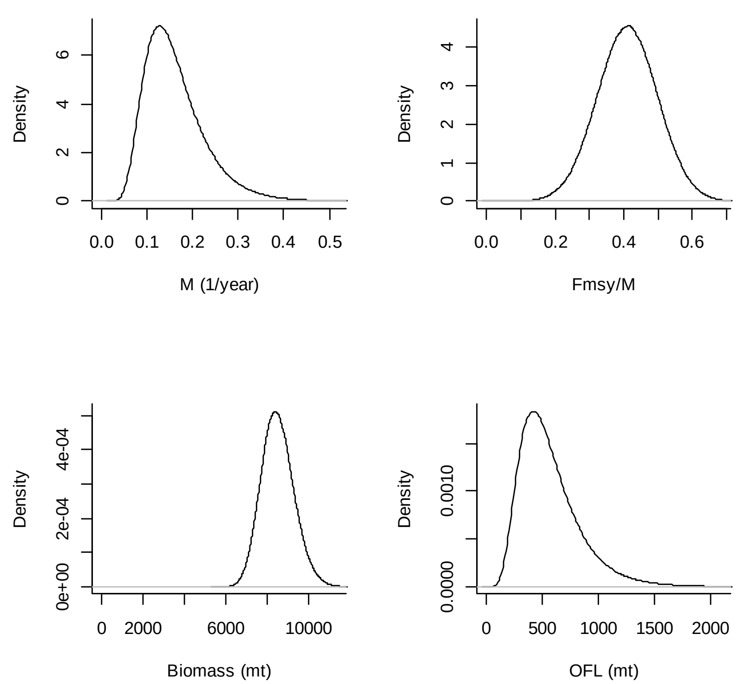

Figure 4-25. Assumed distributions for M and F_{MSY}/M (upper panels) and distribution of the weighted average survey biomass (2008-2010) and OFL (lower panels) for big skate.

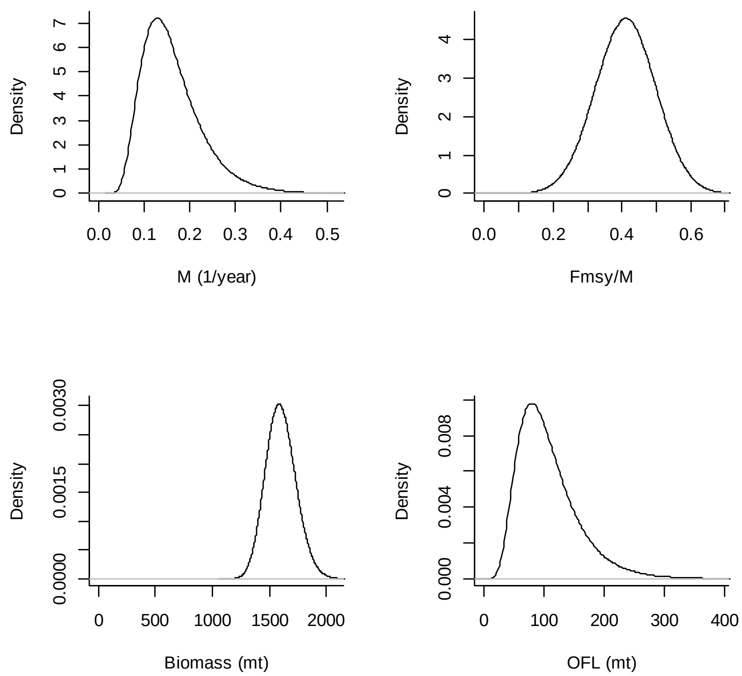

Figure 4-26. Assumed distributions for M and F_{MSY}/M (upper panels) and distributions of the weighted average survey biomass (2008-2010) and OFL (lower panels) for California skate.

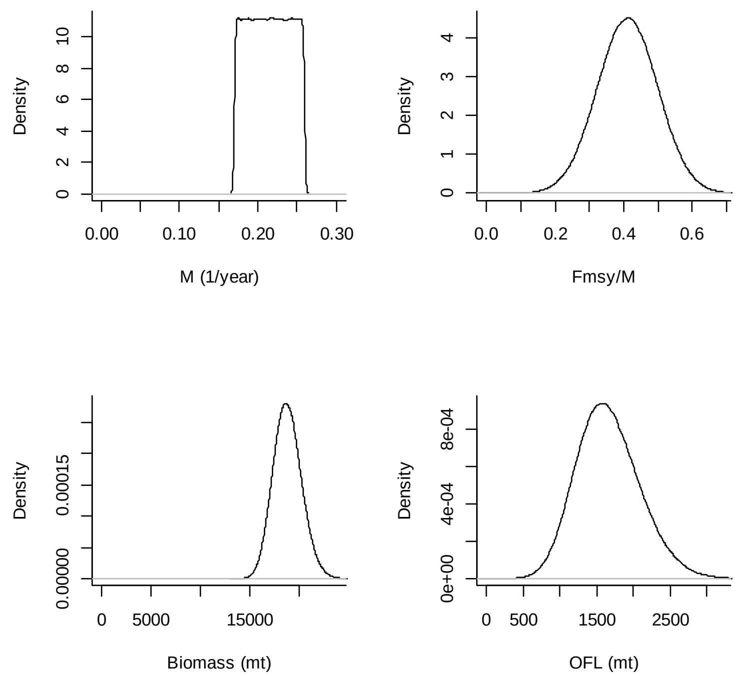

Figure 4-27. Assumed distributions for M and F_{MSY}/M (upper panels) and distributions of the weighted average survey biomass (2008-2010) and OFL (lower panels) for spotted ratfish.

A proposed method to estimate OFLs for the cabezon stock off Washington and the kelp greenling stock off Oregon and Washington using previous stock assessments was reviewed yet not endorsed by the SSC at their March 2012 meeting. The proposed OFLs were estimated using previously accepted assessment models where additional catch was added to account for areas that were not included in the original assessment. The SSC did not endorse the modeling approach used to estimate OFLs for cabezon in Washington and kelp greenling in Washington/Oregon since the interplay between amounts of catch used in the model, model parameters and estimated OFLs was found to be counterintuitive, and further exploration was required to address this issue.

Given the lack of any biological and fisheries information on finescale codling and the fact that the overall complex OFL is the sum of all component stocks' OFLs, no OFL estimate was proposed for finescale codling to reduce the risk of inflating a complex-level OFL that contains stocks with variable vulnerabilities (Cope, *et al.* 2011a).

The current preferred 2013 and 2014 ACLs of 4,717 mt and 4,697 mt, respectively for the Other Fish complex are not likely to impede fishery access to target species since they are higher than the historic estimated mortality of stocks managed in the complex (Table 4-22). The average annual (2005-2010) total mortality of stocks managed in the Other Fish complex is 4,211 mt or approximately 500 mt less than the proposed ACLs.

4.1.2 Marine Ecosystem

4.1.2.1 Models, Data, and Background Information

Conceptual Framework

To consider potential impacts to the marine ecosystem, habitat is used as a proxy for the marine ecosystem, because the nexus between fishing activities and habitat impacts is more straightforward, at least conceptually. This inference assumes that area closed to fishing (by gear type) reduces impacts to habitat in those areas and any effort shifting would have insignificant impacts to habitat in areas open to commercial groundfish fisheries. To this end the spatial extent of the RCAs under the alternatives is used to infer impacts, because their configuration affects fishing patterns. However, the Council may make changes in RCA boundaries, via inseason management, under the 2011-12 harvest specifications and management measures. Effects to benthic habitat is used as a proxy for ecosystem effects because most marine habitat components are fixed spatially and those that are not (e.g., water quality characteristics, kelp canopy, etc) tend to be ephemeral making it difficult to predict impacts.

The 2011-12 Groundfish Harvest Specifications EIS included a conceptual matrix that categorized management scenarios into onshore/offshore fishing opportunities, as a way to predict impacts to species and habitat. Based on the premise that higher canary rockfish ACLs increase inshore fishing opportunity while higher POP ACLs increase offshore fishing opportunity the integrated alternatives are organized in a similar matrix below[37]:

	Increased offshore opportunities	Decreased offshore opportunities
Increased inshore opportunities	7	1,3,5,8
Decreased inshore opportunities	No Action, 4,6	2

Using this matrix provides information to inform relative onshore/offshore impacts, but does not account for potential north/south shifts in effort, nor does it address the effect of gear switching in the IFQ fishery.

The Pacific Coast Groundfish FMP Amendment 20 EIS (PFMC 2010b) includes consideration of the effect of alternative management scenarios to the marine environment, based on the implementation of trawl rationalization. The EIS describes the CCLME model ("Atlantis"), which aggregates species into functional groups to assess fish movement, migration, and behavior, and other factors. That model is describes in of the Amendment 20 EIS (PFMC 2010b) and is hereby incorporated by reference.

Gear switching has likely become more prevalent under trawl rationalization, but is again not quantifiable due to a lack of information from which to draw conclusions. The 2011-12 Harvest Specifications FEIS (PFMC and NMFS 2011) noted that black-footed albatross fishery interactions were limited almost entirely to the non-nearshore fixed gear fishery. Therefore, a relative increase in targeting of sablefish using fixed gear in the shoreside IFQ fishery may have potential for a greater impact to those seabirds. Similarly, green sturgeon bycatch occurs almost entirely in the California halibut fishery (NWFSC 2011). Fishery interactions of both these species are discussed below.

[37] Classifying POP and canary rockfish into "higher" and "lower" categories is based on the median value across the alternatives.

The integrated alternatives use variable ACLs for canary rockfish and POP as management tools to minimized species-specific mortality. Lowering harvest limits may result in decreased impacts to ecosystem components (i.e., habitat), but the effect on shifts in the type of gear used or fishing location, both of which could affect habitat or other ecosystem components, cannot be predicted.

Proposed RCA Configurations

Current, 2012 No Action limited entry trawl RCA boundaries are proposed across all the action alternatives but the nontrawl RCA boundaries are different between nearshore sub-alternative A and B. , there is variation between some Alternatives, relative to changes in RCA boundaries. In all cases except one, the management option changes to RCA boundaries are a net increase in RCA spatial extent. The only exception is a management option under Alternatives 1-3 and 5-7 that would move the shoreward RCA boundary to deeper water, in effect decreasing the spatial extent of the nontrawl RCA in that area (42° - 40°10).

Table 4-36 displays the seaward and shoreward trawl RCA boundaries under the alternatives by bimonthly fishing period and Table 4-37 depicts the nontrawl RCA configurations. Only Alternative 4 is different than No Action and Alternatives 1-3 and 5-8, relative to RCA boundary changes. Alternative 4 is designed to minimize impacts to canary rockfish and the "B" sub-alternative is designed to minimize impacts to yelloweye rockfish. In addition, RCA boundaries may be changed inseason (at any time during the 2013-14 cycle) in response to new information requiring reduction in catches of groundfish species.

Table 4-36. No Action Alternative trawl RCAs by bimonthly period.

JAN-FEB	MAR-APR	MAY-JUNE
North 48°10: Shore – 200 fm 48°10 - 45°46: 75 – 200 fm 45°46 - 40°10 - 75 – 200 fm South 40°10 : 100 – 150 fm	North 48°10: Shore – 200 fm 48°10 - 45°46: 75 – 150 fm 45°46 - 40°10: 75 – 200 fm South 40°10 : 100 – 150 fm	North 48°10: Shore – 150 fm 48°10 - 45°46: 75 – 150 fm 45°46 - 40°10: 75 – 200 fm South 40°10 : 100 – 150 fm
JUL-AUG	**SEPT-OCT**	**NOV-DEC**
North 48°10: Shore – 150 fm 48°10 - 45°46: 100 – 150 fm 45°46 - 40°10: 100 – 200 fm South 40°10 : 100 – 150 fm	North 48°10: Shore – 200 fm 48°10 - 45°46: 75 – 150 fm 45°46 - 40°10: 75 – 200 fm South 40°10 : 100 – 150 fm	North 48°10: Shore – 200 fm 48°10 - 45°46: 75 – 150 fm 45°46 - 40°10: 75 – 200 fm South 40°10 : 100 – 150 fm

Table 4-37. Comparison of the nontrawl RCA configuration under the integrated alternatives. Bold indicates changes from No Action.

	No Action	Alts 1-3, 5-8	Alt 4
Shoreward	North 46°16: Closed to shore 46°16 - 43°: 30 fm 43° - 42°: 20 fm 42° - 40°10 : 20 fm 40°10 to 34°27: 30 fm South 34°27: 60 fm	North 46°16: Closed to shore 46°16 - 43°: 30 fm 43° - 42°: 20 fm 42° - 40°10 : 20 fm (a) or **30 fm (b)** 1/ 40°10 to 34°27: 30 fm South 34°27: 60 fm	North 46°16: Closed to shore 46°16 - 43°: **20 fm** 43° - 42°: 20 fm 42° - 40°10 : 20 fm 40°10 to 34°27: **20 fm** South 34°27: **20 fm**
Seaward	46°16 - 43°: 100 fm 43° - 42°: 100 fm 42° - 40°10: 100 fm 40°10 to 34°27: 150 fm South 34°27: 150 fm	46°46 - 43°: 100 fm 43° - 42°: 100 fm 42° - 40°10: 100 fm 40°10 to 34°27: 150 fm South 34°27: 150 fm	North 46°16: 100 fm 46°46 - 43°: **150 fm** 43° - 42°: **150 fm** 42° - 40°10: **150 fm** 40°10 to 34°27: 150 fm South 34°27: 150 fm

1/ Nearshore fishery sub-alternative A provides for a more restrictive RCA and higher landings. Sub-alternative B provides a less restrictive RCA and only slightly higher landings compared to No Action.

California Current Large Marine Ecosystem

Trawl rationalization was expected to result in fleet consolidation, and more efficient fishing overall. While preliminary information indicates this is happening, sufficient information has not yet been accumulated to provide a quantitative assessment.

The 2011-12 Groundfish Harvest Specifications FEIS (PFMC and NMFS 2011) did not directly consider impacts to the CCLME. However, it did address trophic and other ecosystem impacts. That document, in addition to the Amendment 20 EIS, concludes that while no alternatives would have a perceptible impact on climactic factors such as ENSO, there could be impacts to trophic interactions. Such interactions would most likely include predator-prey interactions. However, these impacts are not readily quantifiable. The 2011-12 Groundfish Harvest Specifications FEIS (PFMC and NMFS 2011) is hereby incorporated by reference.

Any alternative under consideration is unlikely to have a discernible impact on the CCLME and other oceanographic and climate functioning. The Amendment 20 EIS concluded: “the California Current large marine ecosystem is not predicted to be substantially impacted by trawl rationalization, although it is difficult to make predictions about a complicated system that has many inputs to productivity.”

EFH

Pacific Coast groundfish EFH is described in Amendment 19 to the groundfish FMP (PFMC 2006), and briefly described in Section 3.1.2.2 of this document. Groundfish EFH is described to include all waters in the Pacific Coast EEZ:

- With depths less than or equal to 3,500 m (1,914 fm) to mean higher high water level (MHHW) or the upriver extent of saltwater intrusion) defined as upstream and landward to where ocean derived salts measure less than 0.5 ppt during the period of average annual low flow)
- Seamounts in depths greater than 3,500 m as mapped in the EFH assessment GIS
- Areas designated as Habitat Areas of Particular Concern (HAPCs) not already identified by the above criteria

Numerous HAPCs exist within groundfish EFH, based on criteria described in the EFH regulations (50 CFR §600.815). The Council and NMFS implemented varying levels of gear restrictions, based primarily on the designated HAPCs. In addition, areas westward of the 700 fathom depth contour and within designated EFH are closed to bottom trawl gear.

Because much of the designated EFH in the Pacific Coast EEZ is already managed to minimize or exclude bottom contact gear, any alternative being considered would not impact those areas. These include all EFH areas westward of the 700fm depth contour, in addition to the gear restrictions in designated HAPCs. However, it is possible that increases in the spatial extent of the RCA could result in increased fishing intensity in other areas due to displaced fishing effort. The end result could be a net balance of impacts to EFH, via decreased effort in one area being replaced by increased effort in another area. The spatial scale of fishing effort shifts would likely be too fine of a scale to determine any impacts to EFH.

Finally, although there is a lack of sufficient data to quantify impacts to EFH resulting from trawl rationalization, the Council and NMFS have implemented minimization measures to protect EFH, and these measures are likely to remain in place.

Marine Protected Areas

The 2011-12 Harvest Specifications EIS provides a detailed listing of state and Federal MPAs. That document describes 28 National Wildlife Refuges, Seven National Parks, Five National Marine Sanctuaries, and four National Estuarine Research Reserves. In addition, there are other categories of Federal jurisdiction that may affect fishing activities, although they were developed for other purposes. These include Regulated Navigation Areas, Danger Zones and Restricted Areas, and weather and scientific buoys.

Several categories of fishing regulated areas were developed by the Council, including RCAs, Cowcod Conservation Areas, Darkblotched Conservation Area, YRCA, and two Pacific Whiting Salmon Conservation Zones. These are described in PFMC (2010) and incorporated by reference.

4.1.2.2 Comparison of the Alternatives

This section compares potential impacts to marine ecosystem habitat components, based on changes to the RCA boundaries described in the alternatives. For the limited entry trawl fishery, the RCA boundaries do not change between any of the alternatives; therefore, the selection of one alternative over another would have no differential effects resulting from the potential for RCA boundary changes. RCA boundaries can, and have been, adjusted during the 2-year management period (inseason) to respond to new information about catches. Appendix C describes potential changes to the trawl RCA that could be implemented inseason to reduce catches of spiny dogfish and longnose skate; these proposals would increase the spatial extent of the trawl RCA.

No Action Alternative

Implementation of the No Action alternative is not expected to result in any additional adverse or beneficial impacts to the marine ecosystem as have been previously observed in past years. Thus, the effects on the marine ecosystem resources from this alternative would be neutral compared to status quo.

The Preferred Alternative, Alternatives 1-3, and Alternatives 5-8

There are insignificant adverse impacts to the marine ecosystem and habitat components from trawl fishing activities under the Preferred Alternative, Alternatives 1-3 and Alaternatives 5-8, because 1) any changes to the trawl RCA would be applied across all Alternatives; 2) the preferred modifications to waypoints defining RCA boundaries are relatively minor and intended to align boundaries with depth contours while maintaining the intent of existing boundaries; and 3) changes to the trawl RCA would result in a greater spatial extent of the RCA. Although the increase in spatial extent of the RCA would be modest, it would represent an increase in the area of seafloor protected from bottom trawling impacts.

With one exception, there are no likely adverse impacts to the marine ecosystem and habitat components from nontrawl fishing activities under Alternatives 1-3 and 5-7, because changes to the trawl RCA would result in a greater spatial extent of the RCA. The one exception would be option b (see Table 4-37), which would move the shoreward boundary of the RCA between 42° - 40°10 from 20 fm to 30fm, representing a modest decrease in spatial extent of the RCA. Although there is potential for a modest increase in effort outside the RCA, the adverse impacts resulting from a modest increase would be expected to be minimal and temporary compared to No Action.

Alternative 4

Under Alternative 4 the nontrawl RCA is larger compared to the other alternatives (primarily to minimize impacts to canary rockfish). This is likely to have a comparatively beneficial impact of insignificant magnitude to the degree the area available to fishing correlates with ecosystem effects.

It is unlikely that any management scenarios resulting in RCA boundary changes would have a discernible impact to EFH. This is primarily because there is not sufficient evidence to conclude that shifts in effort would have any net impact to more heavily-fished areas, but also because 1) the increased RCA size should be assumed to be a net habitat benefit, and 2) the Council and NMFS have implemented habitat protection measures that would still be in place under an alternative that results in RCA boundary changes. Regarding the CCLME, MPAs, climate, and biogeography, it is even less likely that any of the alternatives would have any discernible adverse impact from the proposed action, but there may be some beneficial impact as a result of a larger RCA compared to No Action.

4.1.3 Nongroundfish Species

4.1.3.1 Models, Data, and Background

The nature of impacts to nongroundfish species will vary depending on the type of fishing gear and fishing practices as well as the life history and behavior of the particular species or populations. Direct impacts from fishing generally include incidential mortality (bycatch), while indirect impacts include changes to habitat and prey availability. The impacts are not expected to be uniform across the spectrum of species, due to the variability in the behavior and susceptibility to various fishing practices of each species or population.

Catch control measures proposed under the alternatives (IFQ, trip limits, RCAs) are only for groundfish species and therefore would have no direct impacts on nongroundfish species. The measures may indirectly affect nongroundfish species if they induce changes in the magnitude of fishing effort and its spatial and temporal distribution. In addition, gear switching in the shoreside IFQ fishery could result in the mix of nongroundfish species caught. However, it is not possible to predict changes in these metrics due to the proposed action. But such changes may be inferred from changes in POP and canary rockfish ACLs across the alternatives and changes to the RCA boundaries. For this reason, past catches of nongroundfish species are likely the best predictor of likely future catches under the proposed action. Section 3.1.3 provides baseline information on past catches of nongroundfish species.

Nongroundfish Catch Patterns

Pacific halibut is taken in both the trawl and fixed gear fishery sectors. There is potential for greater impacts to Pacific halibut bycatch under alternatives that displace fishing opportunities as a result of RCA boundary changes. Although there is not enough information to quantify the potential impacts, because Pacific halibut is generally a deeper water species, it is possible that changes to the seaward boundary (with the potential to push fishing effort further offshore) would have a great impact on Pacific halibut than changes to the shoreward boundary of the RCA.

California halibut is taken incidentally in the west coast groundfish fishery, and mostly in the LE bottom trawl fishery. Between 2007 and 2010, the LE bottom trawl fishery accounted for over 95 percent of the bycatch, with the nearshore fixed gear fishery accounting for approximately four percent, and the non-nearshore fixed gear fishery accounting for less than one percent. To the extent that California halibut is a species more affiliated with the nearshore than offshore, the management measures concentrating effort closer to shore (i.e., increased shoreward RCA boundaries) may have a greater relative impact than measures that shift effort further offshore (i.e., increased seaward RCA boundaries).

Demersal and benthic dwelling species, including miscellaneous flatfishes and skates are taken incidentally in the groundfish fishery, and could potentially experience impacts resulting from RCA changes. However, those impacts would be somewhat speculative and difficult to quantify. For other bottom-dwelling species such as Dungeness crabs, sea cucumbers and other benthic shellfish species, one could expect modest impacts resulting from the various management scenarios. However, these impacts would be difficult to quantify.

CPS are taken incidentally in the groundfish fishery, mostly in the Pacific whiting fishery. CPS are mid-water species, and are typically not associated with the ocean bottom. Exceptions can include spawning events for squid, herring, and other non-managed coastal pelagic fish. They can range far offshore, especially Pacific sardine and mackerel species. Therefore, changes to RCA boundaries are unlikely to have any discernible impact to CPS, regardless of whether groundfish effort shifts onshore or offshore, north or south. It is unlikely that mid-water shellfish species such as pink shrimp would be impacted by any changes to RCA boundaries. Mid-water trawl mesh sizes are typically much too large to capture pink shrimp.

There is a limited amount of documented bycatch of highly migratory species in groundfish fisheries. The 2009 HMS SAFE document (PFMC 2009) shows 100 kg albacore in groundfish trolling gear, and notes some bycatch of thresher sharks in trawl gear. However, because HMS species are typically caught in mid- or top-water gear, it is unlikely that there would be any measurable impacts between any of the Alternatives being considered.

4.1.3.2 Comparison of the Alternatives

As outlined in the previous section, no changes are proposed to the trawl RCA as part of the proposed action and the nontrawl RCA configuration only changes to any degree under alternative 4. (There is also a minor change in the shoreward boundary of the nontrawl RCA under sub-alternative B.) RCA configurations are therefore expected to have a negligible effect on nongroundfish catch under all the alternatives.

As discussed in the previous section, differential ACLs for canary rockfish and POP could affect the distribution of fishing effort between offshore and inshore areas. Higher fishing effort in offshore areas may affect offshore species such as Pacific halibut and some slope flatfishes while higher inshore effort would affect species such as California halibut, Dungeness crab, sea cucumbers, and miscellaneous flatfishes and roundfishes. Based on this premise, differential effects of the alternatives would be as follows:

- Greater effect on inshore species: The Preferred Alternative and Alternatives 1, 2, 3, 5, and 8
- Greater effect on offshore species: No Action, Alternatives 4 and 6
- Greater effect on nongroundfish species in both areas: Alternative 7

4.1.4 Protected Species

4.1.4.1 Models, Data, and Background

The West Coast Groundfish Observer Program (WCGOP) manages fisheries observer data and estimates bycatch of protected species. The bycatch ratios can be found in Jannot, et al. (2011) for marine mammals, seabirds, and sea turtles; and in Al-Humaidhi, et al. (2011) for green sturgeon and eulachon. Pacific salmon bycatch and impacts models can be found in the groundfish Amendment 20 EIS, and Bellman et al. (2011b). These sources are hereby incorporated by reference.

Pacific Salmon

Quantitative models assessing bycatch of salmon species under various alternatives have not been developed, in part because factors external to the fishery are major drivers of bycatch rates. Oceanic conditions in particular affect migration patterns spatially and temporally, as does prey availability and other factors. A qualitative assessment of changes in bycatch is therefore presented in this document. For Chinook, NMFS completed a supplemental biological opinion (NMFS 2006b) that established incidental take limits of 11,000 Chinook salmon in the whiting fishery and 9,000 in the nonwhiting groundfish bottom trawl fishery. This opinion remains in effect.

Pacific salmon, during the adult (ocean) phase of their lifecycle, occur throughout the US EEZ, from southern California northward to Canadian and Alaskan marine waters. Although seasonally more abundant in nearshore areas, this varies between stocks.

Although the resulting incidental take of Chinook salmon cannot be predicted, in 2013-14 it is likely to be within the range of incidental take experienced in the recent past. With regard to variable impacts to Pacific salmon resulting from the Alternatives considered, it is unlikely that any management scenarios under the Alternatives would have a negative impact on Pacific salmon. The exception may be in cases where fishing pressure is displaced shoreward during seasons when Pacific salmon are more prevalent.

Green sturgeon

The Southern distinct population segment (DPS) of the North American green sturgeon (*Acipenser medirostris*) was listed as threatened in April, 2006, with Critical Habitat designated October 9, 2009. Documented interactions with the California halibut trawl fishery provide background for a qualitative assessment of the potential significance of impacts to green sturgeon. However, quantitative modeling or bycatch estimates have not yet been developed. Al-Humaidhi et al. (2011) contains bycatch estimates for green sturgeon interactions with the groundfish fishery, and NWFSC (2011) contains detailed information on biology, range, fishery impacts, habitat, and trophic effects. This risk assessment was only recently issued, and warrants more review prior to making conclusive statements regarding impacts. The 2011-12

Groundfish Harvest Specifications EIS noted that "quantitative modeling or bycatch estimates have not yet been developed" but also noted that bycatch in the LE trawl fishery appears to be much lower than that of the California halibut fishery.

NMFS recently issued a biological opinion (NMFS 2012) for the 2012 Pacific groundfish fishery. Although it does not apply to the 2013-14 fishery, we can infer relatively similar conclusions, given the lack of alternative biological information on which to base conclusions regarding impacts to protected species. This biological opinion concludes that there may be up to 330 take interactions with green sturgeon, and mostly likely less than 19 lethal takes, because most are released alive.

Alternatives 3, 5, and 7 could in theory increase nearshore opportunities; because they offer relatively greater canary rockfish (i.e., shelf spp.) and relatively less POP (i.e., slope spp.) opportunities. This could increase impacts to green sturgeon.

Eulachon

The Southern DPS of Eulachon (*Thaleichthys pacificus*), or Columbia River smelt, was listed as threatened under the ESA in 2010 (75 FR 13012). A status review (NMFS 2010b) describes the most likely threats to eulachon recovery, allowing for a qualitative assessment of the potential significance of impacts to eulachon from the US West Coast commercial groundfish fishery. The status review identified many potential threats, including climate change, bycatch, dredging, shoreline construction, and others. NMFS initiated consultation for eulachon in early 2012, and issued a Biological Opinion in February. The biological opinion concluded that the fishery is not likely to jeopardize the continued existence of the species (NMFS 2012). Although the biological opinion does not apply to the 2013-14 fishery, we can infer relatively similar conclusions, given the lack of alternative biological information on which to base conclusions regarding impacts to protected species.

Eulachon are incidentally caught in groundfish trawl fisheries and in the at-sea hake fishery as well. Chapter 3.2 describes bycatch information. In both fisheries, the bycatch rates are described in terms of total number of individuals (21 in 2010). Table 3-26 depicts bycatch of eulachon in groundfish fisheries. NWFSC (2011) contains detailed information on eulachon biology, range, fishery impacts, habitat, and trophic effects. Although scientific estimates of spawning stock biomass (SSB) in US waters are unavailable, the Fraser River (Canada) stock appears to be experiencing a downward trend (NWFSC 2011).

Because bycatch of eulachon in the groundfish bottom trawl fishery is extremely small, measured in the number of individuals, it is reasonable to conclude that no single alternative or group of alternatives would have a discernible impact.

Marine mammals

The West Coast Groundfish Observer Program documents fishery interactions with marine mammals. Several species are protected under the ESA and the MMPA. In the 2011-12 Groundfish Harvest Specifications EIS, a qualitative approach was used to assess the significance of the impacts to marine mammal populations, based on reported interactions and, when available, the Potential Biological Removal (PBR) established for a species. Recently, the NWFSC issued a risk assessment (NWFSC 2011) that summarizes biological, trophic, habitat, and bycatch information.

NMFS prepared a Biological Opinion in 1990 that concluded the groundfish fisheries are not likely to jeopardize the continued existence of listed marine mammals. The 1990 consultation was reinitiated and a new Biological Opinion was prepared in 2012 for the 2012 fishery. The 2012 Biological Opinion concluded that the continued existence of humpback whales and Steller sea lions would not be jeopardized by the 2012 groundfish fishery. NMFS (2012) further concludes that the Pacific Coast groundfish fishery is not likely to adversely affect sei whales, North Pacific right whales, blue whales, fin whales, sperm whales, southern resident killer whales, or Guadalupe fur seals.

The effects of the harvest limit alternatives on endangered and threatened marine mammal species are difficult to quantify, but recent WCGOP data (Heery, *et al.* 2010) provides some ability to make inferences about potential relative impacts of various management scenarios. Section 3.1.4.4 summarizes information on pinnipeds and cetaceans with known groundfish fishery interactions, and Jannot et al. (2011) contains more detailed information on fishery interactions.

Alternatives that displace fishing effort may have impacts to marine mammals. In particular, species more prevalent in nearshore waters are more likely to be impacted by shoreward RCA shifts under Alternative 4, as well as between 42° - 40°10 across the remaining Alternatives. The No Action Alternative is not expected to have any discernible impact.

Species more likely to be encountered offshore are commensurately more likely to be impacted by displaced fishing pressure resulting from seaward RCA shifts. These also would be associated with Alternative 4, as well as with the remaining Alternatives but only north of 46°60. Again, the No Action Alternative is not expected to have any discernible impact.

Seabirds

Seabird species with documented interactions with the US West Coast commercial groundfish fishery represent a diverse suite of life histories, migration patterns, and reproductive strategies. Three distinct spatial/temporal seasons have been identified for the West Coast: the Upwelling, Oceanic, and Davidson Current seasons (Ford et al. 2004). Distribution of seabird species also varies latitudinally. These seasons coincide with winter (January-April), summer (May-August) and fall (September-December).

Based on information available for the December 2005 EFH FEIS (NMFS 2005, section 4.6.2), seabird interactions in the West Coast groundfish fishery were described as “rare and infrequent.” The effects of the harvest limit alternatives on endangered and threatened seabird species are unknown. However, NMFS recently initiated consultation with USFWS on listed sea birds. In addition, NWFSC (2011) contains detailed information on sea bird biology, habitat, life history, and bycatch information.

As described in Section 3.1.4.5, there were two recent fishery interactions with short tailed albatross, including a take that occurred in the LE sablefish fishery. Management measures may be implemented independently of the 2013-14 groundfish harvest specifications process, and NWFSC (2011) contains detailed information that will serve as background scientific material for the recently-initiated ESA consultation.

The effect of the management measure alternatives on seabirds (listed and non-listed) may be negative if fishing effort intensifies in areas where seabirds congregate. However, the effects of the Alternatives on effort displacement are not predictable and the effects of the alternatives are unknown. A risk assessment recently completed by NMFS (2012) evaluates impacts to several protected species, including marine mammals, sea birds, sea turtles, and selected fish. A US Fish and Wildlife Service ESA consultation was initiated recently, although a biological option is still pending.

Sea turtles

The WCGOP reported one documented interaction with a leatherback sea turtle, in 2008. The rarity of documented interactions precludes meaningful analysis of bycatch estimates. Therefore, the impacts analysis will be limited to a qualitative description of the past interaction, and the possibility of future interactions based on the alternatives presented.

As noted in section 3.1.4.6, major threats to sea turtles in the U.S. include, but are not limited to, destruction and alteration of nesting and foraging habitats; incidental capture in commercial and recreational fisheries; entanglement in marine debris; and vessel strikes. On the U.S. West Coast, the primary turtle threat consists of incidental take in fisheries. Incidental catch poses a threat in pelagic foraging and transit areas, and the coastal feeding grounds and migratory corridors that probably exist along the West Coast of the United States and south into Mexico, and between the western Pacific and the California current. Entanglement and ingestion of marine debris, including old abandoned nets, continues to pose a threat to leatherback turtles (NWFSC 2011). There is very little information available to estimate total mortalities of sea turtles, with the exception of the drift gillnet fishery, which is not a part of the Groundfish FMP. NMFS prepared a risk assessment in 2012 and reinitiated the 1990 Biological Opinion. A new Biological Opinion prepared for the 2012 fishery concluded that while the Pacific groundfish fishery may result in sea turtle interactions, particularly leatherbacks, it will not appreciably reduce the survival or recovery of the stocks (NMFS 2012). Adverse effects of the alternatives on endangered and threatened sea turtle species are unknown but are considered to be similar to No Action and minimal based on a lack of observed takes.

Leatherback turtles are present in the fishing areas and are potentially vulnerable as bycatch in the Pacific coast groundfish fishery, particularly during the summer-fall period (June through November) (Jannot, *et al.* 2011). Relative to transit areas and migratory corridors, the 2012 risk assessment considered the type of activities that could affect or impede the passage of a leatherback turtle, and did not find fishing gear or vessel traffic as potential threats to passage (NWFSC 2011). Relative to jelly fish, the major prey species for leatherback turtles, the Pacific whiting fishery is the groundfish fishery target fishery most likely to incidentally catch jelly fish. However, prey availability was not considered a limiting factor for leatherbacks, and jelly fish are not believed to be impacted by the Pacific Coast Groundfish fishery to any major extent (NWFSC 2011).

NMFS Groundfish observer programs train observers to document sea turtle interactions and take and would continue to do so under all of the alternatives. To date, reported sea turtle interactions with groundfish fisheries have been rare and infrequent. Therefore, it is unlikely that modest spatial shifts in fishing effort under any of the alternatives would result in sea turtle take beyond what is occurring under No Action. However, the effect of the management measure alternatives on sea turtles could be negative if fishing effort intensifies in areas where sea turtles congregate. Because temporal and spatial changes in effort are not predictable, the effects of the alternatives on sea turtles are ultimately uncertain.

4.1.4.2 Comparison of the Alternatives

For the purposes of this comparison, it is not realistic to parse potential impacts to species or groups of species, based on fishing opportunities, gear switching, or other fishing behavior. One exception to this could be situations in which management options lead to greater fixed gear effort. The reason this may be worth examining is that interactions with marine mammals are more likely to occur in the fixed gear fisheries, rather than the trawl fisheries.

The Preferred Alternative; Alternatives 1-3, 6; and No Action

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment (NWFSC 2011), there may be adverse impacts resulting from the implementation of the 2012 Pacific groundfish fishery. However, based on the information provided above, it is not possible to predict with any precision, any differential adverse impacts among the Preferred Alternative; Alternatives 1-3, and 6; and the No Action Alternative, for the protected species considered here. This includes Pacific salmon, green sturgeon, Pacific eulachon, marine mammals, sea birds, and sea turtles. Therefore, we can conclude that the available information is not sufficient to infer any negative or positive impacts resulting from these alternatives and in comparison with the No Action alternative.

Alternatives 5, 7, and 8 (higher canary ACLs)

To the extent that great opportunities may be presented for canary rockfish (a mixed fixed gear and trawl fishery), there could be associated greater impacts to species more likely to experience interactions with fixed gear. Interactions with whales, sea turtles, and other marine mammals are generally limited to fixed gear fisheries. However, while there could potentially be an adverse impact, there is insufficient data to conclude that such a negative impact would occur.

Alternative 4 (lower canary ACL; highest POP ACL; larger nontrawl RCA)

This alternative presents the potential to shift fishing effort seaward and shoreward, with the potential to have greater adverse impacts to protected species. This is especially true for humpback whales, sea turtles, and sea birds. Other protected species such as Pacific salmon and eulachon may be less likely to experience negative impacts because they are not typically offshore/shelf species. However, we can conclude, based on the information in this section, that there is insufficient information to infer any greater adverse impacts resulting from Alternative 4 in comparison with the No Action alternative than any other Alternative considered as part of this action.

4.2 Socioeconomic Consequences

This section evaluates the effects of the alternatives (see Section 2.4) on fishery participants and fishing communities. Section 3.2 describes the economic status of these affected groups during the baseline period 2005-2010 based on historical commercial landings data, estimates of recreational fishing activity, and census data. Here, various methods are used to estimate how conditions may change from the baseline, either by continuing to apply the ACLs and management measures in effect in 2012 (No Action) or under the eight action alternatives, which are organized around different combinations of ACLs for canary rockfish and POP. ACLs for all other groundfish species categories do not vary under the action alternatives. (However, the action alternatives' ACLs for these species do differ from the ACLs proposed under No Action based on the best available science.)

4.2.1 Models and Data

The GMT has developed several methods or models to project catch of overfished and principal target species in different groundfish fisheries, or "sectors." (Appendix A) For commercial and tribal fisheries these catch (or landings) estimates are converted to ex-vessel revenue estimates by applying historical price information derived from the PacFIN database. A landings distribution model is then used to estimate where landings are likely to occur and the resulting port-level ex-vessel revenue. The landings distribution model was reviewed by the SSC in September 2011. A description of the model and SSC review comments can be found at http://www.pcouncil.org/wp-content/uploads/

G5a_ATT6_DIST_MDL_SEPT2011BB.pdf and http://www.pcouncil.org/wp-content/uploads/G5b_SUP_SSC_SEPT2011BB.pdf.

Another measure used to compare impacts on commercial fisheries under the alternatives is the estimated change in total accounting net revenues ("profits") by each directed shoreside groundfish vessel sector. Results are presented for vessels engaged in shoreside whiting, nonwhiting trawl, limited entry fixed gear, and directed open access sectors.

Since recreationally-caught fish are not sold, a different metric—recreational angler trips—is used to compare the impacts of the alternatives on recreational fisheries. These estimates are made by state and within states by county level regions.

In addition to ex-vessel revenue, the effect of the alternatives on coastal communities (ports where commercial groundfish landings are made) is evaluated by estimating personal income generated ("income impacts") and resulting employment. These metrics are derived from the IOPAC model developed by economists at the NWFSC.[38] Personal income impact is a valuable metric because in addition to earnings received by harvesters, it also captures effects on processors, local input suppliers, and retail businesses in the communities. However since personal income impacts are generated by an economic model and only produced for the base years and the alternative scenarios being evaluated, there is no existing time series of personal income impacts that can be used to establish baseline conditions in the communities. Consequently personal income impacts are not used to compare effects under the alternatives against historic conditions, but rather solely to illustrate the differences between the alternatives (including No Action) in terms of regional economic effects that can be expected in coastal communities.

Personal income impact results are also used to project the average change in employment and overall unemployment rates in each community under the alternatives.

The models used to project harvest by fisheries sector, and the socioeconomic impacts associated with those activities are detailed in Appendices A and C and summarized in the sections below.

The socioeconomic impacts of the alternatives are evaluated using the following comparisons.

Commercial and Tribal Groundfish Fisheries: Change in total ex-vessel revenue (and accounting net revenue) from No Action by fishery sector

In Section 4.2.2.1 the alternatives are compared based on data summarized in Table 4-39 and Table 4-40 showing projected ex-vessel revenues by groundfish fisheries sectors in 2013 under the proposed management alternatives. Revenue estimates are based on projected landings estimates shown in Table 4-38. All comparisons are with respect to the No Action Alternative unless otherwise indicated. Projections assume average 2011 ex-vessel prices. Effects are presented according to groundfish fishery "sectors," which are described in Section 3.2.1. It should be noted that shoreside whiting trawl is presented separately from nonwhiting trawl, although both these sectors comprise the shorebased IFQ fishery beginning in 2011. As explained in Section 3.2.1, because vessels fishing under the IFQ program may use any legal groundfish gear, the terminology is moving away from referring to "trawl" sectors. Participants in the IFQ fishery may use fixed gear, principally to target sablefish, while species such as

38 Commercial fishing sectors in IOPAC are based on vessel costs and earnings estimates collected using periodic surveys. Since cost and earnings for tribal vessels have not been surveyed, IOPAC currently doesn't include community income impact estimates attributable to activities by the tribal groundfish fleet. Tribal groundfish landings are concentrated in communities along the Washington Coast.

Pacific whiting and flatfish will continue to be harvested with trawl gear since they are not vulnerable to fixed gear. However, in the evaluation of alternatives below the terminology whiting and nonwhiting "trawl" is used for these components of the shorebased IFQ fishery.

In modeling commercial fishery impacts, it is assumed that effort that is displaced or discouraged by management measures under a particular alternative is not able to switch readily into another fishery in the same region, or another region elsewhere along the coast. Thus the numbers reported probably represent something of an upper bound on regional economic impacts on commercial fisheries, or the maximum amount of displacement that could be expected to occur under the alternatives. This also means that the models may not necessarily be able to distinguish subtle differences resulting from relatively fine distinctions between the alternatives if those differences lie within the models' margins of error.

Catch projection in the shoreside trawl fishery (which has historically accounted for almost 45 percent of groundfish ex-vessel revenue, see Table 3-23) was based on catch in 2011—the first year under IFQ management—which may not accurately characterize the future performance of this dynamic fishery. Furthermore, because of the scheduling of this EIS process, data for the last months of 2011 were not yet available at the time catch projection modeling was conducted. As a result fishing patterns in late 2011 had to be inferred from the seasonal distribution in prior years. However as it turned out, catch increased dramatically in December 2011, likely because harvesters were more assured that stocks of QP on hand were sufficient to last the year. Once fishermen have gained more experience with IFQ fishery management, behavior in the future is likely to be different than 2011. For example, an increase in the diversity of species caught is already evident from comparing the first three months of 2012 to 2011 (Sean Matson, NMFS NWR, pers. comm., April 2012).

Under IFQ management, where harvesters are individually accountable for covering their catch with matching QP, quotas for rebuilding stocks function like performance standards. While the direct revenue realized from landing the small amounts of available rebuilding species stocks is negligible, these stocks leverage access to much higher levels of target species landings.[39] Consequently a higher allocation of, e.g., canary rockfish to the shoreside IFQ fishery may generate more actual revenue than is forecast using the current catch projection models.

In addition to the limitations in catch projection models, stock recruitment variability and catch monitoring uncertainty mean that actual catches may differ from the projections. If encounters with rebuilding species run higher than projected, reductions in trip limits or adjustments to the RCAs may be necessary inseason, such as exemplified by the strict measures proposed under Alternative 4 to manage the lowest canary rockfish ACL. While overall target species landings may not be increased directly, higher overfished species ACLs may provide an additional buffer against the need to impose more restrictive inseason measures if actual mortality proves to be higher than modeled.

Under each of Alternatives 1-8, two sub-alternatives ("A" and "B") are shown for the Nearshore Open Access sector. (The Preferred Alternative incorporates the management measures under sub-alternative B.) This treatment reflects consideration of two different management options to achieve the prescribed bycatch levels. In each case, the "B" option would likely yield lower harvests and revenues for the Nearshore Open Access sector than would the "A" option. Note that the same two options are applied to the Nearshore Open Access sector under alternatives 1, 2, 3, 5, 6, 7, and 8. Two different options yielding

[39] The at-sea whiting fishery, managed with co-ops, has similar accountability mechanisms. While the same 2011 Pacific whiting TAC must be assumed for forecasting revenue and income impacts in the whiting fisheries under the alternatives, similar dynamics in terms of fleet performance in response to bycatch limits are likely to play out in these fisheries.

distinctly lower revenues are applied under Alternative 4 reflecting effects under two different possible management responses to implement the low canary rockfish ACLs and sector HGs under this alternative. Also note that revenues projected for the Limited Entry Fixed Gear, Non-nearshore Open Access, Tribal and At Sea sectors are the same across Alternatives 1-8. Because the Preferred Alternative has slightly different tribal fishery set-asides from the ACLs, commercial fishery allocations under the Preferred Alternative vary somewhat for certain species compared with the other alternatives. Results for the commercial sectors are primarily driven by the ACLs for sablefish north of 36° north latitude, sablefish south of 36° north latitude, and the ACL for Pacific whiting, all of which do not vary across the action alternatives (See Section 4.2.2.5 for an evaluation of the effects of Pacific whiting TACs other than those used to model the alternatives).

For Pacific whiting a total allowable catch (TAC) is determined annually consistent with the Agreement with Canada on Pacific Hake/Whiting; 73.88 percent of the TAC is allocated to U.S. fisheries. As noted in Chapter 2 the actual TACs and related allocations to U.S. fisheries for 2013 and 2014 were not known at the time this document was prepared. To model the socioeconomic impacts of the alternatives the same TAC, U.S. allocation, and sector allocations—equal to those set for 2011—were used for all of the integrated alternatives including No Action. Note however there is some variation in estimated ex-vessel revenues earned by the shoreside whiting sector under the integrated alternatives due to the effects of variation in ACLs for two constraining bycatch species: POP and canary rockfish.

To facilitate comparison of the effects under the alternatives with the experience of the recent past, *The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.
Note: “A” and “B” identifiers indicate the Nearshore Open Access sub-alternatives.
Table 4-41 and Table 4-42 show the change in groundfish ex-vessel revenue by fishery sector from the baseline period described in Section 3.2 in absolute and percentage terms. The baseline used is average annual inflation-adjusted ex-vessel revenue from 2005 to 2010.

In addition, Table 4-43 and Table 4-44 report projected aggregate accounting net revenues (i.e., “profits”) for the directed shoreside groundfish sectors in terms of dollar and percentage change from No Action, respectively. Accounting net revenues are calculated as the difference between the ex-vessel value of estimated landings and the costs incurred in achieving those landings. Estimates are based on a comparison of landings projected under the alternatives with landings and average costs reported in a 2008 cost-earnings survey of a sample of vessels. Note that since separate surveys of average costs incurred by vessels in the two open access subsectors have not been performed, for purposes of this analysis the Nearshore Open Access and Non-nearshore Open Access subsectors have been combined into a single “Open Access” sector.

Table 4-38. Projected combined commercial and tribal fisheries landings (mt) of non-overfished west coast groundfish species and species complexes under the Integrated Alternatives ("PA"=Preferred Alternative, which is the same as Alternative 1B).

Stock	Integrated Alts														
	No Action	1A Can ACL 116	PA/1B* POP ACL 150	2A Can ACL 101	2B POP ACL 150	3A Can ACL 116	3B POP ACL 74	4A Can ACL 48	4B POP ACL 247	5A Can ACL 216	5B POP ACL 74	6A Can ACL 101	6B POP ACL 222	7A Can ACL 147	7B POP ACL 222
Non-overfished Species															
Arrowtooth Flounder	1,787.6	784.3	784.3	784.3	784.3	641.3	641.3	710.4	710.4	641.3	641.3	784.5	784.5	784.5	784.5
Black Rockfish WA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black Rockfish OR and CA	200.8	227.9	208.9	227.9	208.9	227.9	208.9	139.9	117.9	227.9	208.9	227.9	208.9	227.9	208.9
Cabezon CA	71.3	71.3	71.3	71.3	71.3	71.3	71.3	57.2	40.2	71.3	71.3	71.3	71.3	71.3	71.3
Cabezon OR	30.5	35.1	32.1	35.1	32.1	35.1	32.1	20.1	20.1	35.1	32.1	35.1	32.1	35.1	32.1
California Scorpionfish	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Chilipepper S of 40°10' N lat.	271.7	229.2	229.2	229.2	229.2	229.2	229.2	186.3	186.3	229.2	229.2	229.2	229.2	229.2	229.2
Dover Sole	7,559.8	7,589.3	7,589.3	7,589.3	7,589.3	6,488.9	6,488.9	6,969.4	6,969.4	6,488.9	6,488.9	7,594.4	7,594.4	7,594.4	7,594.4
English Sole	97.3	79.3	79.3	79.3	79.3	76.2	76.2	74.1	74.1	76.2	76.2	79.3	79.3	79.3	79.3
Lingcod N of 40°10' N lat.	296.0	277.8	300.0	310.0	300.0	284.2	274.2	263.0	258.0	284.2	274.2	310.1	300.0	310.1	300.0
Lingcod CA N of 40°10' N lat.	10.6	22.6	128.3	128.3	128.3	110.5	110.5	117.8	117.8	110.5	110.5	128.3	128.3	128.3	128.3
Lingcod WA	133.1	128.3	149.1	159.1	149.1	151.3	141.3	126.6	126.6	151.3	141.3	159.2	149.1	159.2	149.1
Lingcod OR	152.3	159.1	22.6	22.6	22.6	22.5	22.5	18.6	13.6	22.5	22.5	22.6	22.6	22.6	22.6
Lingcod S of 40°10' N lat.	21.6	25.9	25.9	25.9	25.9	25.9	25.9	21.2	16.3	25.9	25.9	25.9	25.9	25.9	25.9
Longnose Skate	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5	626.5
Longspine Thornyheads N of 34°27' N lat.	917.4	896.2	896.2	896.2	896.2	749.2	749.2	812.1	812.1	749.2	749.2	897.5	897.5	897.5	897.5
Longspine Thornyheads S of 34°27' N lat.	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7
Pacific Cod	523.1	522.5	522.5	522.5	522.5	489.8	489.8	469.0	469.0	489.8	489.8	522.5	522.5	522.5	522.5
Pacific Whiting	287,394	286,769	286,769	286,769	286,769	278,676	278,676	277,454	277,454	278,676	278,676	287,449	287,449	287,449	287,449
Sablefish N of 36° N lat.	4,915.5	3,671.3	3,671.3	3,671.3	3,671.3	3,440.3	3,440.3	3,547.2	3,547.2	3,440.3	3,440.3	3,672.3	3,672.3	3,672.3	3,672.3
Sablefish S of 36° N lat.	1,091.8	1,212.2	1,212.2	1,212.2	1,212.2	1,210.1	1,210.1	1,203.1	1,203.1	1,210.1	1,210.1	1,212.2	1,212.2	1,212.2	1,212.2
Shortbelly Rockfish	0.0	0.0	0.0	0.0	0.0	0.0	602.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shortspine Thornyheads N of 34°27' N lat.	727.8	722.2	722.2	722.2	722.2	602.0	134.0	654.2	654.2	602.0	602.0	722.9	722.9	722.9	722.9
Shortspine Thornyheads S of 34°27' N lat.	134.0	134.0	134.0	134.0	134.0	134.0	0.0	134.0	134.0	134.0	134.0	134.0	134.0	134.0	134.0
Splitnose Rockfish S of 40°10' N lat.	8.9	9.4	9.4	9.4	9.4	9.4	9.4	8.2	8.2	9.4	9.4	9.4	9.4	9.4	9.4
Starry Flounder	16.0	17.5	17.5	17.5	17.5	17.1	17.1	15.9	15.9	17.1	17.1	17.5	17.5	17.5	17.5
Widow Rockfish	169.2	166.2	166.2	166.2	166.2	150.7	150.7	151.2	151.2	150.7	150.7	167.3	167.3	167.3	167.3

Stock		Integrated Alts													
	No Action	1A Can ACL 116	PA/1B* POP ACL 150	2A Can ACL 101	2B POP ACL 150	3A Can ACL 116	3B POP ACL 74	4A Can ACL 48	4B POP ACL 247	5A Can ACL 216	5B POP ACL 74	6A Can ACL 101	6B POP ACL 222	7A Can ACL 147	7B POP ACL 222
Yellowtail Rockfish N of 40°10' N lat.	931.2	866.7	866.7	866.7	866.7	803.9	803.9	791.9	791.9	803.9	803.9	870.0	870.0	870.0	870.0
Stock Complexes															
Minor Nearshore Rockfish N of 40°10' N lat.	39.6	42.2	40.2	42.2	40.2	42.2	40.2	31.2	26.2	42.2	40.2	42.2	40.2	42.2	40.2
Minor Shelf Rockfish N of 40°10' N lat.	39.7	39.8	39.8	39.8	39.8	37.8	37.8	37.0	37.0	37.8	37.8	39.8	39.8	39.8	39.8
Minor Slope Rockfish N of 40°10' N lat.	202.3	194.8	194.8	194.8	194.8	165.0	165.0	181.8	181.8	165.0	165.0	194.9	194.9	194.9	194.9
Minor Nearshore Rockfish S of 40°10' N lat.	99.7	100.4	100.4	100.4	100.4	100.4	100.4	80.6	56.7	100.4	100.4	100.4	100.4	100.4	100.4
Minor Shelf Rockfish S of 40°10' N lat.	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Minor Slope Rockfish S of 40°10' N lat.	139.4	139.5	139.5	139.5	139.5	138.6	138.6	131.9	131.9	138.6	138.6	139.5	139.5	139.5	139.5
Other Flatfish	636.6	636.5	636.5	636.5	636.5	573.5	573.5	586.1	586.1	573.5	573.5	636.6	636.6	636.6	636.6
Other Fish	1,077.0	1,104.1	1,077.0	1,104.1	1,103.1	1,104.1	1,103.1	1,088.2	1,082.1	1,104.1	1,103.1	1,104.1	1,103.1	1,104.1	1,103.1

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of landings between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.

Recreational Fisheries: Change in marine angler trips from No Action under the alternatives

In Section 4.2.2.2 impacts of the alternatives on recreational fisheries are compared using the data summarized in Table 4-52 showing projected numbers of marine area angler boat trips taken in groundfish plus Pacific halibut recreational fisheries under the proposed management alternatives. All comparisons are with respect to the No Action Alternative unless otherwise indicated. Under action Alternative 4 there are two sub-alternatives ("A" and "B"). This treatment reflects consideration of two different management strategies to achieve the prescribed bycatch levels in Oregon and California recreational fisheries. Selection of the "B" sub-alternative under Alternative 4 would likely result in lower participation rates in those states' recreational fisheries than would selection of sub-alternative "A."

In modeling recreational fishery impacts, it is assumed that anglers who are displaced or discouraged by management measures under a particular alternative are not able to switch readily into a different fishery in the same region or another region elsewhere along the coast. Thus the numbers reported below probably represent something of an upper bound on regional economic impacts on recreational fisheries, or the maximum amount of displacement likely to occur under the alternatives. This also means that the models may not necessarily be able to distinguish subtle differences resulting from relatively fine distinctions between the alternatives if those differences lie within the models' margins of error.

Also note that impacts projected for most management areas vary little if at all under most of the action alternatives. This is for two main reasons: (1) POP is not generally caught by recreational anglers, so variation in the POP ACL does not impact recreational fisheries, and (2) measures used to manage recreational fisheries to stay within the common ACLs and HGs for cowcod, bocaccio and yelloweye rockfish allow little or no flexibility to respond to variation in canary rockfish ACLs.

Recreational fisheries impacts are compared here at the coastwide and individual state levels. Comparison of income impacts at the sub-state regional level are discussed under the communities impacts section, below. Note that there are no projections for groundfish plus halibut trips taken from the Astoria region in Oregon due to the relatively small numbers of such trips originating there.

Communities: Change in personal income and employment from No Action under the alternatives and change from the 2005-10 baseline in ex-vessel revenue

Change in personal income (income impacts) and employment-related measures for communities under the alternatives are compared in Section 4.2.2.3. These effects are a function of the projected changes in commercial and recreational fishing activity described above. Comparisons are with respect to the No Action Alternative unless otherwise indicated. Impacts were estimated using NWFSC IOPAC input-output model and convey combined direct, indirect, and induced economic effects resulting from projected changes in recreational angling, commercial fishing, fish processing and related input supply and support activities.

For simplification and ease of combining and comparing impacts from commercial and recreational fishing activities, coastal ports are grouped regionally into the following community groups:

- Puget Sound: ports in combined King, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston and Whatcom counties in Washington.
- Washington Coast: ports in combined Jefferson, Clallam, Grays Harbor and Pacific counties in Washington.
- Astoria-Tillamook: ports in combined Clatsop and Tillamook counties in Oregon.
- Newport: ports in Lincoln County Oregon.

- Coos Bay – Brookings: ports in combined Lane, Douglas, Coos and Curry counties in Oregon.
- Crescent City – Eureka: ports in combined Del Norte and Humboldt counties in California.
- Fort Bragg – Bodega Bay: ports in combined Mendocino and Sonoma counties in California.
- San Francisco: ports in combined Marin, Alameda, Contra Costa, San Francisco and San Mateo counties in California.
- Santa Cruz – Monterey – Morro Bay: ports in combined Santa Cruz, Monterey and San Luis Obispo counties in California.
- Santa Barbara – Los Angeles – San Diego: ports in combined Santa Barbara, Ventura, Los Angeles, Orange and San Diego counties in California.

Commercial fishery and recreational fishery impacts are calculated and displayed separately. Impacts are calculated by applying income and employment multipliers generated using IOPAC regional impact models to the projected levels of local expenditures by commercial harvesters, processors and recreational anglers under the alternatives. Although strictly speaking, the commercial and recreational impact components are not directly additive due to the slightly different estimation procedures used, in the following discussion, income impacts generated by combined commercial and recreational fishing activities are presented at the community level in order to provide an index to facilitate comparison of effects under the alternatives.

As noted above, it is assumed that commercial and recreational fishing effort displaced or discouraged under a particular alternative is not able to switch readily into a different fishery in the same region or another region elsewhere along the coast. Therefore the numbers reported below probably represent something of an upper bound on community income and employment impacts, or the maximum amount of short term economic disruption likely to occur under the alternatives. Also as noted above, the impact models are not necessarily able to distinguish subtle differences resulting from relatively fine distinctions between the alternatives if those differences lie within the models' margins of error.

Projected changes in measures of personal income and employment in community groups under the alternatives are shown in the following tables. Table 4-47 displays the dollar change in commercial fishery income impacts from No Action. Table 4-48 displays the same information in terms of percentage change. Table 4-49 and Table 4-50 display the projected change in commercial fishery employment impacts from No Action in terms of in number of total jobs (combined full-time and part-time) and percentage change, respectively. Table 4-51 displays the projected change in regional unemployment rates from No Action in each community resulting from the commercial fishery employment impacts. Table 4-52 and Table 4-53 display recreational fishery income impacts in terms of change in dollars and percentage change, respectively. Finally, Table 4-54 and Table 4-55 display the combined commercial plus recreational fishery income impacts for each community group under the alternatives in terms of change in dollars and percentage change, respectively, subject to the caveat in the preceding paragraph.

As discussed above, estimates of personal income for the full range of baseline years are not available for comparison. Therefore, Table 4-56 and Table 4-57 use the change in total commercial groundfish ex-vessel revenue to compare impacts under the alternatives against the baseline for each community group. The baseline, described above, is average inflation-adjusted average annual ex-vessel revenue during 2005-10.

Note that where impacts from commercial fisheries are reported, the alternatives are grouped based on whether the "A" or "B" sub-alternative for the Nearshore Open Access sector is included. In all cases inclusion of sub-alternative "B" for the Nearshore Open Access sector results in more negative overall impacts than sub-alternative "A." Among the recreational alternatives, only Alternative 4 includes both "A" and "B" sub-alternatives in order to show effects under two different possible management responses to implement the low canary rockfish ACLs and sector HGs under this alternative. Again sub-alternative "B" results in more negative overall impacts than sub-alternative "A".

Processors

Section 4.2.2.4 describes impacts to processors under the proposed management alternatives using the comparison in Table 4-58 and Table 4-59, which show the change in projected processor purchases of groundfish landings from No Action in dollar and percentage terms, respectively. These are actually estimates of ex-vessel revenues paid to harvesters but are used here as a measure of the value of raw material inputs available to groundfish processors. Comparisons are with respect to the No Action Alternative unless otherwise indicated. The projections assume average 2011 ex-vessel prices. Results are summarized for whiting and combined nonwhiting groundfish species. For each action alternative, two sub-alternatives ("A" and "B") are shown reflecting the two different possible management options included in each case for the Nearshore Open Access sector. Results for nonwhiting species are driven in large part by the ACL for sablefish north of 36° north latitude, which is 25 percent lower than No Action but does not vary across the 2013 action alternatives.

In modeling impacts on processors, it is assumed that effects of the management measures under a particular alternative are not avoidable by simply buying from another fishery in the same region or from another region elsewhere along the coast. Thus the numbers reported below probably represent something of an upper bound on regional economic impacts on processors, or the maximum amount of economic disruption likely to occur under the alternatives. Also note that the models used to estimate impacts are not necessarily able to distinguish subtle differences resulting from relatively fine distinctions between the alternatives if those differences lie within the models' margins of error.

Impacts on Non-market and Non-use Values

EISs evaluating previous harvest specifications discussed effects related to non-market and non-use (NMNU) values. These are non-consumptive uses that range from recreational enjoyment of the environment (e.g., wildlife viewing) to option or existence value (benefit derived from the knowledge that these resources will be available in the future or simply that environmental quality is maintained). There is no information to directly determine these preferences with respect to the resources most directly affected by the proposed action (groundfish species).

Impacts on Vessel Safety

The differences between the integrated alternatives in terms of their possible effects on vessel safety are expected to be negligible. Any proposed differences between the alternatives in RCA boundaries, thereby potentially pushing vessels to fish in much deeper waters or much closer to shore, are minimal and therefore are not expected to adversely impact vessel safety. Also the introduction of the individual quota program for groundfish trawl fisheries during the prior management cycle has relieved pressure on vessels to pursue "use-it-or-lose-it" periodic trip limits. Individual quota management will be in place during the 2013-2014 management cycle for all shorebased limited entry trawl fisheries. While periodic trip limits will still be used to manage nontrawl fisheries, for the most part these do not vary substantially between the integrated alternatives.

Impacts on Other Indicators of Social Welfare

The effect of the integrated alternatives on other indicators of community social welfare (e.g., poverty, divorce rates, graduation/dropout rates, incidents of domestic violence, etc.) cannot be directly measured, but are expected to be negligible. Change in personal income in communities may be used as a rough proxy for other socioeconomic effects to the degree change in these indicators correlates with potential change in income. However, changes in the broader regional economy ("cumulative effects") and long term trends in fishery-related employment are more likely to drive these indicators of social well being than the short term economic effects of the alternatives.

4.2.2 Direct and Indirect Economic Impacts of the Alternatives

4.2.2.1 Commercial and Tribal Groundfish Fisheries

No Action: 2012 Regulations, 107 mt Canary Rockfish ACL and 183 mt POP ACL

Under No Action, total shoreside ex-vessel revenues from groundfish landings of $93.512 million are projected in 2013. This total includes the following projections for shoreside groundfish sectors: Whiting Trawl $23.65 million, Nonwhiting Trawl $26.912 million, Limited Entry Fixed Gear $19.068 million, Nearshore Open Access $4.218 million, Non-nearshore Open Access $7.687 million, Tribal groundfish (including shoreside tribal whiting) $11.825 million, and Incidental Open Access $0.151 million. In addition, $30.890 million ex-vessel revenue equivalent[40] from At Sea Non Tribal whiting fisheries (combined Motherships and Catcher Processors), and $9.675 million ex-vessel revenue equivalent from At Sea Tribal whiting (Mothership) fisheries are projected under the No Action and all the action alternatives.

Much of the change from No Action results from a 25 percent reduction in the ACL for sablefish north of 36° north latitude under the action alternatives. This reduction extends across all the 2013 action alternatives and forms a backdrop affecting all sectors targeting sablefish. The affected sectors and projected respective shares of total groundfish ex-vessel revenue contributed by sablefish landings under No Action are: Nonwhiting Trawl (IFQ) 50 percent, Limited Entry Fixed Gear 79 percent, Non-nearshore Open Access 88 percent, and Tribal groundfish (including shoreside whiting) 35 percent.

Note that there is no projected change from No Action for groundfish landings by the Incidental Open Access and At Sea whiting sectors under the action alternatives. Therefore discussion of results for these sectors is omitted from the summary of impacts, below.

Comparing estimated shoreside ex-vessel revenue to average annual (inflation adjusted) revenue during the 2005-10 baseline, revenue increases by 41 percent for all shoreside groundfish fisheries combined. Shoreside whiting ex-vessel revenue more than doubles from the 2005-10 baseline under No Action, because of substantially higher Pacific whiting ACL in 2011-12 compared to previous management cycles as well as higher assumed ex-vessel prices. Changes from the baseline in other fishery sectors are strongly influenced by the price and availability of sablefish, the largest revenue generator in groundfish fisheries. Although the No Action sablefish ACL north of 36° N. latitude is somewhat lower than the average during the baseline period, the No Action sablefish ACL south of 36° N. latitude is higher than the base period average. This plus the assumption of continued high sablefish ex-vessel prices as was observed in 2011 cause the limited entry and open access fixed gear fisheries to show 38 percent and 76 percent gains in ex-vessel revenue respectively. Nonwhiting trawl, on the other hand, declines slightly under No Action, by $0.9 million (-3 percent), chiefly due to lower harvest limits for petrale sole which was classified as a rebuilding species in 2011.

Total shoreside directed groundfish net accounting revenues ("profits") for participating groundfish sectors are projected to be $30.629 million under No Action. This total includes the following

40 Ex-vessel revenue equivalent is the estimated value of Pacific whiting delivered as raw material inputs to at sea mothership floating processers plus the imputed value of Pacific whiting caught by at sea catcher-processors.

projections for shoreside groundfish sectors: Whiting Trawl $10.256 million, Nonwhiting Trawl $6.693 million, Limited Entry Fixed Gear $8.059 million, and Open Access $5.621 million. Note that net accounting revenues for the Limited Entry Fixed Gear sector are the same under all the action alternatives.

The Preferred Alternative: 116 mt Canary Rockfish ACL and 150 mt POP ACL

The Preferred Alternative is a variation of Alternative 1B (see below). Compared with No Action, total shoreside ex-vessel revenue under the Alternative 1B is projected to decline or $9.174 million (-9.8 percent) and accounting net revenues (vessel “profits”) by $4.510 (-14.7 percent).

The Preferred Alternative differs slightly from Alternative 1B (and Alternatives 2-8) in (1) increased deductions from the ACLs for petrale sole, yellowtail rockfish, and to a smaller extent, shortspine thornyheads, to accommodate tribal fisheries set asides ; and (2) increased allowances for research and at-sea whiting sector catch of arrowtooth flounder. These changes reduce the allocations to commercial fisheries for those four species accordingly. However it is uncertain what if any effect these changes will have on commercial and tribal fisheries landings and revenue under the Preferred Alternative. The reasons for this uncertainty and discussion of potential impacts follow below.

Compared with Alternative 1B, potential additional impacts under the Preferred Alternative include the following:

5. There may be an increase in tribal landings of petrale sole under the Preferred Alternative since projected tribal petrale sole landings under No Action are slightly higher than the Alternative 1 set aside. If the full amount of the tribal petrale sole set aside were landed under the Preferred Alternative, the upper bound on possible additional tribal revenue impact is on the order of +$0.25 million. All of these additional landings would be made in Puget Sound and Washington Coast ports.
6. Any increase in tribal yellowtail rockfish landings under the Preferred Alternative is less certain since projected tribal yellowtail rockfish landings under No Action are well below the Alternative 1 set aside amount.
7. There is no expected decrease in commercial trawl (IFQ) fisheries revenue impacts under the Preferred Alternative because projected landings of petrale sole and yellowtail rockfish under Alternative 1B are both well below the Preferred Alternative’s shorebased trawl sector harvest guideline.
8. There is no expected decrease in non-trawl sectors’ revenue impacts under the Preferred Alternative because the affected species either aren't taken (arrowtooth flounder, petrale sole), or projected landings under Alternative 1B are well below the Preferred Alternative’s non-trawl sector harvest guideline (shortspine thornyheads, yellowtail rockfish).

Alternative 1: Same ACLs as the Preferred Alternative

Compared with No Action, under the Alternative 1B, total shoreside ex-vessel revenue is projected to decline or $9.174 million (-9.8 percent) and accounting net revenues by $4.510 (-14.7 percent). Under sub-alternative A total shoreside ex-vessel revenue is projected to decline by $8.98 million (-9.6 percent) and accounting net revenues by $4.411 million (-14.4 percent).

Nearshore Open Access would see projected revenues increase by $0.539 million (+12.8 percent) under Alternative 1B. These revenues increase by $0.733 million (+17.4 percent) under sub-alternative A.

These numbers represent the most favorable outcome for the Nearshore Open Access sector and are the same as those expected under Alternatives 2, 3, 5, 6, 7, and 8.

All other shoreside directed groundfish sectors would experience ex-vessel revenue decreases from No Action under this alternative: Whiting Trawl by $0.278 million (-1.2 percent), Nonwhiting Trawl by $3.175 million (-11.8 percent), Limited Entry Fixed Gear by $3.782 million (-19.8 percent), Non-nearshore Open Access by $1.436 million (-18.7 percent), and Tribal groundfish by $1.042 million (-8.8 percent).

Under Alternative 1, Shoreside Whiting and Nonwhiting Trawl would experience the second highest ex-vessel revenues among the action alternatives. Ex-vessel revenues for Limited Entry Fixed Gear, Non-nearshore Open Access and Tribal sectors do not vary across the action alternatives.

Compared to the 2005-10 baseline, ex-vessel revenue is projected to increase for all fishery sectors except nonwhiting trawl. For all sectors combined the change is +28 percent compared with +41 percent under No Action. Under all the action alternatives the nonwhiting trawl sector shows a large decline in ex-vessel revenue compared to the baseline. For Alternative 1 a $4.1 million decline in ex-vessel revenue (-15 percent) is forecast.

All shoreside directed sectors would see reduced accounting net revenues compared with No Action under this alternative: Shoreside Whiting accounting net revenues would decline by $0.146 million or -1.4 percent, the second most favorable result for this sector among the action alternatives; Nonwhiting trawl by $1.637 million or -24.5 percent, the second most favorable result; Open Access by $0.280 million (-5.0 percent) to 0.380 million (-6.8 percent), tied for the most favorable result; and Limited Entry Fixed Gear by $2.348 million or -29.1 percent, the same under all the action alternatives

Alternative 2: Lower Canary Rockfish ACL (101 mt Canary Rockfish ACL and 150 mt POP ACL)

Projected impacts under Alternative 2 are the same as under Alternative 1 for all commercial groundfish sectors. This is because measures used to manage commercial fisheries to stay within the 116 mt canary rockfish ACL and sector HGs under Alternative 1 are also sufficient to not exceed the 101 mt canary rockfish ACL under Alternative 2. The primary common factor limiting commercial groundfish fisheries modeled under Alternatives 1 and 2 is the fixed ACL for POP. Also as mentioned above, relatively subtle differences between alternatives may not have apparent effects if they lie within the analytical models' margins of error.

Alternative 3: Lowest POP ACL (116 mt Canary Rockfish ACL and 74 mt POP ACL)

Alternative 3 is expected to produce the second lowest total ex-vessel revenues and accounting net revenues among action alternatives. Under Alternative 3 (compared with No Action), total ex-vessel revenue declines by $14.061 million (-15 percent) or $14.255 million (-15.2 percent), and accounting net revenues by $5.971 million (-19.5 percent) or $6.071 (-19.8) depending on whether Nearshore Open Access option A or B is selected.

Revenues in the shoreside Whiting and Nonwhiting Trawl sectors decrease by $2.296 million (-9.7 percent) and $6.238 million (-23.2 percent), respectively. These numbers represent the lowest sector revenues for Nonwhiting Trawl and the second lowest revenues for Whiting Trawl among the action alternatives.

Revenues in Limited Entry Fixed Gear and Non-nearshore Open Access sectors decrease by $3.782 million (-19.8 percent) and $1.436 million (-18.7 percent), respectively, the same result as under Alternative 1.

Tribal groundfish revenues decrease by $1.042 million (-8.8 percent), the same as under Alternative 1.

Nearshore Open Access revenues increase by $0.733 million (+17.4 percent) under option A, or $0.539 million (+12.8 percent) under option B, the same as under Alternative 1.

Compared to the 2005-10 baseline, the increase in ex-vessel revenue for all shoreside sectors combined under Alternative 3 is less than under Alternatives 1 and 2 (+20 percent versus +28 percent). The differences between Alternative 3 and Alternatives 1 and 2 are a smaller increase in the shoreside whiting sector (+92 percent versus +110 percent) and a larger decrease in the nonwhiting trawl sector (-26 percent versus -15 percent).

All shoreside directed sectors would see reduced accounting net revenues under this alternative: Shoreside Whiting accounting net revenues would decline by $1.224 million or -11.9 percent, the second lowest revenue for this sector among the action alternatives; Nonwhiting trawl by $2.119 million or -31.7 percent, the lowest overall result; Open Access by $0.280 million (-5.0 percent) to 0.380 million (-6.8 percent), tied for the most favorable result; and Limited Entry Fixed Gear by $2.348 million or -29.1 percent, the same under all the action alternatives.

Alternative 4: Lowest Canary Rockfish ACL and Highest POP ACL (48 mt Canary Rockfish ACL and 247 mt POP ACL)

Alternative 4 is expected to produce the lowest total ex-vessel revenues and accounting net revenues among the action alternatives. Under Alternative 4 (compared with No Action), total ex-vessel revenue declines by $14.698 million (-15.7 percent) or $15.531 million (-16.6 percent), and accounting net revenues by $6.963 million (-22.7 percent) or $7.571 (-24.7 percent) depending on whether Nearshore Open Access option A or B is selected.

Revenues in the Whiting and Nonwhiting Trawl sectors decrease by $2.584 million (-10.9 percent) and $5.157 million (-19.2 percent), respectively. These numbers represent the lowest sector revenues for Whiting Trawl and the second lowest revenues for Nonwhiting Trawl among the action alternatives.

Nearshore Open Access would see revenues fall by $0.698 million (-16.5 percent) under option A, or $1.531 million (-36.3 percent) under option B. These results represent the lowest sector revenues for Nearshore Open Access among the action alternatives.

Revenues in Limited Entry Fixed Gear and Non-nearshore Open Access sectors decrease by $3.782 million (-19.8 percent) and $1.436 million (-18.7 percent), respectively, the same as under Alternative 1.

Tribal groundfish revenue decreases by $1.042 million (-8.8 percent), the same as under Alternative 1.

Compared to the 2005-10 baseline, under this alternative ex-vessel revenue for all shoreside sectors combined shows the smallest overall increase at 19 percent. The change from the baseline in the shoreside whiting revenue (+89 percent) and open access fixed gear revenue (+11 percent under sub-alternative A and -16 percent under sub-alternative B) is smaller under Alternative 4 than Alternative 3, which shows the next smallest increase overall. The decline in nonwhiting trawl ex-vessel revenue (-22 percent) is less than under Alternative 3 but greater than the other action alternatives.

All shoreside directed sectors would see reduced accounting net revenues under this alternative: Shoreside Whiting accounting net revenues would decline by $1.38 million or -13.5 percent, the worst result for this sector among the action alternatives; Nonwhiting trawl by $2.049 million or -30.6 percent, the second worst result; Open Access by $1.186 million (-21.1 percent) to 1.794 million (-31.9 percent), the worst result; and Limited Entry Fixed Gear by $2.348 million or -29.1 percent, the same under all the action alternatives.

Alternative 5: Highest Canary Rockfish ACL and Lowest POP ACL (216 mt Canary Rockfish ACL and 74 mt POP ACL)

Projected impacts under Alternative 5 are the same as under Alternative 3 for all commercial groundfish sectors. This is because measures used to manage commercial fisheries to stay within the 74 mt POP ACL and sector HGs under Alternative 5 are the same as those used under Alternative 3. The 74 mt POP ACL is the main factor limiting commercial fisheries modeled under both Alternatives 3 and 5. Also as mentioned above, relatively subtle differences between alternatives may not have apparent effects if they lie within the analytical models' margin of error.

Alternative 6: Lower Canary Rockfish ACL and Higher POP ACL (101 mt Canary Rockfish ACL and 222 mt POP ACL)

Alternative 6 is expected to produce the highest total ex-vessel revenues and accounting net revenues among the action alternatives. Under Alternative 6, compared with No Action, total ex-vessel revenue declines by $8.798 million (-9.4 percent) or $8.992 million (-9.6 percent), and accounting net revenues by $4.319 million (-14.1 percent) or $4.419 (-14.4 percent) depending on whether Nearshore Open Access option A or B is selected.

Revenues in the Whiting and Nonwhiting Trawl sectors decrease by $0.110 million (-0.5 percent) and $3.162 million (-11.7 percent), respectively. These results represent the highest sector revenues for Whiting Trawl and Nonwhiting Trawl sectors among the action alternatives.

Nearshore Open Access revenues would increase by $0.733 million (+17.4 percent) under option A, or $0.539 million (+12.8 percent) under option B, the same result as under Alternative 1.

Revenues in Limited Entry Fixed Gear and Non-nearshore Open Access sectors decrease by $3.782 million (-19.8 percent) and $1.436 million (-18.7 percent), respectively, the same as under Alternative 1.

Tribal groundfish revenue decreases by $1.042 million (-8.8 percent), the same as under Alternative 1.

Among the action alternatives, Alternative 6 would result in the largest overall increase in ex-vessel revenue from the 2005-10 baseline at $18.5 million (+28 percent), although only slightly greater than Alternatives 1 and 2. Effects under Alternative 6 differ from the other action alternatives primarily in terms of the change from the baseline in whiting and nonwhiting trawl ex-vessel revenue. Whiting trawl shows the largest increase from the baseline among all the alternatives, including No Action at $12.4 million (+111 percent), while nonwhiting trawl shows the smallest decline at -$4.1 million (-15 percent) among all the action alternatives although very close to the estimated change under Alternatives 1 and 2).

Compared with No Action all shoreside directed sectors would see reduced accounting net revenues under this alternative: Shoreside Whiting accounting net revenues would decline by $0.056 million or -0.5 percent, the most favorable result for this sector among the action alternatives; Nonwhiting trawl declines by $1.635 million or -24.4 percent, the most favorable result; Open Access by $0.280 million (-5.0

percent) to 0.380 million (-6.8 percent), tied for the most favorable result; and Limited Entry Fixed Gear by $2.348 million or -29.1 percent, the same under all the action alternatives.

Alternative 7: Higher Canary Rockfish ACL and Higher POP ACL (147 mt Canary Rockfish ACL and 222 mt POP ACL)

Projected impacts under Alternative 7 are the same as under Alternative 6 for all commercial groundfish sectors. This is because measures used to manage commercial fisheries to stay within the 222 mt POP ACL and sector HGs under Alternative 7 are the same as those used under Alternative 6. The 222 mt POP ACL is the main factor limiting commercial fisheries modeled under both Alternatives 6 and 7. Also as mentioned above, relatively subtle differences between alternatives may not have apparent effects if they lie within the analytical models' margins of error.

Alternative 8: Higher Canary Rockfish ACL (147 mt Canary Rockfish ACL and 150 mt POP ACL)

Projected impacts under Alternative 8 are the same as under Alternative 1 (the Preferred Alternative). The lack of difference in projected ex-vessel revenue impacts may seem surprising given that management measures to limit canary rockfish mortality are likely to affect target species fishing opportunity. However measures used to manage commercial trawl fisheries to stay within the 150 mt POP ACL and sector HGs under Alternative 8 are the same as those used under Alternative 1. Thus the POP ACL is more limiting of commercial trawl fisheries modeled under Alternatives 1 and 8 than is the canary rockfish ACL. Similarly the 3.3 mt of yelloweye rockfish allocated to the fixed gear fisheries sectors under all the action alternatives means that increasing the canary rockfish ACL is not expected to increase fishing opportunity for fixed gear sector target species to any great degree. Also as mentioned above, relatively subtle differences between alternatives may not have apparent effects if they lie within the analytical models' margins of error. Additional factors affecting this result are discussed in the section on models and data (Section 4.2.1).

Table 4-39. Change in groundfish ex-vessel revenues from No Action by groundfish harvest sector under the 2013-14 integrated alternatives ($1,000).

Alternative:	No Action	Pref. Alt / Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Shoreside Sectors:									
Whiting	*23,650*	-278	-278	-2,296	-2,584	-2,296	-110	-110	-278
Nonwhiting Trawl	*26,912*	-3,175	-3,175	-6,238	-5,157	-6,238	-3,162	-3,162	-3,175
Limited Entry Fixed Gear	*19,068*	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782
Nearshore Open Access (A)	*4,218*	733	733	733	-698	733	733	733	733
Nearshore Open Access (B)		539	539	539	-1,531	539	539	539	539
Non-nearshore Open Access	*7,687*	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436
Incidental Open Access	*151*	-	-	-	-	-	-	-	-
Tribal (incl. whiting)	*11,825*	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042
At-Sea Sectors:									
Non Tribal Whiting	*30,890*	-	-	-	-	-	-	-	-
Tribal Whiting	*9,675*	-	-	-	-	-	-	-	-
TOTAL CHANGE IN SHORESIDE REVENUES ($1,000)	*93,512*								
Nearshore Sub-alternative A		**-8,980**	**-8,980**	**-14,061**	**-14,698**	-14,061	-8,798	-8,798	**-8,980**
Nearshore Sub-alternative B		**-9,174**	**-9,174**	**-14,255**	**-15,531**	-14,255	-8,992	-8,992	**-9,174**

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.
Note: "A" and "B" identifiers indicate the Nearshore Open Access sub-alternatives.

Table 4-40. Change in groundfish ex-vessel revenues from No Action by shoreside harvest sector under the 2013-14 integrated alternatives (%).

Alternative:	No Action	Pref. Alt / Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Shoreside Sectors:									
Whiting	*23,650*	-1.20%	-1.20%	-9.70%	-10.90%	-9.70%	-0.50%	-0.50%	-1.20%
Nonwhiting Trawl	*26,912*	-11.80%	-11.80%	-23.20%	-19.20%	-23.20%	-11.70%	-11.70%	-11.80%
Limited Entry Fixed Gear	*19,068*	-19.80%	-19.80%	-19.80%	-19.80%	-19.80%	-19.80%	-19.80%	-19.80%
Nearshore Open Access (A)	*4,218*	17.40%	17.40%	17.40%	-16.50%	17.40%	17.40%	17.40%	17.40%
Nearshore Open Access (B)		12.80%	12.80%	12.80%	-36.30%	12.80%	12.80%	12.80%	12.80%
Non-nearshore Open Access	*7,687*	-18.70%	-18.70%	-18.70%	-18.70%	-18.70%	-18.70%	-18.70%	-18.70%
Incidental Open Access	*151*	-	-	-	-	-	-	-	-
Tribal (incl. whiting)	*11,825*	-8.80%	-8.80%	-8.80%	-8.80%	-8.80%	-8.80%	-8.80%	-8.80%
At-Sea Sectors:									
Non Tribal Whiting	*30,890*	-	-	-	-	-	-	-	-
Tribal Whiting	*9,675*	-	-	-	-	-	-	-	-
TOTAL CHANGE IN SHORESIDE REVENUES (%)	*93,512*								
Nearshore Sub-alternative A		**-9.60%**	**-9.60%**	**-15.00%**	**-15.70%**	**-15.00%**	**-9.40%**	**-9.40%**	**-9.60%**
Nearshore Sub-alternative B		**-9.80%**	**-9.80%**	**-15.20%**	**-16.60%**	**-15.20%**	**-9.60%**	**-9.60%**	**-9.80%**

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.
Note: "A" and "B" identifiers indicate the Nearshore Open Access sub-alternatives.

Table 4-41. Change in groundfish ex-vessel revenues from the baseline (2005-10 inflation-adjusted average annual ex-vessel revenue) by shoreside harvest sector under the 2013-14 integrated alternatives, including nearshore sub-alternatives (2011 $1,000).

		Integrated Alternatives								
	Baseline	No Action	Pref. Alt / Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Shoreside Whiting	*11,141*	+12,509	+12,231	+12,231	+10,213	+9,925	+10,213	+12,399	+12,399	+12,231
Shoreside Nonwhiting Trawl	*27,824*	-912	-4,087	-4,087	-7,150	-6,069	-7,150	-4,074	-4,074	-4,087
Shoreside LE Fixed Gear	*13,796*	+5,272	+1,490	+1,490	+1,490	+1,490	+1,490	+1,490	+1,490	+1,490
Shoreside Non-nearshore OA	*3,756*	+3,930	+2,495	+2,495	+2,495	+2,495	+2,495	+2,495	+2,495	+2,495
Shoreside Tribal (incl. whiting)	*6,376*	+5,449	+4,407	+4,407	+4,407	+4,407	+4,407	+4,407	+4,407	+4,407
Shoreside Nearshore OA (sub-alternative A)	*3,185*	+1,033	+1,766	+1,766	+1,766	+336	+1,766	+1,766	+1,766	+1,766
Shoreside Nearshore OA (sub-alternative B)			+1,572	+1,572	+1,572	-498	+1,572	+1,572	+1,572	+1,572
Total (under sub-alternative A)	*66,079*	**+27,281**	**+18,302**	**+18,302**	**+13,221**	**+12,583**	**+13,221**	**+18,483**	**+18,483**	**+18,302**
Total (under sub-alternative B)	*66,079*		**18,108**	**18,108**	**13,027**	**11,749**	**13,027**	**18,289**	**18,289**	**18,108**

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.
Note: "A" and "B" identifiers indicate the Nearshore Open Access sub-alternatives.
Note: Totals do not include inflation-adjusted annual average $0.7 million from un-modeled landings including EFP, research, exempted trawl, and other fisheries catching groundfish incidentally.

Table 4-42. Change in groundfish revenues from baseline (2005-10 inflation-adjusted annual average ex-vessel revenue) by shoreside harvest sector under the 2013-14 integrated alternatives, including nearshore sub-alternatives (%).

		Integrated Alternatives								
	Baseline	No Action	Pref. Alt / Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Shoreside Whiting	*11,141*	+112%	+110%	+110%	+92%	+89%	+92%	+111%	+111%	+110%
Shoreside Nonwhiting Trawl	*27,824*	-3%	-15%	-15%	-26%	-22%	-26%	-15%	-15%	-15%
Shoreside LE Fixed Gear	*13,796*	+38%	+11%	+11%	+11%	+11%	+11%	+11%	+11%	+11%
Shoreside Non-nearshore OA	*3,756*	+105%	+66%	+66%	+66%	+66%	+66%	+66%	+66%	+66%
Shoreside Tribal (incl. whiting)	*6,376*	+85%	+69%	+69%	+69%	+69%	+69%	+69%	+69%	+69%
Shoreside Nearshore OA (sub-alternative A)	*3,185*	+32%	+55%	+55%	+55%	+11%	+55%	+55%	+55%	+55%
Shoreside Nearshore OA (sub-alternative B)			+49%	+49%	+49%	-16%	+49%	+49%	+49%	+49%
Total (under sub-alternative A)*	*66,079*	+41%	+28%	+28%	+20%	+19%	+20%	+28%	+28%	+28%
Total (under sub-alternative B)*	*66,079*		+27%	+27%	20%	+18%	+20%	+28%	+28%	+27%

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.
Note: "A" and "B" identifiers indicate the Nearshore Open Access sub-alternatives.
Note: Totals do not include inflation-adjusted annual average $0.7 million from un-modeled landings including EFP, research, exempted trawl, and other fisheries catching groundfish incidentally.

Table 4-43. Change in groundfish accounting net revenue impacts by shoreside commercial fishery sector from No Action under the 2013-14 integrated alternatives ($1,000).

Alternative:	*No Action*	Pref. Alt / Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Whiting	*10,256*	-146	-146	-1,224	-1,380	-1,224	-56	-56	-146
Nonwhiting Trawl	*6,693*	-1,637	-1,637	-2,119	-2,049	-2,119	-1,635	-1,635	-1,637
Limited Entry Fixed Gear	*8,059*	-2,348	-2,348	-2,348	-2,348	-2,348	-2,348	-2,348	-2,348
Open Access (A)	*5,621*	-280	-280	-280	-1,186	-280	-280	-280	-280
Open Access (B)		-380	-380	-380	-1,794	-380	-380	-380	-380
TOTAL SHORESIDE CHANGE ($,000)	*30,628*								
Nearshore Sub-alternative A		**-4,411**	**-4,411**	**-5,971**	**-6,963**	**-5,971**	**-4,319**	**-4,319**	**-4,411**
Nearshore Sub-alternative B		**-4,510**	**-4,510**	**-6,071**	**-7,571**	**-6,071**	**-4,419**	**-4,419**	**-4,510**

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.
Note: “A” and “B” identifiers indicate the Nearshore Open Access sub-alternatives.

Table 4-44. Change in groundfish accounting net revenue impacts by shoreside commercial fishery sector from No Action under the 2013-14 integrated alternatives (%).

Alternative:	No Action	Pref. Alt / Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Whiting	*10,256*	-1.40%	-1.40%	-11.90%	-13.50%	-11.90%	-0.50%	-0.50%	-1.40%
Nonwhiting Trawl	*6,693*	-24.50%	-24.50%	-31.70%	-30.60%	-31.70%	-24.40%	-24.40%	-24.50%
Limited Entry Fixed Gear	*8,059*	-29.10%	-29.10%	-29.10%	-29.10%	-29.10%	-29.10%	-29.10%	-29.10%
Open Access (A)	*5,621*	-5.00%	-5.00%	-5.00%	-21.10%	-5.00%	-5.00%	-5.00%	-5.00%
Open Access (B)		-6.80%	-6.80%	-6.80%	-31.90%	-6.80%	-6.80%	-6.80%	-6.80%
TOTAL SHORESIDE CHANGE ($,000)	*30,629*								
Nearshore Sub-alternative A		-14.40%	-14.40%	-19.50%	-22.70%	-19.50%	-14.10%	-14.10%	-14.40%
Nearshore Sub-alternative B		-14.70%	-14.70%	-19.80%	-24.70%	-19.80%	-14.40%	-14.40%	-14.70%

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, as described in the text.
Note: “A” and “B” identifiers indicate the Nearshore Open Access sub-alternatives.

4.2.2.2 Recreational Fisheries

No Action: 2012 Regulations, 107 mt Canary Rockfish ACL and 183 mt POP ACL

Under No Action, a total of 653,600 groundfish and Pacific halibut trips are projected coastwide. Just over half of these are private boat trips with the remainder taken on charter boats. The breakdown by state is: Washington 27,100 trips (14,300 charter + 12,800 private), Oregon 92,100 trips (37,600 charter + 54,400 private), and California 534,500 (269,400 charter + 265,100 private).

The Preferred Alternative and Alternative 1: (Preferred Alternative) 116 mt Canary Rockfish ACL and 150 mt POP ACL

The Preferred Alternative differs slightly from Alternative 1B (and Alternatives 2-8) in (1) increased deductions from the ACLs for petrale sole, yellowtail rockfish and to a smaller extent, shortspine thornyheads to accommodate tribal fisheries set asides; and (2) increased allowances for research and at sea whiting sector catch of arrowtooth flounder. However since these species are not typically targeted or caught in recreational fisheries, the differences are not anticipated to affect recreational fishing effort or impacts under this alternative.

Under the Preferred Alternative and Alternative 1, angler trips coastwide are projected to increase by 1,700 (+0.3 percent) over No Action, with all of the increase occurring in the Mendocino and Sonoma County (Fort Bragg – Bodega Bay) region of California. No change in angler effort is expected in Washington or Oregon. Alternative 1 shows the greatest increase in angler trips under the action alternatives. Note that impacts reported under Alternative 1 are the same as impacts projected under Alternatives 2, 3, 5, 6, 7 and 8, as discussed below for each of those alternatives.

Alternative 2: Lower Canary Rockfish ACL (101 mt Canary Rockfish ACL and 150 mt POP ACL)

Impacts under Alternative 2 are the same as Alternative 1. This result is because measures used to manage cowcod, bocaccio and yelloweye rockfish to stay within their common ACLs and HGs under all the action alternatives are already sufficient to manage for the lower canary rockfish ACL under Alternative 2.

Alternative 3: Lowest POP ACL (116 mt Canary Rockfish ACL and 74 mt POP ACL)

Impacts under Alternative 3 are the same as Alternative 1. This is because POP is not generally caught by recreational anglers, so changes in the POP ACL do not impact recreational fisheries.

Alternative 4: Lowest Canary Rockfish ACL and Highest POP ACL (48 mt Canary Rockfish ACL and 247 mt POP ACL)

Angler trips projected under Alternative 4 are the lowest among the action alternatives. No change is projected in Washington because measures used to manage yelloweye rockfish are also sufficient to manage for the lower canary rockfish ACL. Both Oregon and California expect considerable reductions from No Action. Under **Alternative 4A**, coastwide angler trips are projected to decrease by 11,700 (-1.8 percent) over No Action, with nearly 3/4 of the decrease occurring in Oregon. Under **Alternative 4B**, coastwide angler trips decrease by 80,200 (-12.3 percent) over No Action. Although Oregon is three times more negatively affected under Alternative 4B than Alternative 4A, more than 2/3 of the decrease in angler trips under Alternative 4B is projected to occur in California.

Alternative 5: Highest Canary Rockfish ACL and Lowest POP ACL (216 mt Canary Rockfish ACL and 74 mt POP ACL)

Projected impacts under Alternative 5 are the same as under Alternative 1. This is because measures used to manage cowcod, bocaccio and yelloweye rockfish to stay within their common ACLs and HGs under the action alternatives generally override the effects of the higher canary rockfish ACL under Alternative 5. Also, as noted above, changes in the POP ACL do not impact recreational fisheries.

Alternative 6: Lower Canary Rockfish ACL and Higher POP ACL (101 mt Canary Rockfish ACL and 222 mt POP ACL)

Projected impacts under Alternative 6 are the same as under Alternative 1. This is because measures used to manage cowcod, bocaccio and yelloweye rockfish to stay within their common ACLs and HGs under the action alternatives generally override the effects of the lower canary rockfish ACL under Alternative 6, and changes in the POP ACL do not impact recreational fisheries.

Alternative 7: Higher Canary Rockfish ACL and Higher POP ACL (147 mt Canary Rockfish ACL and 222 mt POP ACL)

Projected impacts under Alternative 7 are the same as under Alternative 1. This is because measures used to manage cowcod, bocaccio and yelloweye rockfish to stay within their common ACLs and HGs under the action alternatives generally override the effects of the higher canary rockfish ACL under Alternative 7, and changes in the POP ACL do not impact recreational fisheries.

Alternative 8: Higher Canary Rockfish ACL (147 mt Canary Rockfish ACL and 150 mt POP ACL)

Projected impacts under Alternative 8 are the same as Alternative 1 (the Preferred Alternative). As stated above, measures used to manage cowcod, bocaccio and yelloweye rockfish catches in recreational fisheries mean that increasing the canary rockfish ACL has only a limited effect. Also as mentioned above, relatively subtle differences between alternatives may not have apparent effects if they lie within the analytical models' margins of error.

Table 4-45. Estimated bottomfish + Pacific halibut marine angler boat trips under No Action and change from No Action under the 2013-14 action alternatives (thousands of trips).

	No Action			Preferred Alternative / Alternative 1			Alternative 2			Alternative 3			Alternative 4A		
State / District	***Charter***	***Private***	***Total***	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**
Washington															
La Push-Neah Bay	*1.6*	*9.9*	*11.5*	-	-	-	-	-	-	-	-	-	-	-	-
Westport	*11.7*	*1.8*	*13.5*	-	-	-	-	-	-	-	-	-	-	-	-
Ilwaco-Chinook	*1.0*	*1.1*	*2.0*	-	-	-	-	-	-	-	-	-	-	-	-
Washington Total	***14.3***	***12.8***	***27.1***	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Oregon	0.0	0.0	0.0												
Astoria	0.0	0.0	0.0												
Tillamook	*5.7*	*8.4*	*14.2*	-	-	-	-	-	-	-	-	-	- 1.8	- 2.6	- 4.3
Newport	*22.5*	*17.6*	*40.0*	-	-	-	-	-	-	-	-	-	- 1.0	- 0.8	- 1.8
Coos Bay	*5.1*	*7.8*	*12.8*	-	-	-	-	-	-	-	-	-	- 0.7	- 1.0	- 1.7
Brookings	*4.3*	*20.7*	*25.0*	-	-	-	-	-	-	-	-	-	- 0.1	- 0.5	- 0.6
Oregon Total	***37.6***	***54.4***	***92.1***	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**- 3.5**	**- 4.9**	**- 8.4**
California															
North Coast: Del Norte and Humboldt	*3.4*	*19.0*	*22.4*	-	-	-	-	-	-	-	-	-	+ 0.1	+ 1.4	+ 1.5
North-Central Coast: Mendocino and Sonoma	*4.2*	*6.1*	*10.3*	+ 0.3	+ 1.4	+ 1.7	-	+ 1.4	+ 1.4	-	+ 1.4	+ 1.4	+ 2.7	+ 5.8	+ 8.5
North-Central Coast: Marin through San Mateo	*27.6*	*27.1*	*54.7*	-	-	-	-	-	-	-	-	-	- 1.6	- 0.7	- 2.3
South-Central Coast: Santa Cruz through San Luis Obispo	*32.7*	*37.8*	*70.5*	-	-	-	-	-	-	-	-	-	- 5.0	- 6.1	- 11.1
South Coast: Santa Barbara through San Diego	201.5	175.1	376.6	-	-	-	-	-	-	-	-	-	-	-	-
California Total	**269.4**	**265.1**	**534.5**	**+ 0.3**	**+ 1.4**	**+ 1.7**	**-**	**+ 1.4**	**+ 1.4**	**-**	**+ 1.4**	**+ 1.4**	**- 3.8**	**+ 0.4**	**- 3.4**
Washington-Oregon-California Total	**321.3**	**332.3**	**653.6**	**+ 0.3**	**+ 1.4**	**+ 1.7**	**-**	**+ 1.4**	**+ 1.4**	**-**	**+ 1.4**	**+ 1.4**	**- 7.3**	**- 4.4**	**- 11.7**

Table 4-45 (cont.)

	Alternative 4B			Alternative 5			Alternative 6			Alternative 7			Alternative 8		
State / District	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**
Washington															
La Push-Neah Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Westport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ilwaco-Chinook	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Oregon															
Astoria															
Tillamook	- 2.4	- 3.6	- 6.0	-	-	-	-	-	-	-	-	-	-	-	-
Newport	- 7.8	- 6.1	- 13.9	-	-	-	-	-	-	-	-	-	-	-	-
Coos Bay	- 0.9	- 1.3	- 2.2	-	-	-	-	-	-	-	-	-	-	-	-
Brookings	- 0.6	- 2.8	- 3.4	-	-	-	-	-	-	-	-	-	-	-	-
Oregon Total	**- 11.7**	**- 13.8**	**- 25.5**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
California															
North Coast: Del Norte and Humboldt	- 0.7	- 3.8	- 4.6	-	-	-	-	-	-	-	-	-	-	-	-
North-Central Coast: Mendocino and Sonoma	- 0.6	+ 0.9	+ 0.3	+ 0.3	+ 1.4	+ 1.4	+ 0.3	+ 1.4	+ 1.4	+0.3	+ 1.4	+1.4	+ 0.3	+ 1.4	+ 1.4
North-Central Coast: Marin through San Mateo	- 10.2	- 11.5	- 21.8	-	-	-	-	-	-	-	-	-	-	-	-
South-Central Coast: Santa Cruz through San Luis Obispo	- 12.5	- 16.2	- 28.7	-	-	-	-	-	-	-	-	-	-	-	-
South Coast: Santa Barbara through San Diego	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California Total	**- 24.1**	**- 30.7**	**- 54.8**	**+ 0.3**	**+ 1.4**	**+ 1.4**	**+ 0.3**	**+ 1.4**	**+ 1.4**	**+ 0.3**	**+ 1.4**	**+ 1.4**	**+ 0.3**	**+ 1.4**	**+ 1.4**
Washington-Oregon-California Total	**- 35.7**	**- 44.5**	**- 80.2**	**+ 0.3**	**+ 1.4**	**+ 1.4**	**+ 0.3**	**+ 1.4**	**+ 1.4**	**+ 0.3**	**+ 1.4**	**+ 1.4**	**+ 0.3**	**+ 1.4**	**+ 1.4**

Table 4-46. Estimated bottomfish + Pacific halibut marine angler boat trips under No Action and change from No Action under the 2013-14 action alternatives (% change).

State / District	*No Action (thousands)*			Preferred Alternative / Alternative 1			Alternative 2			Alternative 3			Alternative 4A		
	Charter	*Private*	*Total*	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total
Washington															
La Push-Neah Bay	*1.6*	*9.9*	*11.5*	-	-	-	-	-	-	-	-	-	-	-	-
Westport	*11.7*	*1.8*	*13.5*	-	-	-	-	-	-	-	-	-	-	-	-
Ilwaco-Chinook	*1.0*	*1.1*	*2.0*	-	-	-	-	-	-	-	-	-	-	-	-
Washington Total	***14.3***	***12.8***	***27.1***	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Oregon	0.0	0.0	0.0												
Astoria	0.0	0.0	0.0												
Tillamook	*5.7*	*8.4*	*14.2*	-	-	-	-	-	-	-	-	-	- 30.6%	- 30.6%	- 30.6%
Newport	*22.5*	*17.6*	*40.0*	-	-	-	-	-	-	-	-	-	- 4.4%	- 4.4%	- 4.4%
Coos Bay	*5.1*	*7.8*	*12.8*	-	-	-	-	-	-	-	-	-	- 12.9%	- 12.9%	- 12.9%
Brookings	*4.3*	*20.7*	*25.0*	-	-	-	-	-	-	-	-	-	- 2.5%	- 2.5%	- 2.5%
Oregon Total	***37.6***	***54.4***	***92.1***	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**- 9.3%**	**- 9.0%**	**- 9.1%**
California															
North Coast: Del Norte and Humboldt	*3.4*	*19.0*	*22.4*	-	-	-	-	-	-	-	-	-	+2.3%	+7.6%	+ 6.8%
North-Central Coast: Mendocino and Sonoma	*4.2*	*6.1*	*10.3*	+7.4%	+23.4%	+16.9%	+7.4%	+23.4%	+13.9%	+7.4%	+23.4%	+13.9%	+65.7%	+95.1%	+ 83.2%
North-Central Coast: Marin through San Mateo	*27.6*	*27.1*	*54.7*	-	-	-	-	-	-	-	-	-	- 5.8%	- 2.5%	- 4.2%
South-Central Coast: Santa Cruz through San Luis Obispo	*32.7*	*37.8*	*70.5*	-	-	-	-	-	-	-	-	-	- 15.2%	- 16.2%	- 15.8%
South Coast: Santa Barbara through San Diego	201.5	175.1	376.6	-	-	-	-	-	-	-	-	-	-	-	-
California Total	**269.4**	**265.1**	**534.5**	**+ 0.1%**	**+0.5%**	**+0.3%**	**+7.4%**	**+0.5%**	**+0.3%**	+7.4%	**+0.5%**	**+0.3%**	**- 1.4%**	**+0.2%**	**- 0.6%**
Washington-Oregon-California Total	**321.3**	**332.3**	**653.6**	**+ 0.1%**	**+0.4%**	**+0.3%**	**+0.1%**	**+0.4%**	**+0.2%**	**+0.1%**	**+0.4%**	**+0.2%**	**- 2.3%**	**- 1.3%**	**- 1.8%**

Table 4-46 (cont.)

	Alternative 4B			Alternative 5			Alternative 6			Alternative 7			Alternative 8		
State / District	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**
Washington															
La Push-Neah Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Westport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ilwaco-Chinook	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Oregon															
Astoria															
Tillamook	- 42.4%	- 42.4%	- 42.4%	-	-	-	-	-	-	-	-	-	-	-	-
Newport	- 34.6%	- 34.6%	- 34.6%	-	-	-	-	-	-	-	-	-	-	-	-
Coos Bay	- 17.3%	- 17.3%	- 17.3%	-	-	-	-	-	-	-	-	-	-	-	-
Brookings	- 13.6%	- 13.6%	- 13.6%	-	-	-	-	-	-	-	-	-	-	-	-
Oregon Total	**- 31.0%**	**- 25.3%**	**- 27.7%**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
California															
North Coast: Del Norte and Humboldt	- 21.7%	- 20.1%	- 20.4%	-	-	-	-	-	-	-	-	-	-	-	-
North-Central Coast: Mendocino and Sonoma	- 14.5%	+ 14.6%	+ 2.8%	+7.4%	+23.4%	+13.9%	+7.4%	+23.4%	+13.9%	+7.4%	+23.4%	+7.4%	+7.4%	+23.4%	+7.4%
North-Central Coast: Marin through San Mateo	- 37.1%	- 42.6%	- 39.8%	-	-	-	-	-	-	-	-	-	-	-	-
South-Central Coast: Santa Cruz through San Luis Obispo	- 38.2%	- 43.0%	- 40.7%	-	-	-	-	-	-	-	-	-	-	-	-
South Coast: Santa Barbara through San Diego	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California Total	**- 8.9%**	**- 11.6%**	**- 10.2%**	**+ 0.1%**	**+0.5%**	**+0.3%**	**+ 0.1%**	**+0.5%**	**+0.3%**	**+ 0.1%**	**+0.5%**	**+0.3%**	**+ 0.1%**	**+0.5%**	**+0.3%**
Washington-Oregon-California Total	**- 11.1%**	**- 13.4%**	**+ 0.1%**	**+ 0.1%**	**+0.4%**	**+0.3%**	**+ 0.1%**	**+0.4%**	**+0.2%**	**+ 0.1%**	**+0.4%**	**+0.3%**	**+ 0.1%**	**+0.4%**	**+0.3%**

4.2.2.3 Communities

No Action: 2012 Regulations, 107 mt Canary Rockfish ACL and 183 mt POP ACL

Coastwide:

Commercial groundfish fishing coastwide generates income and employment impacts of $90.429 million and 3,029 total full and part-time jobs. The unemployment rate in coastal counties coastwide in 2010 according to the Bureau of Labor Statistics was 11.17 percent. A total of $74.089 million in income impacts were generated by recreational groundfish angling. Combined coastwide commercial plus recreational income impacts under No Action total $164.518 million.

Compared to the 2005-10 baseline period groundfish ex-vessel revenue would increase by $26.3 million coastwide, or 39 percent under the No Action Alternative. Relative to the baseline period, No Action would produce the largest increase in ex-vessel revenue among all the alternatives.

Puget Sound:

Commercial groundfish fishing generates income and employment impacts in Puget Sound of $2.376 million and 56 jobs. This represents the second-lowest commercial groundfish income impact and the lowest employment impact among community groups. The local average unemployment rate in 2010 was 9.244 percent, the lowest among community groups. There were no income impacts resulting from recreational angling of federally managed groundfish (i.e., Puget Sound is not federally managed for groundfish). Combined commercial plus recreational income impacts under No Action are $2.376 million, the lowest total among the community groups.

Compared to the 2005-10 baseline period, groundfish ex-vessel revenue would decrease by $1.93 million in Puget Sound, or -54 percent under the No Action Alternative.

Washington Coast:

Commercial groundfish fishing generates income and employment impacts on the Washington Coast of $14.595 million and 310 jobs. This represents the second-largest commercial groundfish income impact among the community groups. The local average unemployment rate in 2010 was 13.142 percent, highest among community groups. There were $2.310 million in income impacts resulting from recreational groundfish angling. Combined commercial plus recreational income impacts under No Action are $16.905 million.

Compared to the 2005-10 baseline period groundfish ex-vessel revenue would increase by $10.02 million on the Washington Coast, or 77 percent under the No Action Alternative.

Note that landings from tribal groundfish fisheries also occur in ports along the Washington Coast. However since cost and earnings data for tribal vessels have not been formally surveyed, impact projection models currently do not measure community income impacts generated by the tribal groundfish fleet.

Astoria – Tillamook:

Commercial groundfish fishing generates income and employment impacts in Astoria-Tillamook of $26.899 million and 450 jobs. This represents the largest commercial groundfish income impact among the community groups. The local average unemployment rate in 2010 was 10.039 percent. $0.978

million in income impacts were generated from recreational groundfish angling, the second lowest level (after Puget Sound) among the community groups. Combined commercial plus recreational income impacts under No Action are $27.877 million, the second highest total among community groups.

Compared to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $8.79 million in Astoria-Tillamook, or 77 percent under the No Action Alternative.

Newport:

Commercial groundfish fishing generates income impacts in Newport of $12.653 million and employment impacts 362 jobs. The local average unemployment rate in 2010 was 10.791 percent. $3.372 million in income impacts were generated from recreational groundfish angling. Combined commercial plus recreational income impacts under No Action are $16.025 million.

Compared to the 2005-10 baseline period groundfish ex-vessel revenue would increase by $3.66 million in Newport, or 37 percent under the No Action Alternative.

Coos Bay – Brookings:

Commercial groundfish fishing generates income and employment impacts in Coos Bay-Brookings of $11.4 million and 504 jobs. These are the largest commercial groundfish employment impacts among the community groups. The local average unemployment rate in 2010 was 11.964 percent. $2.481 million in income impacts were generated from recreational groundfish angling. Combined commercial plus recreational income impacts under No Action are $13.881 million.

Compared to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.56 million in Coos Bay - Brookings, or 16 percent under the No Action Alternative.

Crescent City – Eureka:

Commercial groundfish fishing generates income and employment impacts in Crescent City-Eureka of $6.523 million and 254 jobs. The local average unemployment rate in 2010 was 11.759 percent. $1.414 million in income impacts were generated from recreational groundfish angling. Combined commercial plus recreational income impacts under No Action are $7.937 million.

Compared to the 2005-10 baseline period, groundfish ex-vessel revenue would decrease by $467,000 in Crescent City - Eureka, or -7 percent under the No Action Alternative.

Fort Bragg – Bodega Bay:

Commercial groundfish fishing generates income and employment impacts in Fort Bragg-Bodega Bay of $4.750 million and 198 jobs. The local average unemployment rate in 2010 was 9.885 percent, the second-lowest among community groups. $1.035 million in income impacts were generated from recreational groundfish angling. Combined commercial plus recreational income impacts under No Action are $5.786 million, the second-lowest total among the community groups.

Compared to the 2005-10 baseline period groundfish ex-vessel revenue would increase by $657,000 in Fort Bragg – Bodega Bay, or 18 percent under the No Action Alternative.

San Francisco Area:

Commercial groundfish fishing generates income and employment impacts in the San Francisco area of $1.720 million and 98 jobs. This represents the lowest commercial groundfish income and second-lowest employment impacts among the community groups. The local average unemployment rate in 2010 was 10.647 percent. $5.896 million in income impacts were generated from recreational groundfish angling. Combined commercial plus recreational income impacts under No Action are $7.616 million.

Compared to the 2005-10 baseline period groundfish ex-vessel revenue would decrease by $11,000 in the San Francisco Area, or -1 percent under the No Action Alternative.

Santa Cruz – Monterey – Morro Bay:

Commercial groundfish fishing generates income impacts in Santa Cruz–Monterey–Morro Bay of $6.223 million and employment impacts of 457 jobs. These are the second-largest commercial groundfish employment impacts among the community groups. The local average unemployment rate in 2010 was 12.053 percent, the second-highest among community groups. $7.725 million in income impacts were generated from recreational groundfish angling the second-highest level among community groups. Combined commercial plus recreational income impacts under No Action are $13.948 million.

Compared to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $2.9 million in the Santa Cruz – Monterey – Morro Bay, or 69 percent under the No Action Alternative.

Santa Barbara – Los Angeles – San Diego:

Commercial groundfish fishing generates income and employment impacts in Santa Barbara – Los Angeles – San Diego of $3.289 million and 339 jobs. The local average unemployment rate in 2010 was 11.779 percent. $48.878 million in income impacts were generated from recreational groundfish angling, the highest level by far among the community groups. Combined commercial plus recreational income impacts under No Action are $52.167 million, the highest total by far among the community groups.

Compared to the 2005-10 baseline period groundfish ex-vessel revenue would increase by $1.01 million in the Santa Barbara – Los Angeles – San Diego, or 45 percent under the No Action Alternative.

The Preferred Alternative and Alternative 1: 116 mt Canary Rockfish ACL and 150 mt POP ACL

Difference in Income Impacts between the Preferred Alternative and Alternative 1

Income and employment impacts have not been estimated separately for the Preferred Alternative but are expected to be indistinguishable from Alternative 1. The increased set asides of petrale sole and yellowtail rockfish for tribal fisheries under the Preferred Alternative may result in increased tribal groundfish landings and revenue of up to +$0.25 million. All of these additional landings and revenue would be made in Washington Coast and Puget Sound ports. However as described in section 4.2.1, any additional landings by the tribal fleet will not affect estimated community personal income and employment impacts. Also, as mentioned in sections 4.2.2.1 and 4.2.2.2, changes in set asides under the Preferred Alternative are not expected to have any effect on commercial fishery landings or recreational angling effort, and therefore no effect on estimated community personal income and employment impacts.

Therefore the following discussion describes estimated impacts to fishing communities under both the Preferred Alternative and Alternative 1.

Coastwide:

Under the Preferred Alternative / Alternative 1B income from commercial groundfish fishing declines by $9.274 million (-10.3 percent) coastwide and total jobs by 228 (-7.5 percent) compared with No Action. Under Alternative 1A the decline is $9.132 million (-10.1 percent) in income and 195 (-6.4 percent) total jobs. Other things being equal, the coastwide unemployment rate would increase by 0.001 percent to 11.171 percent. Income impacts from recreational groundfish angling would increase by $0.136 million (+0.2 percent), the same as under Alternatives 2, 3, 5, 6, 7 and 8. Compared with No Action, combined coastwide commercial plus recreational income impacts decrease under Alternative 1B, the Preferred Alternative, by $9.138 million (-5.6 percent). Under Alternative 1A the decline is $8.996 million (-5.5 percent).

Comparing the Preferred Alternative / Alternative 1B, to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $17.12 million (+26 percent). Under Alternative 1A it would increase by $17.32 million, or 26 percent. Sub-alternative A represents the second largest coastwide increase among the action alternatives after Alternative 6 sub-alternative A.

Puget Sound:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B by $0.509 million (-21.4 percent) and total jobs by 12 (-21.5 percent). Other things being equal, the local unemployment rate would increase by 0.001 percent to 9.245 percent. Income impacts from recreational groundfish angling are nil, the same as No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $0.509 million (-21.4 percent).

Comparing the Preferred Alternative / Alternative 1B to the 2005-10 baseline period, groundfish ex-vessel revenue would decrease by $2.3 million in Puget Sound, a 64 percent decline. Decreases under Alternative 1 in Puget Sound are the same as Alternatives 2, 6, 7 and 8, and less than under Alternatives 3, 4 and 5. The decrease under Alternative 4 is about $2,000 greater than under Alternative 1.

Washington Coast:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B by $1.952 million (-13.4 percent) and total jobs by 50 (-16.2 percent). Other things being equal, the local unemployment rate would increase by 0.017 percent to 13.159 percent. There is no change in impacts from recreational groundfish angling from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $1.952 million (-11.5 percent).

Comparing the Preferred Alternative / Alternative 1B to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $7.34 million on Washington Coast, a 52 percent increase. Alternatives 1, 2, 6, 7 and 8 would result in the larger increases in ex-vessel revenue on the Washington Coast from the baseline than Alternatives 3, 4 and 5.

Astoria – Tillamook:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B, by $1.909 million (-7.1 percent) and total jobs by 28 (-6.2 percent). For Alternative 1A the declines are $1.888 million in income (-7.06 percent) and 20 jobs (-4.4 percent). Other things being equal, the local unemployment rate would increase by between 0.005 percent and 0.007 percent to between 10.044 percent and 10.046 percent for sub-alternatives A and B respectively. Income impacts from recreational groundfish angling are the same as No Action. Combined commercial plus recreational income decreases under Alternative 1B and the Preferred Alternative in this community group by $1.909 million (-6.8 percent); for Alternative 1A the decline is $1.888 million (-6.8 percent).

Comparing the Preferred Alternative / Alternative 1B to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $7.30 million in Astoria – Tillamook, a 64 percent increase; for Alternative 1A it increases by $7.32 million. Alternative 1 A, would result in a smaller increase in ex-vessel revenue in Astoria - Tillamook from the baseline than Alternatives 6 and 7 but greater than Alternatives 2, 3, 4 and 5.

Newport:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B , by $1.564 million (-12.4 percent) and total jobs by 59 (-16.4 percent); for Alternative 1A the declines are $1.558 million (-12.3 percent) in income, and 57 jobs (-15.9 percent). Other things being equal, the local unemployment rate would increase by between 0.245 percent and 0.254 percent to between 11.036 percent and 11.045 percent for sub-alternatives A and B respectively. Income impacts from recreational groundfish angling are the same as No Action. Combined commercial plus recreational income decreases under Alternative 1B, the Preferred Alternative, in this community group by $1.564 million (-9.8 percent); for Alternative 1A the decline is $1.558 million (-9.7 percent).

Comparing the Preferred Alternative / Alternative 1B , to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.94 million in Newport, a 20 percent increase; for sub-alternative A the increase is $1.95 million. The Preferred Alternative / Alternative 1B would result in a smaller increase in ex-vessel revenue from the baseline than Alternatives 6 and 7 but greater than Alternatives 2, 3, 4 and 5 in Newport.

Coos Bay – Brookings:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B , by $1.925 million (-16.9 percent) and total jobs by 64 (-12.8 percent); for Alternative 1A the declines are $1.810 million (-15.9 percent) and 41 (-8.2 percent). Other things being equal, the local unemployment rate would increase by 0.024 percent to 11.988 percent under Alternative 1B, and by 0.015 percent to 11.979 percent under Alternative 1A. Income impacts from recreational groundfish angling are the same as No Action. Combined commercial plus recreational income decrease under Alternative 1B and the Preferred Alternative, in this community group by $1.925 million (-13.9 percent); for Alternative 1A the decline is $1.810 million (-13 percent).

Comparing the Preferred Alternative / Alternative 1B to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $262 thousand (-3 percent) in Coos Bay – Brookings; for Alternative 1A the decline is $100 thousand (-1 percent). The decline in ex-vessel revenue from the baseline in Coos Bay – Brookings is greater than Alternatives 6 and 7 but less than Alternatives 2, 3, 4 and 5.

Crescent City – Eureka:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B by $0.902 million (-13.8 percent) and by 28 (-11.0 percent) total jobs. Other things being equal, the local unemployment rate would increase by 0.039 percent to 11.979 percent. Income impacts from recreational groundfish angling are the same as No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $0.902 million (-11.4 percent).

Comparing the Preferred Alternative / Alternative 1B to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $1.2 million in Crescent City – Eureka, a 19 percent decline. The decline in ex-vessel revenue from the baseline in Crescent City – Eureka is greater than Alternatives 6 and 7 but less than Alternatives 2, 3, 4 and 5.

Fort Bragg – Bodega Bay:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B by $0.736 million (-15.5 percent) and by 21 total jobs (-10.6 percent). Other things being equal, the local unemployment rate would increase by 0.005 percent to 9.89 percent. Income impacts from recreational groundfish angling increase from No Action by $0.136 million (+13.1 percent). Combined commercial plus recreational income impacts decrease under this alternative in this community group by $0.600 million (-10.4 percent).

Comparing the Preferred Alternative / Alternative 1 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $17 thousand in Fort Bragg – Bodega Bay under both sub-alternatives, a 1 percent decline. The decline in ex-vessel revenue from the baseline in Fort Bragg – Bodega Bay is the same as Alternatives 2, 6 7 and 8 but less than Alternatives 3, 4 and 5.

San Francisco Area:

Compared with No Action, income from commercial groundfish fishing declines under the Preferred Alternative / Alternative 1B by $0.299 million (-17.4 percent) and by 10 total jobs (-10.4 percent). Other things being equal, the local unemployment rate would increase negligibly from 10.647 percent. Income impacts from recreational groundfish angling are the same as No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $0.299 million (-3.9 percent).

Comparing the Preferred Alternative / Alternative 1 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $285 thousand in the San Francisco Area, a 17 percent decline. The decline in ex-vessel revenue from the baseline is the same as Alternatives 2, 6, 7 and 8 but less than Alternatives 3, 4 and 5. Alternatives 3 and 5 show a $3,000 greater decline from the baseline than Alternative 1.

Santa Cruz – Monterey – Morro Bay:

Compared with No Action, income from commercial groundfish fishing increases under the Preferred Alternative / Alternative 1B by $0.453 million (+7.3 percent) and by 39 total jobs (+8.6 percent). Other things being equal, the local unemployment rate would decrease by 0.008 percent to 12.045 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational income impacts increase under this alternative in this community group by $0.453 million (+3.3 percent).

Comparing the Preferred Alternative / Alternative 1 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $3.43 million in Santa Cruz – Monterey – Morro Bay, an 82 percent increase. The increase in ex-vessel revenue from the baseline in Santa Cruz – Monterey – Morro Bay is the same as Alternatives 2, 6, 7 and 8 and greater than Alternatives 3, 4 and5.

Santa Barbara – Los Angeles – San Diego:

Compared with No Action, income from commercial groundfish fishing increases under the Preferred Alternative / Alternative 1B by $0.069 million (+2.1 percent) and by 6 total jobs (+1.8 percent). Other things being equal, the local unemployment rate would decrease negligibly from 11.779 percent. Income impacts from recreational groundfish angling are the same as No Action. Combined commercial plus recreational income impacts increase under this alternative in this community group by $0.069 million (+0.1 percent).

Comparing the Preferred Alternative / Alternative 1 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.17 million in Santa Barbara – Los Angeles – San Diego, a 48 percent increase. The increase in ex-vessel revenue from the baseline in Santa Barbara – Los Angeles – San Diego is the same as all the action alternatives except Alternative 4 sub-alternative B, which is slightly lower.

Alternative 2: Lower Canary Rockfish ACL (101 mt Canary Rockfish ACL and 150 mt POP ACL)

Under Alternative 2 impacts overall and in all community groups are the same as under Alternative 1. This is because measures used to manage commercial fisheries to stay within the 150 mt POP ACL under Alternative 2 are the same as those used under Alternative 1. The common 150 mt POP ACL is the main factor limiting commercial fisheries under both Alternatives. Measures used to manage recreational fisheries to stay within the common ACLs and HGs for cowcod, bocaccio and yelloweye rockfish under the action alternatives limit the potentially negative impact of the lower canary rockfish ACL under Alternative 2 in all regions.

Alternative 3: Lowest POP ACL (116 mt Canary Rockfish ACL and 74 mt POP ACL)

Coastwide:

Compared with No Action, income from commercial groundfish fishing declines coastwide by between $15.433 million (-17.1 percent) and $15.575 million (-17.2 percent), and between 298 and 331 total jobs (-9.8 percent to -10.9 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the coastwide unemployment rate would increase by 0.002 percent to 11.172 percent. Income impacts from recreational groundfish angling are the same as Alternatives 1, 2, 5, 6, 7 and 8, increasing by $0.136 million (+0.2 percent). Combined coastwide commercial plus recreational income impacts decrease under this alternative by between $15.297 million (-9.3 percent) and $15.439 million (-9.4 percent).

Comparing Alternative 3 to the 2005-10 baseline period, coastwide groundfish ex-vessel revenue would increase by $12.24 million (sub-alternative A) or $12.04 million (sub-alternative B), or 18 percent. Alternative 3 would produce the second smallest increase in ex-vessel revenue among all the alternatives relative to the baseline.

Puget Sound:

Compared with No Action, under Alternative 3 income and job declines from commercial groundfish fishing are the most severe among the action alternatives, declining by $0.610 million (-25.7 percent) and 14 total jobs (-25 percent). Other things being equal, the local unemployment rate would increase by 0.001 percent to 9.245 percent. Income impacts from recreational groundfish angling in this region are nil, the same as No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $0.610 million (-25.7 percent), the largest amount of decline among the action alternatives.

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would decrease by $2.35 million in Puget Sound under both sub-alternatives, a 66 percent decline. Alternative 3 and Alternative 5 show the largest declines in Puget Sound groundfish ex-vessel revenue of all the alternatives.

Washington Coast:

Compared with No Action, under Alternative 3 income from commercial groundfish fishing declines by $3.019 million (-20.7 percent) and 72 total jobs (-23.3 percent). Other things being equal, the local unemployment rate would increase by 0.024 percent to 13.166 percent. There is no change in impacts from recreational groundfish angling from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $3.019 million (-17.9 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $6.42 million on Washington Coast under either sub-alternative, a 46 percent increase. Alternative 3 would result in the smallest increase in ex-vessel revenue from the baseline of all the action alternatives for the Washington Coast.

Astoria – Tillamook:

Compared with No Action, under Alternative 3 income from commercial groundfish fishing declines by between $5.540 million (-20.6 percent) and $5.561 million (-20.7 percent), and by between 73 and 81 total jobs (-16.1 percent to -18 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by between 0.017 percent and 0.019 percent to between 10.056 percent and 10.058 percent. There is no change in recreational groundfish angling income impacts from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by between $5.540 million and $5.561 million (-19.9 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $4.59 million (sub-alternative A) or $4.57 million (sub-alternative B) in Astoria – Tillamook, a 40 percent increase. Alternative 3 would result in the same increase in ex-vessel revenue from the baseline in Astoria - Tillamook as Alternative 5, but less than all the other alternatives.

Newport:

Compared with No Action, under Alternative 3 income and job declines from commercial groundfish fishing are the second most severe among the action alternatives, declining by between $1.937 million (-15.3 percent) and $1.943 million (-15.4 percent) income, and by between 64 (-17.6 percent) and 66 (-18.2 percent) total jobs. Other things being equal, the local unemployment rate would increase by between 0.272 percent and 0.281 percent to between 11.063 percent and 11.072 percent. There is no change in impacts from recreational groundfish angling from No Action. Combined commercial plus recreational fishing income impacts are the second most severe among the action alternatives, decreasing in this community group by between $1.937 million and $1.943 million (-12.1 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.55 million under both sub-alternatives (rounded to the nearest $10,000), a 16 percent increase. Alternative 3 would result in the same increase in ex-vessel revenue in Newport from the baseline as Alternative 5 but less than all the other alternatives.

Coos Bay – Brookings:

Compared with No Action, under Alternative 3 income from commercial groundfish fishing declines by between $2.026 million (-17.8 percent) and $2.140 million (-18.8 percent) income and by between 45 and 68 total jobs (-8.9 percent to -13.4 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by between 0.017 percent and 0.025 percent to between 11.98 percent and 11.989 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by between $2.026 million (-14.6 percent) and $2.140 million (-15.4 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $303 thousand (sub-alternative A) or $466 thousand (sub-alternative B) in Coos Bay – Brookings, a decline of 3 percent to 5 percent depending on sub-alternative. The declines in ex-vessel revenue from the baseline under Alternatives 3 and 5 in Coos Bay – Brookings are the greatest among all the alternatives except Alternative 4.

Crescent City – Eureka:

Compared with No Action, income from commercial groundfish fishing declines by $1.735 million (-26.6 percent) and by 44 total jobs (-17.2 percent). Other things being equal, the local unemployment rate would increase by 0.06 percent to 11.819 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by $1.735 million (-21.9 percent). This represents the greatest decrease in income impacts for this community group among the action alternatives.

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $1.9 million in Crescent City – Eureka under both sub-alternatives, a 30 percent decline. The decline in ex-vessel revenue from the baseline in Crescent City – Eureka is greater under Alternatives 3 and 5 than all the other alternatives but less than Alternatives 2-5.

Fort Bragg – Bodega Bay:

Compared with No Action, income from commercial groundfish fishing declines by $0.765 million (-16.1 percent) and by 22 total jobs (-10.9 percent). Other things being equal, the local unemployment rate would increase by 0.005 percent to 9.89 percent. Income impacts from recreational groundfish angling increase from No Action by $0.136 million (+13.1 percent), the same as under Alternatives 1 and 2. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $0.629 million (-11.7 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $45 thousand in Fort Bragg – Bodega Bay under both sub-alternatives, a 1 percent decline. The decline in ex-vessel revenue from the baseline in Fort Bragg – Bodega Bay under Alternatives 3 and 5 is the greatest among all the action alternatives with the exception of Alternative 4.

San Francisco Area:

Compared with No Action, income from commercial groundfish fishing declines by $0.302 million (-17.6 percent) and by 10 total jobs (-10.4 percent). As a result, other things being equal, the local unemployment rate would increase negligibly from 10.647 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by $0.302 million (-4 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $288 thousand in the San Francisco Area under both sub-alternatives, a 17 percent decline. Alternatives 3 and 5 show identical declines in ex-vessel revenue from the baseline in the San Francisco Area, exceeding the declines under Alternatives 1, 2, 6, 7 and 8 by only $3,000.

Santa Cruz – Monterey – Morro Bay:

Compared with No Action, income from commercial groundfish fishing increases by $0.431 million (+6.9 percent) and by 39 total jobs (+8.5 percent). Other things being equal, the local unemployment rate would decrease by 0.008 percent to 12.045 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational income impacts increase under this alternative in this community group by $0.431 million (+3.1 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $3.41 million in Santa Cruz – Monterey – Morro Bay under both sub-alternatives, an 82 percent increase. The increase in ex-vessel revenue from the baseline in Santa Cruz – Monterey – Morro Bay is the same as Alternative 5, less than Alternatives 2, 6, and 7, but greater than Alternatives 4.

Santa Barbara – Los Angeles – San Diego:

Compared with No Action, impacts on income and jobs from commercial groundfish fishing under Alternative 3 are the same as under Alternative 1, increasing by $0.069 million (+2.1 percent) and by 6 total jobs (+1.8 percent). Other things being equal, the local unemployment rate would decrease negligibly from its No Action level of 11.779 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational income impacts are the same as under Alternative 1, increasing in this community group by $0.069 million (+0.1 percent).

Comparing Alternative 3 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.17 million in Santa Barbara – Los Angeles – San Diego under both sub-alternatives, a 48 percent increase. The increase in ex-vessel revenue from the baseline in Santa Barbara – Los Angeles – San Diego is the same as under all the action alternatives except Alternative 4, which is slightly lower.

Alternative 4: Lowest Canary Rockfish ACL and Highest POP ACL (48 mt Canary Rockfish ACL and 247 mt POP ACL)

Coastwide:

Compared with No Action, under Alternative 4 coastwide income from commercial groundfish fishing declines the greatest amount among the alternatives, by between $15.577 million (-17.2 percent) and $16.269 million (-18 percent), and total jobs decline by between 492 (-16.2 percent) and 599 (-19.8 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the coastwide unemployment rate would increase by 0.003 percent to 11.173 percent. Income impacts from recreational groundfish angling are the most negative among the alternatives, decreasing by between $1.253 million (-1.7 percent) and $7.632 (-10.3 percent). Combined coastwide commercial plus recreational fishing income impacts decrease the greatest amount among the alternatives, by between $16.830 million (-10.2 percent) and $23.901 million (-14.5 percent).

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $11.60 million (sub-alternative A) or $10.77 million (sub-alternative B) coastwide, or 16 percent to 17 percent. These are the smallest coastwide increases in groundfish ex-vessel revenue from the baseline among the alternatives.

Puget Sound:

Compared with No Action, the income decline from commercial groundfish fishing (-$0.513 million,-21.6 percent) is less under Alternative 4 than under Alternative 3; total jobs decline by 12 (-21.7 percent). Other things being equal, the local unemployment rate would increase by 0.001 percent to 9.245 percent. Income impacts from recreational groundfish angling in this region are nil, the same as No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by $0.513 million (-21.6 percent).

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would decrease by $2.28 million in Puget Sound under both sub-alternatives, a 64 percent decline. Alternative 4 would result in the largest decrease in Puget Sound ex-vessel revenue among the alternatives, although the amount is only $3,000 greater than Alternatives 1, 2, 6, 7 and 8.

Washington Coast:

Compared with No Action, income from commercial groundfish fishing declines under Alternative 4 by $2.736 million (-18.7 percent) and by 66 total jobs (-21.2 percent). This is the second largest reduction in income impacts for this community group among the action alternatives. Other things being equal, the local unemployment rate would increase by 0.022 percent to 13.164 percent. There is no change in impacts from recreational groundfish angling from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by $2.736 million (-16.2 percent). This represents the second greatest decline for this community group among the action alternatives.

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $6.67 million on the Washington Coast under both sub-alternatives, a 48 percent increase. Alternative 4 would result in a smaller increase in ex-vessel revenue than Alternatives 1, 2, 6, 7 and 8 but greater than Alternatives 3 and 5.

Astoria – Tillamook:

Compared with No Action, income from commercial groundfish fishing declines under Alternative 4 by $5.527 million (-20.5 percent) and by 101 total jobs (-22.3 percent). This represents the second largest decline for this community group in terms of commercial fisheries income impacts, but the largest decline in terms of commercial fisheries employment impacts due to effects on the region's nearshore open access fishery. Other things being equal, the local unemployment rate would increase by 0.023 percent to 10.062 percent. Income impacts from recreational groundfish angling decrease by between $0.299 million (-30.6 percent) and $0.414 million (-42.4 percent) from No Action. This is the only alternative for this community group for which recreational impacts are negative. Combined commercial plus recreational income impacts decrease under Alternative 4 in this community group by between $5.826 million (-20.9 percent) and $5.941 million (-21.3 percent), the greatest decline for this community group among the action alternatives.

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $4.61 million in Astoria – Tillamook under both sub-alternatives, a 40 percent increase. Alternative 4 would result in a smaller increase in ex-vessel revenue from the baseline in Astoria - Tillamook than Alternatives 1, 2, 6, 7 and 8, but greater than Alternatives 3 and 5.

Newport:

Compared with No Action, under Alternative 4 income from commercial groundfish fishing declines by $2.030 million (-16.0 percent) and by 71 total jobs (-19.5 percent). Other things being equal, the local unemployment rate would increase by 0.301 percent to 11.092 percent. Income impacts from recreational groundfish angling decrease by between $0.150 million (-4.4 percent) and $1.167 million (-34.6 percent) from No Action. This is the only alternative for this community group under which recreational impacts are negative. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by between $2.180 million (-13.6 percent) and $3.197 million (-19.9 percent), the greatest decline for this community group among the action alternatives.

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.44 million in Newport under both sub-alternatives, a 14.6 percent increase. Alternative 4 would result in the smallest increase in ex-vessel revenue in Newport from the baseline among the alternatives.

Coos Bay – Brookings:

Compared with No Action, income from commercial groundfish fishing declines by $2.270 million (-19.9 percent) and total jobs decline by 132 (-26.3 percent). Other things being equal, the local unemployment rate would increase by 0.049 percent to 12.013 percent. Income impacts from recreational groundfish angling decrease by between $0.183 million (-7.4 percent) and $0.380 million (-15.3 percent). This is the only alternative for this community group under which recreational impacts are negative. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by between $2.453 million (-17.7 percent) and $2.650 million (-19.1 percent), the greatest decrease for this community group among the action alternatives.

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $750 thousand in Coos Bay – Brookings (-8 percent) under both sub-alternatives, the largest decline in ex-vessel revenue from the baseline for this community group among the alternatives.

Crescent City – Eureka:

Compared with No Action, income from commercial groundfish fishing declines under Alternative 4 by between $0.989 million (-15.2 percent) and $1.109 million (-17.0 percent), and total jobs decline by between 41 (-16.1 percent) and 58 (-22.7 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by between 0.056 percent and 0.079 percent to between 11.815 percent and 11.838 percent. Income impacts from recreational groundfish angling range from an increase of $0.081 million (+5.8 percent) to a decrease of $0.380 million (-20.7 percent) from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by between $0.907 million (-11.4 percent) and $1.401 million (-17.7 percent).

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $1.33 million (sub-alternative A) or $1.50 million (sub-alternative B) in Crescent City – Eureka, a decline of between 21 percent and 24 percent. This decline in ex-vessel revenue from the baseline in Crescent City – Eureka is greater than Alternatives 1, 2, 6, 7 and 8 but less than Alternatives 3 and 5.

Fort Bragg – Bodega Bay:

Compared with No Action, income from commercial groundfish fishing declines under alternative 4 by between $1.286 million (-27.1 percent) and $1.364 million (-28.7 percent), and total jobs decline by between 41 and 54 (-20.5 percent to -27.1 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by between 0.009 percent and 0.013 percent to between 9.894 percent and 9.898 percent. Income impacts from recreational groundfish angling range from an increase of $0.789 million (+76.3 percent) to a decrease of $0.042 million (-4.1 percent) from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by between $0.496 million (-8.6 percent) and $1.406 million (-24.3 percent).

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $524 thousand (sub-alternative A) or $605,000 (sub-alternative B) in Fort Bragg – Bodega Bay, a decline of between 14 percent and16 percent. Alternative 4 would result in the largest decline in ex-vessel revenue from the baseline in Fort Bragg – Bodega Bay among the alternatives.

San Francisco Area:

Compared with No Action, income from commercial groundfish fishing declines under Alternative 4 by between $0.333 million (-19.4 percent) and $0.370 million (-21.5 percent), and total jobs decline by between 17 (-17.2 percent) and 24 (-24.7 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by 0.001 percent to 10.648 percent. Income impacts from recreational groundfish angling range from a decrease of between $0.291 million (-4.9 percent) and $2.272 million (-38.5 percent) from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by between $0.624 million (-8.2 percent) and $2.642 million (-34.7 percent).

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $323 thousand (sub-alternative A) or $365 thousand (sub-alternative B) in the San Francisco Area, a decline of between 19 percent and 22 percent. Alternative 4 would result in the largest decline in ex-vessel revenue from the baseline in the San Francisco Area among the alternatives.

Santa Cruz – Monterey – Morro Bay:

Compared with No Action, income from commercial groundfish fishing under Alternative 4 ranges from an increase of $0.081 million (+1.3 percent) to a decrease of $0.323 million (-5.2 percent), and total jobs decrease by between 13 (-2.8 percent) and 75 (-16.5 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by between 0.003 percent and 0.015 percent to between 12.056 percent and 12.068 percent. Income impacts from recreational groundfish angling range from a decrease of between $1.201 million (-15.5 percent) and $3.064 million (-39.7 percent) from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by between $1.12 million (-8 percent) and $3.387 million (-24.3 percent).

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $2.99 million (sub-alternative A) or $2.50 (sub-alternative B) in Santa Cruz – Monterey – Morro Bay, an increase of between 60 percent and 72 percent. Alternative 4 would result in the smallest increase in ex-vessel revenue from the baseline in Santa Cruz – Monterey – Morro Bay among the alternatives.

Santa Barbara – Los Angeles – San Diego:

Compared with No Action, income from commercial groundfish fishing under Alternative 4 ranges from an increase of $0.025 million (+0.8 percent) to a decrease of $0.028 million (-0.9 percent), and total jobs decrease by between 0 and 7 (0 percent to -2.0 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would change negligibly from the No Action level of 11.779 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined impacts from commercial plus recreational groundfish activities range from an increase of $0.025 million (+0.0 percent) to a decrease of $0.028 million (-0.1 percent).

Comparing Alternative 4 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.12 million (sub-alternative A) or $1.10 (sub-alternative B) in Santa Barbara – Los Angeles – San Diego, an increase of from 44percent to 46 percent. Alternative 4 would result in the smallest increase in ex-vessel revenue from the baseline in Santa Barbara – Los Angeles – San Diego among the alternatives.

Alternative 5: Highest Canary Rockfish ACL and Lowest POP ACL (216 mt Canary Rockfish ACL and 74 mt POP ACL)

Impacts coastwide and in all community groups under Alternative 5 are the same as under Alternative 3. This is because measures used to manage commercial fisheries to stay within the 74 mt POP ACL under Alternative 5 are the same as those used under Alternative 3. The common 74 mt POP ACL is the main factor limiting commercial fisheries under both Alternatives. Measures used to manage recreational fisheries to stay within the common ACLs and HGs for cowcod, bocaccio and yelloweye rockfish under the action alternatives do not allow recreational fisheries to exploit the relatively higher canary rockfish ACL under Alternative 5.

Alternative 6: Lower Canary Rockfish ACL and Higher POP ACL (101 mt Canary Rockfish ACL and 222 mt POP ACL)

Coastwide:

Compared with No Action, income from commercial groundfish fishing under Alternative 6 declines coastwide by between $8.897 million (-9.8 percent) and $9.039 million (-10.0 percent), and total jobs decline by between 191 and 224 (-6.3 percent to -7.4 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the coastwide unemployment rate would increase by 0.001 percent to 11.171 percent. Income impacts from recreational groundfish angling are the same as under Alternatives 1, 2, 3, 5, 7 and 8, increasing by $0.136 million (+0.2 percent). Combined coastwide commercial plus recreational income impacts decrease under this alternative by between $8.761 million and $8.903 million (-5.4 percent).

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $17.50 million (sub-alternative A) or $17.30 million (sub-alternative B) coastwide (+18 percent). Alternative 6 would produce the second largest increase in ex-vessel revenue among the action alternatives relative to the baseline.

Puget Sound:

Income impacts from commercial groundfish fishing in Puget Sound under Alternative 6 are the same as under Alternative 1, declining compared with No Action by $0.509 million (-21.4 percent); and total jobs decline by 12 (-21.5 percent). Other things being equal, the local unemployment rate would increase by 0.001 percent to 9.245 percent. Income impacts from recreational groundfish angling in this region are nil, the same as No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by $0.509 million (-21.4 percent).

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would decrease by $2.28 million in Puget Sound under both sub-alternatives, a 64 percent decline, which is the same as Alternative 1.

Washington Coast:

Income impacts from commercial groundfish fishing on the Washington Coast under Alternative 6 are the same as under Alternative 1, declining compared with No Action by $1.952 million (-13.4 percent); total jobs decrease by 50 (-16.2 percent). Other things being equal, the local unemployment rate would increase by 0.017 percent to 13.159 percent. There is no change in impacts from recreational groundfish angling from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $1.952 million (-11.5 percent).

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $7.34 million on Washington Coast under both sub-alternatives, a 52 percent increase, which is the same as Alternatives 1.

Astoria – Tillamook:

Income from commercial groundfish fishing declines under Alternative 6 compared with No Action by between $1.700 million (-6.3 percent) and $1.721 million (-6.4 percent), and total jobs decline by between 17 (-3.8 percent) and 25– (-5.6 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by between 0.004

percent and 0.006 percent to between 10.043 percent and 10.045 percent. There is no change in impacts from recreational groundfish angling from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by between $1.700 million (-6.1 percent) and $1.721 million (-6.2 percent).

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $7.46 million (sub-alternative A) or $7.44 million (sub-alternative B) in Astoria – Tillamook, an increase of 65 percent to 66 percent. Alternative 6 sub-alternative A would result in the largest increase in ex-vessel revenue from the baseline in Astoria - Tillamook among the action alternatives.

Newport:

Compared with No Action, income from commercial groundfish fishing declines under Alternative 6 by between $1.526 million and $1.532 million (-12.1 percent), and total jobs decline by between 57 and 59 (-15.7 percent to -16.3 percent) depending on whether sub-alternative A or B is selected. Other things being equal, the local unemployment rate would increase by between 0.243 percent and 0.251 percent to between 11.034 percent and 11.042 percent. There is no change in impacts from recreational groundfish angling from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by between $1.526 million (-9.5 percent) and $1.532 million (-9.6 percent).

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase in Newport by $1.98 million (sub-alternative A) or $1.97 million (sub-alternative B), a 65 percent increase. Alternative 6 sub-alternative A would result in the largest increase in ex-vessel revenue from the baseline in Newport among the action alternatives.

Coos Bay – Brookings:

Income from commercial groundfish fishing under Alternative 6 is almost exactly the same as under Alternative 1, declining compared with No Action by between $1.810 million (-15.9 percent) and $1.924 million (-16.9 percent) depending on whether sub-alternative A or B is selected; total jobs decline by between 41 and 64 (-8.2 percent to -12.8 percent). Other things being equal, the local unemployment rate would increase by between 0.015 percent and 0.024 percent to between 11.979 percent and 11.988 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by between $1.810 million (-13 percent) and $1.924 million (-13.9 percent), the same under Alternative 6A as under Alternative 1A, and just a slightly greater decline under Alternative 6B than under Alternative 1B.

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline in Coos Bay – Brookings by $99 thousand (sub-alternative A) or $261 thousand (sub-alternative B), a decline of 1 percent to 3 percent depending on sub-alternative. Alternative 6 sub-alternative A would result in the smallest decline in ex-vessel revenue in Coos Bay – Brookings from the baseline among the action alternatives.

Crescent City – Eureka:

Compared with No Action, income from commercial groundfish fishing under Alternative 6 is slightly greater than under Alternative 1, declining by $0.899 million (-13.6 percent); total jobs decline by 28 (-10.9 percent). Other things being equal, the local unemployment rate would increase by 0.038 percent to 11.978 percent. Income impacts from recreational groundfish angling are unchanged from No

Action. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by $0.889 million (-11.2 percent).

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $1.2 million in Crescent City – Eureka under both sub-alternatives, a 19 percent decline. This is the smallest decline in ex-vessel revenue from the baseline among all the action alternatives for this community group, but only a slightly smaller decline than under Alternatives 1, 2, 7 and 8.

Fort Bragg – Bodega Bay:

Income from commercial groundfish fishing under Alternative 6 is the same as under Alternative 1, declining compared with No Action by $0.736 million (-15.5 percent); total jobs decline by 21 (-10.6 percent). Other things being equal, the local unemployment rate would increase by 0.005 percent to 9.89 percent. Income impacts from recreational groundfish angling increase from No Action by $0.136 million (+13.1 percent), the same as under Alternatives 1, 2, 3, 5, 7 and 8. Combined commercial plus recreational fishing income impacts decrease under this alternative in this community group by $0.6 million (-11.2 percent).

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $17 thousand in Fort Bragg – Bodega Bay under both sub-alternatives, a 1 percent decline. This decline in ex-vessel revenue from the baseline in Fort Bragg – Bodega Bay is the same as Alternatives 1, 2, 7 and 8 and less than Alternatives 3, 4 and 5.

San Francisco Area:

Income from commercial groundfish fishing under Alternative 6 is the same as under Alternative 1, declining compared with No Action by $0.299 million (-17.4 percent); total jobs decline by 10 (-10.4 percent). As a result, other things being equal, the local unemployment rate would increase negligibly from 10.647 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational income impacts decrease under this alternative in this community group by $0.299 million (-3.9 percent), the same as under Alternatives 1, 2, 7 and 8.

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would decline by $285 thousand in the San Francisco Area under both sub-alternatives, a 17 percent decline. This decline in ex-vessel revenue from the baseline in the San Francisco Area is the same as Alternatives 1, 2, 7 and 8 and less than Alternative 4. Results under Alternatives 3 and 5 are not meaningfully different from those under Alternative 6 with respect to the change in ex-vessel revenue from the baseline for this community group.

Santa Cruz – Monterey – Morro Bay:

Income from commercial groundfish fishing is the same under Alternative 6 as under Alternative 1, increasing compared with No Action by $0.453 million (+7.3 percent); total jobs increase by 39 (+8.6 percent). Other things being equal, the local unemployment rate would decrease by 0.008 percent to 12.045 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational fishing income impacts increase under this alternative in this community group by $0.453 million (+3.3 percent), the same as under Alternatives 1, 2, 7 and 8.

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $3.43 million in Santa Cruz – Monterey – Morro Bay under both sub-alternatives, an 82 percent increase. This increase in ex-vessel revenue from the baseline in Santa Cruz – Monterey – Morro Bay is the same as Alternatives 1, 2, 7 and 8 and greater than Alternatives 3, 4 and 5.

Santa Barbara – Los Angeles – San Diego:

Income from commercial groundfish fishing under Alternative 6 is the same as under Alternative 1, increasing compared with No Action by $0.069 million (+2.1 percent); total jobs increase by 6 (+1.8 percent). Other things being equal, the local unemployment rate would decrease negligibly from 11.779 percent. Income impacts from recreational groundfish angling are unchanged from No Action. Combined commercial plus recreational fishing income impacts increase under this alternative in this community group by $0.069 million (+0.1 percent), the same as under Alternatives 1, 2, 3, 5, 7 and 8.

Comparing Alternative 6 to the 2005-10 baseline period, groundfish ex-vessel revenue would increase by $1.17 million in Santa Barbara – Los Angeles – San Diego under both sub-alternatives, a 48 percent increase. This increase in ex-vessel revenue from the baseline in Santa Barbara – Los Angeles – San Diego is the same as all the action alternatives except Alternative 4, sub-alternative B, which is slightly lower.

Alternative 7: Higher Canary Rockfish ACL and Higher POP ACL (147 mt Canary Rockfish ACL and 222 mt POP ACL)

Coastwide impacts and impacts in all community groups under Alternative 7 are the same as under Alternative 6. This is because measures used to manage commercial fisheries to stay within the 222 mt POP ACL and sector HGs under Alternative 7 are the same as those used under Alternative 6. The 222 mt POP ACL is the main factor limiting commercial fisheries under both alternatives 6 and 7. Measures used to manage cowcod, bocaccio and yelloweye rockfish to stay within their common ACLs and HGs under the action alternatives do not allow recreational fisheries to exploit the relatively higher canary rockfish ACL under Alternative 7.

Alternative 8: Higher Canary Rockfish ACL (147 mt Canary Rockfish ACL and 150 mt POP ACL)

Coastwide impacts and impacts in all community groups under Alternative 8 are the same as under Alternative 1. This is because measures used to manage commercial fisheries to stay within the 150 mt POP ACL and sector HGs under Alternative 8 are the same as those used under Alternative 1. Combined coastwide commercial plus recreational income impacts decrease from No Action by between $8.996 million (-5.5 percent) and $9.138 million (-5.6 percent). Factors that may lead to this result are discussed in the section on models and data (Section 4.2.1). Fixed ACLs for the other rebuilding stocks may also limit harvest opportunities for commercial and recreational fishery sectors in each community.

Table 4-47. Change in commercial fishery income impacts (from No Action) under the action alternatives by community group ($1,000).

Community Groups	*No Action ($,000)*	Alt 1A	Alt 2A	Alt 3A	Alt 4A	Alt 5A	Alt 6A	Alt 7A	Alt 8A
Alternatives including "A" sub-alternatives for Nearshore Open Access Sector:									
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*14,595*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*26,899*	-1,888	-1,888	-5,540	-5,527	-5,540	-1,700	-1,700	-1,700
Newport	*12,653*	-1,558	-1,558	-1,937	-2,030	-1,937	-1,526	-1,526	-1,526
Coos Bay-Brookings	*11,400*	-1,810	-1,810	-2,026	-2,270	-2,026	-1,810	-1,810	-1,810
Crescent City-Eureka	*6,523*	-902	-902	-1,735	-989	-1,735	-889	-889	-889
Fort Bragg - Bodega Bay	*4,750*	-736	-736	-765	-1,286	-765	-736	-736	-736
San Francisco Area	*1,720*	-299	-299	-302	-333	-302	-299	-299	-299
SC – Mo - MB	*6,223*	+453	+453	+431	+81	+431	+453	+453	+453
SB – LA - SB	*3,289*	+69	+69	+69	+25	+69	+69	+69	+69
Coastwide Total	*90,429*	-9,132	-9,132	-15,433	-15,577	-15,433	-8,897	-8,897	-8,897

Community Groups	*No Action ($,000)*	Pref. Alt. / Alt 1B*	Alt 2B	Alt 3B	Alt 4B	Alt 5B	Alt 6B	Alt 7B	Alt 8B
Alternatives including "B" sub-alternatives for Nearshore Open Access Sector:									
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*14,595*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*26,899*	-1,909	-1,909	-5,561	-5,527	-5,561	-1,721	-1,721	-1,721
Newport	*12,653*	-1,564	-1,564	-1,943	-2,030	-1,943	-1,532	-1,532	-1,532
Coos Bay-Brookings	*11,400*	-1,925	-1,925	-2,140	-2,270	-2,140	-1,924	-1,924	-1,924
Crescent City-Eureka	*6,523*	-902	-902	-1,735	-1,109	-1,735	-889	-889	-889
Fort Bragg - Bodega Bay	*4,750*	-736	-736	-765	-1,364	-765	-736	-736	-736
San Francisco Area	*1,720*	-299	-299	-302	-370	-302	-299	-299	-299
SC – Mo - MB	*6,223*	+453	+453	+431	-323	+431	+453	+453	+453
SB – LA - SB	*3,289*	+69	+69	+69	-28	+69	+69	+69	+69
Coastwide Total	*90,429*	-9,274	-9,274	-15,575	-16,269	-15,575	-9,039	-9,039	-9,039

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.
*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors; however there are no expected differences in income or employment impacts, as described in the text.

Table 4-48. Change in Commercial Fishery Income Impacts (from No Action) under the Action Alternatives by Community Group (%).

Community Groups	*No Action ($,000)*	Alt 1A	Alt 2A	Alt 3A	Alt 4A	Alt 5A	Alt 6A	Alt 7A	Alt 8A
Alternatives including "A" sub-alternatives for Nearshore Open Access Sector:									
Puget Sound	*2,376*	- 21.4%	- 21.4%	- 25.7%	- 21.6%	- 25.7%	- 21.4%	- 21.4%	- 21.4%
Washington Coast	*14,595*	- 13.4%	- 13.4%	- 20.7%	- 18.7%	- 20.7%	- 13.4%	- 13.4%	- 13.4%
Astoria-Tillamook	*26,899*	- 7.0%	- 7.0%	- 20.6%	- 20.5%	- 20.6%	- 6.3%	- 6.3%	- 6.3%
Newport	*12,653*	- 12.3%	- 12.3%	- 15.3%	- 16.0%	- 15.3%	- 12.1%	- 12.1%	- 12.1%
Coos Bay-Brookings	*11,400*	- 15.9%	- 15.9%	- 17.8%	- 19.9%	- 17.8%	- 15.9%	- 15.9%	- 15.9%
Crescent City-Eureka	*6,523*	- 13.8%	- 13.8%	- 26.6%	- 15.2%	- 26.6%	- 13.6%	- 13.6%	- 13.6%
Fort Bragg - Bodega Bay	*4,750*	- 15.5%	- 15.5%	- 16.1%	- 27.1%	- 16.1%	- 15.5%	- 15.5%	- 15.5%
San Francisco Area	*1,720*	- 17.4%	- 17.4%	- 17.6%	- 19.4%	- 17.6%	- 17.4%	- 17.4%	- 17.4%
SC – Mo - MB	*6,223*	+ 7.3%	+ 7.3%	+ 6.9%	+ 1.3%	+ 6.9%	+ 7.3%	+ 7.3%	+ 7.3%
SB – LA - SB	*3,289*	+ 2.1%	+ 2.1%	+ 2.1%	+ 0.8%	+ 2.1%	+ 2.1%	+ 2.1%	+ 2.1%
Coastwide Total	*90,429*	- 10.1%	- 10.1%	- 17.1%	- 17.2%	- 17.1%	- 9.8%	- 9.8%	- 9.8%
Community Groups	***No Action ($,000)***	**Pref. Alt. / Alt 1B***	**Alt 2B**	**Alt 3B**	**Alt 4B**	**Alt 5B**	**Alt 6B**	**Alt 7B**	**Alt 8B**
Alternatives including "B" sub-alternatives for Nearshore Open Access Sector:									
Puget Sound	*2,376*	- 21.4%	- 21.4%	- 25.7%	- 21.6%	- 25.7%	- 21.4%	- 21.4%	- 21.4%
Washington Coast	*14,595*	- 13.4%	- 13.4%	- 20.7%	- 18.7%	- 20.7%	- 13.4%	- 13.4%	- 13.4%
Astoria-Tillamook	*26,899*	- 7.1%	- 7.1%	- 20.7%	- 20.5%	- 20.7%	- 6.4%	- 6.4%	- 6.4%
Newport	*12,653*	- 12.4%	- 12.4%	- 15.4%	- 16.0%	- 15.4%	- 12.1%	- 12.1%	- 12.1%
Coos Bay-Brookings	*11,400*	- 16.9%	- 16.9%	- 18.8%	- 19.9%	- 18.8%	- 16.9%	- 16.9%	- 16.9%
Crescent City-Eureka	*6,523*	- 13.8%	- 13.8%	- 26.6%	- 17.0%	- 26.6%	- 13.6%	- 13.6%	- 13.6%
Fort Bragg - Bodega Bay	*4,750*	- 15.5%	- 15.5%	- 16.1%	- 28.7%	- 16.1%	- 15.5%	- 15.5%	- 15.5%
San Francisco Area	*1,720*	- 17.4%	- 17.4%	- 17.6%	- 21.5%	- 17.6%	- 17.4%	- 17.4%	- 17.4%
SC – Mo - MB	*6,223*	+ 7.3%	+ 7.3%	+ 6.9%	- 5.2%	+ 6.9%	+ 7.3%	+ 7.3%	+ 7.3%
SB – LA - SB	*3,289*	+ 2.1%	+ 2.1%	+ 2.1%	- 0.9%	+ 2.1%	+ 2.1%	+ 2.1%	+ 2.1%
Coastwide Total	*90,429*	- 10.3%	- 10.3%	- 17.2%	- 18.0%	- 17.2%	- 10.0%	- 10.0%	- 10.0%

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors; however there are no expected differences in income or employment impacts, as described in the text.

Table 4-49. Change in commercial fishery employment impacts (from No Action) under the action alternatives by community group (number of jobs).

Community Groups	***No Action***	**Alt 1A**	**Alt 2A**	**Alt 3A**	**Alt 4A**	**Alt 5A**	**Alt 6A**	**Alt 7A**	**Alt 8A**
Puget Sound	*56*	-12	-12	-14	-12	-14	-12	-12	-12
Washington Coast	*310*	-50	-50	-72	-66	-72	-50	-50	-50
Astoria-Tillamook	*450*	-20	-20	-73	-101	-73	-17	-17	-20
Newport	*362*	-57	-57	-64	-71	-64	-57	-57	-57
Coos Bay-Brookings	*504*	-41	-41	-45	-132	-45	-41	-41	-41
Crescent City-Eureka	*254*	-28	-28	-44	-41	-44	-28	-28	-28
Fort Bragg - Bodega Bay	*198*	-21	-21	-22	-41	-22	-21	-21	-21
San Francisco Area	*98*	-10	-10	-10	-17	-10	-10	-10	-10
SC – Mo - MB	*457*	+39	+39	+39	-13	+39	+39	+39	+39
SB – LA - SB	*339*	+6	+6	+6	+0	+6	+6	+6	+6
Coastwide Total	*3,029*	-195	-195	-298	-492	-298	-191	-191	-195
Community Groups	***No Action***	**Pref. Alt. / Alt 1B***	**Alt 2B**	**Alt 3B**	**Alt 4B**	**Alt 5B**	**Alt 6B**	**Alt 7B**	**Alt 8B**
Puget Sound	*56*	-12	-12	-14	-12	-14	-12	-12	-12
Washington Coast	*310*	-50	-50	-72	-66	-72	-50	-50	-50
Astoria-Tillamook	*450*	-28	-28	-81	-101	-81	-25	-25	-28
Newport	*362*	-59	-59	-66	-71	-66	-59	-59	-59
Coos Bay-Brookings	*504*	-64	-64	-68	-132	-68	-64	-64	-64
Crescent City-Eureka	*254*	-28	-28	-44	-58	-44	-28	-28	-28
Fort Bragg - Bodega Bay	*198*	-21	-21	-22	-54	-22	-21	-21	-21
San Francisco Area	*98*	-10	-10	-10	-24	-10	-10	-10	-10
SC – Mo - MB	*457*	+39	+39	+39	-75	+39	+39	+39	+39
SB – LA - SB	*339*	+6	+6	+6	-7	+6	+6	+6	+6
Coastwide Total	*3,029*	-228	-228	-331	-599	-331	-224	-224	-228

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.
*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors; however there are no expected differences in income or employment impacts, as described in the text.

Table 4-50. Change in commercial fishery employment impacts (from No Action) under the action alternatives by community group (%).

Community Groups	***No Action***	**Alt 1A**	**Alt 2A**	**Alt 3A**	**Alt 4A**	**Alt 5A**	**Alt 6A**	**Alt 7A**	**Alt 8A**

Puget Sound	*56*	- 21.5%	- 21.5%	- 25.0%	- 21.7%	- 25.0%	- 21.5%	- 21.5%	- 21.5%
Washington Coast	*310*	- 16.2%	- 16.2%	- 23.3%	- 21.2%	- 23.3%	- 16.2%	- 16.2%	- 16.2%
Astoria-Tillamook	*450*	- 4.4%	- 4.4%	- 16.1%	- 22.3%	- 16.1%	- 3.8%	- 3.8%	- 4.4%
Newport	*362*	- 15.9%	- 15.9%	- 17.6%	- 19.5%	- 17.6%	- 15.7%	- 15.7%	- 15.9%
Coos Bay-Brookings	*504*	- 8.2%	- 8.2%	- 8.9%	- 26.3%	- 8.9%	- 8.2%	- 8.2%	- 8.2%
Crescent City-Eureka	*254*	- 11.0%	- 11.0%	- 17.2%	- 16.1%	- 17.2%	- 10.9%	- 10.9%	- 11.0%
Fort Bragg - Bodega Bay	*198*	- 10.6%	- 10.6%	- 10.9%	- 20.5%	- 10.9%	- 10.6%	- 10.6%	- 10.6%
San Francisco Area	*98*	- 10.4%	- 10.4%	- 10.4%	- 17.2%	- 10.4%	- 10.4%	- 10.4%	- 10.4%
SC – Mo - MB	*457*	+ 8.6%	+ 8.6%	+ 8.5%	- 2.8%	+ 8.5%	+ 8.6%	+ 8.6%	+ 8.6%
SB – LA - SB	*339*	+ 1.8%	+ 1.8%	+ 1.8%	+ 0.1%	+ 1.8%	+ 1.8%	+ 1.8%	+ 1.8%
Coastwide Total	*3,029*	- 6.4%	- 6.4%	- 9.8%	- 16.2%	- 9.8%	- 6.3%	- 6.3%	- 6.4%

Community Groups	***No Action***	**Pref. Alt. / Alt 1B***	**Alt 2B**	**Alt 3B**	**Alt 4B**	**Alt 5B**	**Alt 6B**	**Alt 7B**	**Alt 8B**
Puget Sound	*56*	- 21.5%	- 21.5%	- 25.0%	- 21.7%	- 25.0%	- 21.5%	- 21.5%	- 21.5%
Washington Coast	*310*	- 16.2%	- 16.2%	- 23.3%	- 21.2%	- 23.3%	- 16.2%	- 16.2%	- 16.2%
Astoria-Tillamook	*450*	- 6.2%	- 6.2%	- 18.0%	- 22.3%	- 18.0%	- 5.6%	- 5.6%	- 6.2%
Newport	*362*	- 16.4%	- 16.4%	- 18.2%	- 19.5%	- 18.2%	- 16.3%	- 16.3%	- 16.4%
Coos Bay-Brookings	*504*	- 12.8%	- 12.8%	- 13.4%	- 26.3%	- 13.4%	- 12.8%	- 12.8%	- 12.8%
Crescent City-Eureka	*254*	- 11.0%	- 11.0%	- 17.2%	- 22.7%	- 17.2%	- 10.9%	- 10.9%	- 11.0%
Fort Bragg - Bodega Bay	*198*	- 10.6%	- 10.6%	- 10.9%	- 27.1%	- 10.9%	- 10.6%	- 10.6%	- 10.6%
San Francisco Area	*98*	- 10.4%	- 10.4%	- 10.4%	- 24.7%	- 10.4%	- 10.4%	- 10.4%	- 10.4%
SC – Mo - MB	*457*	+ 8.6%	+ 8.6%	+ 8.5%	- 16.5%	+ 8.5%	+ 8.6%	+ 8.6%	+ 8.6%
SB – LA - SB	*339*	+ 1.8%	+ 1.8%	+ 1.8%	- 2.0%	+ 1.8%	+ 1.8%	+ 1.8%	+ 1.8%
Coastwide Total	*3,029*	- 7.5%	- 7.5%	- 10.9%	- 19.8%	- 10.9%	- 7.4%	- 7.4%	- 7.5%

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.
*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors; however there are no expected differences in income or employment impacts, as described in the text.

Table 4-51. Change in regional unemployment rates[t] for all industries (from No Action) resulting from commercial fishery employment impacts under the action alternatives by community group.

Community Groups	***No Action***	**Alt 1A**	**Alt 2A**	**Alt 3A**	**Alt 4A**	**Alt 5A**	**Alt 6A**	**Alt 7A**	**Alt 8A**
Puget Sound	*9.244%*	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%

Washington Coast	*13.142%*	+0.017%	+0.017%	+0.024%	+0.022%	+0.024%	+0.017%	+0.017%	+0.017%
Astoria-Tillamook	*10.039%*	+0.005%	+0.005%	+0.017%	+0.023%	+0.017%	+0.004%	+0.004%	+0.005%
Newport	*10.791%*	+0.245%	+0.245%	+0.272%	+0.301%	+0.272%	+0.243%	+0.243%	+0.245%
Coos Bay-Brookings	*11.964%*	+0.015%	+0.015%	+0.017%	+0.049%	+0.017%	+0.015%	+0.015%	+0.015%
Crescent City-Eureka	*11.759%*	+0.039%	+0.039%	+0.060%	+0.056%	+0.060%	+0.038%	+0.038%	+0.039%
Fort Bragg - Bodega Bay	*9.885%*	+0.005%	+0.005%	+0.005%	+0.009%	+0.005%	+0.005%	+0.005%	+0.005%
San Francisco Area	*10.647%*	+0.000%	+0.000%	+0.000%	+0.001%	+0.000%	+0.000%	+0.000%	+0.000%
SC – Mo - MB	*12.053%*	-0.008%	-0.008%	-0.008%	+0.003%	-0.008%	-0.008%	-0.008%	-0.008%
SB – LA - SB	*11.779%*	-0.000%	-0.000%	-0.000%	-0.000%	-0.000%	-0.000%	-0.000%	-0.000%
Coastwide Total	*11.170%*	+0.001%	+0.001%	+0.002%	+0.003%	+0.002%	+0.001%	+0.001%	+0.001%

Community Groups	***No Action***	**Pref. Alt. / Alt 1B***	**Alt 2B**	**Alt 3B**	**Alt 4B**	**Alt 5B**	**Alt 6B**	**Alt 7B**	**Alt 8B**
Puget Sound	*9.244%*	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%	+0.001%
Washington Coast	*13.142%*	+0.017%	+0.017%	+0.024%	+0.022%	+0.024%	+0.017%	+0.017%	+0.017%
Astoria-Tillamook	*10.039%*	+0.007%	+0.007%	+0.019%	+0.023%	+0.019%	+0.006%	+0.006%	+0.007%
Newport	*10.791%*	+0.254%	+0.254%	+0.281%	+0.301%	+0.281%	+0.251%	+0.251%	+0.254%
Coos Bay-Brookings	*11.964%*	+0.024%	+0.024%	+0.025%	+0.049%	+0.025%	+0.024%	+0.024%	+0.024%
Crescent City-Eureka	*11.759%*	+0.039%	+0.039%	+0.060%	+0.079%	+0.060%	+0.038%	+0.038%	+0.039%
Fort Bragg - Bodega Bay	*9.885%*	+0.005%	+0.005%	+0.005%	+0.013%	+0.005%	+0.005%	+0.005%	+0.005%
San Francisco Area	*10.647%*	+0.000%	+0.000%	+0.000%	+0.001%	+0.000%	+0.000%	+0.000%	+0.000%
SC – Mo - MB	*12.053%*	-0.008%	-0.008%	-0.008%	+0.015%	-0.008%	-0.008%	-0.008%	-0.008%
SB – LA - SB	*11.779%*	-0.000%	-0.000%	-0.000%	+0.000%	-0.000%	-0.000%	-0.000%	-0.000%
Coastwide Total	*11.170%*	+0.001%	+0.001%	+0.002%	+0.003%	+0.002%	+0.001%	+0.001%	+0.001%

t Based on 2010 county labor force and employment statistics from the Bureau of Labor Statistics http://www.bls.gov/data/

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors; however there are no expected differences in income or employment impacts, as described in the text.

Table 4-52. Change in recreational fishery income impacts (from No Action) by community group ($1,000).

Community Groups	*No Action ($,000)*	Pref. Alt. / Alt. 1	Alt. 2	Alt. 3	Alt. 4A	Alt. 4B	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Puget Sound	-	-	-	-	-	-	-	-	-	-
Washington Coast	*2,310*	-	-	-	-	-	-	-	-	-
Astoria-Tillamook	*978*	-	-	-	-299	-414	-	-	-	-
Newport	*3,372*	-	-	-	-150	-1,167	-	-	-	-
Coos Bay-Brookings	*2,481*	-	-	-	-183	-380	-	-	-	-
Crescent City-Eureka	*1,414*	-	-	-	+81	-292	-	-	-	-
Fort Bragg - Bodega Bay	*1,035*	+136	+136	+136	+789	-42	+136	+136	+136	+136
San Francisco Area	*5,896*	-	-	-	-291	-2,272	-	-	-	-
SC – Mo – MB*	*7,725*	-	-	-	-1,201	-3,064	-	-	-	-
SB – LA – SB*	*48,878*	-	-	-	-	-	-	-	-	-
Coastwide Total	*74,089*	**+136**	**+136**	**+136**	**-1,253**	**-7,632**	**+136**	**+136**	**+136**	**+136**

Table 4-53. Change in Recreational fishery income impacts (from No Action) by community group (%).

Community Groups	*No Action ($,000)*	Pref. Alt. / Alt. 1	Alt. 2	Alt. 3	Alt. 4A	Alt. 4B	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Puget Sound	-	-	-	-	-	-	-	-	-	-
Washington Coast	*2,310*	-	-	-	-	-	-	-	-	-
Astoria-Tillamook	*978*	-	-	-	-30.6%	-42.4%	-	-	-	-
Newport	*3,372*	-	-	-	-4.4%	-34.6%	-	-	-	-
Coos Bay-Brookings	*2,481*	-	-	-	-7.4%	-15.3%	-	-	-	-
Crescent City-Eureka	*1,414*	-	-	-	+5.8%	-20.7%	-	-	-	-
Fort Bragg - Bodega Bay	*1,035*	+13.1%	+13.1%	+13.1%	+76.3%	-4.1%	+13.1%	+13.1%	+13.1%	+13.1%
San Francisco Area	*5,896*	-	-	-	-4.9%	-38.5%	-	-	-	-
SC – Mo – MB*	*7,725*	-	-	-	-15.5%	-39.7%	-	-	-	-
SB – LA – SB*	*48,878*	-	-	-	-	-	-	-	-	-
Coastwide Total	***74,089***	**+0.2%**	**+0.2%**	**+0.2%**	**-1.7%**	**-10.3%**	**+0.2%**	**+0.2%**	**+0.2%**	**+0.2%**

*SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.

Table 4-54. Change in combined commercial plus recreational fishery income impacts (from No Action) by community group ($1,000)[t].

Community Groups	*No Action*	Alt 1A	Alt 2A	Alt 3A	Alt 4A	Alt 5A	Alt 6A	Alt 7A	Alt 8A
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*16,905*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*27,877*	-1,888	-1,888	-5,540	-5,826	-5,540	-1,700	-1,700	-1,888
Newport	*16,025*	-1,558	-1,558	-1,937	-2,180	-1,937	-1,526	-1,526	-1,558
Coos Bay-Brookings	*13,881*	-1,810	-1,810	-2,026	-2,453	-2,026	-1,810	-1,810	-1,810
Crescent City-Eureka	*7,937*	-902	-902	-1,735	-907	-1,735	-889	-889	-902
Fort Bragg - Bodega Bay	*5,786*	-600	-600	-629	-496	-629	-600	-600	-600
San Francisco Area	*7,616*	-299	-299	-302	-624	-302	-299	-299	-299
SC – Mo - MB	*13,948*	+453	+453	+431	-1,120	+431	+453	+453	+453
SB – LA - SB	*52,167*	+69	+69	+69	+25	+69	+69	+69	+69
Coastwide Total	*164,518*	-8,996	-8,996	-15,297	-16,830	-15,297	-8,761	-8,761	-8,996

Community Groups	*No Action*	Pref. Alt. / Alt 1B*	Alt 2B	Alt 3B	Alt 4B	Alt 5B	Alt 6B	Alt 7B	Alt 8B
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*16,905*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*27,877*	-1,909	-1,909	-5,561	-5,941	-5,561	-1,721	-1,721	-1,909
Newport	*16,025*	-1,564	-1,564	-1,943	-3,197	-1,943	-1,532	-1,532	-1,564
Coos Bay-Brookings	*13,881*	-1,925	-1,925	-2,140	-2,650	-2,140	-1,924	-1,924	-1,925
Crescent City-Eureka	*7,937*	-902	-902	-1,735	-1,401	-1,735	-889	-889	-902
Fort Bragg - Bodega Bay	*5,786*	-600	-600	-629	-1,406	-629	-600	-600	-600
San Francisco Area	*7,616*	-299	-299	-302	-2,642	-302	-299	-299	-299
SC – Mo - MB	*13,948*	+453	+453	+431	-3,387	+431	+453	+453	+453
SB – LA - SB	*52,167*	+69	+69	+69	-28	+69	+69	+69	+69
Coastwide Total	*164,518*	-9,138	-9,138	-15,439	-23,901	-15,439	-8,903	-8,903	-9,138

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.

t Although strictly speaking, the two measures are not directly additive due to the slightly different estimation procedures used, combined income impacts generated by commercial and recreational fishing activities are displayed here in order to facilitate comparison of the alternatives.

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, however there are no expected differences in income or employment impacts, as described in the text.

Table 4-55. Change in combined commercial plus recreational fishery income impacts (from No Action) by community group (%)[t].

Community Groups	*No Action*	Alt 1A	Alt 2A	Alt 3A	Alt 4A	Alt 5A	Alt 6A	Alt 7A	Alt 8A
Puget Sound	*2,376*	- 21.4%	- 21.4%	- 25.7%	- 21.6%	- 25.7%	- 21.4%	- 21.4%	- 21.4%
Washington Coast	*16,905*	- 11.5%	- 11.5%	- 17.9%	- 16.2%	- 17.9%	- 11.5%	- 11.5%	- 11.5%
Astoria-Tillamook	*27,877*	- 6.8%	- 6.8%	- 19.9%	- 20.9%	- 19.9%	- 6.1%	- 6.1%	- 6.8%
Newport	*16,025*	- 9.7%	- 9.7%	- 12.1%	- 13.6%	- 12.1%	- 9.5%	- 9.5%	- 9.7%
Coos Bay-Brookings	*13,881*	- 13.0%	- 13.0%	- 14.6%	- 17.7%	- 14.6%	- 13.0%	- 13.0%	- 13.0%
Crescent City-Eureka	*7,937*	- 11.4%	- 11.4%	- 21.9%	- 11.4%	- 21.9%	- 11.2%	- 11.2%	- 11.4%
Fort Bragg - Bodega Bay	*5,786*	- 10.4%	- 10.4%	- 10.9%	- 8.6%	- 10.9%	- 10.4%	- 10.4%	- 10.4%
San Francisco Area	*7,616*	- 3.9%	- 3.9%	- 4.0%	- 8.2%	- 4.0%	- 3.9%	- 3.9%	- 3.9%
SC – Mo - MB	*13,948*	+ 3.3%	+ 3.3%	+ 3.1%	- 8.0%	+ 3.1%	+ 3.3%	+ 3.3%	+ 3.3%
SB – LA - SB	*52,167*	+ 0.1%	+ 0.1%	+ 0.1%	+ 0.0%	+ 0.1%	+ 0.1%	+ 0.1%	+ 0.1%
Coastwide Total	*164,518*	- 5.5%	- 5.5%	- 9.3%	- 10.2%	- 9.3%	- 5.3%	- 5.3%	- 5.5%

Community Groups	*No Action*	Pref. Alt. / Alt 1B*	Alt 2B	Alt 3B	Alt 4B	Alt 5B	Alt 6B	Alt 7B	Alt 8B
Puget Sound	*2,376*	- 21.4%	- 21.4%	- 25.7%	- 21.6%	- 25.7%	- 21.4%	- 21.4%	- 21.4%
Washington Coast	*16,905*	- 11.5%	- 11.5%	- 17.9%	- 16.2%	- 17.9%	- 11.5%	- 11.5%	- 11.5%
Astoria-Tillamook	*27,877*	- 6.8%	- 6.8%	- 19.9%	- 21.3%	- 19.9%	- 6.2%	- 6.2%	- 6.8%
Newport	*16,025*	- 9.8%	- 9.8%	- 12.1%	- 19.9%	- 12.1%	- 9.6%	- 9.6%	- 9.8%
Coos Bay-Brookings	*13,881*	- 13.9%	- 13.9%	- 15.4%	- 19.1%	- 15.4%	- 13.9%	- 13.9%	- 13.9%
Crescent City-Eureka	*7,937*	- 11.4%	- 11.4%	- 21.9%	- 17.7%	- 21.9%	- 11.2%	- 11.2%	- 11.4%
Fort Bragg - Bodega Bay	*5,786*	- 10.4%	- 10.4%	- 10.9%	- 24.3%	- 10.9%	- 10.4%	- 10.4%	- 10.4%
San Francisco Area	*7,616*	- 3.9%	- 3.9%	- 4.0%	- 34.7%	- 4.0%	- 3.9%	- 3.9%	- 3.9%
SC – Mo - MB	*13,948*	+ 3.3%	+ 3.3%	+ 3.1%	- 24.3%	+ 3.1%	+ 3.3%	+ 3.3%	+ 3.3%
SB – LA - SB	*52,167*	+ 0.1%	+ 0.1%	+ 0.1%	- 0.1%	+ 0.1%	+ 0.1%	+ 0.1%	+ 0.1%
Coastwide Total	*164,518*	- 5.6%	- 5.6%	- 9.4%	- 14.5%	- 9.4%	- 5.4%	- 5.4%	- 5.6%

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.

t Although strictly speaking, the two measures are not directly additive due to the slightly different estimation procedures used, combined income impacts generated by commercial and recreational fishing activities are displayed here in order to facilitate comparison of the alternatives.

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, however there are no expected differences in income or employment impacts, as described in the text.

Table 4-56. Change in groundfish ex-vessel revenue from baseline 2005-10 average annual revenue (2011 $1,000).

	Baseline (2005-10)	**No Action**	**Alt. 1A**	**Alt. 2A**	**Alt. 3A**	**Alt. 4A**	**Alt. 5A**	**Alt. 6A**	**Alt. 7A**	**Alt. 8A**
Puget Sound	*3,580*	-1,927	-2,277	-2,277	-2,351	-2,279	-2,351	-2,277	-2,277	-2,277
Washington Coast	*14,039*	+10,015	+7,337	+7,337	+6,416	+6,666	+6,416	+7,337	+7,337	+7,337
Astoria-Tillamook	*11,394*	+8,786	+7,324	+7,324	+4,594	+4,605	+4,594	+7,459	+7,459	+7,324
Newport	*9,944*	+3,658	+1,948	+1,948	+1,554	+1,439	+1,554	+1,981	+1,981	+1,948
Coos Bay-Brookings	*9,862*	+1,597	-100	-100	-303	-750	-303	-99	-99	-100
Crescent City-Eureka	*6,384*	-467	-1,212	-1,212	-1,914	-1,334	-1,914	-1,201	-1,201	-1,212
Fort Bragg - Bodega Bay	*3,712*	+657	-17	-17	-45	-524	-45	-17	-17	-17
San Francisco Area	*1,698*	-11	-285	-285	-288	-323	-288	-285	-285	-285
Santa Cruz - Monterey - Morro Bay	*4,175*	+2,890	+3,433	+3,433	+3,406	+2,985	+3,406	+3,433	+3,433	+3,433
Santa Barbara - Los Angeles - San Diego	*2,427*	+1,098	+1,166	+1,166	+1,166	+1,116	+1,166	+1,166	+1,166	+1,166
Shoreside Total	***67,216***	**+26,297**	**+17,317**	**+17,317**	**+12,236**	**+11,599**	**+12,236**	**+17,498**	**+17,498**	**+17,317**
	Baseline (2005-10)		**Pref. Alt. / Alt. 1B***	**Alt. 2B**	**Alt. 3B**	**Alt. 4B**	**Alt. 5B**	**Alt. 6B**	**Alt. 7B**	**Alt. 8B**
Puget Sound	*3,580*		-2,277	-2,277	-2,351	-2,279	-2,351	-2,277	-2,277	-2,277
Washington Coast	*14,039*		+7,337	+7,337	+6,416	+6,666	+6,416	+7,337	+7,337	+7,337
Astoria-Tillamook	*11,394*		+7,301	+7,301	+4,570	+4,605	+4,570	+7,436	+7,436	+7,301
Newport	*9,944*		+1,940	+1,940	+1,546	+1,439	+1,546	+1,973	+1,973	+1,940
Coos Bay-Brookings	*9,862*		-262	-262	-466	-750	-466	-261	-261	-262
Crescent City-Eureka	*6,384*		-1,212	-1,212	-1,914	-1,499	-1,914	-1,201	-1,201	-1,212
Fort Bragg - Bodega Bay	*3,712*		-17	-17	-45	-605	-45	-17	-17	-17
San Francisco Area	*1,698*		-285	-285	-288	-365	-288	-285	-285	-285
Santa Cruz - Monterey - Morro Bay	*4,175*		+3,433	+3,433	+3,406	+2,498	+3,406	+3,433	+3,433	+3,433
Santa Barbara - Los Angeles - San Diego	*2,427*		+1,166	+1,166	+1,166	+1,056	+1,166	+1,166	+1,166	+1,166
Shoreside Total	***67,216***		**+17,123**	**+17,123**	**+12,042**	**+10,765**	**+12,042**	**+17,304**	**+17,304**	**+17,123**

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, however there are no expected differences in income or employment impacts, as described in the text.

Table 4-57. Change in groundfish ex-vessel revenue from baseline 2005-10 average annual revenue (%).

	No Action	Alt. 1A	Alt. 2A	Alt. 3A	Alt. 4A	Alt. 5A	Alt. 6A	Alt. 7A	Alt. 8A
Puget Sound	-53.8%	-63.6%	-63.6%	-65.7%	-63.7%	-65.7%	-63.6%	-63.6%	-63.6%
Washington Coast	+71.3%	+52.3%	+52.3%	+45.7%	+47.5%	+45.7%	+52.3%	+52.3%	+52.3%
Astoria-Tillamook	+77.1%	+64.3%	+64.3%	+40.3%	+40.4%	+40.3%	+65.5%	+65.5%	+64.3%
Newport	+36.8%	+19.6%	+19.6%	+15.6%	+14.5%	+15.6%	+19.9%	+19.9%	+19.6%
Coos Bay-Brookings	+16.2%	-1.0%	-1.0%	-3.1%	-7.6%	-3.1%	-1.0%	-1.0%	-1.0%
Crescent City-Eureka	-7.3%	-19.0%	-19.0%	-30.0%	-20.9%	-30.0%	-18.8%	-18.8%	-19.0%
Fort Bragg - Bodega Bay	+17.7%	-0.5%	-0.5%	-1.2%	-14.1%	-1.2%	-0.5%	-0.5%	-0.5%
San Francisco Area	-0.6%	-16.8%	-16.8%	-17.0%	-19.0%	-17.0%	-16.8%	-16.8%	-16.8%
Santa Cruz - Monterey - Morro Bay	+69.2%	+82.2%	+82.2%	+81.6%	+71.5%	+81.6%	+82.2%	+82.2%	+82.2%
Santa Barbara - Los Angeles - San Diego	+45.3%	+48.1%	+48.1%	+48.1%	+46.0%	+48.1%	+48.1%	+48.1%	+48.1%
Shoreside Total	**+39.1%**	**+25.8%**	**+25.8%**	**+18.2%**	**+17.3%**	**+18.2%**	**+26.0%**	**+26.0%**	**+25.8%**

		Pref. Alt. / Alt. 1B*	Alt. 2B	Alt. 3B	Alt. 4B	Alt. 5B	Alt. 6B	Alt. 7B	Alt. 8B
Puget Sound		-63.6%	-63.6%	-65.7%	-63.7%	-65.7%	-63.6%	-63.6%	-63.6%
Washington Coast		+52.3%	+52.3%	+45.7%	+47.5%	+45.7%	+52.3%	+52.3%	+52.3%
Astoria-Tillamook		+64.1%	+64.1%	+40.1%	+40.4%	+40.1%	+65.3%	+65.3%	+64.1%
Newport		+19.5%	+19.5%	+15.5%	+14.5%	+15.5%	+19.8%	+19.8%	+19.5%
Coos Bay-Brookings		-2.7%	-2.7%	-4.7%	-7.6%	-4.7%	-2.6%	-2.6%	-2.7%
Crescent City-Eureka		-19.0%	-19.0%	-30.0%	-23.5%	-30.0%	-18.8%	-18.8%	-19.0%
Fort Bragg - Bodega Bay		-0.5%	-0.5%	-1.2%	-16.3%	-1.2%	-0.5%	-0.5%	-0.5%
San Francisco Area		-16.8%	-16.8%	-17.0%	-21.5%	-17.0%	-16.8%	-16.8%	-16.8%
Santa Cruz - Monterey - Morro Bay		+82.2%	+82.2%	+81.6%	+59.8%	+81.6%	+82.2%	+82.2%	+82.2%
Santa Barbara - Los Angeles - San Diego		+48.1%	+48.1%	+48.1%	+43.5%	+48.1%	+48.1%	+48.1%	+48.1%
Shoreside Total		**+25.5%**	**+25.5%**	**+17.9%**	**+16.0%**	**+17.9%**	**+25.7%**	**+25.7%**	**+25.5%**

*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of revenues between Nonwhiting Trawl and Tribal fisheries sectors, however there are no expected differences in income or employment impacts, as described in the text.

4.2.2.4 Processors

No Action: 2012 Regulations, 107 mt Canary Rockfish ACL and 183 mt POP ACL

Under No Action, total purchases of groundfish landings by shoreside processors of $93.512 million are projected in 2013. This total includes projected purchases of $23.65 million of whiting, and $69.862 million in deliveries of combined nonwhiting groundfish species.

The Preferred Alternative and Alternative 1: (Preferred Alternative) 116 mt Canary Rockfish ACL and 150 mt POP ACL

The Preferred Alternative differs slightly from Alternative 1B (and Alternatives 2-8) in (1) increased deductions from the ACLs for petrale sole, yellowtail rockfish and to a smaller extent, shortspine thornyheads to accommodate tribal fisheries set asides ; and (2) increased allowances for research and at sea whiting sector catch of arrowtooth flounder. These changes shift a portion of the allocations for those four species between commercial and tribal fisheries. However it is uncertain what if any effect these changes will have on commercial and tribal fisheries landings and revenue under the Preferred Alternative. More discussion of potential impacts under the Preferred Alternative can be found in sections 4.2.2.1 and 4.2.2.3.

Compared with No Action, under the Preferred Alternative / Alternative 1B total groundfish purchases by processors are projected to decline by $9.174 million (-9.8 percent), or $8.98 million (-9.6 percent) under Alternative 1A. These values describe the second highest overall level of total groundfish purchases among the 2013 action alternatives.

Purchases of whiting decrease by $0.278 million (-1.2 percent), while deliveries of combined nonwhiting groundfish species decrease by $8.895 million (-12.7 percent) under the Preferred Alternative / Alternative 1B or by $8.702 million (-12.5 percent) under Alternative 1A. These results represent the second highest purchase levels for both whiting and nonwhiting groundfish species projected under the 2013 action alternatives.

Alternative 2: Lower Canary Rockfish ACL (101 mt Canary Rockfish ACL and 150 mt POP ACL)

Projected impacts under Alternative 2 are the same as under Alternative 1 for all commercial groundfish sectors. This is because measures used to manage commercial fisheries to stay within the 119 mt canary rockfish ACL and sector HGs under Alternative 1 are also sufficient to not exceed the 104 mt canary rockfish ACL under Alternative 2. The main factors limiting commercial fisheries under Alternatives 1 and 2 are the common ACLs for POP and the other overfished species.

Alternative 3: Lowest POP ACL (116 mt Canary Rockfish ACL and 74 mt POP ACL)

Alternative 3 is expected to yield the second lowest total groundfish purchases among the 2013 action alternatives. Under Alternative 3, the total value of ex-vessel purchases declines (compared with No Action) by $14.061 million (-15 percent) under Alternative 3A, or $14.255 million (-15.2 percent) under Alternative 3B.

Whiting purchases decrease by $2.296 million (-9.7 percent), and nonwhiting groundfish purchases decrease by $11.765 million (-16.8 percent) under Alternative 3A, or $11.959 million (-17.1 percent) under Alternative 3B. These numbers represent the second lowest purchase levels for both whiting and nonwhiting groundfish species among the 2013 action alternatives.

Alternative 4: Lowest Canary Rockfish ACL and Highest POP ACL (48 mt Canary Rockfish ACL and 247 mt POP ACL)

Alternative 4 is expected to produce the lowest total groundfish purchase levels among the 2013 action alternatives. Compared with No Action, total groundfish purchases decline by $14.698 million (-15.7 percent) under Alternative 4A, or $15.531 million (-16.6 percent) under Alternative 4B.

Whiting purchases decrease by $2.584 million (-10.9 percent), and nonwhiting groundfish purchases decrease by $12.114 million (-17.3 percent) under Alternative 4A, or $12.948 million (-18.5 percent) under Alternative 4B. These numbers describe the lowest purchase levels for both whiting and nonwhiting groundfish species among the 2013 action alternatives.

Alternative 5: Highest Canary Rockfish ACL and Lowest POP ACL (216 mt Canary Rockfish ACL and 74 mt POP ACL)

Projected impacts under Alternative 5 are the same as under Alternative 3 for all commercial groundfish sectors. This is because measures used to manage commercial fisheries to stay within the 76 mt POP ACL and sector HGs under Alternative 5 are the same as those used under Alternative 3. The 76 mt POP ACL is the main factor limiting commercial fisheries under both Alternatives 3 and 5.

Alternative 6: Lower Canary Rockfish ACL and Higher POP ACL (101 mt Canary Rockfish ACL and 222 mt POP ACL)

Alternative 6 is expected to result in the highest total groundfish purchase levels among the 2013 action alternatives. Under Alternative 6, compared with No Action, total groundfish purchases decline by $8.798 million (-9.4 percent) under Alternative 6A, or $8.992 million (-9.6 percent) under Alternative 6B.

Compared with No Action, whiting purchases decrease by $0.110 million (-1.2 percent), and nonwhiting groundfish purchases decrease by $8.689 million (-12.4 percent) under Alternative 6A, or $8.883 million (-12.7 percent) under Alternative 6B. These results describe the highest purchase levels for both whiting and nonwhiting groundfish species among the 2013 action alternatives.

Alternative 7: Higher Canary Rockfish ACL and Higher POP ACL (147 mt Canary Rockfish ACL and 222 mt POP ACL)

Projected impacts under Alternative 7 are the same as under Alternative 6 for all commercial groundfish sectors. This is because measures used to manage commercial fisheries to stay within the 222 mt POP ACL and sector HGs under Alternative 7 are the same as those used under Alternative 6. The 222 mt POP ACL is the main factor limiting commercial fisheries under both Alternatives 6 and 7.

Alternative 8: Higher Canary Rockfish ACL (147 mt Canary Rockfish ACL and 150 mt POP ACL)

Projected impacts under Alternative 8 are the same as under Alternative 1 for all commercial groundfish sectors. This is because measures used to manage commercial fisheries to stay within the 150 mt POP

ACL and sector HGs under Alternative 8 are the same as those used under Alternative 1. Some of the factors that may result in less change in income and jobs under Alternative 8 compared to No Action are discussed in the section on models and data (Section 4.2.1). Low ACLs for the other rebuilding stocks may also limit harvesting opportunities.

Table 4-58. Change from No Action in shoreside processors' groundfish purchases by species group under the 2013-14 integrated alternatives ($1,000).

Alternative:	*No Action*	Alt. 1A	Alt. 2A	Alt. 3A	Alt. Alt. 4A	Alt. 5A	Alt. 6A	Alt. 7A	Alt. 8A
Whiting	*23,650*	-278	-278	-2,296	-2,584	-2,296	-110	-110	-278
Nonwhiting	*69,862*	-8,702	-8,702	-11,765	-12,114	-11,765	-8,689	-8,689	-8,702
TOTAL CHANGE	*93,512*	**-8,980**	**-8,980**	**-14,061**	**-14,698**	**-14,061**	**-8,798**	**-8,798**	**-8,980**
Alternative:		**Pref. Alt / Alt. 1B***	**Alt. 2B**	**Alt. 3B**	**Alt. 4B**	**Alt. 5B**	**Alt. 6B**	**Alt. 7B**	**Alt. 8B**
Whiting		-278	-278	-2,296	-2,584	-2,296	-110	-110	-278
Nonwhiting		-8,895	-8,895	-11,959	-12,948	-11,959	-8,883	-8,883	-8,895
TOTAL CHANGE		**-9,174**	**-9,174**	**-14,255**	**-15,531**	**-14,255**	**-8,992**	**-8,992**	**-9,174**

Note: "A" and "B" identifiers indicate the Nearshore Open Access option included in the action alternatives.
*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of landings between Nonwhiting Trawl and Tribal fisheries sectors, however there are no expected differences in income or employment impacts, as described in the text.

Table 4-59. Change from No Action in shoreside processors' groundfish purchases by species group under the 2013-14 integrated alternatives (%).

Alternative:	No Action	Alt. 1A	Alt. 2A	Alt. 3A	Alt. Alt. 4A	Alt. 5A	Alt. 6A	Alt. 7A	Alt. 8A
Whiting	*23,650*	-1.2%	-1.2%	-9.7%	-10.9%	-9.7%	-0.5%	-0.5%	-1.2%
Nonwhiting	*69,862*	-12.5%	-12.5%	-16.8%	-17.3%	-16.8%	-12.4%	-12.4%	-12.5%
TOTAL CHANGE	*93,512*	**-9.6%**	**-9.6%**	**-15.0%**	**-15.7%**	**-15.0%**	**-9.4%**	**-9.4%**	**-9.6%**
Alternative:		**Pref. Alt / Alt. 1B**	**Alt. 2B**	**Alt. 3B**	**Alt. 4B**	**Alt. 5B**	**Alt. 6B**	**Alt. 7B**	**Alt. 8B**
Whiting		-1.2%	-1.2%	-9.7%	-10.9%	-9.7%	-0.5%	-0.5%	-1.2%
Nonwhiting		-12.7%	-12.7%	-17.1%	-18.5%	-17.1%	-12.7%	-12.7%	-12.7%
TOTAL CHANGE		**-9.8%**	**-9.8%**	**-15.2%**	**-16.6%**	**-15.2%**	**-9.6%**	**-9.6%**	**-9.8%**

Note: "A" and "B" identifiers indicate the Nearshore Open Access option included in the alternatives.
*The Preferred Alternative may differ slightly from Alternative 1 in the distribution of landings between Nonwhiting Trawl and Tribal fisheries sectors, however there are no expected differences in income or employment impacts, as described in the text.

4.2.2.5 Effects on the IFQ Fishery of Alternative ACLs for Widow Rockfish and Pacific Whiting

In addition to the No Action and Preferred ACL alternatives for widow rockfish of 600 mt and 1,500 mt, respectively, the Council is also considering an alternative widow rockfish ACL of 2,500 mt. Results of the 2,500 mt widow rockfish ACL analysis could be applied to any of the seven integrated action alternatives analyzed above. There are also four alternative intersector allocations under each ACL alternative. Widow rockfish are encountered in the Pacific whiting fishery and have also historically been a midwater trawl target species along with yellowtail rockfish. Consequently, in conjunction with the TAC decision that is ultimately adopted for Pacific whiting (in a separate action), the ACL decision for widow rockfish will help determine (1) to what degree the Pacific whiting fisheries, particularly the at-sea catcher-processor and mothership sectors, will be able to harvest their Pacific whiting allocations, and (2) whether the shoreside trawl sector will be able to resume a midwater trawl fishery targeting widow and yellowtail rockfish.

Effects of alternative Pacific whiting TACs on the trawl fishery

Table 4-60 shows a range of possible whiting sector allocations derived from an historical analysis of Pacific whiting harvest limits (OY, U.S. TAC) during 2005-2011. Note that during this entire period widow rockfish was being managed under a rebuilding plan. In addition to the 2011 allocations used for the integrated alternatives, four scenarios are shown including the lowest and highest values observed for each whiting sector during the 2005-2011 period, and two additional scenarios, one derived by subtracting 50 percent from the lowest scenario, and another by adding 50 percent to the highest scenario, respectively. These are based on examination of “final” sector allocations during the 2005-2011 period (i.e., after all in-season reallocations). Consequently the potential sector allocations shown do not necessarily adhere to the Pacific whiting intersector allocation shares specified in the FMP. The whiting sector allocations shown are used (1) to illustrate associated impacts on whiting sector ex-vessel revenues (i.e., the equivalent of what would be paid to catcher vessel operators upon delivery to the processors), and (2) to infer potential ex-vessel revenue impacts generated from a possible renewed shoreside midwater trawl fishery for widow and yellowtail rockfish.

Shoreside sector Pacific whiting allocations shown in Table 4-60 under the alternative U.S. TAC scenarios range from 20,369 mt to 146,204 mt. The highest and lowest final allocations for the shoreside sector were 97,469 mt which occurred in 2005-2006 and 40,738 mt in 2009, respectively. By comparison, the allocation for the shoreside sector under the integrated alternatives is 92,818 mt.

Allocations under the alternative TACs for the whiting mothership sector range from 12,017 mt to 87,131 mt. The highest and lowest final allocations for the sector were 58,087 mt in 2008 and 24,034 mt in 2009, respectively. The allocation for the mothership sector under integrated alternatives is 55,039 mt.

Allocations under the alternative TACs for the catcher-processor sector range from 17,688 mt to 173,684 mt. The highest and lowest final allocations for the sector were 115,789 mt recorded in 2008 and 35,376 mt in 2009, respectively. By comparison, the allocation for the catcher-processor sector under the integrated alternatives is 75,138 mt.

Table 4-61 shows the potential whiting sector ex-vessel revenues associated with the range of Pacific whiting TAC alternatives shown in Table 4-60. Estimated potential revenues under the integrated alternatives are also shown for comparison. Revenues are projected by assuming all sectors take their entire allocation delivered at average 2011 shoreside ex-vessel prices. Ex-vessel revenues for the catcher-processor sector are imputed to represent the equivalent value for the volume of whiting harvested by catcher-processors.

Table 4-61 shows potential ex-vessel revenues for the three combined, non-Tribal commercial whiting sectors ranging from $21.1 million to $98.1 million, compared with a projected level of $53.3 million under the integrated alternatives. Mothership sector revenues under the whiting alternative TACs are shown to range from $2.9 million to $21 million compared with an integrated alternatives level of $12.8 million. Catcher-processor sector revenues under the whiting alternative TACs range from $4.3 million to $41.9 million, compared with $18.1 million under the integrated alternatives. Mothership sector revenues under the whiting alternative TACs are shown to range from $2.9 million to $21 million, compared with $12.8 million under the integrated alternatives.

Shoreside sector revenues under the whiting alternative TACs range from $4.9 million to $35.2 million compared with about $22.4 million under the integrated alternatives. Based on patterns observed in the 2011 fishery, nearly half of the shoreside whiting revenue (48 percent) is projected to derive from landings delivered to the Astoria port group, with Newport projected to receive about 28 percent, and ports on the Washington coast about 22 percent of shoreside Pacific whiting sector ex-vessel revenues.

Effects of alternative widow rockfish ACLs on the trawl fishery

As mentioned above, the widow rockfish ACL will partially determine whether the shoreside trawl sector is able to resume a midwater trawl fishery targeting widow and yellowtail rockfish following the rebuilding of widow rockfish stocks. Another determining factor is the intersector allocation option adopted for widow rockfish. Each commercial whiting sector will leverage its available widow rockfish (and the other bycatch species) to maximize catch up to the sector's Pacific whiting allocation. If, assured that the bycatch requirements of the Pacific whiting harvest will be satisfied, there is sufficient additional widow rockfish quota available to the shoreside sector, then a targeted widow rockfish-yellowtail rockfish fishery may possibly ensue.

Table 4-62 shows potential Pacific whiting catch by the three non-Tribal commercial whiting sectors under the different widow rockfish ACL and intersector allocation options and two sets of assumed widow rockfish bycatch rates: (1) the average widow rockfish bycatch rate over 2005-2011 (during which period widow rockfish was being managed under a rebuilding plan), and (2) the maximum annual bycatch rate observed during that period. Unshaded cells in Table 4-62 indicate that the widow rockfish ACL and sector allocation are not likely to constrain Pacific whiting harvest even under the "Highest plus 50 percent" Pacific whiting TAC option for that sector shown in Table 4-60. Conversely the shaded cells indicate for a specific combination of widow rockfish ACL, intersector allocation and assumed bycatch rate, that the sector may not be able to harvest up to its "Highest plus 50 percent" Pacific whiting TAC option.

One of the main points to note here is that under the higher assumed widow rockfish bycatch rate, the mothership and catcher-processor sectors may become limited by widow rockfish bycatch under all of the widow rockfish ACL and intersector allocation options. However under the average assumed 2005-2011 widow rockfish bycatch rates, only the mothership sector appears to be potentially limited by widow rockfish bycatch under intersector allocation options 2 and 3. The difference in bycatch rates observed between the sectors is thought to be primarily due to the different areas and times of year in which each sectors' fisheries usually occur.

Another implication of this analysis is that Table 4-62 indicates the shoreside whiting sector appears not to be limited by widow rockfish bycatch under both the 1,500 mt and 2,500 mt widow rockfish ACL options. Assuming adequate widow bycatch has been allotted to take the shoreside sector's "Highest plus 50 percent" whiting allocation, Table 4-63 calculates potential maximum harvest and ex-vessel revenue in a directed shoreside widow rockfish-yellowtail rockfish fishery under the range of widow rockfish ACL and intersector allocation options. Table 4-63 shows that assuming the average 2001 widow-yellowtail encounter (landing) rate and 2011 ex-vessel prices, combined landings of widow plus yellowtail rockfish in a directed fishery may have an ex-vessel value between approximately $1.2 million and $2.2 million under the 1,500 mt widow ACL option, and between $2.7 million and $4.2 million under the 2,500 mt widow ACL option (depending on the assumed bycatch rate and intersector allocation).

By way of comparison, PacFIN landings data show that the most recent shoreside widow-yellowtail midwater trawl fishery in 2001 landed approximately 1,700 mt of widow rockfish and 1,500 mt of yellowtail rockfish. At an average ex-vessel price of about $1,000 per metric ton, the total ex-vessel value of these landings was approximately $3.7 million. Landings from that fishery were widely distributed in ports north of 40°10' N. latitude. The greatest share (35 percent) was landed in Astoria, with 15 percent landed in Newport, 15 percent on the Washington coast, 13 percent in Puget Sound ports, 6 percent in Brookings, 6 percent in Eureka, 5 percent in Coos Bay, and 3 percent in Crescent City.

Table 4-60. Range of potential Pacific whiting allocations by sector based on actual annual 2005-2011 final sector allocations compared with values projected under the integrated alternatives (mt).*

	Shoreside Sector		Mothership Sector		Catcher-Processor Sector		Total implied combined commercial whiting sectors' TAC (mt)
ACL Scenario	mt	year	mt	year	mt	year	
Lowest minus 50%	20,369	-	12,017	-	17,688	-	50,074
Lowest	40,738	(2009)	24,034	(2009)	35,376	(2009)	100,148
Highest	97,469	(2005-2006)	58,087	(2008)	115,789	(2008)	271,345
Highest plus 50%	146,204	-	87,131	-	173,684	-	407,019
2011 (Assumed under the Integrated Alternatives)	92,818	(2011)	55,039	(2011)	75,138	(2011)	222,995

* Based on examination of "final" sector allocations each year during the period (i.e., after all in-season reallocations). Note that the potential sector allocations shown do not necessarily adhere to intersector allocation shares in the FMP.

Table 4-61. Potential Pacific whiting sector ex-vessel revenues under the range of Pacific whiting sector allocations compared with values projected under the integrated alternatives ($ million)*

HG Scenario	Shoreside Sector	Mothership Sector	Catcher-Processor Sector	Commercial Whiting Sectors Total
Lowest minus 50%	4.9	2.9	4.3	12.1
Lowest	9.8	5.8	8.5	24.1
Highest	23.5	14.0	27.9	65.4
Highest plus 50%	35.2	21.0	41.9	98.1
2011 (Assumed under the Integrated Alternatives)	22.4	12.8	18.1	53.3

* Assuming average 2011 shoreside ex-vessel prices and all sectors take their entire allocations.
Ex-vessel revenues for the catcher-processor sector represent the equivalent value of raw whiting harvested.

Table 4-62. Projected potential whiting catch at the average and maximum widow bycatch rates for whiting sectors during 2005-2011. *

Widow ACL Alt.	Widow Allocation Option	Projected potential whiting catch (mt) at the average widow bycatch rate			Projected potential whiting catch (mt) at the highest widow bycatch rate		
		Shoreside	MS	CP	Shoreside	MS	CP
600	Option 1 (No Action)	180,936	122,534	356,860	116,063	78,601	171,152
	Option 2	326,037	62,492	181,999	209,140	40,086	87,287
	Option 3	272,836	84,506	246,110	175,014	54,208	118,036
	Option 4	221,780	105,633	307,638	142,264	67,759	147,545
	Option 5	170,725	126,759	369,166	109,513	81,311	177,053
1,500	Option 1 (No Action)	1,017,231	122,534	356,860	652,515	78,601	171,152
	Option 2	1,162,331	62,492	181,999	745,591	40,086	87,287
	Option 3	1,109,131	84,506	246,110	711,465	54,208	118,036
	Option 4	1,058,075	105,633	307,638	678,715	67,759	147,545
	Option 5	1,007,019	126,759	369,166	645,965	81,311	177,053
2,500	Option 1 (No Action)	1,946,447	122,534	356,860	1,248,571	78,601	171,152
	Option 2	2,091,548	62,492	181,999	1,341,648	40,086	87,287
	Option 3	2,038,348	84,506	246,110	1,307,522	54,208	118,036
	Option 4	1,987,292	105,633	307,638	1,274,772	67,759	147,545
	Option 5	1,936,236	126,759	369,166	1,242,021	81,311	177,053

*Highlighted cells show projected potential whiting catch levels that are below the "Highest plus 50%" whiting HG, indicating a potential widow rockfish bycatch constraint under that scenario.

Table 4-63. Potential residual widow and yellowtail rockfish harvest by the shoreside trawl sector after assumed "Highest plus 50%" whiting harvest guideline is taken.*

Widow ACL Alt. (mt)	Widow Allocation Alternative	Using average 2005-2011 whiting-per-widow bycatch rate			Using maximum 2005-2011 whiting-per-widow bycatch rate		
		Widow mt	Yellowtail mt	Revenue $,000	Widow mt	Yellowtail mt	Revenue $,000
600	Option 1 (No Action)	47	40	$86	-	-	$0
	Option 2	241	205	$447	84	72	$156
	Option 3	170	144	$315	39	33	$72
	Option 4	101	86	$188	-	-	$0
	Option 5	33	28	$61	-	-	$0
1,500	Option 1 (No Action)	1,168	994	$2,166	679	578	$1,259
	Option 2	1,362	1,159	$2,526	804	684	$1,490
	Option 3	1,291	1,099	$2,394	758	645	$1,405
	Option 4	1,223	1,040	$2,267	714	608	$1,324
	Option 5	1,154	982	$2,140	670	570	$1,243
2,500	Option 1 (No Action)	2,414	2,054	$4,476	1,478	1,258	$2,741
	Option 2	2,608	2,220	$4,837	1,603	1,364	$2,972
	Option 3	2,537	2,159	$4,704	1,557	1,325	$2,887
	Option 4	2,468	2,101	$4,577	1,513	1,288	$2,806
	Option 5	2,400	2,043	$4,450	1,469	1,250	$2,724

*Note: Assumes average and highest whiting-per-widow bycatch rates observed during 2005-2011, average yellowtail-per-widow landings rates observed in 2001, and 2011 widow and yellowtail rockfish ex-vessel prices.

4.2.2.6 Impacts for Which Socioeconomic Differences among the Alternatives Cannot be Discerned

New Management Measures for Commercial Fisheries

New management measures (i.e., measures not yet designated as routine and implemented through full notice and comment rulemaking) are included in all of the action alternatives for the purpose of analysis. These measures are described in section 2.3, and their performance in relation to management objectives is evaluated in Appendix C. These new management measures are not incorporated into the models used to project ex-vessel revenue, net revenue, income impacts, and employment used in the evaluation of the alternatives in section 4.2.2. The Council considered several new accountability measures, adopting a subset to recommend for implementation, as indicated below. These measures are primarily intended to improve program performance. The anticipated socioeconomic impacts of these proposals are summarized below.

Modifications to the boundaries defining RCAs—Council Preferred

RCA changes are technical improvements to the management program. They will have insignificant socioeconomic effects because, although harvesters may experience somewhat higher costs, these measures allow harvesters access to additional fishing grounds while minimizing the risk that fisheries may be closed due to overfished species bycatch.

Managing ACL set asides—Council Preferred

This measure would allow the ACL set-asides to be redistributed to the trawl and nontrawl sectors in the event the amounts set aside are higher than necessary. In the absence of this measure, amounts set aside for various sectors or activities cannot be redistributed, and thus the opportunity to catch those fish and garner associated revenue and economic impacts is lost. This measure is anticipated to have insignificant beneficial socioeconomic impacts, because in the event of a redistribution, it may increase fishing opportunities.

Sorting requirements for aurora, shortraker, and rougheye rockfish north of 40°10' N. latitude

This measure would require processors (and most likely harvesters) north of 40'10 N. latitude to separate aurora, shortraker and rougheye rockfish catch from the other slope rockfish complex species prior to first weighing, after offloading. This would add costs related to acquiring the expertise needed to identify these species and the labor required to separately weigh these species prior to any further processing.

Catch accounting provisions between limited entry and open access fishery sectors—Council Preferred

This is a technical fix to reinstate a requirement that was inadvertently deleted from regulations. Clarification of the regulations eliminates the risk of "double counting" catch or landings. This measure would have an insignificant beneficial socioeconomic impact, because it reduces the likelihood of the application of unnecessary accountability measures due to incorrect catch accounting.

Clarification of regulatory and FMP language related to catch accounting—Council Preferred

Current offloading requirements for the trawl sector be would be applied to other groundfish fishery sectors to make catch accounting for sector allocations more accurate. This measure would increase costs to harvesters and processors for those sectors where such offloading requirements do not currently apply by reducing their flexibility in business operations. Appendix C also describes a related technical fix to the regulations and the Groundfish FMP that has no environmental effect.

Revising within-trawl allocations of widow rockfish

This measure is evaluated in Section 4.2.2.5.

Revising accumulation limits for the shorebased IFQ fishery

Accumulation limits are intended to prevent the consolidation of large blocks of quota holdings by a small number of controlling entities, and to encourage the distribution of quota among communities. The performance of the accumulation limits for all management units was evaluated to see if they met the IFQ program goals and objectives. As a result, an issue with lingcod accumulation limits was identified. Splitting lingcod into two geographic management units may create an imbalance in quota share holdings and utilization. In order to allow harvesters in each of the two geographic areas the opportunity to harvest up to the original vessel use limit of 3.8% of coastwide lingcod quota pounds, an increase in the vessel use limits would be required. Based on the 2013-2014 ACL and sector allocations, a lingcod vessel use limit of at least 5.3% is required north of 40°10' N. latitude, and at least 13.2% is required south of 40°10' N. latitude. Similarly, the lingcod quota share control limits would need to be adjusted. The coastwide lingcod quota share control limit of 2.5% was originally set as 2/3 of the vessel use limit (i.e., 2/3 x 3.8% ≈ 2.5%). Following the same logic, the lingcod quota share control limits would need to be reset to at least 3.6% north of 40°10’ N. latitude and 8.8% south of 40°10’ N. latitude. Increasing the lingcod accumulation limits to accommodate the division of the coastwide stock into two management units would restore the Council’s original intent and provide greater revenue opportunity for entities controlling or harvesting lingcod quota within either of the two, new lingcod management units.

Specifying a process for determining the carryover of surplus quota pounds from one year to the next in the shorebased IFQ fishery

This measure would establish a process for the Council to make recommendations on the amount of eligible carryover of surplus quota pounds from one year to the next in the IFQ fishery and related accountability measures, so that it would be consistent with MSA conservation requirements. This measure is unlikely to have any direct socioeconomic impact although it would provide a public forum for stakeholders to weigh in on decisions about surplus carryover through the Council process. If implemented, a Council decision-making role could have indirect socioeconomic impacts in terms of the amount of carryover authorized. Allowing a higher surplus carryover would be socioeconomically beneficial because entities would have increased flexibility to optimize harvest of their quota pound holdings.

Remove the lingcod length limit in the shorebased IFQ fishery—Council Preferred

The lingcod size limit is in place mainly to address stock conservation objectives (reducing juvenile mortality). Removing the lingcod size limit will have an insignificant beneficial socioeconomic impact by allowing fish that were previously discarded to be landed. While the Council chose not to remove the length limit for the start of the 2013-14 management period, the Preferred Alternative would allow the change to be implemented at a later time in the management period as a routine (“inseason”) measure.

Threshold for switching from the primary to DTL fishery for sablefish north of 36° N. latitude—Council Preferred

This change in regulations corrects an unanticipated adverse effect of the elimination of regulations for the sablefish DTL fishery in this area. Establishing a 300 pound threshold, substituting for the previous daily limit, will have insignificant beneficial socioeconomic impacts, because it restores the intent of the original regulations and increases inadvertently limited fishing opportunity.

Recreational shelf rockfish retention in the Cowcod Conservation Area—Council Preferred

Four options for this measure are evaluated in Appendix C (including No Action, the 2012 regulatory program). Option 2 is identified as the preferred measure and is carried forward into the integrated action alternatives. Under Option 2 retention of shelf rockfish—excluding bronzespotted, canary, cowcod and yelloweye rockfish—would be allowed when fishing in depths less than or equal to 20 fm in the CCAs when the season is open to fishing for other groundfish species. Recreational fishing ports in Los Angeles, Orange, and San Diego Counties have been adversely affected by the current prohibition on retaining recreationally-caught shelf rockfish in the CCAs. Changing recreational retention limits for shelf rockfish in the CCA would have an insignificant beneficial impact by stimulating additional recreational angling effort in Southern California. An increase in recreational fishing effort is assumed to correlate with the degree that the opportunity to retain fish enhances the recreational experience and therefore motivates greater participation. In public testimony charter vessel owners stated their revenues would increase by $25,000-$50,000 per vessel per year (based on a 10-15 percent increase in revenue) if the measure is implemented. Assuming 140 charter vessels would benefit from this measure, the overall increase in revenue could be as much as $3.5-7 million.

Removing the 10 inch minimum size limit for bocaccio—Council Preferred

The bocaccio size limit is in place mainly to address stock conservation objectives (reducing juvenile mortality). The bocaccio size limit is being eliminated because it is ineffective in meeting its objective, and this change would therefore have an insignificant impact.

Commercial Fisheries Impacts

In modeling ex-vessel revenues, net revenue, and personal income impacts, catch projections (and therefore revenue estimates) for certain sectors do not vary across the alternatives:

- There is no projected change from No Action in groundfish landings by the Incidental Open Access sector, because management measures applying to nongroundfish fisheries (catching groundfish incidentally) do not change under the proposed action.
- Projected landings in the Limited Entry Fixed Gear, Non-nearshore Open Access and Tribal groundfish sectors do not vary under the action alternatives, because the catch projection models for these sectors assume bycatch allowances for incidentally-caught species under the action alternatives are generally sufficient to allow harvesters to achieve their full allocations of sablefish.
- As discussed in section 4.2.1, the same 2011 Pacific whiting U.S. TAC and FMP-defined sector allocations are used for all the integrated alternatives including No Action. For that reason, projected harvests of Pacific whiting in the Tribal and At-sea sectors do not vary across the alternatives. However low ACLs for canary rockfish or POP are anticipated to limit catch opportunity for commercial shorebased whiting vessels under certain action alternatives.

Recreational Fisheries Impacts

No new recreational management measures are proposed for Washington State. Therefore, the same level of recreational fishing effort and related socioeconomic benefits would accrue from fishing off Washington under all the alternatives, including No Action.

4.3 Cumulative Effects

CEQ regulations at 40 CFR 1508.25 identify three types of impacts that must be considered in an EIS: direct, indirect, and cumulative effects. Direct effects are directly related to the action (occurring at the same time and place); for indirect effects there is some intermediate cause-and-effect between the proposed action and the actual effect being evaluated (occurring at a distance in time and/or place). The regulations also define a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or nonfederal) or person undertakes such actions.” Although the regulations and guidance identify cumulative effects as a separate, third class of impacts, all effects can be viewed as cumulative to the extent they are part of some causal chain that results in an ultimate effect on an environmental component. Therefore, to arrive at the final, cumulative effect on an environmental component, the effects in a causal chain are traced out and measured qualitatively or quantitatively, in terms of the metrics that have been identified in this EIS. The phenomena contributing to cumulative effects are baseline conditions (e.g., all relevant past and present actions), reasonably foreseeable future actions (RFFAs), the effects of the proposed action, and any mitigation that is proposed separately from the alternatives. Some of the baseline conditions of the affected environment are described in Chapter 3. Sections 4.1 and 4.2 describe the direct and indirect impacts of the alternatives on fish stocks, fishery sectors, fishing communities, protected species, EFH, and the ecosystem.

4.3.1 The Scope and Types of External Actions and Trends Relevant to the Proposed Action

4.3.1.1 Geographic Boundaries

The analysis of impacts focuses on actions related to the harvest of Pacific Coast groundfish. The core geographic scope for each of the potentially impacted resources is focused on the Eastern Pacific Ocean (section 1.3). The core geographic scopes for the managed resources are the waters of the EEZ off of the coasts of Washington, Oregon, and California. For nongroundfish species, those ranges may be expanded and would depend on the biological range of each individual nontarget species in the Eastern Pacific Ocean. For habitat, the core geographic scope is focused on EFH within the EEZ, but includes all habitat utilized by groundfish and other nongroundfish species in the Eastern Pacific Ocean. The core geographic scope for endangered and protected species can be considered the overall range of these species in the Eastern Pacific Ocean. For human communities, the core geographic boundaries are defined as those U.S. fishing communities directly involved in the harvest or processing of the managed resources, which were found to occur in coastal states from Washington through California (section 3.2.2).

4.3.1.2 Temporal Boundaries

The temporal scope of past and present actions for the potentially affected resources is primarily focused on actions that have occurred after FMP implementation (PFMC 2011b, originally implemented on October 5, 1982). For endangered and other protected resources, the scope of past and present actions is on a species-by-species basis and is largely focused on the 1980s and 1990s through the present, when NMFS began generating stock assessments for marine mammals and sea turtles that inhabit waters of the U.S. EEZ. The temporal scope of future actions for all relevant resources extends five years into the future to provide a reasonable timeframe.

4.3.1.3 Past, Present, and Reasonably Foreseeable Future Actions and Ongoing Trends

Section 4.3 in the 2011-12 Groundfish Harvest Specifications FEIS describes the ongoing and reasonably foreseeable “external actions” and “ongoing trends” that contribute to the effects of the proposed action under the different alternatives to produce a cumulative effect. This information is incorporated by reference and summarized here with respect to actions and trends with continuing effects in 2013 and beyond.

Fishing-related Actions (including Past, Present, and Reasonably Foreseeable Future Actions)

<u>Past and future harvest specifications</u>. Groundfish fisheries are managed to prevent total catch exceeding ACLs, which are set at or below the ABC and therefore represent a precautionary reduction from the overfishing limit to account for scientific uncertainty and to rebuild overfished and other stocks whose biomass is below the MSY target level (or its proxy). The policy objective is to attain or maintain MSY over the long term, which depends on the continuous reapplication of ACLs during past, present, and future biennial management cycles. Harvest specifications also indirectly control the amount of fishing effort expended in regulated fisheries and the distribution of effort among groundfish sectors and gear

types through the allocation of fishing opportunity. This indirectly affects EFH and the relative level of protected species take, due to the differential effects of different gear types.

Nongroundfish fisheries. Other fisheries contribute to mortality of environmental components also affected by groundfish fisheries, particularly protected species. (Catch of groundfish in nongroundfish fisheries is regulated and accounted for through the biennial management process and therefore directly affected by the proposed action.) Adverse impacts from other gear types may also combine with impacts to EFH from groundfish gear. Fishery removals from all sources also have long-term effects on the trophic structure of the California Current ecosystem.

Section 7 consultation on the Groundfish FMP pursuant to the ESA. NMFS NWR Sustainable Fisheries Division consulted with the Protected Resources Division to determine if fishing authorized under the Groundfish FMP is likely to jeopardize the continued existence of any species listed under the ESA in 2012 (NMFS 2012). This consultation concluded that operation of the groundfish fishery in 2012 is not likely jeopardize the continued existence of ESA-listed species found in the action area or result in the destruction or adverse modification of designated critical habitat. NMFS is in consultation on the operation of groundfish fisheries for 2013 and beyond, which will be concluded prior to implementation of the proposed action. NMFS is also consulting with the USFWS on the effects of operation of the fishery on listed species under USFWS jurisdiction. If either of these consultations reaches a jeopardy determination then changes to the proposed action would need to be implemented in order to avoid jeopardizing the listed species. Past consultations have been done for the groundfish trawl fishery with respect to ESA-listed Chinook salmon ESUs. A bycatch threshold of 11,000 Chinook salmon was established for trawl fisheries targeting Pacific whiting; exceeding the threshold in any one year one year may trigger re-initiation of consultation. (No equivalent threshold has been established for nonwhiting groundfish trawl, because the level of take in this fishery has not yet been determined to be an ESA issue.)

Catch share management. IFQ and co-op management in trawl sectors were implemented at the beginning of 2011, based on Groundfish FMP Amendment 20. Regulatory changes to improve program performance and implement cost recovery provisions allowed for in the MSA are ongoing. A regulatory package was implemented on January 1, 2012, and comparable regulatory packages will likely be implemented in future years. The current moratorium on quota share trading is scheduled to expire at the beginning of 2013. However, this moratorium may be extended and further modifications may be made in response to recent litigation (Pacific Dawn, LLC, v. Bryson, Case No. C10-4829 THE, N.D. Cal. 2011). In response, the Council is reevaluating initial allocations of catch shares of Pacific whiting in the shorebased IFQ program and in the at-sea mothership/catcher vessel sector. Any reallocation of catch shares must occur by the start of the 2013 fishing year. The shoreside IFQ fishery may now use any legal groundfish gear (previously they were restricted to using only trawl gear). Although trawl gear is likely to remain the dominant gear type, harvesters may increasingly use fixed gear in certain areas and time periods. Coincident with catch share management, fixed allocations between the IFQ and whiting co-op fisheries and other nontrawl groundfish fisheries were established. This makes it easier to determine QP and co-op share distributions during each management period, but also reduces the scope of decision-making about fishing opportunity among different sectors of the fishery. Cost recovery measures and the end of subsidies to pay for observer coverage in the IFQ fishery will shift some costs from government to fishery participants.

Non-Fishing Actions (including Past, Present, and Reasonably Foreseeable Future Actions)

Non-fishing activities that introduce chemical pollutants, sewage, changes in water temperature, salinity, dissolved oxygen, and suspended sediment into the marine environment pose a risk to all of the identified resources. Human-induced non-fishing activities tend to be localized in nearshore areas and marine project areas where they occur. Examples of these activities include, but are not limited to agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging, and the disposal of dredged material. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of groundfish species, nongroundfish species, and protected species. Decreased habitat suitability would tend to reduce the tolerance of these resources to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities. The overall impact to the affected species and their habitats on a population level is unknown, but likely neutral to low negative, since a large portion of these species have a limited or minor exposure to these local nonfishing perturbations.

In addition to guidelines mandated by the MSA, NMFS reviews these types of effects through the review processes required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by Federal, state, and local authorities. The jurisdiction of these activities is in "waters of the U.S." and includes both riverine and marine habitats.

For many of the proposed nonfishing activities to be permitted under other Federal agencies (such as beach nourishment, offshore tidal and wind power facilities, etc.), those agencies would conduct examinations of potential impacts on the resources. The MSA (50 CFR 600.930) imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH. The eight Regional Fishery Management Councils are engaged in this review process by making comments and recommendations on any Federal or state action that may affect habitat, including EFH, for their managed species and by commenting on actions likely to substantially affect habitat, including EFH.

In addition, under the Fish and Wildlife Coordination Act (Section 662), "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatsoever, including navigation and drainage, by any department or agency of the U.S., or by any public or private agency under Federal permit or license, such department or agency first shall consult with the USFWS, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular state wherein the" activity is taking place. This Act provides another avenue for review of actions by other Federal and state agencies that may impact resources that NMFS manages in the reasonably foreseeable future.

In addition, NMFS and the USFWS share responsibility for implementing the ESA. The ESA requires NMFS to designate "critical habitat" for any species it lists under the ESA (i.e., areas that contain physical or biological features essential to conservation, which may require special management considerations or protection) and to develop and implement recovery plans for threatened and endangered species. The ESA provides another avenue for NMFS to review actions by other entities that may impact endangered and protected resources whose management units are under NMFS' jurisdiction.

Ongoing Trends

Change in the use of ocean areas. Habitat protection measures (e.g., MPAs) and offshore energy projects (e.g., wind and wave power) could further limit the area open to fisheries.

Changes to coastal economies and land use. Increasing population and rising living standards can increase demand for nonfishery-related economic activities and land use in coastal areas. This may increase costs to fishery participants for shoreside infrastructure such as dock space.

Changing demand affecting real prices. Population growth and rising living standards globally are likely to increase demand for fishery products. This could lead to price increases unless aquaculture increases supply at lower cost than wild-caught fish (and consumers consider the two products substitutable). Higher ex-vessel prices would benefit harvesters while higher wholesale prices (depending on changes in ex-vessel prices) would benefit processors.

<u>Increased consumer awareness affecting purchasing decisions</u>. Certification and consumer awareness programs may affect buying decisions. Consumers may become more aware of or form opinions about how effectively a fishery is managed both in terms of the status of target stocks and the effect of a particular fishery on other resources (e.g., protected species). Consumer awareness may have a marginal effect on demand for specific products (based on source) over the long term.

<u>Changes to stock productivity due to climate forcing or other environmental factors</u>. Stock productivity determines whether a given level of fishing mortality allows a stock to remain at or achieve MSY, but is not under human control. Harvest rates in rebuilding plans account for productivity, but this may change over time due to environmental factors. Periodic stock assessments usually indicate a need to change harvest rates based on stock status. Although policy and practice is to prevent overfishing, undetected changes in stock productivity (due to ocean regime, for example), change in understanding or estimates of stock reference points (e.g., unfished biomass), or assessment of previously unassessed stocks could reveal that overfishing has occurred and catch must be reduced to rebuild the stock and maintain it at the target biomass (B_{MSY} or proxy).

<u>Cyclical and ongoing climate change</u>. Cyclical events (e.g., El Niño-Southern Oscillation, Pacific Decadal Oscillation) and long-term climate change affect the relative productivity of different marine organisms with attendant ecosystem effects. As discussed above, such changes can also affect the allowable level of catch under harvest specifications; it can also influence the relative impact of fisheries on protected species and other ecosystem components (because a less productive stock will be relatively more adversely affected by a given level of fishery take, for example).

4.3.2 Evaluation of the Cumulative Impacts of the Proposed Action

It is not possible to determine if the external actions and ongoing trends described above would differentially affect the alternatives evaluated in this EIS. While the resulting cumulative impact could be greater in intensity and scope, it is likely that any resulting increase in impacts would correlate with the differences between the alternatives with respect to direct and indirect impacts disclosed and evaluated in in this EIS. Furthermore, some types of impacts which could be reasonably classified as cumulative cannot be separated from the discussion of direct and indirect impacts. The best example of this situation is the rebuilding of overfished species. Short-term measures in 2013-14 (ACLs, management measures) are tied to the long-term policy objective (the target year), which represents the cumulative effect of applying harvest policies over multiple biennial cycles. For other biological resources (e.g., nonoverfished groundfish, other fish, protected resources, EFH) the same general concept applies: impacts to resources—measured by population status for example—can only be discerned over a longer time period in relation to policy benchmarks (e.g., MSY, “no jeopardy”). To a greater or lesser degree, this is the case when managing any renewable resource where measures are tied to long-term objectives (yield, population status, system structure). For this reason, the cumulative effects analysis below describes how the external actions and trends enumerated above interact with the environmental components evaluated in this EIS. Then in section 4.4 the alternatives are evaluated with respect to combined direct, indirect, and cumulative effects. (This is also consistent with viewing cumulative impacts as the overall, combined effect of various causal factors.)

4.3.2.1 Biological Resources

Groundfish Species

A key policy objective of the Groundfish FMP (and the MSA) is to achieve OY, which the FMP describes as "a decisional mechanism for resolving the Magnuson-Stevens Act's multiple purposes and policies, implementing an FMP's objectives and balancing the various interests that comprise the national welfare" (Groundfish FMP Section 4.1). Harvest specifications and management measures are an integrated mechanism for constraining fishing mortality as necessary to achieve OY over the long term. ACLs and related management measures in a given biennial period are relevant in terms of their effect on stock status over longer time periods. Achieving OY involves monitoring stock characteristics (fishing mortality, recruitment, etc.) and formally assessing stocks where the data are available. The management framework is adaptive such that the receipt of new information informs decisions about setting harvest limits in future years through each biennial harvest specifications cycle.

Stock rebuilding (whether through an overfished species rebuilding plan or appropriate harvest rates for stocks below B_{MSY}) must account for or adjust to cumulative effects since fishing mortality and stock productivity over time periods longer than the current biennial management cycle affect stock size. Overfished species ACLs for the current management period are evaluated in the context of a long-term strategy based on a target rebuilding year objective. Consistent with the adopted strategy (i.e., an SPR harvest rate) and objective (target year), proposed overfished species ACLs are explicitly related to past harvest specifications (and resulting fishing mortality) and future harvest specifications (and assumed fishing mortality), representing the cumulative effects of all these actions. In principal, this process accounts for all fishing mortality (not just that from directed groundfish fisheries). However, broad environmental trends also affect stock status in combination with fishing mortality. Although the current state of science is advanced to better model potential effects of climate, the information is not operationalized to formally integrate such future trends as the effect of climate forcing on stock productivity into formal stock assessments, except in limited cases. From a stock assessment perspective, natural mortality accounts for all of these effects (in other words, all sources of mortality other than fishing) but is not estimated by explicitly accounting for these sources of mortality. Rather, it is usually indirectly estimated from estimates of the age structure of the population and age-specific fishing mortality.

The MSA requires councils to "specify a time period for rebuilding" (sec. 304(e)(4)(A)); this mandate is translated into the identification of a target year (T_{TARGET}) and associated fishing mortality rate (constant SPR harvest rate) estimated to result in the stock biomass reaching the target biomass in that year. Periodically, new information from stock assessments indicates that the current harvest rate policy will not meet the target year objective, in which case it must be changed. This is an ongoing process implemented through successive management cycles. For that reason the principal concern, and impact on the stock, is the cumulative effect of harvest limits (and associated fishing mortality) over the entire rebuilding period, and whether the stock will be rebuilt by T_{TARGET}.

The 2011-12 Groundfish Harvest Specifications FEIS (PFMC and NMFS 2011) describes the risk of altering the genetic structure of local groundfish populations due to local depletion from fishing or the age-specific selectivity of fisheries. Changing population genetic structure is the result of the cumulative application of harvest limits and the resulting fishing mortality. This is primarily a concern for depleted stocks, if changes in genetic structure alter productivity or overall fitness. There is no new information to determine how the alternatives evaluated for the 2013-14 management period would contribute to this cumulative effect. The information presented in the 2011-12 Harvest Specifications FEIS is incorporated by reference and described here. That analysis reached the following conclusions on the genetic structure effects on overfished stocks:

- Bocaccio south of 40°10 N. latitude: There is little evidence for geographic differences in the genetic structure of this population, and fishing patterns are unlikely to affect overall population genetic structure.
- Canary rockfish: There is no evidence of geographic difference in the genetic structure of this population, and fishing patterns are unlikely to affect overall population genetic structure.
- Cowcod south of 40°10 N. latitude: A recent study suggested some separation of the population at Point Conception, California, but there is insufficient information to confirm genetic differences at the population level.
- Darkblotched rockfish: There is no information on geographic differences in the genetic structure of the population.
- Petrale sole: Larvae of this species are well-dispersed by currents and it is unlikely that fishing patterns would affect the genetic structure of the population.
- Pacific ocean perch: There is no information on the genetic structure of this stock.
- Widow rockfish (now rebuilt to target biomass): There is no information on the genetic structure of this stock.
- Yelloweye rockfish: There are some data suggesting that the population in Puget Sound, Washington, is genetically different from the population in the PFMC management area.

The 2011-12 Groundfish Harvest Specifications FEIS (PFMC and NMFS 2011) evaluates the effect of fishing on predator-prey relationships for overfished species. The effect of the proposed action on predator-prey relationships results from cumulative application of harvest specifications and management measures over more than one management cycle. No new information is available to determine how the range of alternatives for the 2013-14 management cycle would affect predator-prey relationships. The information in the 2011-12 Groundfish Harvest Specifications FEIS is incorporated by reference and briefly summarized here.

- Bocaccio south of 40°10 N. latitude: Juvenile and adult bocaccio are eaten by a variety of other fish species.
- Canary rockfish: Canary rockfish are eaten by lingcod, whose population has been increasing.
- Cowcod south of 40°10 N. latitude: Because cowcod are rare, they are unlikely to be an important prey species. The effect of the proposed action on cowcod as prey is unknown.
- Darkblotched rockfish: Pelagic young darkblotched rockfish are known to be prey for Chinook salmon and albacore. There is no evidence that darkblotched rockfish are a uniquely important prey item.
- Petrale sole: Eggs and larvae are eaten by planktivorous invertebrates and pelagic fishes. Juveniles are preyed upon by adult Petrale and other flatfish. Adults are prey for a variety of fishes and demersally feeding marine mammals.
- Pacific ocean perch: Pelagic juveniles are eaten by salmon and benthic juveniles are eaten by lingcod and other large demersal fish. Adults are eaten by sablefish, Pacific halibut, Pacific cod, and arrowtooth flounder.
- Widow rockfish (now rebuilt to target biomass): No information.
- Yelloweye rockfish: Yelloweye rockfish are eaten by lingcod, whose population has been increasing.

Section 4.1.1.5 in the 2011-12 Harvest Specifications FEIS (PFMC and NMFS 2011) presents information on the role of juvenile rockfish as prey for seabirds. It concludes that fishery removals have a limited effect on prey availability compared to environmental factors.

The 2011-12 Groundfish Harvest Specifications FEIS concludes that fishing mortality, across the range of ACLs considered, is unlikely to affect the availability of these species as prey in the short term. Since the 2013-14 ACLs under consideration are similar, the same conclusion is reasonable for the effects of the proposed action. Over the long-term these populations will increase under the Groundfish FMP's OY management framework, which should increase their availability as prey. There is not enough information to determine the effect of changes in food availability on these species' fitness.

Nongroundfish Species

Groundfish fisheries catch various nongroundfish species, for the most part in small amounts compared to groundfish management unit species. Generally, the same management objectives apply as described above for groundfish and cumulative effects to nongroundfish stocks result from the combined and ongoing effect of all sources of fishing mortality, along with environmental influences such as the effects of climate forcing on stock productivity. However, since those species that are not groundfish management unit species, and are not directly managed under the Groundfish FMP, different authorities are applied to address stock conservation objectives.

Pacific halibut receives the most attention as a nongroundfish species caught incidentally in groundfish fisheries because of their importance to commercial and recreational fisheries that target them. Pacific halibut are managed by the IPHC and the west coast is part of management area 2A. The IPHC periodically sets a catch limit (called a TAC) for the management area, consistent with management objectives. A catch sharing plan allocates harvest opportunity among target fisheries while accounting for bycatch in other fisheries, where retention is prohibited. Bycatch in the shoreside IFQ fishery is constrained by IBQ, which is similar to IFQ except that it is credited against bycatch mortality. Retention is generally prohibited in commercial groundfish fixed gear fisheries, except in limited circumstances. The catch sharing plan accounts for this bycatch mortality with respect to directed fishery allocations.

Incidental catch of Pacific halibut in groundfish fisheries is accounted for under the IPHC's CEY policy framework.

Marine Ecosystem including EFH

The California Current Large Marine Ecosystem may be described in terms of the web of trophic relationships and environmental influences on system conditions. As described above, the 2011-12 groundfish harvest specifications FEIS (PFMC and NMFS 2011) summarized information on predator-prey relationships and concluded that fishery removals have insignificant effects. Fishing gear can adversely affect EFH and periodic harvest specifications, management measures, and related regulations authorize fishing for groundfish, contributing to any long-term effects that result from the adverse impacts of fishing gear. The EIS for groundfish FMP Amendment 19 evaluated adverse impacts to EFH resulting from fishing, and the amendment implemented a variety of mitigation measures. Past harvest specifications EISs (PFMC 2002; PFMC 2003; PFMC 2004; PFMC 2006; PFMC 2008a; PFMC and NMFS 2011) have evaluated the effects of fishing on EFH. The Council is currently conducting a 5-year review of the current EFH designation and mitigation measures implemented through Amendment 19. Through this process the Council may propose new or different measures in response to any new scientific information identified through this review process.

Currently, no models have been developed to forecast the long-term effect of particular harvest management policies on EFH. Very generally, the effects are expected to correlate with the intensity and distribution of fishing by gear type. Trawl gear is likely to adversely affect EFH more than fixed gear. However, mitigation measures implemented through Amendment 19 (gear restriction and gear-specific closed areas) are intended to address the adverse impact from trawl gear. In addition, although their objective is not to mitigate habitat impacts, trawl RCAs likely have some ancillary mitigation effect, because they close areas to fishing. Although the extent of the RCAs has varied by year and bimonthly period within years, there is a core area that has been continuously closed since their implementation in 2003 (generally between 100 and 150 fm).

Protected Species

The Biological Opinion referenced above (NMFS 2012) discusses cumulative effects to ESA-listed species as consequence of operation of the fishery in 2012. Although the operation of the fishery in 2013-14, as regulated by the proposed action, may result in cumulative effects that are different in scope and intensity, there is no information to determine what these differences may be. For that reason the cumulative effects analysis in the 2012 Biological Opinion is incorporated by reference and summarized here.[41] Many of the cumulative impacts are related to, or represent the ongoing effects of, activities described in the biological opinion environmental baseline. The environmental baseline describes federally authorized activities affecting listed species as well as nonfederal activities. Contributors to cumulative impacts are:

- Bycatch in fishing gear (eulachon, green sturgeon)
- Entrapment and entanglement in fishing gear (humpback whale, stellar sea lion, leatherback sea turtle)
- Ship collisions (humpback whale)
- Acoustic disturbance (humpback whale)
- Prey availability due to fisheries harvest (humpback whale)
- Subsistence harvest (stellar sea lion)
- Ingestion of marine debris (leatherback sea turtle)
- Marine pollution
- Adverse effects to designated critical habitat of listed species

ESA-listed seabirds are also known to be hooked or entangled in fishing gear. The effect of the groundfish fishery on these species is the subject of a pending consultation between NMFS and USFWS.

Marine mammals not listed under the ESA are protected under the MMPA. The MMPA prohibits directed take of marine mammals, but incidental take may be authorized. Pursuant to the MMPA, NMFS Protected Resources Division periodically prepares stock assessment reports, which include benchmarks consistent with statutory requirements. Commercial fisheries are put into one of three categories depending on their effect on marine mammals. Annually NMFS publishes a List of Fisheries containing these classifications; the WA/OR/CA sablefish pot fishery is listed as a category II fishery due to interactions with humpback whales in the 2012 List of Fisheries (see section 6.3.3 for further discussion).

4.3.2.2 Socioeconomic Components

Fishery Sectors

Generally, for harvesters a variety of external factors affect costs and revenues, which determine financial profits. The discussion of cumulative impacts in the 2011-12 Groundfish Harvest Specifications FEIS

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[41] Note, however, that cumulative effects are defined somewhat differently under the ESA than under NEPA. As described in the biological opinion "'Cumulative effects' are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. For purposes of this analysis, the action area includes all marine waters of the U.S. west coast EEZ."

describes factors affecting costs and revenues. On the revenue side, harvest opportunity and real prices determine overall revenues. Ex-vessel prices for many target species have been increasing recently (Figure 3-2). Costs for many inputs, especially fuel, have also increased over time (Figure 3-3). These general trends in prices have not changed significantly since the previous EIS was prepared.

The implementation of catch share management in the groundfish trawl sectors is an important external action that has been discussed extensively in previous EISs. IFQ management in the shoreside fishery may allow greater flexibility to time fishing activities based on revenue opportunities. (For example, the Dungeness crab fishery is the largest West coast fishery by revenue and is fairly seasonal. Operators could stage participation in the IFQ fishery around opportunities to participate in the crab fishery.) IFQ management is also expected to favor more efficient operators (because they can use excess profits to purchase QP or QS) resulting in fewer participants in this sector. Individual accountability encourages harvesters to avoid overfished species, whose low ACLs have traditionally constrained overall harvest opportunity. As a result, target species allocations are more likely to be fully attained (depending on market demand) and as a result may become the primary constraints on overall fishing opportunity. For example, in 2011 under IFQ management, 93 percent of the allocation for sablefish, which accounts for about half of total groundfish ex-vessel revenue, was harvested while the average attainment rate for overfished species other than petrale sole (which is a target species) was 22 percent.

The discussion of cumulative impacts in the 2011-12 Groundfish Harvest Specifications FEIS reviews historical revenue trends in groundfish fisheries. Generally, total revenue (adjusted for inflation) declined substantially when comparing the years after 1997 to previous years, mainly due to regulatory constraints imposed to rebuild overfished stocks. However, total groundfish ex-vessel revenue has increased modestly from a low point of $50.6 million in 2002 to $67.5 million in 2010.

The states of California and Oregon are currently designating MPAs in state waters. This may have a moderate impact on access to fishing grounds for nearshore fisheries.

Communities

The historical revenue trends described in the 2011-12 Groundfish Harvest Specifications FEIS have affected coastal economies along with trends in other economic sectors and the economy at large. At the national level the financial crisis beginning in 2008 has had a pervasive impact on income and employment. Rural counties, such those on the Washington Coast, Southern Oregon, and Northern California may be relatively more affected by local economic trends. Some coastal economies, particularly in Southern Oregon, have been adversely affected economically by the long-term decline in timber harvests. However, the natural amenities in coastal areas attract tourists and retirees, who generate revenue for various—primarily service—economic sectors.

4.4 Summary of the Direct, Indirect, and Cumulative Impacts of the Alternatives

4.4.1 Methods Used to Summarize Impacts

Where differential impacts across the alternatives can be discerned, they are discussed in section 4.4.2. For some environmental components it is not possible to tell how they would be affected differently across the alternatives because there is insufficient information to project these types of effects, the differences among the alternatives are not great enough to produce contrasting effects, or the effects are not of sufficient magnitude to identify them. Section 4.4.3 discusses these effects. In these cases, effects that occurred during the baseline period have been described in Chapter 3, and the likelihood of similar effects under the proposed action evaluated in Chapter 4. This information is summarized here.

Methods used to summarize the effects of the alternatives on groundfish, groundfish fisheries, and fishing communities are described below.

4.4.1.1 Groundfish

Are the ACLs consistent with the Groundfish FMP's OY harvest management policies, including being based on the best available science? If not, does the ACL exceed the value determined using the best available science? For rebuilding species is the target year consistent with MSA §304(e)(4)?

One way to evaluate the target year proposed for a rebuilding plan is how many years beyond $T_{F=0}$ (zero harvest) the target year is for each rebuilding species and, for comparison, what this represents as a percentage of the time (or the number of years) between $T_{F=0}$ and T_{MAX}. (See Table 4-64; the percentages are in parenthesis after they years beyond $T_{F=0}$ value. For alternatives that have the same target year for the species the percent is not repeated). A smaller value can be equated to "faster" rebuilding and used to consider the tradeoff established in MSA §304(e)(4) between rebuilding in a time "as short as possible" while, among other things, taking into account the "needs of fishing communities." These percentages normalize the target year consideration across rebuilding species that have different time periods between $T_{F=0}$ and T_{MAX}. The values can then be used to rank the alternatives according to the sum of these normalized percent values. These rankings in essence show to what degree policies are addressing the "as short as possible" part of the MSA equation. The No Action alternative cannot be compared for these two stocks' rebuilding objectives because the target years for canary rockfish and POP are not feasible. A constant catch policy could be assumed for No Action, meaning that the 2012 ACL would be carried forward in future years until the stock is rebuilt. However, since the Council has adopted a constant harvest rate policy for stock rebuilding, the rebuilding analyses don't estimate the target year (or median year to rebuild) for constant catch. Of course, these rankings of target year must be weighed against socioeconomic costs ("needs of fishing communities"). Using this technique for the two rebuilding species where the target year varies across the action alternatives (canary rockfish and POP), the alternatives rank as follows:

- The Preferred Alternative, Alternative 1 and Alternative 8 rank 4th
- Alternative 2 ranks 3rd
- Alternative 3 ranks 1st
- Alternative 4 ranks 7th
- Alternative 5 ranks 2nd
- Alternative 6 ranks 5th
- Alternative 7 ranks 6th

A caveat of these rankings is that they don't take into account the conservation-socioeconomic tradeoff, because different overfished species have different tradeoffs between short-term benefits (the size of the ACL) and any conservation benefits realized by rebuilding the stock sooner. This is illustrated in Figure 4-28, which plots, for canary rockfish and POP, the ACLs considered in the integrated alternatives against the percentage of the time between $T_{F=0}$ and T_{MAX} represented by the corresponding target year . The information for this plot comes from Table 2-10. It can be seen that the slope of the line for canary is generally shallower than that for POP, indicating that comparatively larger increases in the ACL can be made relative to the tradeoff in lengthening the rebuilding time. Across this range of ACLs (48-216 mt), each 1-year delay in the target year realizes, on average, 55 mt of canary rockfish while for the range of POP ACLs (74-247 mt) the average is only 14.5 mt. Of course this relationship is not linear, so the average gains in short-term benefits (increase in the ACL) against long-term costs (delay in the target year) are different from one ACL option to the next.

Table 4-64. Number of years the target year is beyond $T_{F=0}$ and percentage of $T_{F=0}$–T_{MAX} rebuilding period.

	No Action	Pref. Atl. / Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Bocaccio	2 (17%)								
Canary		2 (9%)	1 (5%)	2	0	4 (18%)	1	2	2
Cowcod	8 (22%)								
Darkblotched	1 (5%)								
POP		8 (29%)	8	3 (11%)	17 (61 %)	3	14 (50%)	14	8
Petrale	0								
Yelloweye	21 (55%)								

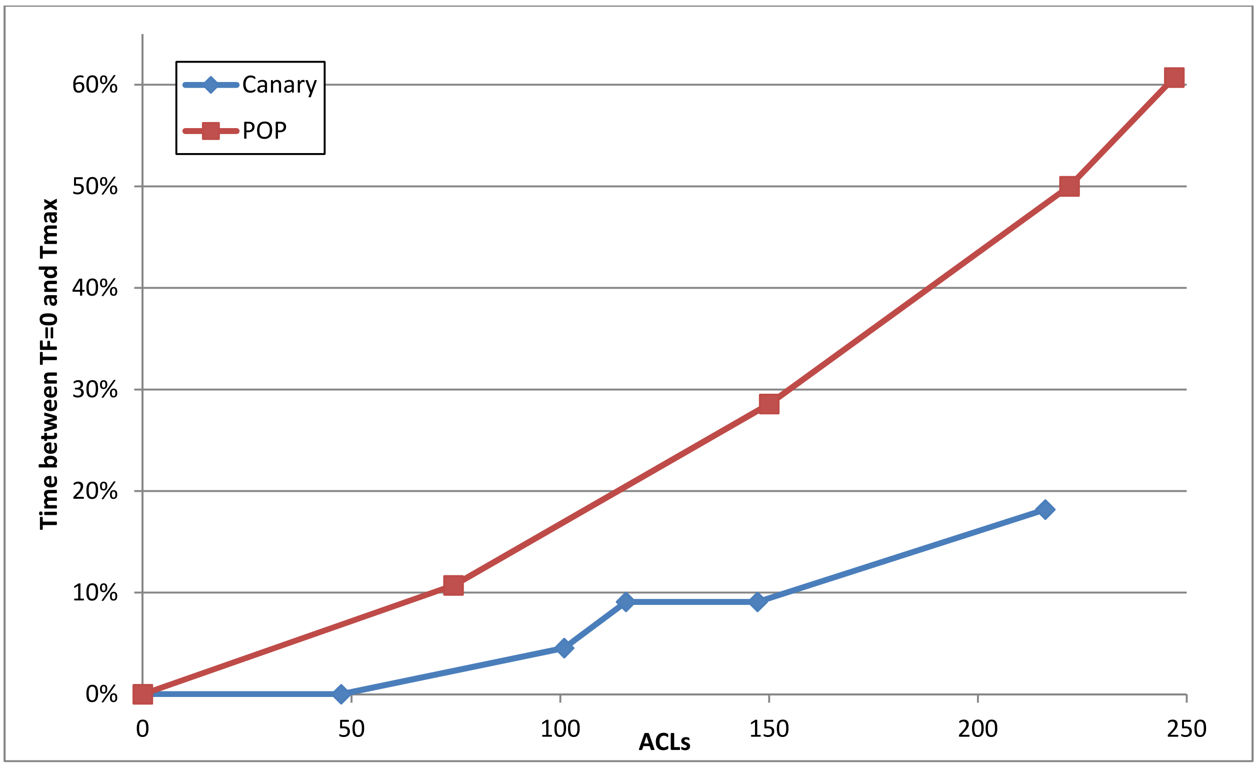

Figure 4-28. Relationship between ACL and target year (as percent of $T_{F=0}$–T_{MAX} rebuilding period) for canary rockfish and POP across the range of ACLs considered in the integrated alternatives.

4.4.1.2 Nongroundfish

It is not possible to distinguish among the alternatives in terms of differential effects, but impacts to nongroundfish are likely to be similar to those that have occurred during past management cycles. Impacts are likely insignificant to negligible.

The effects of the proposed action on nongroundfish fish species are negligible because fishing mortality is modest and, for many species, accounted for through other Federal and state management programs. As a result, if fishing mortality in groundfish fisheries increased to a level to trigger a conservation concern, management measures would be implemented through these programs. Nongroundfish catches are not projected in current models so it is not possible to distinguish among the alternatives in terms of differential effects. Impacts are likely to be similar to those that have occurred during past management cycles.

4.4.1.3 Marine Ecosystem including EFH

What is the spatial extent of the RCAs among the alternatives and the related mitigating effect on the adverse impacts of fishing on EFH?

As noted previously, currently there are no methods to project the distribution of fishing effort as affected authorized under past, present and reasonably foreseeable future harvest specifications, or the intensity of resulting impacts to EFH. Past EISs (PFMC 2004; PFMC 2006; PFMC 2008a; PFMC 2010b; PFMC and NMFS 2011) have evaluated impacts by describing the distribution of different habitat types and using catch as a proxy for the distribution of fishing effort. In this EIS the size and configuration of RCAs is used as a proxy, based on the assumption that a reduction in fishing activity inside RCAs accordingly reduces impacts to habitat.

Ecosystem impacts may correlate with changes in the size and structure of fish populations due to fishing authorized under past, present, and reasonably foreseeable future harvest specifications, which could affect trophic relationships. Environmental forcing (cyclical and long-term climate change) has a much greater effect on ecosystem structure. As summarized in section 4.3.2.1, the FEIS for the 2011-12 harvest specifications (PFMC and NMFS 2011) concluded that the effects of fishing authorized under the proposed action are insignificant.

4.4.1.4 Protected Species

How does the proposed action affect the level and spatial distribution of fishing effort, assuming higher levels, especially in preferential habitat for protected species, correlates with takes.

Models and methods to predict the level and distribution of fishing effort are not currently available, nor is its correlation to protected species take. General inferences may be based on an assumed positive correlation between catch limits and fishing effort and the size and configuration of area closures (e.g., RCAs) that differ under the alternatives. However, the similarity in harvest specifications and the management measures across the alternatives make it difficult to differentiate between the alternatives in terms of effects to these resources. NMFS is conducting an ESA section 7 consultation on the operation of the Pacific coast groundfish fishery in 2013 and beyond. The Fish and Wildlife Service is also consulting on the effects of the fishery on listed seabirds (primarily the short-tail albatross). Discretionary or mandatory mitigation measures may be identified as part of these processes to avoid jeopardizing the continued existence of listed species or to minimize take occurring in the action area.

4.4.1.5 Groundfish Fisheries and Fishing Communities

What is the relative magnitude of the change in ex-vessel revenue and net revenues from No Action? How are impacts distributed across fishery sectors?

What is the relative magnitude of the change in personal income and employment from No Action? Are certain communities disproportionately affected? What is the effect on communities that are especially vulnerable to adverse socioeconomic impacts?

Table 4-65 shows the ranking of each alternative with respect to the change in ex-vessel revenue from No Action. The alternatives were ranked for each shoreside fishery sector (i.e., across the row). (Revenues in the at-sea sectors were the same across all the action alternatives, based on the 2011 Pacific whiting ACL.)

Coastwide, No Action ranks first. The Preferred Alternative and Alternative 1 rank third.

Potentially disproportionate impacts to community groups are considered by identifying cases where the percent change in combined commercial and recreational income impacts from No Action (taken from Table 4-50) is greater than one standard deviation below the mean (adverse impact) or one standard deviation above the mean (a relatively beneficial impact). By using percent change, the relative magnitude—rather than the actual magnitude in dollars—of the change in income impacts is considered. Put another way, a community group historically receiving a comparatively small amount of income from groundfish fishing could show a relatively large impact in terms of the change from No Action.

The results show that the proportional fall in income is more than one standard deviation below the mean for the Puget Sound community group under all the alternatives and Astoria-Tillamook under Alternative 4 (this evaluation just looks at the "A" sub-alternative under each alternative). Using this metric, under all the action alternatives Puget Sound is disproportionately adversely affected, with declines in income from No Action ($2.4 million in personal income from groundfish annually) between 21 and 26 percent. Under Alternative 4 Astoria-Tillamook is also disproportionately adversely affected, with the decline from No Action ($28.9 million) of 21 percent. Under all the action alternatives Santa Barbara-Los Angeles-San Diego shows a relatively large beneficial impact with essentially no change from No Action (under which $52.2 million in groundfish personal income annually is estimated). Santa Cruz-Monterey-Morro Bay shows a gain in personal income from No Action ($14.0 million) under all the alternatives except Alternative 4, which would result in a decline in personal income for this community.

Table 4-66 shows the primary fishery in each community group (with a plus "+" sign indicating that the primary fishery accounts for more than 50 percent of total groundfish ex-vessel revenue in the port during the baseline period); and several socioeconomic indicators: social vulnerability (SoVI® score, see section 3.2), vulnerability as assessed in previous harvest specifications EISs, groundfish dependence, and groundfish engagement. For these indicators, community groups were ranked by score and the three highest ranking were assigned a "+" plus value, the bottom 3 rankings a "-" value, and the remainder a "0" value.[42]

Table 4-67 shows the ranking of each action alternative with respect to the change in personal income from No Action. The alternatives were ranked for each community group (i.e., across the row).

Astoria-Tillamook, Newport, and Crescent City-Eureka ranked high for social vulnerability, and Newport and Crescent City Eureka ranked high for vulnerability to groundfish fisheries regulation. Coos Bay-Brookings and Fort Bragg-Bodega Bay are ranked high for vulnerability to fisheries regulations but not

42 Since the social vulnerability scores are at the county level (see section 3.3.2.1) they were averaged for the community groupings created for the evaluation. Both unweighted and weighted averages were examined, using weightings by county population and the number of counties in a community group. These weights did not substantially affect the rankings and weighting by the number of counties was used for this assessment. Community vulnerability to adverse impacts of groundfish regulations were evaluated in the 2005-06 and 2011-12 EISs. Each time a county was rated vulnerable it was assigned 1 point and if rated most vulnerable 1.5 points. These scores were summed for the counties and the average score was determined for each community group. These scores were then ranked to arrive at the ratings in the table.

for their SoVI scores. Adverse impacts to these community groups, especially if they are disproportionate, receive special attention in the evaluation.

Table 4-65. Ranking of the relative impact of the alternatives on groundfish fishery sectors based on projected ex-vessel revenue.

	No Action	Pref. Alt. / Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Whiting	1	3	3	4	5	4	2	2	3
Nonwhiting Trawl	1	3	3	4	5	4	2	2	3
Limited Entry Fixed Gear	1	2	2	2	2	2	2	2	2
Nearshore Open Access (A)	2	1	1	1	3	1	1	1	1
Non-nearshore Open Access	1	2	2	2	2	2	2	2	2
Incidental Open Access	2	1	1	1	1	1	1	1	1
Tribal (incl. whiting)	1	2	2	2	2	2	2	2	2
Nearshore Open Access (B)	2	1	1	1	3	1	1	1	1
Coastwide: Nearshore Sub-alternative A	1	3	3	4	5	4	2	2	3
Coastwide: Nearshore Sub-alternative B	1	3	3	4	5	4	2	2	3

Table 4-66. Summary of community indicators.

	Primary Fishery	Sector Concentration	SoVI	Vulnerability	Dependence	Engagement
Puget Sound	Limited Entry Fixed Gear (+)	+	0	-	-	-
Washington Coast	Treaty Nonwhiting Groundfish	-	0	0	0	+
Astoria-Tillamook	Shoreside Nonwhiting Trawl (+)	+	+	-	0	+
Newport	Shoreside Nonwhiting Trawl	-	+	+	+	+
Coos Bay-Brookings	Shoreside Nonwhiting Trawl (+)	0	0	+	+	0
Crescent City-Eureka	Shoreside Nonwhiting Trawl (+)	0	+	+	0	0
Fort Bragg - Bodega Bay	Shoreside Nonwhiting Trawl (+)	0	-	+	0	0
San Francisco Area	Shoreside Nonwhiting Trawl (+)	0	-	-	-	-
Santa Cruz - Monterey - Morro Bay	Directed Open Access (+)	-	-	-	+	0
S. Barbara - Los Angeles - San Diego	Limited Entry Fixed Gear (+)	+	0	-	-	-
Coastwide						

*A plus sign "+" under Primary Fishery indicates that the primary fishery accounts for more than 50 percent of total groundfish ex-vessel revenue in the community group during the baseline period. Community Socioeconomic Indicators: Social Vulnerability (SoVI® score, see section 3.2), Vulnerability as assessed in previous harvest specifications EISs, groundfish Dependence, and groundfish Engagement. The three highest rankings in each category were assigned a "+" plus value, the 3 bottom ranked a "-" value, and the remainder a "0" value.

Table 4-67. Relative impacts of the alternatives based on projected groundfish-related income

Community Groups	*No Action*	Alternative 1A	Alternative 2A	Alternative 3A	Alternative 4A	Alternative 5A	Alternative 6A	Alternative 7A	Alternative 8A
Puget Sound	1	2	2	4	3	4	2	2	2
Washington Coast	1	2	2	4	3	4	2	2	2
Astoria-Tillamook	1	3	3	4	5	4	2	2	3
Newport	1	3	3	4	5	4	2	2	3
Coos Bay-Brookings	1	2	2	3	4	3	2	2	2
Crescent City-Eureka	1	3	3	5	4	5	2	2	3
Fort Bragg - Bodega Bay	1	3	3	4	2	4	3	3	3
San Francisco Area	1	2	2	3	4	3	2	2	2
Santa Cruz - Monterey - Morro Bay	3	1	1	2	4	2	1	1	1
Santa Barbara - Los Angeles - San Diego	3	1	1	1	2	1	1	1	1
Coastwide Total	1	3	3	4	5	4	2	2	3

Community Groups	*No Action*	Preferred Alternative – Alternative 1B	Alternative 2B	Alternative 3B	Alternative 4B	Alternative 5B	Alternative 6B	Alternative 7B	Alternative 8B
Puget Sound	1	2	2	4	3	4	2	2	2
Washington Coast	1	2	2	4	3	4	2	2	2
Astoria-Tillamook	1	3	3	4	5	4	2	2	3
Newport	1	3	3	4	5	4	2	2	3
Coos Bay-Brookings	1	3	3	4	5	4	2	2	3
Crescent City-Eureka	1	3	3	5	4	5	2	2	3
Fort Bragg - Bodega Bay	1	2	2	3	4	3	2	2	2
San Francisco Area	1	2	2	3	4	3	2	2	2
Santa Cruz - Monterey - Morro Bay	4	1	1	2	3	2	1	1	1
Santa Barbara - Los Angeles - San Diego	2	1	1	1	3	1	1	1	1
Coastwide Total	1	3	3	4	5	4	2	2	3

4.4.2 Summary by Alternative

4.4.2.1 No Action: 2012 Regulations, 107 mt Canary Rockfish ACL and 187 mt POP ACL

Groundfish Species

With respect to biological impacts, the ACL represents a limit on total fishing mortality for each stock and is determined based on the OY harvest management framework described in Chapter 4 of the Groundfish FMP (PFMC 2011b). Under No Action the ACLs applied in 2012 would be carried over for 2013-14. In many cases these ACLs would not reflect the application of the best available science as represented by projections from stock assessments completed since the 2012 specifications were set or a new projection based on the most recent stock assessment information available.

For all overfished species except canary rockfish and POP, the ACLs are estimated to rebuild the stock by the target year established in the rebuilding plan. New stock assessments and rebuilding analyses for canary and POP resulted in revised rebuilding schedules that show the current target years are not likely to be achieved even with zero mortality (a 48 percent probability for canary and 25 percent probability for POP, see Table 2-10). However, the No Action ACL for canary, 107 mt, is intermediate between the Alternative 1 2013 ACL (116 mt) and the Alternative 2 and 6 2013 ACLs (101 mt), so applying a harvest rate that would produce the No Action ACL in 2013 would likely rebuild the stock by 2029 or 2030, the target years associated with those two alternatives' SPR harvest rates. The No Action ACL for POP is 183 mt. Table 2-10 displays a range of harvest rates and corresponding 2013-14 ACLs and target years. A 2013 ACL of 182 mt corresponds to an SPR harvest rate of 83.9% and a median rebuilding year of 2054. Although this harvest rate was not considered in the range of integrated alternatives, for the purpose of comparison it can be used as a proxy for a No Action rebuilding policy. The median rebuilding year for this harvest rate is 3 years later than the target year associated with the Alternative 1 ACL.

Using the closest ACL-target year combination from Table 2-10 as proxies for canary and POP No Action rebuilding policies and applying the best available science, the fraction of the $T_{F=0}$–T_{MAX} rebuilding period taken up by the target year across all seven overfished species ranges from zero (there is no discernible difference in the time to rebuild between no harvest and the proposed ACL) to 55 percent for yelloweye rockfish, reflecting the very low productivity of that stock (seeTable 4-64). Assuming a the No Action target year for canary is 2029, it is the same as Alternatives 2 and 6, 1 year sooner than Alternatives 1, 3, 7, 8, and the Preferred Alternative; three years sooner than Alternative 5, and one year later than Alternative 4. Assuming a No Action target year for POP of 2054 (associated with a harvest policy producing a 182 mt ACL in 2013 versus the No Action value of 183 mt), it is six years sooner than Alternative 4, three years sooner than Alternatives 6 and 7, and eight years later than Alternatives 3 and 5, and three years later than Alternatives 1, 2, and the Preferred Alternative. (see Table 4-64.)

It is also noteworthy to point out that new scientific information indicates that bocaccio, darkblotched rockfish, petrale sole, and yelloweye rockfish will reach the target rebuilt biomass earlier than the current target years in their rebuilding plans. However, as outlined in section 4.6.3.4 of the Groundfish FMP, (PFMC 2011b) this does not require a change in the rebuilding plan to that earlier year, it just means there is a greater likelihood that rebuilding will occur by the established target year.

Section 4.4.1.1 displays a ranking of the action alternatives by the fractional amount of the $T_{F=0}$–T_{MAX} rebuilding period used for these canary and POP. If the No Action Alternative is included, using a proxy rebuilding policy based on the 2012 ACL and closest associated harvest rate from Table 2-10 (as discussed above), then the No Action alternative ranks ahead of Alternative 6 and 7 but lower than the other action alternatives. (Note that Alternatives 1, 8, and the Preferred Alternative rank equally.)

For nonoverfished groundfish one can ask whether a No Action (2012) ACL is higher or lower than the corresponding ACL determined using the best available science, and proposed under the action alternatives. From a biological standpoint if the 2012 ACL is equal to or lower than the action alternative ACL then it would not impair the MSY management objective. However, it might not be consistent with the OY harvest policy, which takes into account socioeconomic objectives. If the No Action ACL is higher than the action alternative ACL, then it is inconsistent with these objectives. There are 15 No Action ACLs greater than the corresponding action alternative ACLs (see Table 2-18).

Marine Ecosystem

Section 4.1.2 describes measures that mitigate adverse impacts to EFH, either by design (e.g., gear-specific EFH closed areas) or as a side-effect of another objective (e.g., RCAs). It is not possible to quantify adverse effects, but they are expected to be similar to effects that have occurred in the past as described in section 3.1.2.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort. No Action implements the same configuration as in 2012. Impacts are likely to be similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery. Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. It is not possible to discern differential impacts among Alternatives 1, 2, 3, 6, and No Action. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries

No Action shows the largest gain in ex-vessel revenue from the 2005-10 baseline among all the alternatives, a 39 percent increase. The shoreside non-nearshore open access fishery shows the largest proportional gain at 115 percent above the baseline, about $3.9 million. Shoreside whiting shows the largest gain at $11.9 million (+110 percent). Shoreside nonwhiting trawl is projected to decline by $2.6 million (-3 percent). Differences among the alternatives in estimated ex-vessel revenue earned by the shoreside whiting sector are due to the effects of variation in POP and canary rockfish ACLs, which are bycatch species that limit attainment of the whiting allocation.

Note, however, that revenue projections for the nonwhiting trawl fishery are likely to be somewhat lower than actual achievement due to incomplete data and the preliminary nature of the model being used. The accelerated schedule of this EIS process meant that the model necessarily had to rely on incomplete catch data for 2011. Also, since 2011 was only the first year of operation under transferrable individual fishing quotas, only an incomplete and very limited picture of the scope for trading of QP between fishery participants was incorporated into the model. For these reasons it is very likely that the model will underestimate actual catch levels of many of the individual quota species during the 2012 (No Action) and 2013-14 fisheries.

Fishing Communities

Because baseline period estimates of personal income are not available, for this metric No Action can only be compared with the action alternatives. No Action is projected to result in personal income and employment gains in most communities compared to the action alternatives. Only the Santa Cruz-Monterey-Morro Bay and Santa Barbara-Los Angeles-San Diego community groups show income gains under the action alternatives compared to No Action. Likewise, only these two community groups show employment gains under the action alternatives compared to No Action. However, these gains are tiny at this geographic scale, affecting the regions' unemployment rates by less than one-one thousandth of a percent.

Section 4.2 also presents a comparison of the change in groundfish ex-vessel revenue under each alternative from the 2005-10 baseline period by community group, which is another way to comparatively evaluate the No Action estimates. Puget Sound shows a 54 percent decline, Crescent City-Eureka shows a 7 percent decline, and the San Francisco Area shows a 1 percent decline; all other community groups show revenue gains from the baseline. As shown in Table 4-66 of the community groups showing revenue declines, Crescent City-Eureka exhibits several indicators that it is vulnerable to the adverse socioeconomic impacts of the proposed action.

4.4.2.2 The Preferred Alternative and Alternative 1: 116 mt Canary Rockfish ACL and 150 mt POP ACL

Groundfish Species

Except for canary rockfish and POP, the Preferred Alternative / Alternative 1 rebuilding plan objectives for overfished species are the same as No Action. ACLs for bocaccio, darkblotched, petrale sole, and yelloweye rockfish differ from No Action, but using the best available science it is estimated they would rebuild by, or earlier than, the rebuilding plan target year. The canary rockfish target year under Alternative 1 is two years beyond $T_{F=0}$, a little less than one-tenth of the total $T_{F=0}$–T_{MAX} rebuilding period (see Table 4-64). The target year for POP is eight years greater than $T_{F=0}$, about one-third of the permissible rebuilding time. The target year for canary accounts for 9 percent of the permissible rebuilding time and 29 percent for POP.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX} rebuilding period for canary and POP, Alternative 1 and the Preferred Alternative rank above Alternatives 4, 6 and 7 (and No Action using the proxy rebuilding policy assumption) but below Alternatives 2, 3, and 5. (Alternative 8 is tied with Alternative 1 and the Preferred Alternative.)

The Alternative 1 ACLs for nonoverfished groundfish are consistent with the Groundfish FMP's OY harvest management policies, using the best available science to compute them.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005), but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort but concludes that any differences in nongroundfish fishing mortality among the alternatives is not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery. Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. It is not possible to discern differential impacts among Alternatives 1, 2, 3, 6, and No Action. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries

The Preferred Alternative differs slightly from Alternative 1B (and Alternatives 2-8) in (1) increased deductions from the ACLs for petrale sole, yellowtail rockfish, and to a smaller extent, shortspine thornyheads, to accommodate tribal fisheries set asides ; and (2) increased allowances for research and at-sea whiting sector catch of arrowtooth flounder. These changes reduce the allocations to commercial fisheries for those four species accordingly. However it is uncertain what if any effect these changes will have on commercial and tribal fisheries landings and revenue under the Preferred Alternative. For more information on potential differences in the impacts of the Preferred Alternative compared to Alternative 1B see Section 4.2.2.1.

Compared to No Action, Alternative 1 shows a 10 percent decline in coastwide ex-vessel revenue (between -$9.0 million and -$9.2 million). This is primarily due to the decline in the sablefish ACLs, which under No Action sum to 6,813 mt, versus 5,451 mt under the action alternatives (a 20 percent decline in the ACL). (During the baseline period, sablefish accounted for about half of coastwide groundfish ex-vessel revenue.) It should be noted that ex-vessel revenue projections are based on inflation-adjusted actual 2010 prices. PacFIN data show that the average price per pound for sablefish increased from $2.38 in 2010 to $3.18 in 2011, a 34 percent increase.[43] If this price trend holds up in 2013-14 it could compensate for the decline in landings, and ex-vessel revenue projections may therefore be low. Sablefish prices are largely determined by external factors, such as export demand. The March 2011 tsunami in Japan, which destroyed much of the fisheries infrastructure in the northern part of the country, may have increased demand for imports. To the degree that this influenced demand and Japan is able to restore their fisheries, this may put downward pressure on future prices.

[43] PacFIN accessed Feb. 4, 2012. The 2011 data should be considered provisional because of the time lag in state data feeds to the PacFIN system.

The limited entry fixed gear sector shows both the largest relative and absolute decline in revenues from No Action, at -20 percent or -$3.8 million. The non-nearshore open access fishery follows in terms of relative change at -19 percent, but this represents only -$1.4 million, because of the smaller size of this fishery, 5 percent of coastwide landings during the baseline period according to Table 4-39. The only sector showing a gain is the nearshore open access sector, between 13 and 17 percent or $539 thousand to $733 thousand.

Declines in accounting net revenue are estimated to be relatively greater under Alternative 1 compared to No Action. Coastwide, this change is 14-15 percent.

Fishing Communities

Income and employment impacts have not been estimated separately for the Preferred Alternative but are expected to be indistinguishable from Alternative 1. The increased set asides of petrale sole and yellowtail rockfish for tribal fisheries under the Preferred Alternative may result in increased tribal groundfish landings and revenue of up to +$0.25 million. All of these additional landings and revenue would be made in Washington Coast and Puget Sound ports. However as described in section 4.2.1, any additional landings by the tribal fleet will not affect estimated community personal income and employment impacts. Also, as mentioned in sections 4.2.2.1 and 4.2.2.2, changes in set asides under the Preferred Alternative are not expected to have any effect on commercial fishery landings or recreational angling effort, and therefore no effect on estimated community personal income and employment impacts.

Puget Sound is disproportionately adversely affected under the Preferred Alternative / Alternative 1. All communities show declines in personal income from No Action except Santa Cruz-Monterey-Morro Bay and Santa Barbara-Los Angeles-San Diego. As shown in Table 4-66, Puget Sound has a relatively high concentration in the limited entry fixed gear sector (based on its Gini coefficient, see section 3.3).

4.4.2.3 Alternative 2: Lower Canary Rockfish ACL

Groundfish Species

Under Alternative 2, canary rockfish is projected to rebuild by 2029 or 5 percent of the time between $T_{F=0}$ and T_{MAX} (see Table 4-64). The canary rockfish target year for Alternatives 2 and 6 is one year earlier than Alternative 1. POP is projected to rebuild by 2051, the same target year as Alternative 1.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX}, the rebuilding period for canary and POP Alternative 2 ranks behind Alternatives 3 and 5 and above the other alternatives including No Action.

ACLs for nonoverfished groundfish are the same under all the action alternatives. These effects have been described under the Preferred Alternative / Alternative 1.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005), but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort, but concludes that any differences in nongroundfish fishing mortality among the alternatives is not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery. Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. It is not possible to discern differential impacts among Alternatives 1, 2, 3, 6, and No Action. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries and Fishing Communities

The socioeconomic impacts of Alternative 2 are same as those under the Preferred Alternative / Alternative 1 (see Section 4.2.2.3).

4.4.2.4 Alternative 3: Lowest POP ACL

Groundfish Species

Under Alternative 3, canary rockfish is projected to rebuild by the same target year as under Alternative 1 or 9 percent of the $T_{F=0}$–T_{MAX} rebuilding period (see Table 4-64). The target year for POP accounts for 11 percent of the $T_{F=0}$–T_{MAX} rebuilding period.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX} rebuilding period for canary and POP, Alternative 3 ranks first.

ACLs for nonoverfished groundfish are the same under all the action alternatives. These effects have been described under the Preferred Alternative / Alternative 1.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005), but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort, but concludes that any differences in nongroundfish fishing mortality among the alternatives is not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery. Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. It is not possible to discern differential impacts among Alternatives 1, 2, 3, 6, and No Action. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries

Alternative 3 shows a 15 percent decline in groundfish ex-vessel revenues compared to No Action. Nonwhiting trawl shows the largest decline, -$6.3 million or 23 percent. As shown in Table 4-65, Alternative 3 ranks has greater adverse impacts to the IFQ sector (or shoreside trawl) than Alternatives 1, 2, 6, and 7 (and ranks behind these alternatives overall in terms of projected groundfish ex-vessel revenue). Projected groundfish ex-vessel revenue does not vary across the action alternatives for limited entry fixed gear, non-nearshore open access, incidental open access, and tribal groundfish. The nearshore open access sector, evaluated under two management scenarios (A and B sub-alternatives) shows the same gain in ex-vessel revenue as under the Preferred Alternative, Alternative 1, and Alternative 2, $539,000 to $733,000, or 13-17 percent.

Fishing Communities

Puget Sound is disproportionately adversely affected under Alternative 3. All communities show declines in personal income from No Action except Santa Cruz-Monterey-Morro Bay and Santa Barbara-Los Angeles-San Diego. Alternative 3 is projected to have greater adverse impacts to personal income, compared to No Action, than the Preferred Alternative and Alternatives 1, 2, 6, and 7.

4.4.2.5 Alternative 4: Lowest Canary Rockfish ACL and Highest POP ACL

Groundfish Species

Under Alternative 4 the target year is the same as $T_{F=0}$ (or zero percent of the $T_{F=0}$–T_{MAX} rebuilding period), although the ACL is 48 mt in 2013. This is the earliest target year among the alternatives by between one and four years (see Table 4-64). The target year for POP is the later than all the other alternatives by between 6 and 14 years, or 61 percent of the $T_{F=0}$–T_{MAX} rebuilding period.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX} rebuilding period for canary and POP Alternative 4 ranks last, but as discussed above, this is strongly influenced by the relationship between target year and ACLs in the short term. The increase in the ACL resulting from a later rebuilding time is smaller for POP compared to canary rockfish (see Figure 4-28).

ACLs for nonoverfished groundfish are the same under all the action alternatives. These effects have been described under the Preferred Alternative / Alternative 1.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005), but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort, but concludes that any differences in nongroundfish fishing mortality among the alternatives is not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely to be similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Compared to the other alternatives, Alternative 4 may have greater impacts to protected species, especially humpback whales, sea turtles, and seabirds if management measures result in relatively more fishing effort in nearshore areas with fixed gear. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries

Under Alternative 4, coastwide groundfish ex-vessel revenue is expected to decline by 16-17 percent, the largest decline under all the alternatives. This reflects the influence of the low ACL for canary rockfish, which to date has been unavoidably caught across a range of fisheries. Nonwhiting trawl shows a smaller decline than under Alternative 3, because of the higher ACL for POP under Alternative 4. Under Alternative 4 whiting trawl and nearshore open access show the largest projected declines in ex-vessel revenue from No Action among all the alternatives. Nearshore open access under sub-alternative B shows the largest relative decline from No Action—36 percent—of any fishery under any action alternative. Coastwide, Alternative 4 has the largest adverse impacts in terms of the change in ex-vessel revenue from No Action.

Fishing Communities

In addition to Puget Sound, under Alternative 4 Astoria-Tillamook is also disproportionately adversely affected, with a decline from No Action of $28.9 million, or 21 percent. Astoria-Tillamook is identified as a community group that is particularly vulnerable to adverse socioeconomic impacts. Coastwide, Alternative 4 has the largest adverse impacts in terms of the change in personal income from No Action. For Crescent City-Eureka, adverse impacts are less severe than under Alternatives 3 and 5 (comparing sub-alternative A across the alternatives). Adverse impacts to Fort Bragg-Bodega Bay are the least severe among the action alternatives (see Table 4-67).

4.4.2.6 Alternative 5: Highest Canary Rockfish ACL and Lowest POP ACL

Groundfish Species

Under Alternative 5 ,the target rebuilding year for canary rockfish is four years beyond $T_{F=0}$, which is later than under any of the other alternatives; this represents 18 percent of the $T_{F=0}$–T_{MAX} rebuilding period (see Table 4-64). The target year for POP is the same as under Alternative 3.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX} rebuilding period for canary and POP, Alternative 5 ranks second, behind Alternative 3. This rating is influenced by the relatively aggressive rebuilding target for POP, which results in a 2013 ACL about half of that under Alternative 1.

ACLs for nonoverfished groundfish are the same under all the action alternatives. These effects have been described under the Preferred Alternative / Alternative 1.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005), but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort, but concludes that any differences in nongroundfish fishing mortality among the alternatives is not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely to be similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery.

Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. A higher canary rockfish ACL (Alternatives 5, 7, 8) may allow more fishing opportunity in the shoreside IFQ fishery (using both fixed and trawl gear), potentially increasing protected species interactions. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries and Fishing Communities

The socioeconomic impacts of Alternative 5 are same as those under Alternative 3. Only Alternative 4 results in more severe adverse impacts.

4.4.2.7 Alternative 6: Lower Canary Rockfish ACL and Higher POP ACL

Groundfish Species

Alternative 6 has the same canary rockfish target rebuilding year as Alternative 2, or 5 percent of the $T_{F=0}$–T_{MAX} rebuilding period (see Table 4-64). Alternative 6 has the second-longest rebuilding period for POP among the alternatives, which is the same target year as under Alternative 7.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX} rebuilding period for canary and POP, Alternative 6 ranks sixth, ahead of Alternatives 4 and 7 (noting that Alternatives 1 and 8, and the Preferred Alternative rank equally at fourth).

ACLs for nonoverfished groundfish are the same under all the action alternatives. These effects have been described under the Preferred Alternative / Alternative 1.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005), but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort, but concludes that any differences in nongroundfish fishing mortality among the alternatives are not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely to be similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery. Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. It is not possible to discern differential impacts among Alternatives 1, 2, 3, 6, and No Action. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries

Alternative 6 has the smallest adverse impact on fishery sectors based on the change in ex-vessel revenue from No Action. Whiting trawl ex-vessel revenue declines from No Action by -$110,000 (-0.5 percent) and nonwhiting trawl by -$3.2 million (-12 percent). These differences in estimated ex-vessel revenue earned by the shoreside whiting sector are due to the effects of variation in POP and canary rockfish ACLs, which are bycatch species that limit attainment of the whiting allocation. Coastwide, the projected change in ex-vessel revenue is -$8.8 million to -$9.0 million, which is comparable to the Preferred Alternative, Alternative 1, and Alternative 2 (certainly within the margin of error for these projections).

Fishing Communities

Adverse impacts to personal income and employment under Alternative 6 are very similar to Alternatives 1 and 2. Puget Sound, the Washington Coast, Coos Bay-Brookings, the San Francisco Area, Santa Cruz-Monterey-Morro Bay, and Santa Barbara-Los Angeles-San Diego show the same change in personal income as under the Preferred Alternative, Alternative 1, and Alternative 2. Astoria-Tillamook, Newport, and Crescent City-Eureka show smaller declines in personal income compared to No Action (although perhaps within the margin of error for these projections). Fort Bragg-Bodega Bay shows the same decline as the Preferred Alternative, Alternative 1, and Alternative 2 under sub-alternative B but slightly larger decline compared to those alternatives under sub-alternative A.

4.4.2.8 Alternative 7: Higher Canary Rockfish ACL and Higher POP ACL

Groundfish Species

The target rebuilding year for canary rockfish is the same as under Alternatives 1, and 3, but this Alternative allows more harvest (a 2013 ACL of 147 mt versus 116 mt), which entails a slightly higher risk of not achieving rebuilding objectives. The target rebuilding year for POP is the same as under Alternative 6.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX} rebuilding period for canary and POP, Alternative 7 ranks seventh, ahead of Alternative 4 (noting that Alternatives 1 and the Preferred Alternative are equally ranked at fourth).

ACLs for nonoverfished groundfish are the same under all the action alternatives. These effects have been described under the Preferred Alternative / Alternative 1.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005), but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort, but concludes that any differences in nongroundfish fishing mortality among the alternatives is not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely to be similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery. Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. A higher canary rockfish ACL (Alternatives 5, 7, 8) may allow more fishing opportunity in the shoreside IFQ fishery (using both fixed and trawl gear), potentially increasing protected species interactions. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries and Fishing Communities

The socioeconomic impacts of Alternative 7 are same as those under Alternative 6.

4.4.2.9 Alternative 8: Higher Canary Rockfish ACL

Groundfish Species

As with the other alternatives, rebuilding plan objectives for overfished species are the same as No Action except for canary rockfish and POP. The target rebuilding year for canary rockfish is the same as under Alternatives 1, and 3, but this Alternative allows more harvest than the Preferred Alternative, Alternative 1 (a 2013 ACL of 147 mt versus 116 mt), which entails a slightly higher risk of not achieving rebuilding objectives. The target rebuilding year for POP is the same as under the Preferred Alternative / Alternative 1 (see Table 4-64). The target year for POP is eight years greater than $T_{F=0}$, about one-third of the permissible rebuilding time. The target year for canary accounts for 9 percent of the permissible rebuilding time, and 29 percent for POP.

Using the approach discussed above of ranking alternatives by the fractional use of $T_{F=0}$–T_{MAX} rebuilding period for canary and POP Alternative 8 ranks fourth along with Alternative 1 and the Preferred Alternative, ahead of No Action and Alternatives 6 and 7.

ACLs for nonoverfished groundfish are the same under all the action alternatives. These effects have been described under the Preferred Alternative / Alternative 1.

Marine Ecosystem

The action alternatives do not differ substantially from No Action in the extent of the RCAs, the principal metric used to evaluate differential impacts. Impacts under these alternatives are expected to be similar in type and intensity to those effects described for the baseline in section 3.1.2. There are likely to be some adverse cumulative effects due to fishing and other activities, which have been described in previous EISs (for example NMFS 2005) , but such adverse cumulative impacts are not expected to be any more frequent or intense than have occurred in the past. Because the proposed changes to the management program are not great, the impacts of the action alternatives are expected to be similar to No Action.

Nongroundfish Species

Impacts to nongroundfish from the proposed action (combined with past and future fishing mortality in the groundfish fishery and other fisheries) are negligible. The analysis of effects in section 4.1.3 infers impacts based on the effect of RCAs on the distribution and intensity of fishing effort, but concludes that any differences in nongroundfish fishing mortality among the alternatives is not discernible because differences among the alternatives in RCA configuration are modest. Impacts are likely to be similar to those that have occurred during past management cycles. External actions (management of fish stocks under various authorities) are likely to mitigate cumulative effects to stock status by preventing overfishing.

Protected Species

Based on the NMFS Biological Opinion (NMFS 2012) and the NMFS Risk Assessment 2011 (NWFSC 2011), there may be impacts resulting from the implementation of the 2012 Pacific groundfish fishery. Direct and indirect impacts to protected species are likely to be similar to effects disclosed in these documents for the fishery in 2012. A higher canary rockfish ACL (Alternatives 5, 7, 8) may allow more fishing opportunity in the shoreside IFQ fishery (using both fixed and trawl gear), potentially increasing protected species interactions. External actions (continued monitoring of protected species bycatch, ongoing section 7 consultation on the fishery) could have beneficial cumulative effects by prompting implementation of any necessary mitigation measures to prevent significant adverse impacts.

Groundfish Fisheries and Fishing Communities

At the April 2012 meeting, the Council added Alternative 8 to the analysis to evaluate the effect of proceeding with Alternative 1 (and the Preferred Alternative, which has the same ACLs), but substituting a higher canary rockfish ACL of 147 mt in 2013 and 151 mt in 2014. Socioeconomic impacts in terms of projected ex-vessel revenue and personal income does not differ between Alternatives 1 and 8, however, even with the higher ACL. This lack of contrast is likely a limitation of the models used to project landings, and resulting revenue and income (see Section 4.2.1) and projections of landings and revenue may not therefore capture the actual benefit of a higher canary rockfish ACL in terms of resulting catch of target species..

While the direct revenue realized from landing the small amounts of available rebuilding species stocks is negligible, these stocks leverage access to much higher levels of target species landings. Consequently, a higher allocation of canary rockfish to the shoreside IFQ fishery may generate more actual revenue than is forecast using the current catch projection models. As discussed above, the ACL and allocation to the shoreside IFQ fishery dictates the amount of QP available to the fleet based on quota share holdings. Smaller canary rockfish QP holdings in relation to potential unavoidable high bycatch events (so-called "disaster tows") increase risk aversion, affecting fishing behavior (Holland and Jannot 2012). The higher

ACL under Alternative 8 could reduce perceived risk, affecting behavior and resulting fleetwide landings and revenue from higher target species landings. These effects are not captured in the catch projection models.

4.4.2.10 Differences between Sub-alternatives A and B

These sub-alternatives present two ways of achieving the groundfish management objectives through the application of different management measures to the nearshore fixed gear fishery. Under sub-alternative A, the fishery is managed using the status quo nontrawl RCA configuration and trip limits. Under Sub-alternative B, the nontrawl RCA would be reduced in size but trip limits would then have to be lower so the protected species bycatch does not exceed the open access allocation.

Within any of the action alternatives, the impacts of these two sub-alternatives with respect to stock management objectives do not substantially differ. Both sub-alternatives are consistent with the overall objective of keeping total catch below ACLs. Sub-alternative A implements a larger RCA compared to Sub-alternative B, which could affect the spatial distribution of fishing effort. While this may result in different impacts to protected species and habitat, these differential effects cannot be discerned.

Table 4-68 compares the two sub-alternatives by alternative and community group. The table shows the difference in ex-vessel revenue between Sub-alternative B and Sub-alternative A to highlight these differences. The difference in impact is the same for all of the action alternatives except for Alternative 4. Puget Sound and the Washington Coast are unaffected, because there is effectively no nearshore fishery in the state. In Alternatives 1-3 and 5-7, the different measures under sub-alternative B would only apply to the Oregon Coast; coastwide application of sub-alternative B results in $194,000 less in ex-vessel revenue compared to Sub-alternative A. Coos Bay-Brookings is the most adversely affected under Sub-alternative B compared to Sub-alternative A.

Under Alternative 4, Sub-alternative B management measures would be applied instead in California. Under Alternative 4, Sub-alternative B would produce $833,000 less ex-vessel revenue than Sub-alternative A in California. Santa Cruz-Monterey-Morro Bay would be the most adversely affected community group. As can be seen from the table, which shows average annual nearshore revenue during the 2005-10 baseline period, adverse effects generally correlate with the size of the nearshore fishery in a community group. Taking the ratio between the baseline level of ex-vessel revenue and the difference in revenue between the B and A sub-alternatives under the alternatives allows an assessment of the proportionality of these effects. Under Alternatives 1-3 and 5-7, Newport shows the biggest ratio between historical revenue and the impact of Sub-alternative B; the difference between Sub-alternative B and Sub-alternative A is 38 percent of baseline revenue. Under Alternative 4, this ratio is largest for Santa Cruz-Monterey-Morro Bay at 44 percent.

Table 4-68. Average annual 2005-10 ex-vessel revenue by the nearshore fishery (dollars and percent of total groundfish ex-vessel revenue for community group) and difference in income impacts ($,000) between Sub-alternative B and Sub-alternative A by community group. Note: Alternative 8 is not shown but impacts are the same as Alternative 1; "PA"=Preferred Alternative.

	Nearshore		Action Alternatives						
A versus B	**$,000**	**Pct.**	**PA/1**	**2**	**3**	**4**	**5**	**6**	**7**
Puget Sound		0%							
Washington Coast	<1	<1%							
Astoria-Tillamook	125	1%	-23	-23	-23	0	-23	-23	-23
Newport	23	0%	-8	-8	-8	0	-8	-8	-8
Coos Bay-Brookings	854	9%	-163	-163	-163	0	-163	-163	-163
Crescent City-Eureka	479	8%	0	0	0	-164	0	0	0
Fort Bragg - Bodega Bay	248	7%	0	0	0	-81	0	0	0
San Francisco Area	136	9%	0	0	0	-41	0	0	0
Santa Cruz - Monterey - Morro Bay	1,116	30%	0	0	0	-486	0	0	0
Santa Barbara - Los Angeles - San Diego	226	10%	0	0	0	-61	0	0	0
Coastwide Total			-194	-194	-194	-833	-194	-194	-194

4.4.2.11 Summary Comparison of the Alternatives

Only the ACLs for canary rockfish and POP vary both between the No Action and the action alternatives and among the action alternatives. Thus, comparing biological impacts of the alternatives focuses on these two overfished stocks. While the the proportion of the $T_{F=0}$–T_{MAX} rebuilding period was used to rate the alternatives above, the No Action alternative cannot be included in this approach, because the No Action target year is not feasible. For an overall evaluation, the ACLs for canary rockfish and POP in all nine alternatives can be compared to rank the alternatives. ACLs represent a short-term biological impact in terms of the potential fishing mortality that would be authorized. In addition, since the ACLs are determined from the harvest rate that would be incorporated into the revised rebuilding plan, they can serve as a proxy for the long-term rebuilding objective. For comparison only, these No Action ACLs may be associated with a harvest rate that, if applied for the duration of the rebuilding period, would result in a corresponding target rebuilding year earlier than a target year associated with a higher ACL. A lower rank value corresponds to a lower ACL and presumed less-adverse biological impact. Table 4-69 provides a summary ranking of the alternatives using the ACLs for canary rockfish and POP and the projected coastwide personal income under the alternatives as metrics (see Table 4-54). To arrive at the overall ranking, the individual rank values for each metric were summed and the alternatives re-ranked. This approach assigns equal weight to the rebuilding decisions for canary rockfish and POP and the associated personal income estimated to result. This approach relates to the tradeoff established in MSA §304(e)(4) between rebuilding in a time "as short as possible" while, among other things, taking into account the "needs of fishing communities." The rebuilding rankings can be compared to socioeconomic costs ("needs of fishing communities"). From a policy or legal perspective, equal weighting of these metrics may not be appropriate, but there is no clear guidance on an alternative weighting.

Table 4-69. Rank of canary rockfish and POP ACLs and coastwide personal income. Overall score sums individual metric scores and re-ranks the alternatives. 1=lowest impact/highest benefit.

Metric	No Action	Pref. Alt. / Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Canary ACL	3	4	2	4	1	6	2	5	5
POP ACL	3	2	2	1	5	1	4	4	2
Income	1	3	3	4	5	4	2	2	3
Overall	**1**	**3**	**1**	**3**	**5**	**5**	**2**	**5**	**4**

4.4.3 Impacts not Discerned in the Integrated Alternatives

This EIS discloses and evaluates various impacts of the proposed action where differences cannot be discerned between the integrated alternatives (No Action, the Preferred Alternative, and Alternatives 1-8).

4.4.3.1 Impacts not expected to Differ Substantially across all of the Action Alternatives

There are eight proposed new management measures included as part of all the integrated action alternatives. Four other new measures were considered by the Council but included in the Preferred Alternative. These measures are described in section 2.3. Appendix C contains a detailed evaluation of these and other routine measures. These measures are intended to improve program performance, with respect to catch monitoring and accounting, catch control, and fishing opportunity.

4.4.3.2 Impacts of Measures Evaluated Outside of the Integrated Alternatives

Section 4.2.2.5 describes alternative ACLs for Pacific whiting and widow rockfish not incorporated into the integrated alternatives. The catch limit for Pacific whiting is determined through a process established by the Agreement with Canada on Pacific Hake/Whiting. Through this process the U.S. portion of the TAC is determined annually. The integrated alternatives used the 2011 Pacific whiting TAC as a placeholder value to explore potential socioeconomic impacts of the fishery, because the actual TACs for 2013-14 were unknown when this EIS was prepared. Because of its biology, TACs for this stock can vary substantially from one year to the next, so potential revenue was computed for whiting catch ranging from 50 percent below the lowest catch recorded between 2005 and 2011 and 50 percent above the highest catch. Revenue from commercial (nontribal) fisheries totaled $53.3 million in 2011; based on the range described above, revenues in future years could vary from $12.1 million to $98.1 million. Because the Pacific whiting TAC is determined using the best available scientific information to assess the status and potential yield of the stock, any catch within the TAC would not have significant adverse biological impacts.

Widow rockfish is a newly-rebuilt species. The integrated alternatives include a 600 mt widow rockfish ACL under No Action and a 1,500 mt ACL under the action alternatives. An alternative ACL of 2,500 mt is evaluated (in comparison to 600 mt and 1,500 mt) in section 4.2.2.5. A larger ACL has two potential benefits. First, widow rockfish are caught incidentally in fisheries targeting Pacific whiting, and second, a high enough ACL could allow re-establishing a fishery targeting co-occurring schools of widow and yellowtail rockfish. Such a fishery was prosecuted before widow rockfish was declared overfished in 2001.

The Council also considered several different schemes for allocating the widow rockfish ACL between the shoreside, mothership, and catcher-processor portions of the fishery. At the April 2012 meeting the

Council included the current scheme implemented by Amendment 21 to the Groundfish FMP in the Preferred Alternative (Alternative 1).

The analysis found that at the highest Pacific whiting ACL evaluated (407,019 mt), the preferred 1,500 mt widow rockfish ACL, and the current allocation scheme for widow rockfish, Pacific whiting catch opportunity would not be limited by the widow allocations to the three whiting sectors. Using the highest observed widow rockfish bycatch rate from the recent past the at-sea sectors' catch opportunity could be limited. Both at-sea sectors operate under a catch share system (co-ops), which facilitates cooperation and coordination among harvesters. This allows the fleet as a whole to take actions to reduce bycatch if early attainment of the widow allocation threatens to close the fishery before all of the Pacific whiting allocation is caught.

With a preferred ACL of 1,500 mt and the highest Pacific whiting TAC evaluated, a directed widow-yellowtail fishery could be prosecuted with the remainder of the widow allocation not used to cover bycatch in the whiting fishery, generating between $1.3 million and $2.2 million in revenue depending on the bycatch rate in the whiting fishery. That compares to about $3.7 million in revenue when the fishery was last prosecuted in 2001.

4.4.4 Environmental Justice Considerations

Past groundfish harvest specifications EISs (PFMC 2002; PFMC 2004; PFMC 2006; PFMC 2008a; PFMC and NMFS 2011) have discussed environmental justice and the impact of the proposed action on communities of concern. This information is incorporated by reference and summarized here. EO 12898 on environmental justice 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 sec. 7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes."

The environmental justice analysis must identify minority and low-income groups that live in the project area and may be affected by the action. If there are disproportionately high adverse impacts to these communities, they should be disclosed and mitigation should be proposed. The 2005-06 groundfish harvest specifications included an analysis of 2000 census data to address the question of which communities have comparatively high proportions of minority and low income groups. The evaluation of communities with respect to their socioeconomic vulnerability to the adverse impacts of the proposed action also partially addresses this question, because these analyses take into account the level of economic distress found in communities (counties or Census Designated Places). Results of the vulnerability analyses conducted in 2006 and 2010, along with similar information in this EIS (e.g., the SoVI index), have been used in evaluating the impacts of the alternatives. The analysis of 2000 census data found that the metrics (percent nonwhite, percent Native American, percent Hispanic, median family income, and poverty rate) indicated that the Washington coast and the Southern Oregon-Northern California Coast were areas that exceeded evaluation thresholds. The more recent vulnerability analyses, as summarized in this EIS and supplemented with additional data, support those findings in that the whole of the Oregon coast and Northern California appear more vulnerable to adverse socioeconomic impacts. The identification of the Washington coast as a community of concern under EO 12898 is likely influenced by the comparatively high fraction of the population that is Native American, which is not a metric used in the vulnerability analyses.

Chapter 5 Consistency with the Groundfish FMP and MSA National Standards

5.1 FMP Goals and Objectives

The Groundfish FMP contains 3 broad goals and 17 objectives intended to achieve those goals. Past EISs for rebuilding plans and harvest specifications describe how the actions address each objective. The proposed actions evaluated in the current EIS address the goals and objectives in a similar fashion as described in the previous groundfish harvest specifications EISs.

5.2 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 OY from each fishery for the United States fishing industry.

The harvest specification action alternatives are consistent with the OY harvest management framework described in Chapter 4 of the Groundfish FMP. Chapter 4 describes OY as "a decisional mechanism for resolving the Magnuson Stevens Act's multiple purposes and policies, implementing an FMP's objectives and balancing the various interests that comprise the national welfare." The OY harvest management framework (as revised by Amendment 23 to the Groundfish FMP) is consistent with revised National Standard 1 Guidelines. In this EIS, Section 2.1 describes how the proposed harvest specifications were developed in relation to the OFL, ABC, and ACL reference points. The OFL is the estimate of catch level above which overfishing is occurring, or the estimate of MFMT applied to a stock's abundance. The ABC is a level of annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. Chapter 4 in the Groundfish FMP describes an ABC control rule, ABC values described in this document were determined following that control rule. The ACL is the level of annual catch that serves as the basis for invoking Accountability Measures. The ACL may equal but may not exceed the ABC. The ACL may be set lower than the ABC to account for a wide range of factors. The application of the OY harvest management framework to the specifications described in this document should result in ACLs that reduce the likelihood of overfishing.

The revised National Standard 1 guidelines set forth principles on which stock complexes should be organized, including that stocks within a complex should be similar in terms of geographic distribution, life history, and vulnerability to the fishery. Stock complexes are being reexamined, and as necessary, reorganized, incrementally as scientific information and institutional resources allow. Until the stock complexes can be reorganized the current stock complexes will remain in place. At this time the current configuration of the stock complexes has not shown to allow overfishing on any species therefore allowing them to remain in place thorough the Council's reexamination does not pose a threat to the ongoing sustainability of any of the species in any complex.

Because of past overfishing seven groundfish stocks are currently declared overfished. Widow rockfish was determined to be rebuilt in 2011 and will no longer be managed under a rebuilding plan beginning in 2013. Petrale sole was declared overfished in 2010 based on a revision to the OY harvest management framework that incorporates estimates of B_{MSY} of $B_{25\%}$ and MSST of $B_{12.5\%}$ for flatfish. Petrale sole is estimated to be rebuilt in 2013, but will be managed under its rebuilding plan for the 2013-14 biennial cycle.

Of the remaining overfished species four will be managed under the current, default rebuilding plans, maintaining the same SPR harvest rate and target year. The best available scientific information indicates that there is a less than 50 percent probability that canary rockfish and POP can be rebuilt by the target years currently in their rebuilding plans, even in the absence of fishing (zero ACL at $T_{F=0}$). Therefore, the target years in these rebuilding plans must be revised. The preferred alternative for these stocks maintains the default SPR harvest rate but revises the target year based on the median rebuilding year estimated in the most recent rebuilding analysis. For canary rockfish, the revised target year is 2030, 3 years later than the current target year but only 2 years later than the re-estimated $T_{F=0}$ zero harvest level. The re-estimated target year for POP based on the default harvest rate is 2051, 31 years after the current rebuilding target year but only 8 years after the estimated rebuilding year under zero harvest.

Section 304(e) introduces a tradeoff formulated as specifying a time to rebuild "as short as possible, taking into account the status and biology of any overfished stocks, the needs of fishing communities, … and the interaction of the overfished stock of fish within the marine ecosystem…" The proposed action is evaluated based on these considerations in Chapter 4 of this EIS.

National Standard 2 states that conservation and management measures shall be based on the best scientific information available.

The best available science standard applies to the following areas in relation to this proposed action: stock assessments, rebuilding analyses, and methods for determining management reference points (OFL, ABC, ACL, etc.), which forms the basis for determining harvest levels, and the evaluation of socioeconomic impacts. The supporting science is discussed below.

The harvest specifications (specifically, ACLs) considered under the proposed action (the action alternatives, including the Preferred Alternative), are based on the most recent stock assessments, developed through the peer-review STAR process. As part of the management cycle the Council recommends which stocks should be assessed in advance of current decision-making. Only a small proportion of the 80+ managed groundfish species are regularly assessed, because of a combination of factors. For many stocks there may not be enough data to support a full assessment (the FMP describes a classification system based on the availability of data). For unassessed stocks proxy methods must be used to determine reference points. Stocks may be subjected to little or no fishing pressure, or determined to have low vulnerability, and thus less in need of regular assessment. Finally, there is a limit on the institutional resources needed to carry out the assessments (i.e., fishery scientists). In some cases a previous assessment may be updated; this means that the underlying model is not reevaluated but the model is re-run with the addition of more recent data from the period since the last full assessment. Section 2.1 reviews the basis for alternative harvest specifications and references the stock assessments that were used.

The No Action Alternative specifications do not benefit from the new assessments and updates conducted as part of the current management cycle. For those stocks No Action does not represent the best available science.

Section 4.1 describes the methods that were used to determine reference points for harvest specifications (OFL, ABC, ACL, etc.) for stocks and stock complexes.

The NWFSC has developed a model application, called IO-Pac, for estimating personal income impacts of commercial fishing on the west coast. This model is documented in Appendix A.

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.

Groundfish ACLs are set for management units, which include stocks, stock complexes, or geographic subdivisions thereof. Stock complexes group co-occurring species, many of which have not been formally assessed. Section 2.1.3 describes how ACLs for stock complexes are developed based on ABC estimates of component stocks. Stocks within these complexes are not managed individually for a variety of reasons including the lack of assessments, lack of reliable catch data at the species level, or they constitute a small portion of catches. If a stock within a complex is individually assessed it may be managed under a separate harvest limit, when practicable.

Stocks with their own ACLs 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 international agreement.

Separate ACLs may be set for geographic subcomponents of a stock for management purposes. However, the development of subcomponent ACLs is based on managing these stocks throughout their range within U.S. waters. As part of the proposed action the Council is considering a change in the scope of subcomponent ACLs for lingcod that would better reflect biological and fishery characteristics. Currently lingcod is managed in two area components, north and south of 42° N. latitude. Under the proposed action the dividing line would be moved to 40°10' N. latitude, near Cape Mendocino. Cape Mendocino is a biogeographic boundary and as such 40°10' N. latitude is commonly used in groundfish fishery management for the differential application of management measures.

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.

Allocation decisions are also made as part of the biennial harvest specifications process for those stocks for which formal allocations have not been established under the FMP. Section 2.2.2 describes these allocation decisions. Emphasis is placed on equitable division while ensuring conservation goals. Decision-making on these allocations occurs 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.

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.

Measures have been taken to reduce fishing capacity in the limited entry trawl fleet and nontrawl fleets, including: fixed gear permit stacking program implemented by FMP Amendment 14, the trawl vessel buyback program, and catch share management implemented by FMP Amendment 20. Reducing excess capacity is expected to improve the efficiency in the utilization of fishery resources as well as reduce the levels of incidental catch.

Catch share management in the at-sea whiting sectors and the shoreside IFQ fishery promote efficiency of utilization by reducing regulatory discards. Vessels in these fisheries are subject to 100 percent observer coverage, which improves catch accounting.

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. For example, different RCA configurations are established for different gear types (trawl versus fixed gear) and the catch control tools also differ. For example, at-sea whiting fisheries are managed by co-ops, the shoreside IFQ fishery by IFQs, and limited entry fixed gear fishery for sablefish by vessel-level allocations (permit stacking). Within these fisheries and in the open access sector cumulative trip limits are used for particular management units and/or during certain times of the year. Recreational fisheries are managed with area closures and bag limits proposed by the states and appropriate to the catches and characteristics of each state's recreational fishery.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Generally, by coordinating management, monitoring, and enforcement activities between the three west coast states, duplication, and thus cost, is minimized. Appendix C evaluates proposed management measures in detail, including consideration of associated costs and duplication.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), … take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

This document evaluates the effects of the alternatives on fishing communities (see section 4.3). These effects were taken into account in choosing the preferred "integrated alternative" (incorporating harvest specifications and related management measures). The alternatives are structured to allow a comparison of the tradeoffs between the requirements of the MSA. The requirements in Section 304(e)(4)(A) of the MSA include rebuilding overfished stocks in as short a time possible, taking into account the needs of fishing communities, and minimizing adverse economic impacts to fishing communities. Each integrated alternative contains a suite of ACLs for overfished species associated with a particular rebuilding strategy (target year and harvest rate) and management measures needed to constrain catches to these harvest levels. Target species catch for each alternative is projected based on these management measures, which allows an estimate of resulting ex-vessel revenue and personal income impacts at the community level (with the port group area the unit of analysis for community impacts). In this way the 'rebuild in as short a time as possible' standard can be contrasted with the 'needs of fishing communities' standard to demonstrate what level of catch or bycatch of overfished species is necessary to address adverse impacts to fishing communities.

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 overfished species in particular, is an important component of the alternatives. Through the use of GCAs fishing effort is reduced in areas where overfished species are most abundant, thereby reducing potential bycatch. As noted above, catch share management, particularly in the shoreside IFQ fishery, has reduced bycatch by eliminating most regulatory discards (some non-target species are managed with cumulative trip limits, which may induce some level of regulatory discards). Nontrawl sectors use cumulative trip limits as the principal catch control tool. Because trip limits are based on landings, when they are set at a low level to discourage directed and incidental catch of overfished species, this can result in regulatory discards.

The petrale sole rebuilding plan established objectives reflecting that it is an important target species for vessels using groundfish bottom trawl gear (managed under the shoreside IFQ fishery). The rebuilding plan allows a limited target fishery to continue, which in concert with IFQ management minimizes discards.

The at-sea whiting sectors are managed under bycatch limits for selected overfished species. Mandatory co-ops in the mothership sector are allocated a portion of these sector bycatch limits and are accountable for keeping catch of these species within their allocation. The catcher-processor operates as a single, voluntary co-op responsible for the bycatch limit assigned to the sector.

As noted above, the at-sea whiting sectors and shoreside IFQ fishery are subject to 100 percent observer coverage. While necessary for catch accounting under IFQ/co-op management, observers also allow complete monitoring of total catch (including bycatch). The limited entry fixed gear sector and directed open access fisheries are subject to partial observer coverage. This observer data is used to develop bycatch rate estimates, which can be used to forecast and account for total catch of all managed species.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

RCAs may affect safety if more vessels elect to fish seaward of the closed areas and are more exposed to bad weather conditions. Individual accountability under catch share management has resulted in vessels fishing more often seaward of the RCA in order to avoid catch of species such as canary and yelloweye rockfish, for which the allocations and resulting available QP are limited. As harvesters gain experience with the management program they may be able to develop opportunities to fish shoreward of RCAs while avoiding catch of these species, resulting in more inshore fishing.

The moratorium on quota share trading is expected to sunset beginning in 2013, which may lead to further capacity reduction and increased profits in the trawl sector. This may result in more investment in vessels and equipment that would enhance safety. Less efficient vessels are expected to leave the trawl fishery as part of this consolidation, which may eliminate older, less safe vessels.

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.

5.3 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 NS1 Guidelines (50 CFR 600.310).

NMFS prepared an EIS evaluating programmatic measures designed to identify and describe west coast groundfish EFH (NMFS 2005), 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. The Council is planning to commence a 5-year review of its groundfish EFH designation in 2011. Section 4.1.4 in this EIS describes impacts of the proposed action on EFH, consistent with the EFH assessment requirements of 50 CFR 600.920 (e)(3).

5.4 Public Scoping under MSA

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 biennial specifications process. The advisory bodies involved in groundfish management include the 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. Meetings of the Council and its advisory bodies constitute the Council scoping process, involving the development of alternatives and consideration of the impacts of the alternatives. In addition to Council-sponsored meetings, the Washington Department of Fish and Wildlife (WDFW), ODFW and CDFG held public hearings to solicit input on the formulation of management measures.

Table 5-1 summarizes Council decision-making steps in developing biennial harvest specifications and management measures.

Table 5-1.Summary of Council decision-making during biennial harvest specifications process.

Council meeting	Council Actions
June 8-13, 2011	Set schedule for developing 2013-14 harvest specifications and conduct preliminary review of stock status information.
September 14-19, 2011	Adopt new stock assessments for use in management, OFLs, and a range of ABC values; prioritize a range of new management measures for preliminary analysis.
November 2-7, 2011	Adopt overfished species rebuilding analyses; adopt ABCs for analysis; identify tentative range of allocation alternatives. Review exempted fishing permits for 2013-14. Adopt new management measures for detailed analysis.
March 2-12, 2012	Adopt revised ACL for the Other Fish complex and ACLs for lingcod north and south of 40°10’ N. latitude.
April 1-6, 2012	Adopt preferred alternative ACLs and narrow the range of allocations and management measures under consideration.
June 20-25, 2012	Adopt final preferred alternative including all elements for the 2013-14 management program.

Chapter 6 NEPA and Other Applicable Laws

6.1 National Environmental Policy Act

The CEQ has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508), and NOAA's agency policy and procedures for NEPA can be found in NOAA Administrative Order 216-6 (NAO 216-6). The required elements of an Environmental Impact Statement (EIS) and the public process associated with an EIS are specified in both CEQ's regulations and NAO 216-6.

The required elements of an EIS are as follows (as per NAO 216-6 5.04b):

- A cover sheet and table of contents;
- A discussion of the purpose and need for the action;
- A summary of the EIS, including the issues to be resolved, and in the FEIS, the major conclusions and areas of controversy including those raised by the public;
- Alternatives, as required by Sections 102(2)(C)(iii) and 102(2)(E) of NEPA;
- A description of the affected environment;
- A succinct description of the environmental impacts of the proposed action and alternatives, including cumulative impacts;
- A listing of agencies and persons consulted, and to whom copies of the EIS are sent;
- A ROD, in the case of a FEIS, and;
- An index and appendices, as appropriate.

Comments received on the DEIS during the 45-day public comment period, which ended on July 30, 2012, are addressed in this FEIS (see Chapter 7). It is noted that August 6, 2012, was listed as the end of the public comment period in the Dear Reviewer letter that accompanied the DEIS. Thus, NMFS accepted all public comments received through August 6, 2012, to avoid any confusion. NMFS will publish a Notice of Availability for a 30-day public comment period for the FEIS and will conclude the NEPA process with a Record of Decision prior to deciding whether to approve, partially approve, or disapprove this proposed action under the MSA.

6.1.1 Notice of Intent and Public Scoping Under NEPA

The National Marine Fisheries Service in coordination with the Pacific Fishery Management Council published a Notice of Intent (NOI) on November 14, 2011, to announce the intent to develop and prepare an EIS. This EIS will include analysis of the impacts of setting harvest specifications (including OFLs, ABCs, and ACLs) and management measures for 2013 and 2014, pursuant to the Pacific Coast Groundfish Fishery Management Plan.

The purpose of the NOI was to alert the interested public of the commencement of the scoping process and to provide for public participation in compliance with the National Environmental Policy Act. The scoping process is the first and best opportunity for the public to raise issues and concerns for the Council and NMFS to consider during the development of the harvest specifications and management measures.

The Council and NMFS rely on input during scoping to both identify management measures and develop alternatives that meet the objectives of the Pacific Coast Groundfish FMP.

The public comment period was open for thirty days, ending on December 14, 2011. No public comments were received on the scope of the action during the thirty-day public comment period.

6.1.2 Related NEPA documents

The following NEPA documents provide information and analyses related to the effects of this proposed action:

- Trailing Actions for the Pacific Coast Groundfish Trawl Rationalization Program, Including 1. Pacific Halibut Trawl Bycatch Mortality Limit (Amendment 21-1); 2. Exemption from the Prohibition on Processing At Sea in the Shorebased IFQ Program, DRAFT Environmental Assessment. Published by the Pacific Fishery Management Council in July 2011. (http://www.pcouncil.org/groundfish/fishery-management-plan/amendment-21-1/)
- Proposed Harvest Specifications and Management Measures for the 2011-2012 Pacific Coast Groundfish Fishery and Amendment 16-5 to the Pacific Coast Groundfish Fishery Management Plan to Update Existing Rebuilding Plans and Adopt a Rebuilding Plan for Petrale Sole; Final Environmental Impact Statement. Published by the Pacific Fishery Management Council and NMFS in February 2011. (http://www.pcouncil.org/wp-content/uploads/1112GF_SpexFEIS_100806-FINAL_feb21_.pdf)
- Amendment 23: Considerations for a New Harvest Specification Framework that Incorporates Revised National Standard 1 Guidelines to Prevent Overfishing, Environmental Assessment. Published by the Pacific Fishery Management Council and NMFS in September 2010. (http://www.pcouncil.org/groundfish/fishery-management-plan/fmp-amendment-23/)
- Allocation of Harvest Opportunity between Sectors of the Pacific Coast Groundfish Fishery (Amendment 21 to the Groundfish FMP); Final Environmental Impact Statement Including Regulatory Impact Review and Initial Regulatory Flexibility Analysis. Published by the Pacific Fishery Management Council and NMFS in June 2010.(http://www.pcouncil.org/groundfish/fishery-management-plan/fmp-amendment-21/)
- Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery (Amendment 20 to the Groundfish FMP); Final Environmental Impact Statement Including Regulatory Impact Review and Initial Regulatory Flexibility Analysis. Published by the Pacific Fishery Management Council and NMFS in June 2010. (http://www.pcouncil.org/groundfish/fishery-management-plan/fmp-amendment-20/#EIS)

Information may be incorporated by reference from these documents into this EIS. Council on Environmental Quality (CEQ) regulations (40 CFR 1502.21) state "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." When information from the above document is incorporated, these procedures are followed within the body of this EIS.

6.1.3 Preparers and Listing of Agencies and Persons Consulted

The following people wrote the EIS:

Kelly Ames, Pacific Fishery Management Council: Sections 2.2, 2.3, 2.4, 2.5

Christopher "Kit" Dahl, Pacific Fishery Management Council: Executive Summary, Chapter 1, Sections 3.2, 4.2, 4.3, 4.4, Chapter 5, Chapter 6, document management

John Devore, Pacific Fishery Management Council: Sections 2.1, 3.1.1, 4.1.1
Kerry Griffin, Pacific Fishery Management Council: Sections 3.1.2, 3.1.3, 3.1.4, 4.1.2, 4.1.3, 4.1.4
Becky Renko, National Marine Fisheries Service, Northwest Region: Sections 3.1.2, 3.1.3, 3.1.4
Edward Waters, Contracting Economist: Sections 3.2, 4.2

This EIS was prepared and evaluated in consultation with the National Marine Fisheries Service and the Pacific Fishery Management Council. In addition, members of the Groundfish Management Team (GMT) and the Scientific and Statistical Committee (SSC) prepared and reviewed portions of the analyses and provided technical advice during the development of the EIS. Members of Council advisory bodies are listed in rosters available at http://www.pcouncil.org/council-operations/council-and-committees/council-and-committee-rosters/. The following people were also consulted or were involved in reviewing drafts of the document:

Sarah Biegel, NMFS NWR, NEPA Coordinator
Ryan Couch, NOAA GC, Attorney
Kevin Duffy, NMFS NWR, Groundfish Section
James Hastie, NMFS NWFSC
Mariam McCall, NOAA GC, Attorney
Sarah Williams, NMFS NWR, Groundfish Section
Becky Renko, NMFS NWR, Groundfish Section
Ian Taylor, NMFS NWFSC

6.1.4 Agencies, Organizations, and Persons to whom Copies of the FEIS Were Sent

The Council makes the EIS available on its website so anyone with computer access may download a copy of the document. Electronic copies on CD-ROM and paper copies are made available upon request. The Council distributes a notice of availability for the EIS through its electronic mail list, which includes 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 EIS to the following agencies:

- U.S. Department of the Interior, Office of Environmental Policy and Compliance
- Department of State, Office of Marine Conservation
- Environmental Protection Agency, Region 10
- Environmental Protection Agency, Region 9
- U.S. Coast Guard Pacific Area, Thirteenth District
- U.S. Coast Guard Pacific Area, Eleventh District
- Marine Mammal Commission
- Pacific States Marine Fish Commission
- State Coastal Zone Commissionerss
  - Oregon Department of Lands Conservation & Development
  - Washington State Shorelands and Environmental Assistance Program
  - California Coastal Zone Commission
  - San Francisco Bay Conservation and Development Commission

Copies of the FEIS were also sent to the following people:

- Gerry Richter, B & G Seafoods, Inc

- Seth Atkinson, Natural Resources Defense Council
- Geoff Shester, Oceana
- Paul Friesema, Environmental Policy and Culture Program, Northwestern University
- James Mize, Safety and Compliance Manager, Premier Pacific Seafoods, Inc

A Notice of Availability of the DEIS was published in the *Federal Register* on June 15, 2012, triggering a 45-day public comment period, which ended on July 30, 2012. It is noted that August 6, 2012, was listed as the end of the public comment period in the Dear Reviewer letter that accompanied the DEIS. Thus, NMFS accepted and responded to all comments received through August 6, 2012, to avoid any confusion. This FEIS responds to these comments in the manner described in regulations at 40 CFR 1503.4.

Questions concerning this document and requests for additional copies of this document may be addressed to:

Ms. Becky Renko
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way
Seattle, WA 98115
becky.renko@noaa.gov
(206) 526-6110

6.2 Administrative Procedure Act

The Administrative Procedures Act, or APA, governs the Federal regulatory process and establishes standards for judicial review of Federal regulatory activities. Most Federal rulemaking, including regulations promulgated pursuant to the MSA, are considered “informal,” which is determined by the controlling legislation. Provisions at 5 U.S.C. 553 establish rulemaking procedures applicable to the proposed action. Section 6.2 in the Groundfish FMP (PFMC 2011b) specifies that biennial harvest specifications and management measures require ‘full notice-and-comment rulemaking’ to implement the regulations necessary to implement the Council recommendation. The rulemaking associated with this proposed action will be conducted in accordance with the APA and procedures identified in section 304 of the MSA.

6.3 Additional Laws and Executive Orders Applicable to the Proposed Action

In addition to the Magnuson-Stevens Act (see Chapter 5), the National Environmental Policy Act, and the Administrative Procedures Act there are other laws and Federal Executive Orders that may impose substantive and procedural requirements on the proposed action. These other laws and executive orders are described below.

6.3.1 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. A determination as to whether the proposed action is 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 will be 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.

6.3.2 Endangered Species Act

The Endangered Species Act of 1973 (ESA) was signed on December 28, 1973, and provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The ESA replaced the Endangered Species Conservation Act of 1969; it has been amended several times.

A “species” is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become an endangered species within the foreseeable future.

Federal agencies are directed, under section 7(a)(1) of the ESA, to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Federal agencies must also consult with NMFS or USFWS, under section 7(a)(2) of the ESA, on activities that may affect a listed species. These interagency consultations, or section 7 consultations, are designed to assist Federal agencies in fulfilling their duty to ensure Federal actions do not jeopardize the continued existence of a species or destroy or adversely modify critical habitat. Should an action be determined to jeopardize a species or result in the destruction or adverse modification of critical habitat, NMFS or USFWS will suggest Reasonable and Prudent Alternatives (RPAs) that would not violate section 7(a)(2).

Biological opinions document whether the Federal action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat. Where appropriate, biological opinions provide an exemption for the “take” of listed species while specifying the extent of take allowed, the Reasonable and Prudent Measures (RPMs) necessary to minimize impacts from the Federal action, and the Terms and Conditions with which the action agency must comply.

NMFS NWR SFD consulted with Protected Resources Division (PRD) pursuant to section 7(a)(2) of the ESA on the effects of the operation of the Pacific coast groundfish fishery in 2012. PRD published a Biological Opinion on February 9, 2012, documenting their findings. In the Opinion, NMFS concludes that the proposed action (operation of the Pacific coast groundfish fishery in 2012) is not likely to jeopardize the continued existence of green sturgeon *(Acipenser medirostris),* eulachon *(Thaleichthys pacificus),* humpback whales *(Megaptera novaeangliae),* Steller sea lions *(Eumetopias jubatus),* and leatherback sea turtles *(Dennochelys coriacea).* NMFS also concludes that the proposed action is not likely to destroy or adversely modify designated critical habitat of green sturgeon or leatherback sea turtles.

Furthermore, NMFS concludes that the Pacific coast groundfish fishery may affect, but is not likely to adversely affect the following species and designated critical habitat in 2012:

- Sei whales *(Balaenoptera borealis)*
- North Pacific Right whales *(Eubalaena japonica)*
- Blue whales *(Balaenoptera musculus)*
- Fin whales *(Balaenoptera physalus)*
- Sperm whales *(Physter macrocephalus)*
- Southern Resident killer whales *(Orcinus orca)*
- Guadalupe fur seals *(Arctocephalus townsendi)*
- Green sea turtles *(Chelonia mydas)*

- Olive ridley sea turtles *(Lepidochelys olivacea)*
- Loggerhead sea turtles *(Carretta carretta)*
- Critical habitat of Southern Resident killer whales and
- Critical habitat of Steller sea lions

NMFS does not include an incidental take statement for leatherback sea turtles, because take of this species is unlikely to occur over the opinion term. The annual estimated level of serious injury or mortality incidental to proposed fishing was less than one individual.

6.3.3 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 USFWS 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.

Pursuant to the MMPA, the List of Fisheries (LOF) classifies U.S. commercial fisheries into one of three Categories according to the level of incidental mortality or serious injury of marine mammals:

I. frequent incidental mortality or serious injury of marine mammals
II. occasional incidental mortality or serious injury of marine mammals
III. remote likelihood of/no known incidental mortality or serious injury of marine mammals

The Marine Mammal Protection Act (MMPA) mandates that each fishery be classified by the level of serious injury and mortality of marine mammals that occurs incidental to each fishery is reported in the annual Marine Mammal Stock Assessment Reports for each stock. On the 2012 List of Fisheries the WA/OR/CA sablefish pot fishery is listed as a category II fishery due to interactions with humpback whales. All other west coast groundfish fisheries are listed as category III fisheries. (See http://www.nmfs.noaa.gov/pr/interactions/lof/final2012.htm.)

Commercial fishing vessels participating in Category I or II fisheries must be covered by a Federal permit under the MMPA. For most fisheries, including all west coast fisheries, a blanket permit is issued for all Federal or state permits authorizing participation in the fishery.

6.3.4 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.

6.3.5 Paperwork Reduction Act

The Paperwork Reduction Act requires that agency information collections minimize duplication and burden on the public, have practical utility, and support the proper performance of the agency's mission.

6.3.6 Regulatory Flexibility Act

The Regulatory Flexibility Act 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 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. If the projected impact of the regulation exceeds $100 million, it may be subject to additional scrutiny by the Office of Management and Budget

6.3.7 Executive Order12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. It directs agencies to choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach. The agency must 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 a regulatory impact review (RIR) for all regulatory actions of public interest. 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.

6.3.8 Executive Order 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 Section 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.

6.3.9 Executive Order 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.”

6.3.10 Executive Order 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. In 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.

6.3.11 Executive Order 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.

6.4 Findings

The Council process and this EIS are intended, where possible, to meet the public involvement requirements and provide the information and analysis necessary to address the mandates described above. Mandates that require additional analysis, documentation, and process not met through NEPA are discussed in section 6.5 below. The information and analysis in this EIS supports the following findings with respect to other applicable law.

Coastal Zone Management Act: Harvest specifications and management measures for 2013-2014 are not expected to affect any state's coastal management program.

ESA: NMFS is conducting a section 7 consultation to determine whether activities authorized under groundfish regulations in 2013 and subsequent years are likely to jeopardize the continued existence of any species listed under the ESA. Mitigation measures may be recommended or required depending on the outcome of the consultation. In the meantime, section 3.1.4 describes new information about the incidental take of listed species and section 4.1.4 assesses the effects of the proposed action on listed species. Although the operation of groundfish fisheries may differ from previous management cycles there is insufficient information to predict whether the effects on listed species will differ from previous management cycles.

Marine Mammal Protection Act: Section 3.1.4 describes new information about the incidental take of marine mammals and section 4.1.3 assesses the effects of the proposed action on marine mammals. Although the operation of groundfish fisheries may differ from previous management cycles there is insufficient information to predict whether the effects on marine mammals will differ from previous management cycles.

Migratory Bird Treaty Act: The proposed action is unlikely to cause the incidental take of seabirds protected by the Migratory Bird Treaty Act to differ substantially from levels in previous years. Past EISs evaluating the impact of groundfish harvest specifications (PFMC 2006; PFMC 2008a; PFMC and NMFS 2011) evaluated impacts to seabirds and concluded that the proposed action will not significantly impact seabirds. (Section 4.1.4 evaluated impacts of the proposed action on protected species)

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.

Executive Order 12898 (Environmental Justice): The proposed action will not result in disproportionate adverse impacts to low income and minority communities (see section 4.4.4).

Executive Order 13132 (Federalism): The proposed action does not have federalism implications subject to EO 13132.

Executive Order 13175 (Consultation and Coordination with Indian Tribal Government): Harvest specifications and management measures for 2013-2014 have been developed in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds): See the finding for the Migratory Bird Treaty Act, above.

6.5 Mandates Addressed Through Separate or Parallel Processes

6.5.1 ESA

NMFS Northwest Region Sustainable Fisheries Division has initiated consultations pursuant to section 7(a)(2) of the ESA on the effects of the operation of the Pacific coast groundfish fishery in 2013 and subsequent years. The Biological Opinions and subsequent findings are intended to publish before regulations for this proposed action are final. NMFS will take into account any reasonable and prudent alternatives identified in aBiological Opinion.

6.5.2 Executive Order 12866 (Regulatory Impact Review) and the Regulatory Flexibility Act

NMFS develops the necessary analysis and documentation needed to address these mandates as part of the Federal rulemaking process implementing groundfish harvest specifications and management measures. These analyses rely substantially on the contents of this EIS and the socioeconomic impact evaluation in Chapter 4 and baseline information in Chapter 3, which have been developed in conjunction with NMFS NWR staff to provide information needed for the Regulatory Impact Review and Regulatory Flexibility Act analyses.

Chapter 7 Response to Comments

7.1 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 June 15,2012, and ended on July 30, 2012 (77 FR 35961; June 15, 2012). It is noted that the Dear Reviewer letter cited the incorrect date of August 6, 2012, for when the public comment period ended. To avoid any confusion, NMFS accepted any comments received by the August 6th date.

Comments on the DEIS were provided by the U.S. Environmental Protection Agency; and the U.S. Department of the Interior. The letter received from the U.S. Department of the Interior indicated that the Department had no comments. This chapter summarizes the comments (in italics) received on the DEIS and provides the responses from the National Marine Fisheries Service to those comments. This chapter also identifies those who received copies of the EIS.

7.2 Response to comments

Copies of the two comment letters received may be found in Appendix E. Substantive comments have been summarized below with responses.

Comment 1: *The EIS does not include an alternative that considers ACLs for canary rockfish and POP where the ACL for both species is lower than the current conditions (No Action). We recommend NMFS consider such an alternative.*

Response: Alternative 2 considered ACLs for canary rockfish and POP that are lower than No Action. Alternative 2 considered a canary rockfish ACL based on a more conservative SPR than No Action and which resulted in an ACL of 101 mt in 2013 and 104 mt in 2014. The No Action ACL for canary rockfish is 107 mt. Alternative 2 also considered POP ACLs lower than No Action. The POP ACLs under Alternative 2 are 150 mt in 2013 and 153 mt in 2014. The No Action ACL for POP is 183 mt. POP would continue to be managed with an ACT of 157 mt under No Action.

An alternative with ACLs for both canary rockfish and POP that were lower than Alternative 2, such as an alternative that combined the lowest ACLs for each species with canary rockfish ACLs of 48 mt in 2013 and 49 mt in 2014 along with POP ACLs of 74 mt in 2013 and 76 mt in 2014 was considered early in the process but was not developed into an integrate alternative. Further discussion regarding why such an alternative was not been fully developed has been added to Section 2.5.1.

Comment 2*:* *Adverse impacts to non-target species, such as leatherback turtles are not identified.*

Response: The potential impacts on protected resources in section 4.1.4 have been revised to include additional discussion on impacts to sea turtles.

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Chapter 9 Index

Appendix A Description of Projection Models

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

September 2012

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This Appendix describes the projection models used for each fishery to estimate the total catch of selected non-overfished species (generally target species) and overfished species.

A.1 Commercial Landings Distribution Model

The purpose of the commercial fishery landings distribution model (LDM) is to inform the Council's management processes by projecting where (PacFIN PCID) landings are likely to occur under a set of alternative scenarios (e.g., alternative ACLs or management measures). The projected landings ports can then be mapped onto Port Area aggregations to allow comparison of the geographic distribution of ex-vessel revenues under the alternatives. Since all the alternatives are modeled consistently, projections from the LDM facilitate comparison of the alternatives in an apples-to-apples fashion.

A list of Port Areas and underlying PCIDs is shown in Table 1. Although used primarily to inform the groundfish management processes, the LDM methodology can be applied to analyze any west coast fishery. In the case of groundfish, exvessel revenue results from the LDM, aggregated by Port Area, are fed directly into the IO Pac input-output model and vessel net revenue projection model, where they are used to calculate and compare economic impacts under the different alternatives.

A.1.1 Data Elements

The core of the LDM is a recent-year commercial fishing landings data report from the Pacific Coast Fisheries Information Network (PacFIN) data system. The standardized PacFIN daily vessel landing is used for this purpose. The PacFIN website briefly describes the vdrfd table thus:

> **Vdrfd table**: The relationship between vessels, tickets, date-of-landing, permit(s), fish-ticket category, and post-distribution species id code. (Produced by prod/refresh_vdrfd.sql.)

For analyzing the 2013-2014 groundfish management specifications, a vdrfd table for 2011 was used.

Key data elements of the LDM provided by the PacFIN data report include:

- Inventories of all species (SPIDs including nominal and market categories after application of species composition factors), round weights and ex-vessel values landed during the year by port ((PCID).
- Assignment of each landing to a fisheries management sector.
- Distribution of species landings and revenues by vessel (DRVID).
- Distribution of species landings and revenues among first receivers (Processor ID).

This historical information forms one of baselines against which changes under the management alternatives can be measured.

A.1.2 Model

Groundfish landings records in the vessel landings table are categorized by fisheries sector. This categorization is based on Council area, port, species and the gear used. The fisheries sector categories align with the GMT fishery sector projection models listed below. The GMT models project landings in each of five sectors under the management alternative as part of their overall analysis of harvest specifications and management measures. The next step is to compute the base year percentage of landings for each fishery sector by each combination of Area, Vessel ID, SPID and PCID. The "area" used for this calculation varies according to the resolution of the corresponding fishery sector projection model, as noted below. The percentages are then applied to the results from the GMT fishery sector projection models to estimate the geographic distribution of landings across ports (PCIDs) in each fishery.

To project the geographic distribution of landings under the alternatives, results from the commercial fisheries sector landings projection models are applied to the landings percentages calculated from the vdrfd report as noted above. Unless indicated otherwise (by the GMT model results or the proposed management measures), landings under the alternatives are assumed to occur in the same ports in proportion to landings observed in the base year vdrfd table. Only landings of the main economic groundfish species that are modeled for each fisheries sector are of concern in the LDM. Landings of nongroundfish species, incidentally-caught groundfish species and overfished species such as canary rockfish, bocaccio and cowcod are generally ignored, as these are not managed by the Council or do not generate significant revenues in groundfish fisheries.

The level of detail carried over from the GMT models to the LDM varies considerably by fisheries sector (Figure A-1). The most detailed results are produced by the IFQ catch projection model which generates a table of projected landings by species category for each groundfish permit ID.

Less detailed results and mappings are used to link the LDM with the remaining fishery sector models. For example, the Non-nearshore fisheries model projects landings of sablefish (and incidentally-caught overfished species) in aggregate for the LE and OA fixed gear fisheries north of 36° N. latitude. So, unless otherwise constrained or indicated under the alternatives, a port (PCID) that received, e.g., 8 percent of the north of 36° LE fixed gear sablefish landings in 2011 is expected to receive 8 percent of projected north of 36° LE fixed gear sablefish landings under each alternative each year of the biennial cycle. The same rationale is applied to distribute OA-DTL fixed gear sablefish landings.

Linkage between the LDM and the Nearshore fisheries model is similar, except the additional area detail in the nearshore model is incorporated to distribute projected landings of nearshore groundfish species by area to the ports (PCIDs) associated with each catch area and in proportion to the distribution of landings observed in the base year vdrfd data table.

The main features the GMT model inputs and additional procedures used for integrating this information in the LDM are described below:

- **IFQ catch projection model:** Projected groundfish target species landings by each vessel/permit participating in the LE trawl fishery. The list of target species projected includes Sablefish, Longspine thornyhead, Shortspine thornyhead, Dover sole, Arrowtooth flounder, Petrale sole, English sole, Other flatfish, and Pacific whiting. Incidental landings of nontarget overfished species are also projected by the model, however these projections are not generally incorporated for economic analysis.
- **Non-nearshore fisheries model:** Projected maximum aggregate landings of sablefish and incidentally caught overfished species north of 36° by vessels participating in the fixed-gear LE and OA-DTL fisheries. Only sablefish landings are used in the economic analysis. Note: To date sablefish landings south of 36° have not been explicitly modeled by the GMT. Instead the sablefish OYs/ACLs under each alternative are compared with landings observed in the base year, and then those ratios are applied to project landings under the alternatives.
- **Nearshore fisheries model:** Projected aggregate landings by area (Oregon, California north of 40°10 and California south of 40°10) of nearshore target species (black rockfish, blue rockfish, cabezon, kelp greenling, lingcod, and other minor nearshore rockfish) by vessels participating in the fixed gear OA fishery. Landings of canary and yelloweye rockfish are also projected however these are not used in the economic analysis of this sector.

- **At-sea whiting fisheries model:** Projected alternative allocations of Pacific whiting to the at-sea CP and mothership fisheries, constrained by anticipated relevant overfished species allocations and observed bycatch rates, if applicable.
- **Tribal fisheries model:** Projected total whiting (shoreside and at sea) and nonwhiting groundfish target species landings by the tribal groundfish fisheries.

A.1.2.1 IFQ fishery

Information in the final end-of-year run for the relevant year from the IFQ catch projection model is used to adjust records in the vdrfd table for IFQ fishery participants. This step produces a calibrated landings report that can be readily linked with IFQ catch projections generated for each groundfish management option or alternative. Projected landings by vessels (permits) are assumed to distribute to ports (PCIDs) based on where those vessels (permits) landed in the base year vdrfd table.

A.1.2.2 Non-Nearshore fisheries

Total sablefish landings projected under each option or alternative for the fixed gear LE and OA-DTL fisheries north of 36° by the non-nearshore fisheries model are distributed to participating vessels and ports (PCIDs) in proportion to where sablefish landings occurred in the base year vdrfd table. For areas south of 36° a different procedure is used. The ratio of sablefish landings in the base year to the corresponding sablefish ACL is calculated. This ratio is then applied to the ACL projected under each option or alternative to estimate total sablefish landings south of 36° under each scenario. Estimated total landings are then distributed to associated landing ports south of 36° in proportion to where sablefish landings occurred in the base year vdrfd table.

A.1.2.3 Nearshore fisheries

For the fixed gear OA fishery, total projected nearshore target species landings under each option or alternative projected by the nearshore fishery model are distributed to participating vessels and ports in the proportions observed in the base year vdrfd table. Nearshore target species distributed in this manner include black rockfish, blue rockfish, cabezon, kelp greenling, lingcod, and other minor nearshore rockfish. The most recent three nearshore fishery catch areas: Oregon, California north of 40°10 and California south of 40°10Whiting fisheries

Total projected landings and deliveries by the two nontribal at-sea whiting fisheries (CP and motherships) under each option or alternative are distributed among vessels that participated in the whiting fishery in proportion to their participation in the base year. Pacific whiting harvest is regulated separately from the nonwhiting groundfish specifications process, but a range of possible Pacific whiting harvests is sometimes analyzed in the groundfish DEIS for purposes of comparison.

A.1.2.4 Tribal groundfish fisheries

Total projected landings and deliveries under each option or alternative by the tribal groundfish fisheries, including shoreside and at sea whiting, are distributed among vessels and ports that participated in those fisheries in proportion to their participation in the base year.

A.1.3 Assumptions and Caveats

Major simplifying assumptions are highlighted here, including:

- Average exvessel prices observed in the base year will carry over to the projection period(s).
- There is no cross hauling of raw product. That is the amount landed in each port area is also processed there.
- Average annual ex-vessel prices are assumed to apply in each port no matter when during the year landings occur.

One concern with this approach is that the more future ex-vessel prices deviate from the range of prices observed in the base year, the more projected revenue impacts may be inaccurate. However if better information is available on future exvessel price trends, it is possible to incorporate this type of information into the revenue projections.

Landings and revenue impacts projected for groundfish by the LDM are used in the IO Pac model to estimate community income impacts under the alternatives. To the degree that processing activities, the vessel's home port, or the residences of owners and workers are located in the port of landing, then a larger portion of the impacts generated by these landings will to accrue in the community associated with the port. However to the extent that processing activities, the vessel's home port, or the residences of workers and owners are located elsewhere, the pattern of landings may overstate the value of these activities to the local economy. Where landings are made in one port but a vessel's home port or crew reside elsewhere, or where first receivers transfer landings elsewhere for processing, at least a portion of projected income impacts may be attributed to the wrong port.

A.1.4 Results

Results from the LDM are used as inputs to estimate community income impacts and vessel sector net revenues ("profits") under the alternatives. Projected revenues by species, fishing sector and port are fed into the IO Pac model to generate community personal income impacts under each alternative. IO Pac is in input-output economic model constructed using landings data, vessel cost estimates, and secondary economic data to estimate income and employment impacts resulting from a change in the distribution of commercial fishery landings. Projected landings and revenue for groundfish species by each groundfish fishery sector coupled with vessel cost estimates from IO Pac are also used to estimate net revenues accruing to vessel owners participating in west coast groundfish fisheries. Estimates from these two models are used to compare and contrast economic impacts under the groundfish management alternatives.

Tables 2 and 3 compare results generated using the LDM to analyze management measures and harvest specifications for the 2007-2008 and 2009-2010 groundfish management cycles with actual landings recorded during those periods.

Table A-1. List of Port Groups and PCIDs in the Landings Distribution Model.

State	Port Group Area	County	PCID	Port Name
Washington	**Puget Sound**	Whatcom	BLN	Blaine
		Whatcom	BLL	Bellingham Bay

State	Port Group Area	County	PCID	Port Name
		San Juan	FRI	Friday Harbor
		Skagit	ANA	Anacortes
		Skagit	LAC	La Conner
		Snohomish	ONP	Other North Puget Sound Ports
		Snohomish	EVR	Everett
		King	SEA	Seattle
		Pierce	TAC	Tacoma
		Thurston	OLY	Olympia
		Mason	SHL	Shelton
	North Washington Coast	Jefferson	TNS	Port Townsend
		Clallam	SEQ	Sequim
		Clallam	PAG	Port Angeles
		Clallam	NEA	Neah Bay
		Clallam	LAP	La Push
	South & Central WA Coast	Grays Harbor	CPL	Copalis Beach
		Grays Harbor	GRH	Grays Harbor
		Grays Harbor	WPT	Westport
		Pacific	WLB	Willapa Bay
		Pacific	LWC	Ilwaco/Chinook
		Klickitat	OCR	Other Columbia River Ports
Oregon	**Columbia River**	Multnomah	CRV	Psuedo Port Code for Columbia River
	Astoria-Tillamook	Clatsop	AST	Astoria
		Clatsop	GSS	Gearhart - Seaside
		Clatsop	CNB	Cannon Beach
		Tillamook	NHL	Nehalem Bay
		Tillamook	TLL	Tillamook / Garibaldi
		Tillamook	NTR	Netarts Bay
		Tillamook	PCC	Pacific City
	Newport	Lincoln	SRV	Salmon River
		Lincoln	SLZ	Siletz Bay
		Lincoln	DPO	Depoe Bay
		Lincoln	NEW	Newport
		Lincoln	WLD	Waldport
		Lincoln	YAC	Yachats
	Coos Bay	Lane	FLR	Florence
		Douglas	WIN	Winchester Bay
		Coos	COS	Coos Bay
		Coos	BDN	Bandon
	Brookings	Curry	ORF	Port Orford
		Curry	GLD	Gold Beach
		Curry	BRK	Brookings
California	**Crescent City**	Del Norte	CRS	Crescent City
		Del Norte	ODN	Other Del Norte County Ports
	Eureka	Humboldt	ERK	Eureka (Includes Fields Landing)
		Humboldt	FLN	Fields Landing
		Humboldt	TRN	Trinidad
		Humboldt	OHB	Other Humboldt County Ports
	Fort Bragg	Mendocino	BRG	Fort Bragg

State	Port Group Area	County	PCID	Port Name
		Mendocino	ALB	Albion
		Mendocino	ARE	Arena
		Mendocino	OMD	Other Mendocino County Ports
	San Francisco (incl. Bodega Bay)	Sonoma	BDG	Bodega Bay
		Marin	BOL	Bolinas
		Marin	TML	Tomales Bay
		Marin	RYS	Point Reyes
		Marin	OSM	Other Son. and Mar. Co. Outer Coast Ports
		Marin	SLT	Sausalito
		Alameda	OAK	Oakland
		Alameda	ALM	Alameda
		Alameda	BKL	Berkely
		Contra Costa	RCH	Richmond
		San Francisco	SF	San Francisco
		San Mateo	PRN	Princeton
		San Francisco	SFA	San Francisco Area
		San Francisco	OSF	Other S.F. Bay and S.M. Co. Ports
	Monterey	Santa Cruz	CRZ	Santa Cruz
		Monterey	MOS	Moss Landing
		Monterey	MNT	Monterey
		Monterey	OCM	Other S.C. and Mon. Co. Ports
	Morro Bay	San Luis Obispo	MRO	Morro Bay
		San Luis Obispo	AVL	Avila
		San Luis Obispo	OSL	Other S.L..O. Co. Ports
	Santa Barbara	Santa Barbara	SB	Santa Barbara
		Santa Barbara	SBA	Santa Barbara Area
		Ventura	HNM	Port Hueneme
		Ventura	OXN	Oxnard
		Ventura	VEN	Ventura
		Ventura	OBV	Other S.B. and Ven. Co. Ports
	Los Angeles	Los Angeles	TRM	Terminal Island
		Los Angeles	SPA	San Pedro Area
		Los Angeles	SP	San Pedro
		Los Angeles	WLM	Willmington
		Los Angeles	LGB	Longbeach
		Orange	NWB	Newport Beach
		Orange	DNA	Dana Point
		Orange	OLA	Other LA and Orange Co. Ports
	San Diego	San Diego	SD	San Diego
		San Diego	OCN	Oceanside
		San Diego	SDA	San Diego Area
		San Diego	OSD	Other S.D. Co. Ports

Table A-2. Projections under the LDM compared with actual landings: 2007-2008.

				2007-2008 Spex		PacFIN Actual landings				Projections / Actual (% difference)			
		2005 (Base Year)		Final Council Preferred Alt.		2007		2008		2007		2008	
Groundfish Sector	**Port Area**	mt	$ million	**mt**	**$ million**	mt	$ million	mt	$ million	mt	$ million	mt	$ million
Non-whiting Trawl	Puget Sound	2,080.1	2.1	**2,118.3**	**1.9**	893.0	1.0	823.1	1.0	137.2%	98.2%	157.4%	94.7%
	North Washington Coast	552.8	0.5	**514.4**	**0.4**	74.5	0.1	30.5	0.0	590.6%	474.0%	1587.7%	849.6%
	South and Central Washington Coast	483.0	0.5	**458.7**	**0.4**	1,190.2	1.4	1,330.8	1.5	-61.5%	-69.9%	-65.5%	-70.9%
	Astoria-Tillamook	5,641.9	6.5	**6,578.3**	**6.9**	6,391.8	6.7	7,934.1	8.8	2.9%	3.9%	-17.1%	-21.2%
	Newport	1,653.5	2.2	**1,971.3**	**2.4**	2,245.7	3.2	3,136.2	4.6	-12.2%	-24.7%	-37.1%	-48.9%
	Coos Bay	2,230.6	2.6	**2,697.4**	**2.9**	3,080.5	3.8	3,547.6	4.6	-12.4%	-21.9%	-24.0%	-36.7%
	Brookings	679.7	0.8	**910.7**	**1.0**	1,052.0	1.4	1,277.6	1.9	-13.4%	-28.1%	-28.7%	-46.1%
	Crescent City	621.6	0.8	**709.3**	**0.8**	672.8	0.9	752.5	1.0	5.4%	-9.1%	-5.7%	-15.8%
	Eureka	1,860.1	2.2	**2,158.2**	**2.4**	2,880.8	3.6	2,921.2	4.0	-25.1%	-33.1%	-26.1%	-38.9%
	Fort Bragg	1,545.4	1.7	**2,179.8**	**2.3**	1,276.1	1.9	1,508.5	2.3	70.8%	22.5%	44.5%	1.8%
	San Francisco-Bodega Bay	579.7	0.8	**561.6**	**0.8**	1,120.2	1.8	1,057.8	1.8	-49.9%	-58.9%	-46.9%	-57.4%
	Monterey	602.7	0.8	**725.6**	**0.9**	240.6	0.5	286.1	0.5	201.5%	101.4%	153.6%	84.9%
	Morro Bay	410.0	0.5	**460.0**	**0.5**	26.5	0.1	165.5	0.3	1635.9%	767.0%	178.0%	50.3%
	Santa Barbara					0.0	0.0	0.4	0.0			-100.0%	-100.0%
Limited Entry Fixed Gear	Puget Sound	670.7	2.0	**570.0**	**1.6**	554.0	1.9	326.9	1.5	2.9%	-18.3%	74.3%	2.2%
	North Washington Coast	172.3	0.6	**134.6**	**0.5**	180.8	0.8	257.5	0.8	-25.6%	-45.2%	-47.7%	-42.0%
	South and Central Washington Coast	289.5	1.1	**222.9**	**0.9**	231.4	1.0	334.8	1.6	-3.6%	-12.4%	-33.4%	-46.8%
	Astoria-Tillamook	204.1	0.8	**156.2**	**0.6**	135.2	0.6	140.9	0.8	15.6%	1.7%	10.9%	-20.2%
	Newport	378.3	1.5	**287.5**	**1.2**	320.4	1.6	372.6	2.1	-10.3%	-28.2%	-22.8%	-44.9%
	Coos Bay	271.8	1.2	**206.1**	**0.9**	187.0	1.0	183.4	1.1	10.2%	-7.5%	12.4%	-17.0%
	Brookings	148.1	0.6	**115.3**	**0.5**	142.7	0.6	162.2	0.8	-19.2%	-29.7%	-28.9%	-45.1%
	Crescent City	83.1	0.2	**66.4**	**0.2**	61.4	0.2	64.6	0.3	8.1%	-17.6%	2.7%	-40.7%
	Eureka	87.8	0.3	**68.5**	**0.2**	104.4	0.4	123.0	0.5	-34.4%	-38.7%	-44.3%	-51.0%
	Fort Bragg	64.4	0.2	**49.9**	**0.2**	93.9	0.4	108.6	0.5	-46.9%	-54.0%	-54.1%	-65.2%
	San Francisco-Bodega Bay	43.8	0.2	**34.6**	**0.2**	40.4	0.1	43.0	0.2	-14.3%	11.2%	-19.6%	-8.5%
	Monterey	146.3	0.4	**122.7**	**0.4**	145.2	0.5	143.6	0.5	-15.5%	-29.5%	-14.5%	-26.4%
	Morro Bay					1.6	0.0	30.7	0.1	-100.0%	-100.0%	-100.0%	-100.0%
	Santa Barbara	65.2	0.3	**60.7**	**0.2**	44.9	0.3	31.9	0.2	35.1%	-16.7%	90.2%	-0.2%
	Los Angeles	119.7	0.7	**111.7**	**0.7**	127.5	0.8	114.6	0.8	-12.3%	-17.1%	-2.5%	-13.2%
	San Diego	53.9	0.3	**49.2**	**0.3**	60.0	0.4	105.2	0.8	-18.0%	-29.9%	-53.2%	-63.8%
Open Access	Puget Sound	10.9	0.0	**10.1**	**0.0**	1.4	0.0	0.1	0.0	612.9%	174.5%	8500.6%	1409.6%
	North Washington Coast	38.8	0.1	**30.5**	**0.1**	29.5	0.1	29.8	0.1	3.3%	-28.7%	2.2%	4.9%
	South and Central Washington Coast	137.2	0.5	**103.9**	**0.4**	46.6	0.2	68.4	0.3	122.9%	124.6%	52.0%	31.5%
	Astoria-Tillamook	84.2	0.3	**71.5**	**0.2**	55.9	0.2	52.0	0.2	27.9%	0.4%	37.6%	-4.0%
	Newport	24.5	0.1	**21.1**	**0.1**	29.5	0.1	44.8	0.2	-28.7%	-57.8%	-53.0%	-74.8%
	Coos Bay	104.9	0.3	**82.5**	**0.3**	40.3	0.2	81.1	0.4	104.5%	57.8%	1.7%	-37.3%
	Brookings	273.1	1.2	**236.8**	**1.1**	193.3	1.0	227.4	1.2	22.5%	11.4%	4.1%	-13.2%
	Crescent City	88.5	0.4	**87.7**	**0.4**	100.0	0.5	107.1	0.5	-12.3%	-29.1%	-18.1%	-32.6%
	Eureka	88.1	0.2	**70.5**	**0.2**	45.5	0.2	72.4	0.3	54.9%	24.2%	-2.6%	-31.3%
	Fort Bragg	298.8	1.0	**233.0**	**0.8**	108.4	0.5	111.7	0.6	115.0%	72.6%	108.7%	35.8%
	San Francisco-Bodega Bay	49.6	0.3	**47.0**	**0.3**	50.4	0.3	43.2	0.3	-6.7%	-18.9%	8.8%	-27.3%
	Monterey	187.8	0.5	**164.0**	**0.5**	73.5	0.4	112.6	0.5	123.0%	16.1%	45.6%	-12.5%
	Morro Bay	83.7	1.0	**83.1**	**1.0**	188.6	1.4	161.4	1.4	-56.0%	-30.7%	-48.5%	-30.9%
	Santa Barbara	26.8	0.1	**26.8**	**0.1**	20.9	0.2	36.4	0.3	27.8%	-38.9%	-26.6%	-49.8%
	Los Angeles	32.6	0.1	**32.1**	**0.1**	23.6	0.1	25.4	0.1	36.0%	-15.6%	26.6%	-21.8%
	San Diego	34.5	0.2	**31.8**	**0.2**	14.0	0.1	15.4	0.1	126.8%	94.9%	105.9%	124.8%
	TOTAL	**23,304.2**	**39.2**	**25,632.3**	**37.8**	**24,596.9**	**42.6**	**28,504.5**	**51.8**	**4.2%**	**-11.2%**	**-10.1%**	**-26.9%**

Table A-3. Projections under the LDM compared with actual landings: 2009-2010.

		2007 (Base Year)		2009-2010 Spex Final Council Preferred Alt.		PacFIN Actual landings 2009		PacFIN Actual landings 2010		Projections / Actual (% difference) 2009		Projections / Actual (% difference) 2010	
Groundfish Sector	**Port Area**	mt	$ million	**mt**	**$ million**	mt	$ million	mt	$ million	mt	$ million	mt	$ million
Non-whiting Trawl	Puget Sound	852.5	0.9	**1,013.9**	**1.0**	1,300.2	1.1	1,265.9	1.0	-22.0%	-8.6%	-19.9%	4.5%
	North Washington Coast	109.9	0.1	**113.9**	**0.1**	53.5	0.1	10.7	0.0	112.8%	76.3%	967.9%	961.5%
	South and Central Washington Coast	460.0	0.5	**494.8**	**0.6**	1,352.6	1.1	866.2	0.5	-63.4%	-52.0%	-42.9%	0.4%
	Astoria	5,797.1	6.6	**6,674.5**	**7.4**	8,415.3	8.0	7,332.0	6.9	-20.7%	-8.3%	-9.0%	6.7%
	Tillamook	9.0	0.0	**9.0**	**0.0**	27.6	0.0	9.5	0.0	-67.5%	-65.1%	-5.8%	-14.4%
	Newport	1,922.7	2.5	**2,166.9**	**2.9**	3,773.7	5.1	2,722.9	3.7	-42.6%	-43.6%	-20.4%	-21.5%
	Coos Bay	3,534.8	4.0	**3,911.9**	**4.6**	3,625.7	4.2	3,617.5	4.1	7.9%	9.5%	8.1%	11.7%
	Brookings	961.6	1.1	**1,047.5**	**1.3**	1,198.6	1.6	1,321.3	1.8	-12.6%	-21.2%	-20.7%	-29.1%
	Crescent City	695.5	0.8	**743.1**	**0.9**	986.7	1.3	259.3	0.4	-24.7%	-32.9%	186.6%	129.4%
	Eureka	3,034.8	3.5	**3,285.5**	**3.8**	2,667.5	3.5	2,444.5	3.3	23.2%	9.6%	34.4%	15.8%
	Fort Bragg	1,783.5	1.9	**2,055.2**	**2.3**	1,684.3	2.6	1,574.8	2.2	22.0%	-14.0%	30.5%	0.5%
	Bodega Bay	28.5	0.0	**29.6**	**0.0**	52.6	0.1	30.2	0.1	-43.7%	-52.8%	-1.8%	-27.9%
	San Francisco	1,038.6	1.4	**1,131.9**	**1.5**	661.6	1.0	636.5	0.9	71.1%	53.0%	77.8%	71.9%
	Monterey	526.3	0.5	**578.7**	**0.6**	292.7	0.5	340.0	0.5	97.7%	21.9%	70.2%	14.5%
	Morro Bay	26.1	0.0	**28.7**	**0.0**	99.9	0.2	0.0	0.0	-71.3%	-79.5%	100.0%	100.0%
	Santa Barbara					0.0	0.0	0.0	0.0				
Limited Entry Fixed Gear	Puget Sound	528.8	1.8	**629.7**	**2.3**	289.3	1.6	141.3	0.9	117.6%	41.4%	345.6%	155.7%
	North Washington Coast	168.4	0.8	**216.1**	**1.0**	221.9	1.0	142.0	0.8	-2.6%	7.1%	52.2%	30.9%
	South and Central Washington Coast	178.9	0.8	**232.2**	**1.0**	313.5	1.5	505.5	3.1	-25.9%	-33.6%	-54.1%	-67.2%
	Astoria	134.0	0.6	**174.3**	**0.8**	148.5	0.8	22.3	0.1	17.3%	-1.8%	680.3%	475.9%
	Tillamook	0.1	0.0	**0.1**	**0.0**	0.0	0.0	0.0	0.0	100.0%	100.0%	100.0%	100.0%
	Newport	317.6	1.6	**419.2**	**2.1**	529.9	3.1	475.5	3.2	-20.9%	-32.5%	-11.8%	-33.9%
	Coos Bay	185.2	1.0	**244.1**	**1.3**	195.8	1.2	337.3	2.3	24.7%	6.5%	-27.6%	-42.2%
	Brookings	142.2	0.6	**180.4**	**0.8**	264.1	1.4	267.3	1.5	-31.7%	-43.1%	-32.5%	-46.5%
	Crescent City	63.7	0.2	**79.1**	**0.3**	108.4	0.5	50.6	0.2	-27.1%	-50.0%	56.3%	18.9%
	Eureka	100.8	0.4	**131.3**	**0.5**	101.8	0.4	134.4	0.7	28.9%	15.1%	-2.3%	-27.4%
	Fort Bragg	94.6	0.4	**122.9**	**0.5**	151.8	0.9	195.4	1.2	-19.1%	-39.2%	-37.1%	-54.4%
	Bodega Bay	4.4	0.0	**4.4**	**0.0**	9.5	0.1	11.9	0.1	-53.8%	-69.3%	-63.0%	-78.9%
	San Francisco	37.1	0.1	**48.7**	**0.2**	59.9	0.3	49.5	0.3	-18.7%	-34.0%	-1.6%	-49.3%
	Monterey	145.4	0.5	**177.2**	**0.6**	108.2	0.4	145.4	0.6	63.8%	50.9%	21.9%	10.5%
	Morro Bay	8.6	0.0	**10.7**	**0.1**	200.1	0.7	193.2	0.7	-94.6%	-92.1%	-94.5%	-92.4%
	Santa Barbara	45.0	0.3	**97.6**	**0.5**	35.7	0.3	69.5	0.5	173.6%	79.3%	40.5%	-0.1%
	Los Angeles	124.7	0.8	**353.7**	**2.0**	119.2	0.9	124.7	0.9	196.6%	127.6%	183.7%	117.1%
	San Diego	59.9	0.4	**177.1**	**1.1**	82.3	0.6	86.6	0.7	115.2%	67.4%	104.5%	55.8%
Nearshore Open Access	Puget Sound	0.0	0.0	**0.0**	**0.0**	0.0	0.0	0.0	0.0				
	North Washington Coast	2.9	0.0	**2.9**	**0.0**	0.2	0.0	0.8	0.0	1506.1%	1903.4%	254.5%	-8.5%
	South and Central Washington Coast	1.4	0.0	**1.4**	**0.0**	0.0	0.0	1.0	0.0	5350.4%	605.5%	35.9%	-69.8%
	Astoria	1.4	0.0	**1.4**	**0.0**	0.2	0.0	0.3	0.0	752.9%	96.7%	397.2%	-1.6%
	Tillamook	36.9	0.2	**36.9**	**0.2**	32.0	0.1	24.0	0.1	15.3%	11.5%	53.5%	48.7%
	Newport	12.4	0.1	**12.4**	**0.1**	10.2	0.0	12.9	0.0	20.8%	36.4%	-4.4%	15.9%
	Coos Bay	7.9	0.0	**7.9**	**0.0**	3.9	0.0	5.3	0.0	103.3%	53.8%	48.1%	-10.3%
	Brookings	108.1	0.5	**108.1**	**0.5**	161.4	0.9	114.7	0.7	-33.0%	-46.1%	-5.8%	-30.5%
	Crescent City	72.6	0.3	**72.6**	**0.3**	77.5	0.3	47.9	0.2	-6.3%	-7.1%	51.6%	50.9%
	Eureka	15.4	0.0	**15.4**	**0.0**	14.3	0.1	4.0	0.0	8.0%	-10.4%	284.4%	178.1%
	Fort Bragg	9.1	0.1	**9.1**	**0.1**	14.9	0.2	14.4	0.2	-39.0%	-62.6%	-37.2%	-60.9%
	Bodega Bay	1.0	0.0	**1.0**	**0.0**	2.4	0.0	2.8	0.0	-56.9%	-80.2%	-64.0%	-83.5%
	San Francisco	5.2	0.0	**5.2**	**0.0**	20.2	0.1	9.9	0.1	-74.4%	-73.2%	-47.8%	-69.7%
	Monterey	6.3	0.1	**6.3**	**0.1**	16.3	0.2	13.2	0.1	-61.1%	-69.2%	-52.3%	-62.8%
	Morro Bay	23.8	0.2	**23.8**	**0.2**	67.4	0.9	74.9	0.9	-64.7%	-72.9%	-68.2%	-73.4%
	Santa Barbara	0.6	0.0	**0.6**	**0.0**	14.9	0.2	17.2	0.2	-95.9%	-98.3%	-96.4%	-98.5%
	Los Angeles	0.3	0.0	**0.3**	**0.0**	4.9	0.0	5.8	0.0	-93.7%	-95.7%	-94.7%	-94.8%
	San Diego	0.6	0.0	**0.6**	**0.0**	3.8	0.0	1.4	0.0	-85.0%	-80.6%	-58.7%	-65.2%
Non-Nearshore Open Access	Puget Sound	3.2	0.0	**3.7**	**0.0**	0.0	0.0	0.8	0.0	100.0%	100.0%	100.0%	100.0%
	North Washington Coast	27.8	0.1	**35.9**	**0.2**	23.1	0.1	16.9	0.1	55.3%	79.2%	112.7%	80.3%
	South and Central Washington Coast	35.4	0.2	**46.7**	**0.2**	41.5	0.2	56.5	0.3	12.6%	-1.1%	-17.3%	-41.5%
	Astoria	18.6	0.1	**24.2**	**0.1**	17.1	0.1	8.5	0.0	41.7%	18.6%	184.1%	120.6%
	Tillamook	3.3	0.0	**6.6**	**0.0**	2.7	0.0	3.5	0.0	141.8%	112.2%	87.4%	45.6%
	Newport	12.0	0.0	**15.7**	**0.1**	34.3	0.2	24.6	0.2	-54.1%	-67.6%	-36.0%	-59.6%
	Coos Bay	37.4	0.2	**49.2**	**0.2**	82.7	0.4	46.0	0.3	-40.5%	-50.3%	7.0%	-20.4%
	Brookings	80.4	0.5	**104.5**	**0.6**	114.9	0.6	75.0	0.4	-9.0%	-3.1%	39.3%	33.2%
	Crescent City	25.7	0.2	**23.6**	**0.2**	4.2	0.0	0.7	0.0	461.4%	865.8%	3518.6%	6051.4%
	Eureka	33.5	0.1	**43.3**	**0.2**	59.2	0.3	59.6	0.3	-27.0%	-38.3%	-27.4%	-45.8%
	Fort Bragg	101.0	0.4	**132.1**	**0.5**	88.4	0.4	73.4	0.4	49.5%	20.5%	80.1%	38.1%
	Bodega Bay	3.9	0.0	**4.5**	**0.0**	14.9	0.1	29.5	0.2	-69.9%	-36.5%	-84.8%	-75.9%
	San Francisco	35.3	0.2	**39.6**	**0.2**	27.0	0.1	23.1	0.2	46.5%	63.2%	71.8%	54.4%
	Monterey	65.9	0.3	**79.6**	**0.4**	58.0	0.3	69.0	0.3	37.3%	40.8%	15.4%	29.8%
	Morro Bay	160.3	1.1	**199.4**	**1.3**	449.6	1.7	461.9	1.9	-55.7%	-24.0%	-56.8%	-33.0%
	Santa Barbara	24.4	0.2	**25.8**	**0.2**	63.7	0.3	168.9	0.7	-59.4%	-11.7%	-84.7%	-67.7%
	Los Angeles	34.0	0.1	**105.5**	**0.3**	10.2	0.1	8.2	0.1	933.6%	368.5%	1186.0%	477.8%
	San Diego	12.8	0.1	**31.0**	**0.3**	13.7	0.0	29.9	0.1	126.3%	536.9%	3.7%	259.5%
	TOTAL	**24,140.5**	**39.9**	**27,860.4**	**48.6**	**30,682.0**	**54.4**	**26,890.1**	**51.4**	**-9.2%**	**-10.7%**	**3.6%**	**-5.5%**

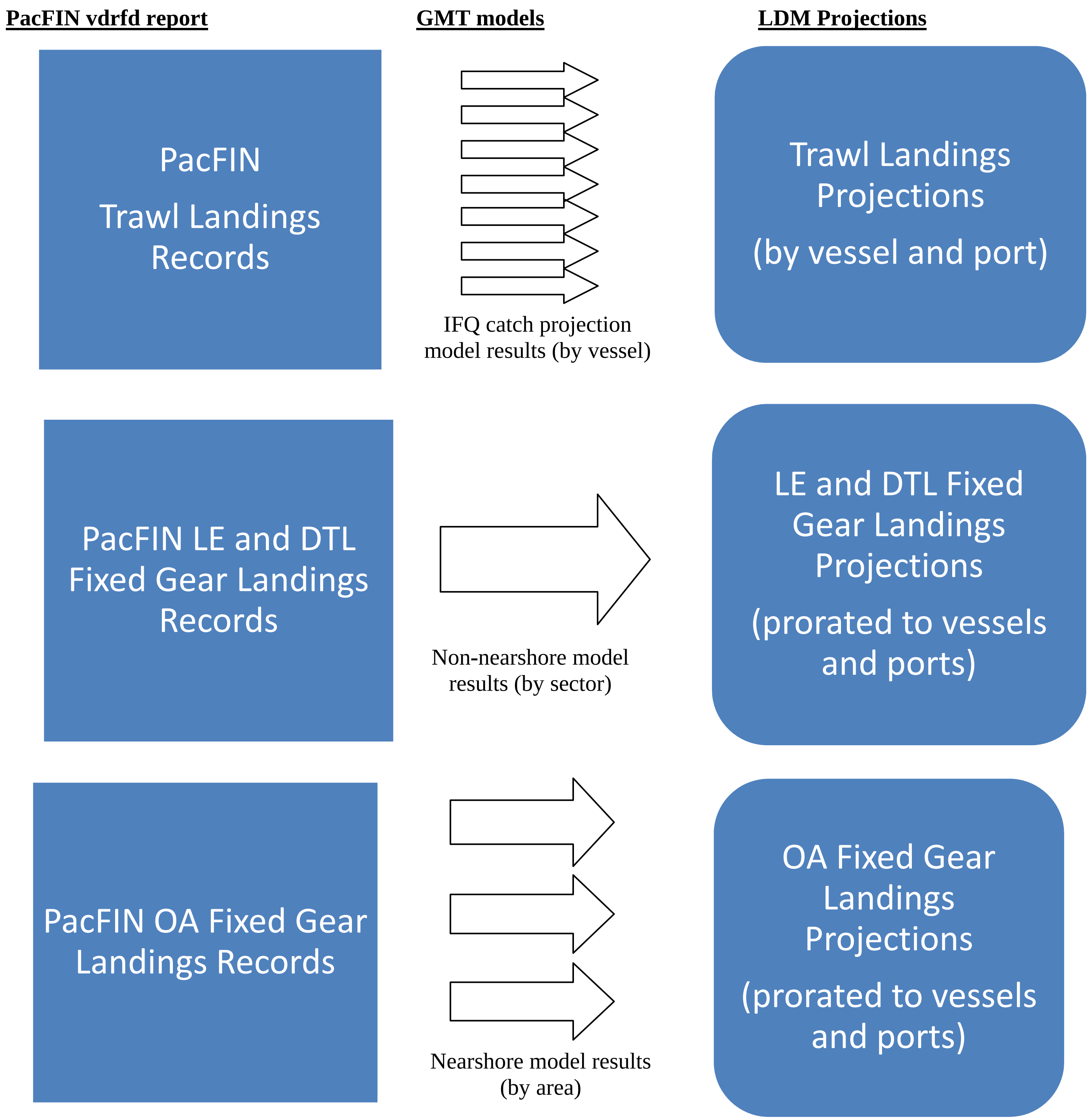

Figure A-1. Linkages between base year data, GMT landings projections, and the LDM.

Note: Results from the at-sea whiting fisheries and tribal fisheries models are incorporated in similar fashion.

A.2 Shorebased IFQ

A.2.1 Analytical description

The purposes of this analysis are to compare the relative predicted total catches and relative constraining influences among the proposed alternatives, in order to explore the range of alternatives, and assist in making the choice of a final preferred alternative in the biennial groundfish harvest specifications for 2013 and 2014. This was accomplished through the development of a new IFQ catch projection model, through the collaboration of staff from the NMFS Northwest Region (Dr. Sean Matson) and the Northwest Fishery Science Center (Dr. Jim Hastie and Dr. Ian Taylor). The model was coded in the R programming language, and executed in R version 2.1.3.0.

A.2.2 Model summary

The purpose of the model is to predict annual total annual catch of target and rebuilding species in the IFQ fishery, under different proposed allocations structures, and to produce landings estimates of each target species for input into economic models, for use in the 2013-14 biennial harvest specifications EIS. Data inputs consist of vessel-species-trip level catch data, vessel account information (total annual quota pounds (QP) by species and vessel account) and fleet allocations by species from the NMFS, IFQ Vessel Accounts system. Total catch is defined here as landings plus discards, and total bycatch is defined the same way, for rebuilding species and Pacific halibut. The model functions at the vessel-species level, and vessel predictions were summed to produce fleet estimates of catch for each IFQ species category. Figure A-2 illustrates the flow of information through the model.

The model predicts catch in three ways: it predicts catch of target species according to annual vessel QP for those species, and expected attainment of target species QP, either as observed in catch data, or the observed attainment rates can be modified by a user-defined formula, for each species, which is applied to every vessel. The model also predicts catch of target species according to the amount of bycatch of rebuilding species (the combination of observed, vessel-specific bycatch ratios and vessel QP of each rebuilding species). It predicts catch of rebuilding species (and Pacific halibut) by applying observed bycatch ratios to final predicted target catch. Observed species and vessel-specific retention rates are applied to final predicted catch, to produce landings estimates.

Catch of target species was deterministically modeled as related to vessel and species-specific attainment of QP. The relationship between variability in observed vessel QP and observed total catch is shown for each IFQ species in Table A-4. The proportion of variation among vessels in catch of each species category, which is explained by variation in QP, is expressed as R^2. Values of this parameter range from 99.9 percent for Pacific whiting, to 95.8 percent for sablefish, north of 36° N. lat., to 52 percent for minor slope rockfish, south of 40°10’ N. lat., to 34.9 percent for arrowtooth flounder, to 0.9 percent for minor shelf rockfish, south of 40°10’ N. lat. These R^2 values give an indication of the reliability of estimates of total catch by species.

Catch of non-target species was modeled as a function of vessel QP and vessel-specific bycatch rates. Thus, catch projections for rebuilding species depend upon the combination of vessel-specific QP for rebuilding species, bycatch ratios of those species, and vessel-specific aggregates of target species attainment rates.

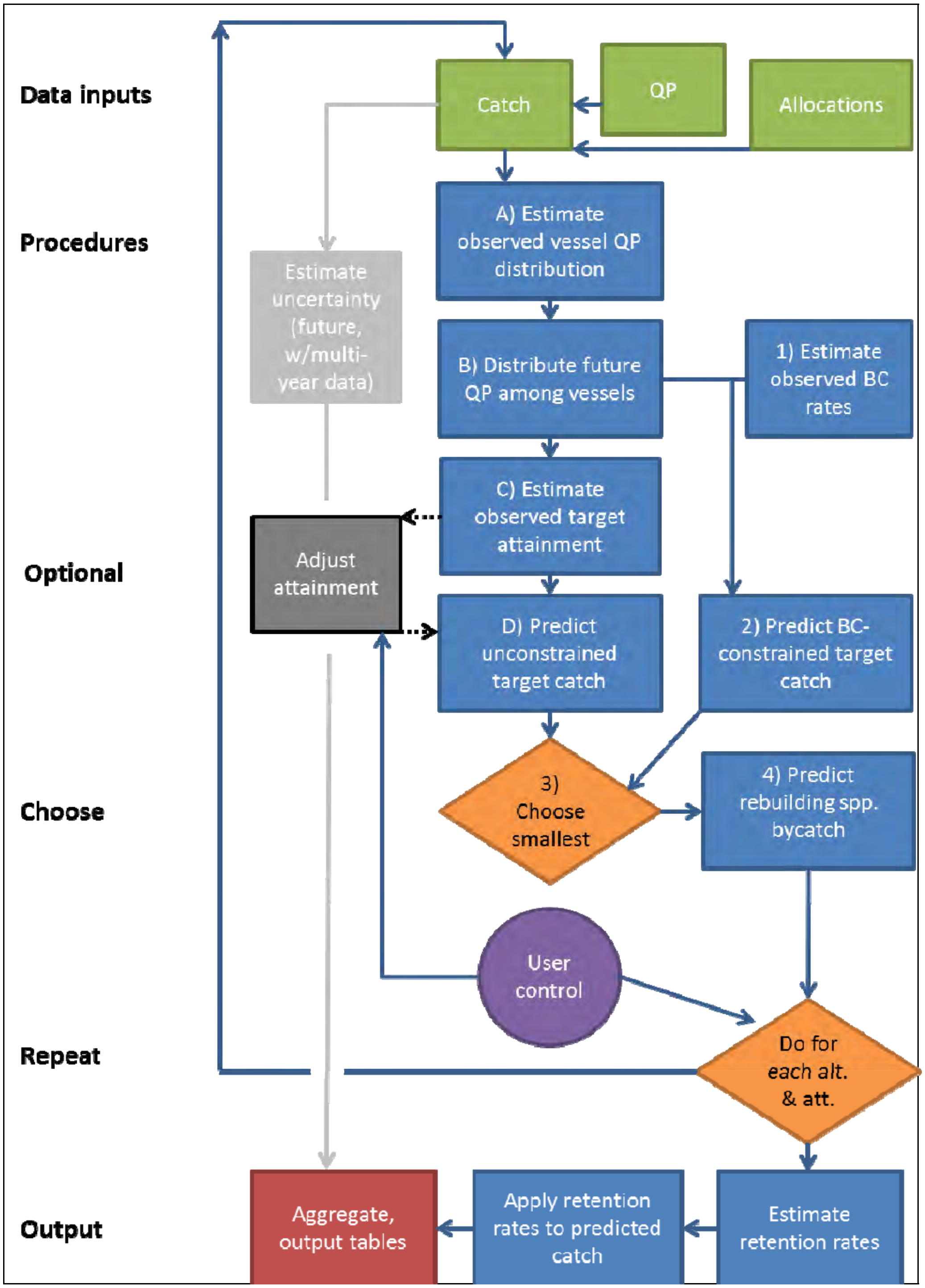

Figure A-2. Diagram illustrating information flow in the IFQ catch projection model, used in the 2013-14 West Coast groundfish harvest specifications.

Table A-4. Estimates of the proportion of variation in observed vessel catch of IFQ species in 2011, explained by variation in vessel QP, for each species category.

IFQ species category	R^2	lo CI	hi CI	p	sig.	n
Pacific whiting	0.999	0.999	0.999	0.000	*	91
Chilipepper rockfish south of 40°10' N.	0.966	0.933	0.999	0.000	*	11
Sablefish north of 36° N.	0.958	0.942	0.974	0.000	*	100
Sablefish south of 36° N.	0.832	0.685	0.979	0.000	*	12
Petrale sole	0.781	0.696	0.866	0.000	*	75
Widow rockfish	0.769	0.669	0.869	0.000	*	58
Longspine thornyheads north of 34°27' N.	0.760	0.669	0.851	0.000	*	76
Shortspine thornyheads north of 34°27' N.	0.642	0.528	0.756	0.000	*	92
Shortspine thornyheads south of 34°27' N.	0.575	-0.607	1.757	0.452		3
Pacific ocean perch north of 40°10' N.	0.546	0.392	0.700	0.000	*	68
Minor slope rockfish south of 40°10' N.	0.520	0.267	0.773	0.000	*	24
Starry flounder	0.460	0.136	0.784	0.005		15
Dover sole	0.444	0.298	0.590	0.000	*	95
Yellowtail rockfish north of 40°10' N.	0.369	0.162	0.576	0.000	*	48
Arrowtooth flounder	0.349	0.196	0.502	0.000	*	93
Pacific cod	0.322	0.096	0.548	0.000	*	40
Lingcod	0.314	0.154	0.474	0.000	*	84
Pacific halibut (IBQ) north of 40°10' N.	0.293	0.125	0.461	0.000	*	75
Darkblotched rockfish	0.289	0.131	0.447	0.000	*	85
Minor slope rockfish north of 40°10' N.	0.176	0.025	0.327	0.000	*	76
English sole	0.148	-0.006	0.302	0.002	*	65
Bocaccio rockfish south of 40°10' N.	0.147	-0.189	0.483	0.275		10
Other flatfish	0.100	-0.019	0.219	0.003	*	84
Minor shelf rockfish north of 40°10' N.	0.071	-0.046	0.188	0.034	*	64
Canary rockfish	0.054	-0.059	0.167	0.090		54
Splitnose rockfish south of 40°10' N.	0.038	-0.124	0.200	0.470		16
Cowcod south of 40°10' N.	0.037	-0.274	0.348	0.807		4
Yelloweye rockfish	0.012	-0.092	0.116	0.735		12
Minor shelf rockfish south of 40°10' N.	0.009	-0.084	0.102	0.086		11

A.2.3 “Unconstrained” target catch prediction

The model predicts total catch of IFQ target species by vessel, by applying the proportion of each vessel’s total annual quota pounds (QP = total allowable catch by species for one particular vessel) which it caught in 2011, to that vessel’s estimated future QP, under a proposed fleet allocation structure. A vessel’s future QP for a particular species category is estimated as the same proportion of the future year’s fleet allocation of that species category, as existed in the observed year. This routine relies upon end-of-year, total QP weights from IFQ vessel accounts. We refer to this as the “unconstrained target catch prediction”, since it is not constrained by bycatch of rebuilding species.

In making predictions of catch, the model either assumes the same attainment level of each vessel’s QP in 2011, or the user adjusts attainment levels for each species category, for a given set of proposed fleet allocations. Vessel total annual QP can be scaled up according to a user-defined function, and parameter value(s). In this case, annual vessel attainment (through November 30) for each species was multiplied by 1.0909, in order to add the equivalent of an additional average month of catch for each vessel. A limit of 100 percent of vessel QP for each species was applied to attainment. This attainment adjustment resulted in a similar monthly catch pattern to 2010. This model was not intended for inseason analysis; however the adjustable attainment mechanism enabled imputation of December catch, in order to meet the deadline for the DEIS.

A.2.4 "Constrained" target catch prediction and bycatch estimation

The model then makes a second type of prediction of target species catch ("constrained target catch prediction"), which is limited by the combination of each vessel's bycatch limits of each rebuilding species (QP), and its bycatch ratios of each rebuilding species, according to the following formula, in order to predict the "constrained" sum target catch:

predicted constrained sum target catch = QP of rebuilding species "X" / bycatch ratio of species "X"

Bycatch ratios are estimated for each species, for each vessel from observed (2011) data as the ratio of each rebuilding species catch, to the observed sum of target species catch.

The two predictions of the sum of target species catch for each vessel are then compared, and the smaller is accepted (either "unconstrained" or "constrained"), reported, and labeled at "target" or "rebuild" in the model output.

Observed bycatch ratios are applied to the final sum of predicted vessel target catch, to produce total bycatch predictions for rebuilding species. The accepted prediction of sum target catch is distributed among target species categories according to the catch composition produced in the unconstrained prediction of target species catch.

A.2.5 Landings estimation

Finally, vessel and species-specific retention rates from 2011 catch data were applied to the predictions of total catch in order to provide landings estimates for revenue modeling by the economic analytical team.

A.2.6 Assumptions and limitations

Although these predictions of catch constitute the best available information at the time of the analysis, several assumptions needed to be made for this exercise. First, due to the timeline for production of the DEIS, catch and vessel account data were truncated at November 30, 2011 to produce vessel landings estimates in time for further analysis by economists, etc. This model was intended to function with one full year of catch data as an input, and so December catch had to be imputed. However, any lack of accuracy of the imputed December catch data does not compromise the usefulness of the model output for the purpose of making relative comparisons of the predictions among alternatives.

Since this is the first year of the IFQ groundfish fishery, and no historic data regarding attainment of allocations exist for the fishery under this management regime, which is vastly different than that of trip limits, it was assumed that the fishery would progress through December of 2011 with vessels fishing at their average monthly vessel and species-specific attainment rate of QP, from January through November of 2011. Imputing December catch in this way also produced a monthly catch time series for DTS species (Dover sole, sablefish, and thornyheads), similar to that of 2010. In the NMFS mid-year IFQ catch report (Matson, 2011), it was shown that Dungeness crab fishery participation was strongly and negatively related to IFQ fishing participation from January through June of 2011 (R^2=0.83). The crab fishery often opens during December, however it was uncertain when this would happen during December of 2011, and thus how much effort could potentially be diverted away from IFQ.

It was also assumed for the purposes of the analysis that all quota pounds (QP) transactions had finished for the year, although additional trading could occur until December 15, 2011. A means for modeling commerce of vessel QP does not yet exist in the current model, although it may be added in the next biennial cycle.

It is inherently assumed in the model predictions of catch that bycatch rates and target species attainment rates will be the same as estimated for 2011. Given that IFQ management for this fishery has existed for less than one year, these rates could change as ratios of QP for different species on each vessel change, new fishing strategies are perfected, risk pools are formed, and different ratios of trawl gear and fixed gear are used.

A.2.7 Bias in catch projections

Catch projections from this analysis are likely to be biased low for 2013 and 2014, and since catch of bycatch species is estimated as a function of vessel catch of all target species, they are affected as well. There are two apparent reasons for this. One stems from the data used for input, and another from the method this first version of the model uses for projecting target catch.

As described earlier, the catch data used for input was incomplete, December catch was imputed, and actual December catch was higher than expected; also incomplete distributions QP to vessel accounts were used, and with no historical annual catch history available in this new fishery, it was impossible to impute the final amounts of QP, thus the QP distributions were biased low.

The second source of low bias in projected catch was also discussed earlier, but it should be noted that it affects projections for bycatch species as well as target species. This source is that the estimation method likely relies too heavily on vessel attainment proportions of their QP for some species. Stated simply, using arrowtooth flounder as an example, it does not seem likely that catch of arrowtooth will drop as drastically as predicted, just because the allocation has dropped drastically, given that this species is vastly underexploited; it's fleet-level attainment rate was only approximately 20 percent in 2011. The amount of variance in vessel catch in this species explained by QP is approximately 35 percent, the rest is likely explained my other predictors such as market influences, processor limits, etc. However, the current version of the model assumes that catch of arrowtooth drops proportionately with the amount of QP available to each vessel.

Since the catch of arrowtooth is relatively large (2 percent of the entire IFQ fishery catch by weight, and 13 percent of the nonwhiting IFQ fishery catch), and since bycatch ratios of rebuilding species are estimated relative to total target species catch, for each vessel, bias in projections of arrowtooth flounder should carry through to those of rebuilding species as well, for vessels which catch arrowtooth. Catch projections for rebuilding species were lower for the alternatives other than No Action, as were arrowtooth flounder, English sole, sablefish north of 36° N. lat., while petrale sole allocations were higher than No Action in all other alternatives (however, the size of the petrale sole allocation is only approximately 5 percent of the sum of the arrowtooth flounder, English sole, and sablefish allocations, for No Action - not enough to counterbalance effects of the other species on projected amounts of total vessel target species catch). It should be noted that vessel catch of sablefish north of 36° N. lat. is strongly related to vessel QP of this species (R^2=0.958).

At least two possible solutions to this problem exist for implementation in the model used for the next harvest specifications and management measures cycle. One is to mediate the proportion of total vessel QP caught for each target species that the model uses to project future target catch by the proportion of the variance in vessel-species catch which is explained by variance in vessel QP for each species (R^2value). For those species whose catch is strongly correlated with the amount of QP available (the amount of QP available results from changes to fleet allocations) projected catch would continue to covary strongly with QP as well. However, for species such as arrowtooth flounder, which weakly covaries with QP, the projected change in catch in response to change in QP would be correspondingly weak (according to R^2 or similar estimate of explicable variance due to QP). Bounds could be placed on projected catch of certain species, corresponding to historical maximums and minimums as well.

Another factor that is often absent from projection models, this one included, is the possibility of change in fisher behavior. The model does not factor the possibility for increased risk in fisher behavior in pursuit of more target catch, and higher resulting bycatch rates of rebuilding species, which could potentially be associated with higher allocations of rebuilding species, and increased confidence after one year of the new IFQ fishery. This situation could be remedied by estimating uncertainty associated with a range of increase or decrease in bycatch rate. This uncertainty could be informed by actual data, when more than one year of catch data exists, such as by the next biennial cycle.

For now, one can look to actual catch data for 2011, as an additional source of inference about absolute amounts of species allocations of bycatch species that are likely to be needed for the next biennium, with the caveat that 2011 was only the first year of the fishery, and one might expect more confidence surrounding bycatch, coinciding with more cooperation and organization among fishermen in the coming seasons, which could enable more full use of bycatch allocations, in pursuit of target species attainment.

A.3 Non-Nearshore

The non-nearshore model projects bycatch impacts for limited entry and open access fixed gear vessels that are fishing seaward of the nontrawl RCA. The main focus is on bycatch of the rebuilding rockfish, canary and yelloweye in particular, as described in Appendix D. WCGOP observations on discards and landed catch 2002-2009 provide the primary data input for estimating bycatch with PacFIN fish ticket data also providing information on the distribution of catch among gear types. Data from 2009 were the most recent data available at the time of the analysis.

As also described in Appendix C, sablefish is the primary target for vessels fishing in these sectors. The sablefish ACL north of 36° N. latitude is apportioned according to the formal intersector allocations shown in Figure A-3. Management measures are intended to keep the total mortality—i.e. discard mortality and landings—within the allocation for each sector. Because of the economic importance of sablefish, the bycatch impact analysis assumes that the annual sablefish allocation will be fully attained by the fixed gear fleets seaward of the RCA. WCGOP bycatch observations are therefore expressed as a ratio to the expected landings of sablefish.

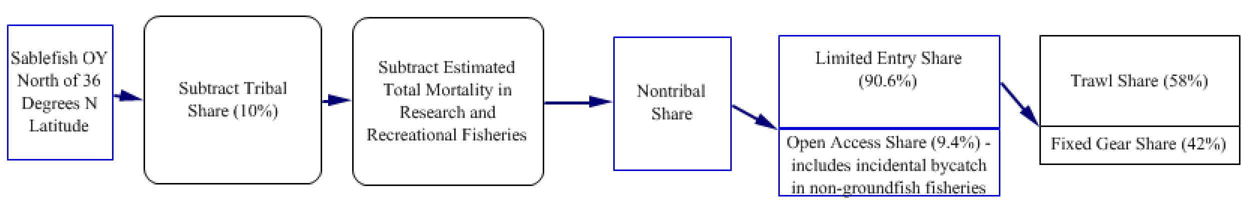

Figure A-3. The formal intersector allocations of sablefish north of 36° N. latitude.

The structure of the projection model has not been changed from that used during the 2009-10 and 2011-12 analyses. Observations were added from 2009 and the model now combines data from the fixed gear sablefish fishery north and south of 40°10' N. latitude from the years 2002-2009. Data from each year is weighted equally. There are tradeoffs with data accuracy and precision involved with stratifying observations to finer levels across attributes (i.e. time, area, depth, and gear type). Aggregating data across years allows reporting of retained and discarded catch of groundfish species by gear type at a finer latitudinal and depth scale than would otherwise be possible. Differences in the encounter rate of yelloweye and canary rockfish between depths and areas are the major focus of the model and so these stratifications have taken priority. The data is stratified by gear because of the differences in the rate of encounter between pot and longline gear types.

Data summarizing observed retained and discarded catch from fishing efforts north of 40°10' N. latitude are stratified across three alternative depth ranges that are used to evaluate the potential impact of extending the seaward boundary of the nontrawl RCA on bycatch levels. As described in Appendix D, the seaward RCA boundary is the key bycatch management measures in these non-nearshore sectors. Although the range of depths recorded for an individual fixed gear set by observers is commonly much smaller than for observed trawl tows, there is some uncertainty in the assignment of catch and discard from many sets to a specific 25 fm interval. For this exercise, the average of the beginning and ending depths of each set was used to represent the depth at which all fish on the set were caught.

The area stratification used in this model was developed first for use in the 2009-10 biennial management cycle. This stratification was arrived at through consideration of canary and yelloweye bycatch north of 40°10' N. latitude by depth and area and provides the Council with the option of employing differential seaward RCA boundaries within these areas. Four subareas were identified bounded by: Cape Mendocino at 40°10' N. latitude, the boundary of the Columbia and Eureka INPFC areas (43°10' N. latitude), Cascade Head (45.064°10' N. latitude), Point Chehalis (46.888°10' N. latitude), and the U.S.-Canada border. Several alternative boundaries were evaluated. Analysts determined that the four listed above provided the greatest contrast and reliability between areas of high and low yelloweye bycatch. Since rockfish bycatch in the pot gear fleet is very small and there are very limited numbers of pot gear observations in some areas, results for this group are summarized with respect to depth only (without subareas). The seaward boundary of the nontrawl RCA south of 40°10' N. latitude has always been 150 fm and so no data is available shallower than that depth.

To produce estimates of catch by area, the model must assume a distribution of sablefish catch between the areas north and south of 40°10' N. latitude and between longline and pot gear types for both the open access and limited entry sectors. The assumed distribution is based on fish ticket landings for the years 2002-2009 (Table A-5). The 2002-2009 average of WCGOP observed landings are then used to project the distribution of the longline catch north of 40°10' N. latitude among the four management subareas (Table A-6). The model then applies WCGOP observed discard rates to these projected catch distributions using the appropriate area, depth, and gear stratification to produce annual estimates of discard for the rebuilding rockfish encountered by the non-nearshore fixed gear sectors. Discard rates were calculated by dividing the total observed discard weight for each species by the weight of retained sablefish and are reported in Table A-7 through Table A-10. Data is available for all species encountered in the non-nearshore sectors, however, this projection model focuses on the rebuilding rockfish stocks and the potential need to adjust the seaward boundary of the RCA to lower their catch. The total mortality of other groundfish species discarded and landed by these sectors is reviewed and accounted for annually and will be addressed if catch reaches levels where a sector allocation or other catch limit is at risk of being exceeded. If necessary, the structure and data in this model could be used to project bycatch of species for which discard becomes a concern in the non-nearshore sectors. The analysis of impact associated with alternative RCA specifications based on this methodology is discussed in Appendix C.

Table A-5. Distribution of fish ticket landings among longline (hkl) and pot gear types in the limited entry and open access non-nearshore fixed gear sectors, 2002-2009.

	LIMITED ENTRY				
	36° - 40°10'		North of 40°10'		TOTAL (LE)
	hkl	pot	hkl	pot	
2002	154	16	783	345	1,298
2003	201	24	1,013	587	1,825
2004	214	58	1,264	575	2,111
2005	212	-	1,319	623	2,154
2006	186	50	1,389	564	2,189
2007	190	45	1,117	391	1,742
2008	226	39	1,146	398	1,809
2009	377	63	1,481	441	2,363
Total	1,758	295	9,513	3,924	15,490
% of LE total	11%	2%	61%	25%	100%

	OPEN ACCESS				
	36° - 40°10'		North of		TOTAL (OA)
	hkl	pot	hkl	pot	
2002	125	82	138	16	361
2003	126	148	246	29	549
2004	90	156	191	10	447
2005	111	262	419	101	893
2006	78	247	280	182	787
2007	31	209	185	32	458
2008	66	206	273	24	570
2009	279	319	305	37	940
Total	906	1,629	2,038	432	5,005
% of OA total	18%	33%	41%	9%	100%

Table A-6. Distribution of observed longline sablefish landings among the four management subareas north of 40°10' N. latitude, 2002-2009.

	Longline				
	North of 40°10' N	**40°10' - Col./Eur. line 43°**	**Col./Eur. line 43° - Cascade Head 45.064°**	**Cascade Head 45.064° - Pt. Chehalis 46.888°**	**North of Pt. Chehalis 46.888°**
Observed sablefish landings (mt)	2,058	296	537	324	900
% of total		**14%**	**26%**	**16%**	**44%**
min (02-09)		*6%*	*17%*	*4%*	*24%*
max (02-09)		*24%*	*37%*	*45%*	*55%*
mean (02-09)		*14%*	*26%*	*18%*	*42%*
stdev (02-09)		*6%*	*7%*	*13%*	*11%*

Table A-7. Rates of species discard (2002-2009 average) for the rebuilding rockfish species relative to retained sablefish, used to project bycatch impacts for longline gear south of 40°10' N. latitude and for pot gear types north and south of north of 40°10' N. latitude.

	36° - 40°10' N. lat.		North of 40°10' N. Lat Pot		
	Longline	Pot	100 fm	125 fm	150fm
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0000	0.0000	0.0000	0.0000	0.0000
Canary rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0014	0.0010	0.0007	0.0007	0.0007
Yelloweye rockfish	0.0002	0.0000	0.0000	0.0000	0.0000

Table A-8. Rates of species discard (2002-2009 average) observed on fixed gear sablefish sets deeper than 100 fm for rebuilding rockfish species, relative to retained sablefish, used to project bycatch impacts for longline gear north of 40°10' N. latitude by management subareas.

	North of 40°10' N	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0001	0.0004	0.0000	0.0000	0.0001
Canary rockfish	0.0016	0.0001	0.0002	0.0021	0.0027
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0025	0.0094	0.0028	0.0009	0.0005
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0001	0.0000

Table A-9. Rates of species discard (2002-2009 average) observed on fixed gear sablefish sets deeper than 125 fm for rebuilding rockfish species, relative to retained sablefish, used to project bycatch impacts for longline gear north of 40°10' N. latitude by management subareas.

	North of 40°10' N	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0001	0.0004	0.0000	0.0000	0.0000
Canary rockfish	0.0012	0.0000	0.0001	0.0001	0.0025
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0030	0.0098	0.0035	0.0019	0.0005
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0001	0.0000

Table A-10. Rates of species discard (2002-2009 average) observed on fixed gear sablefish sets deeper than 150 fm for rebuilding rockfish species, relative to retained sablefish, used to project bycatch impacts for longline gear north of 40°10' N. latitude by management subareas.

	North of 40°10' N	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0000	0.0001	0.0000	0.0000	0.0000
Canary rockfish	0.0012	0.0000	0.0001	0.0000	0.0025
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0039	0.0111	0.0055	0.0025	0.0006
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0000	0.0000

A.4 Coastwide Sablefish Trip Limits

The following section discusses catch projection and trip limit analyses for the four fixed gear, daily trip limit (DTL) fisheries, including both limited entry (LE) and open access (OA), north and south of 36° N. lat. for 2011. Hereafter, they will be referred to as follows: LE North, LE South, OA North, and OA South.

Proposed trip limits for 2013 and 2014 in the fixed gear, sablefish, DTL fisheries were produced through iteration using GMT catch projection models (models described briefly below, and in detail in the 2011-2012 SPEX EIS).

Proposed trip limits in the Preferred Alternatives for 2013 and 2014 were reduced or increased to bring projected catch to within new management targets, resulting from changes to the sablefish ACLs for the areas north and south of 36° N. lat. Landings projections were approximately 91 percent of the landings target, in order to produce trip limits which are likely to result in full attainment of harvest guidelines, while providing sufficient catch buffer, appropriate for the uncertainty in accuracy of estimated landings data, and normal uncertainty associated with statistical model projections. This strategy was supported by the Council in establishing sablefish DTL trip limits for 2012, in the November, 2011 Council meeting.

For 2013, in the LE North fishery, proposed trip limits for 2013 were reduced to approximately 85 percent of No Action levels; for the OA North fishery, proposed trip limits were reduced to 68 percent of No Action. In the area south of 36° N. lat., harvest guidelines were higher than No Action (due to a slightly higher sablefish ACL for 2013 and 2014 in this area). For LE South, proposed trip limits were 104 percent of no action; for OA South, 108 percent. Trip limits for 2014 were slightly higher than for 2013 (2 to 5 percent higher) across all four sablefish DTL fisheries, due to higher ACLs in 2014.

A.4.1 Analytical description

The purposes of this analysis are to compare predicted landings between the No Action Alternative and the Preferred Alternative, under their resultant regional allocations, and fishery harvest guidelines, for the four fixed gear, sablefish daily trip limit (DTL) fisheries, including limited entry (LE) and open access (OA), both north and south of 36° N. lat.

The ACLs, regional allocations, and fishery landing targets (LTs) only vary between the No Action Alternative, versus the Preferred Alternative and all other alternatives, within each year. Levels of these three harvest control points vary only between years (2013-2014), and between No Action and all other alternatives. Within this analysis, “harvest guidelines” is defined as numerical management harvest objectives which are not quotas. These are either cited in regulation or calculated from other higher level numerical management objectives appearing in regulation. These harvest guidelines were reduced to account for discard mortality, the method and rationale for which is described below, to produce “landings targets”, which were used in projection modeling to predict landings, and determine necessary trip limits.

A.4.2 Model description

The catch projection models used in this analysis are linear regression models that relate trip limits to monthly or bimonthly landings, separately for each fishery. Detailed descriptions of the models can be found in Appendix A. of the 2011-2012 harvest specifications EIS.

Limited entry models were specified as described in the 2011-2012 EIS. Minor differences in model specification were made in the open access models for 2013-2014. Sablefish ex-vessel revenue and fuel prices were removed as predictor variables in the open access North and South models. Although these variables present a meaningful picture in retrospect, when their historical values are known, they do not provide valuable information for making projections of future catch, since fuel prices and sablefish prices in the future are not known, are subject to substantial variability, and either assumptions or projections must be made about these would-be predictor variables themselves. Error in assumptions regarding future values of these variables introduces bias and significantly affects accuracy of projections; using them inflates apparent accuracy and precision, producing unrealistically high multiple-R^2 values and low standard errors for the regressions. Trip limits, on the other hand, are known (are set by the Council process), and their use for projecting catch into the future presents a realistic picture of uncertainty. Data from years 2004-2006, when there was extremely small variation in trip limits, and provided little information content for the model, were removed from the OA South model, and resulted in increased model fit.

A.4.3 Model input data

Landings and catch data were acquired from PacFIN using the query "slct_ves_sabl_arid_DTL_no_EFP.sql". As described in the GMT inseason statements from the April, June, September, and November 2011 Council meetings, data from this query were found this year to have two substantial problems, both of which were corrected before use in the analysis for these harvest specifications. First, historical landings of sablefish with fixed gear, in the LE North, DTL fishery were substantially underestimated from 2004 through 2011, as the software in the PacFIN database which estimates division of fixed gear sablefish landings between the sablefish primary fishery and DTL fisheries was malfunctioning. The software has since been modified to make the most accurate division of catch between the two fisheries which is currently possible, and the GMT and Council are working on a long-range solution that would provide direct catch accounting, which would replace the currently necessary computational estimation procedure. Second, gear-switching provisions under IFQ lead to misattribution of IFQ landings of sablefish using fixed gear, to the various sablefish DTL fisheries. This has also been corrected, and screening procedures have been put in place both in PacFIN and with the states to flag and remove IFQ fish tickets from the "slct_ves_sabl_arid_DTL_no_EFP.sql" query for the sablefish DTL projection models.

A.4.4 Accounting for discards and discard mortality

Landings targets which appear in this section have been reduced from harvest guidelines that would appear in regulation, where applicable, in order to account for discard mortality. The harvest guideline (a specified numerical harvest objective that is not a quota) was multiplied by 15.9 percent (discard rate estimate), and by 20 percent (discard mortality rate estimate), and then that product (estimated dead discarded sablefish) was subtracted from the harvest guideline, resulting in a "landings target", which projected landings should be beneath, in order to keep total catch within the harvest guideline. The estimated discard rate used by GMT was taken from the 2010 West Coast Groundfish Observer Program (WCGOP) Total Mortality Report. In the 2009-10 management cycle, the discard rate estimate was the same, and was derived from data in the 2007 WCGOP Total Mortality Report, which was the most recent available data at that time. That discard mortality rate estimate was taken from information in Davis (2001, LTtp://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2001.tb00495.x/abstract), Shirrippa and Colbert (2005, LTtp://www.pcouncil.org/wp-content/uploads/Sable05_complete.pdf), and Shirrippa (2007, LTtp://www.pcouncil.org/wp-content/uploads/Sable07v3_0.pdf). Shirrippa (2005) used experimental data and sea surface temperature to predict varying release mortality by gear. The GMT considered that Davis (2001) demonstrated high sensitivity to temperature and deck time, along with high variability of predicted discard mortality in Shirrippa (2005) informed by sea surface temperature data, and adopted an estimate of 20 percent. This value was also adopted by Taylor 2011 in the current sablefish stock assessment.

A.4.5 Results

A.4.5.1 No Action Alternative

Under No Action, the following Rockfish Conservation Area boundaries for use of fixed gear, from 2012 regulations, would remain in place for 2013 and 2014 (Table A-11).

Table A-11. Rockfish Conservation Area (RCA) boundaries for fixed gear, under the No Action Alternative.

Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
North of 46° 16'	shore - 100 fm					
45° 03' 83" - 46° 16'	30 - 100 fm					
43° - 45° 03' 83"	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)					
42° - 43°	20 - 100 fm					
40° 10' - 42°	20 fm depth contour - 100 fm					
34° 27' - 40° 10'	30 fm - 150 fm line					
South of 34° 27' (w/islands)	• m - 150 fm line					

Projected impacts (No action)

Projected landings under the No Action Alternative are presented in Table A-12. The GMT and the Council considered, while constructing and adopting them, respectively, the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings) along with the normal uncertainty associated with projection models, the No Action trip limit structures for 2012 for each fishery presented here. The No Action Alternative resulted in projected attainments in the range of 91 percent to 93 percent, aiming to enable harvest of a high proportion of the HG, yet accommodating previously described uncertainty.

Table A-12. Model-projected impacts of trip limits under the No Action Alternative, for the fixed-gear, sablefish, DTL fisheries. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	LT	No act. projection	% of LT
LE N.	North of 36° N. lat.	265	242	91%
OA N.	North of 36° N. lat.	419	381	91%
LE S.	South of 36° N. lat.	380	353	93%
OA S.	South of 36° N. lat.	309	284	92%

These trip limits can be adjusted inseason as needed to influence higher or lower catch as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure (which was appreciated by the GAP, in their statement, in the November 2011 Council meeting), and to avoid starting the year with highly variable trip limits, such as resulted from the "rolling over" of 2010 trip limits into 2011, due to unforeseeable delays in implementation (Table A-13).

Table A-13. Trip limits for sablefish DTL fisheries under No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 900 lb., not to exceed 1,800 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,800 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,350 lb., not to exceed 2,700 lb. per 2 mo.					

A.4.5.2 Preferred and remaining alternatives

Preferred Alternative for 2013

Projected landings under the Preferred Alternative are presented in Table A-14. As with the No Action Alternative, we considered the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The Preferred Alternative results in projected attainments of 91 percent, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the PPA and all alternatives other than No Action, within each year.

Table A-14. 2013 Model-projected impacts of trip limits under the Preferred Alternative, No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	LT	PPA projection	% of LT
LE N.	North of 36° N. lat.	197	179	91%
OA N.	North of 36° N. lat.	291	266	91%
LE S.	South of 36° N. lat.	446	405	91%
OA S.	South of 36° N. lat.	362	330	91%

Projected landings under the PPA were lower than No Action for the LE North and OA North fisheries (74 percent and 70 percent of No Action, respectively), and higher than No Action for the LE South and OA South (115 percent and 116 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table A-15 and Figure A-4.

Table A-15. 2013 Model-projected impacts of trip limits under the Preferred Alternative (equal to alternatives other than No Action), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected impacts are in metric tons (mt).

Fishery	Area	PPA projection	No act. projection	% of No act.
LE N.	North of 36° N. lat.	179	242	74%
OA N.	North of 36° N. lat.	266	381	70%
LE S.	South of 36° N. lat.	405	353	115%
OA S.	South of 36° N. lat.	330	284	116%

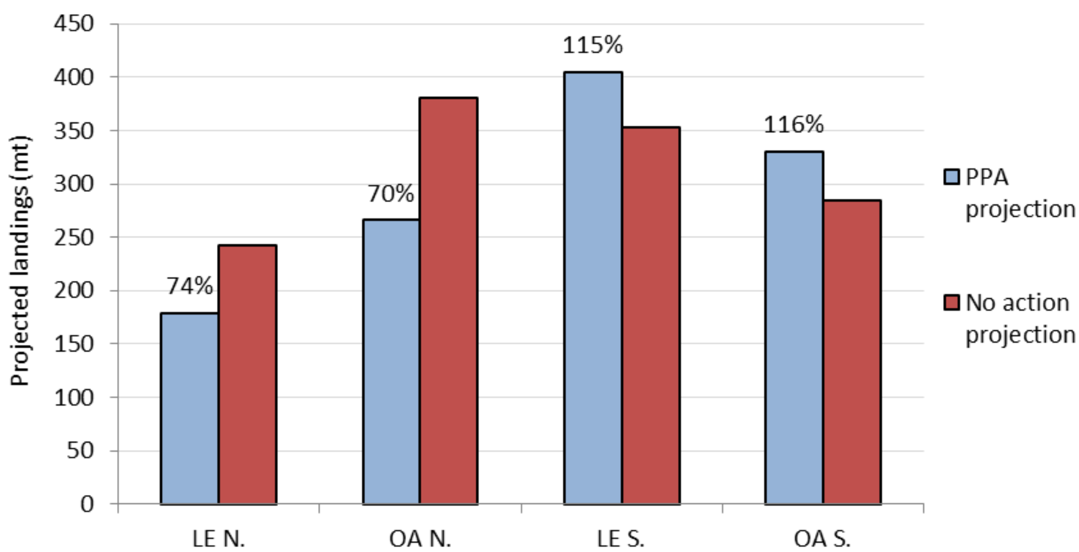

Figure A-4. Projected landings for 2013 under the PPA and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show PPA projection as a percentage of No Action.

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table A-16), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 800 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 290 pounds per week and 580 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 80 pounds per week was possible in the LE South fishery, while an increase of 110 pounds per week and 220 pounds per bimonthly period was possible in the OA South fishery.

Table A-16. 2013 Proposed trip limits for 2013 in sablefish DTL fisheries under the PPA, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					

to 36° N. lat.)	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.
South of 36° N. lat.	LE S.	1,880 lb. per week
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.

Preferred Alternative for 2014

Projected landings under the Preferred Alternative for 2014 are presented in Table A-17. As with the No Action Alternative, we considered uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2014 for each fishery presented here. The Preferred Alternative for 2014 results in projected attainments of 91 percent, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2014 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the PPA and all alternatives other than No Action, within each year.

Table A-17. Model-projected impacts of trip limits under the Preferred Alternative, No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	LT PPA	PPA projection	% of LT
LE N.	North of 36° N. lat.	214	194	91%
OA N.	North of 36° N. lat.	319	290	91%
LE S.	South of 36° N. lat.	483	441	91%
OA S.	South of 36° N. lat.	393	359	91%

Projected landings under the PPA were lower than No Action for the LE North and OA North fisheries (80 percent and 76 percent of No Action, respectively), and higher than No Action for the LE South and OA South (125 percent and 126 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2014; see Table A-18 and Figure A-5.

Table A-18. Model-projected impacts of trip limits under the Preferred Alternative, No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	PPA projection	No act. projection	% of No act.
LE N.	North of 36° N. lat.	194	242	80%
OA N.	North of 36° N. lat.	290	381	76%
LE S.	South of 36° N. lat.	441	353	125%
OA S.	South of 36° N. lat.	359	284	126%

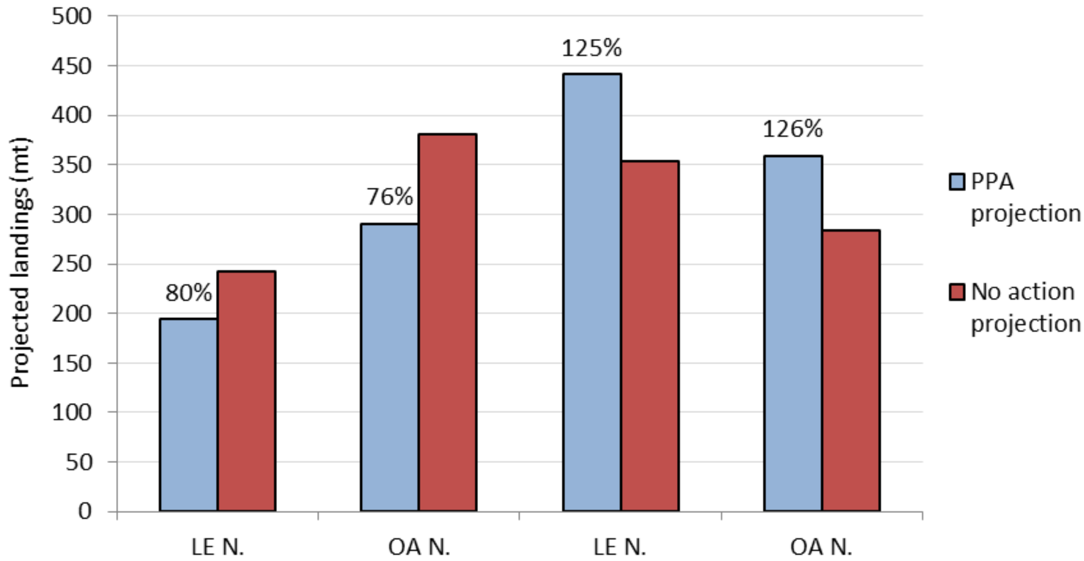

Figure A-5. Projected landings for 2014 under the PPA and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show PPA projection as a percentage of No Action.

Table A-19. Proposed trip limits for 2014, in sablefish DTL fisheries under the PPA, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N	1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.					
	OA N	300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.					
South of 36° N. lat.	LE S	1,930 lb. per week					
	OA S	300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.					

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table A-19), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 600 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 225 pounds per week and 450 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 130 pounds per week was possible in the LE South fishery, while an increase of 175 pounds per week and 350 pounds per bimonthly period was possible in the OA South fishery.

A.5 Non-Nearshore: Blackgill Rockfish South of 40°10 N. Latitude Trip Limits

The following analytical treatment of the 2005-2010 PacFIN data aims to define bi-monthly period limits for the limited entry and fixed gear nontrawl fleets. Given the yearly harvest guideline is known, the two main unknowns in these calculations are how many vessels will participate each bi-monthly period and how much of the period limit they will attain. If one assumes each vessel fully attains the limit each period, the corresponding limit given a certain number of vessels per period is expressed as an exponentially declining function (Figure A-6). The two methods used to calculate period limits explore different attainment and vessel participation assumptions to define a range of period limits with differing levels of risk.

A.5.1 Method 1: Used to calculate the most conservative estimates of bi-monthly period limits.

Assumptions
Vessel attainment: All latent removal by every participating vessel in each fishery is realized, therefore any limit is fully realized by all vessels in every bi-monthly period.

Vessel participation: The mean and standard deviation of vessel numbers by each year and bi-monthly period are used to define a normal distribution of expected number of vessels per bi-monthly period (Figure A-7 and Figure A-8).

Calculations
The bi-monthly limit is then calculated as:

$$P = \left(\frac{HG}{6}\right) \Big/ V$$

where P = period limit; HG = yearly harvest guideline; v = number of vessels. Five different vessel participation assumptions (values for V) were explored, where the mean is the least conservative and the 99 percent is the most conservative (Table A-20).

A.5.2 Method 2: Used to calculate less conservative estimates of bi-monthly period limits.

Assumptions

- Vessel attainment: Instead of assuming each vessel participating will attain the full limit, a threshold value is used to determine which vessels will and will not attain the full limit. Vessels with average catch over a given time period that exceeds the threshold are assumed to catch the period limit; vessels with average catch below the threshold are assumed to catch their average value in any given period:

$$C_{v,b,y,P_y,T} = \begin{Bmatrix} P_y & \text{if } \hat{C}_{v,b,y} > T \\ \hat{C}_v & \text{if } \hat{C}_{v,b,y} \le T \end{Bmatrix}$$

  where C_v = catch per vessel within bi-monthly period b across years y; $\hat{C}_{v,b,y}$= average catch of vessel v within bi-monthly period b across years y; T = threshold value.
- Vessel participation: For a given set of years, any vessel that caught blackgill in any bi-monthly period will contribute an average catch to that period's total catch.

Calculation

- The bi-monthly period limit ($P_{HG,y}$) is subsequently solved to allow vessel catches over all periods to obtain the yearly harvest guideline for a given T and series of years:

$$HG = \sum_{b=1}^{6} C_{v,b,y,P_{HG,y},T}$$

A.5.3 Applications

Method 1

Table A-3 provides application of method 1 to each fleet and area. Figure A-8 shows how alternative allocation scenarios of the nontrawl harvest guideline between the limited entry and fixed gear fleets will change the limited entry period limit.

Method 2

Table A-21 provides the catch per vessel by periods and years used to calculate threshold values. Table A-22 gives the period limits as calculated for several threshold values and data assumptions.

Each method can be updated at each in-season consideration using the remaining amount of the harvest guideline and any updated information on number of vessels, allowing for adjustable period limits to avoid harvest guideline overages. It can also be updated easily to accommodate different limited entry:open access allocations.

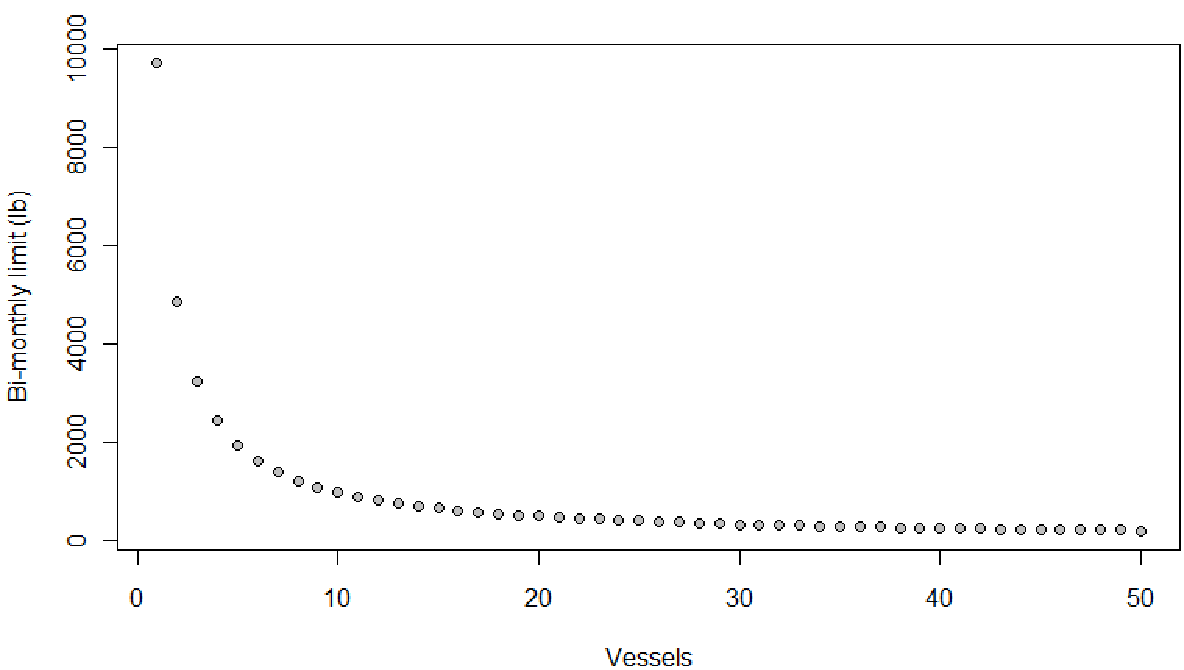

Figure A-6. Relationship between number of vessels and the bi-monthly limit (in lb) of blackgill rockfish (assuming no discards) in the limited entry fishery for the 2013 harvest guideline assuming 60% allocation to the limited entry fishery.

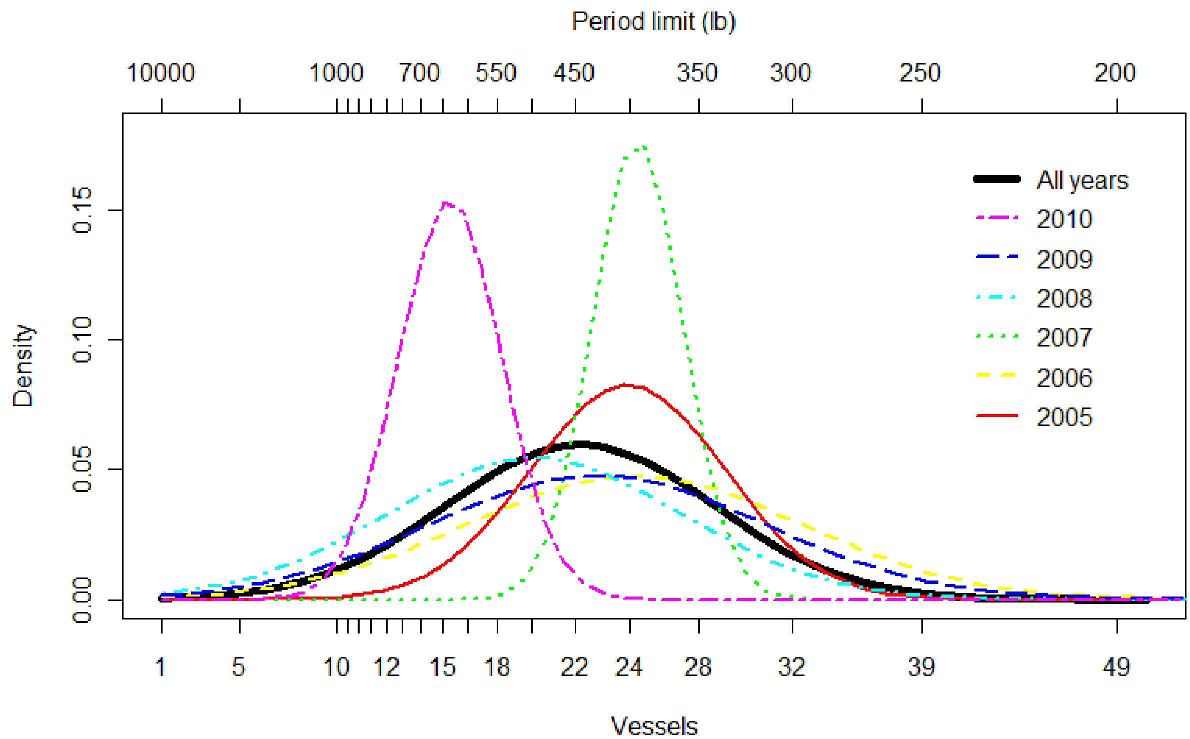

Figure A-7. Normal probability density function distribution for bi-monthly trips that caught blackgill rockfish in each year and all years combined for the limited entry fishery south of 40.10. Secondary x-axis identifies the bi-monthly blackgill rockfish trip limits associated with the number of vessels that would reach the 2013 blackgill harvest guideline (26.4 mt).

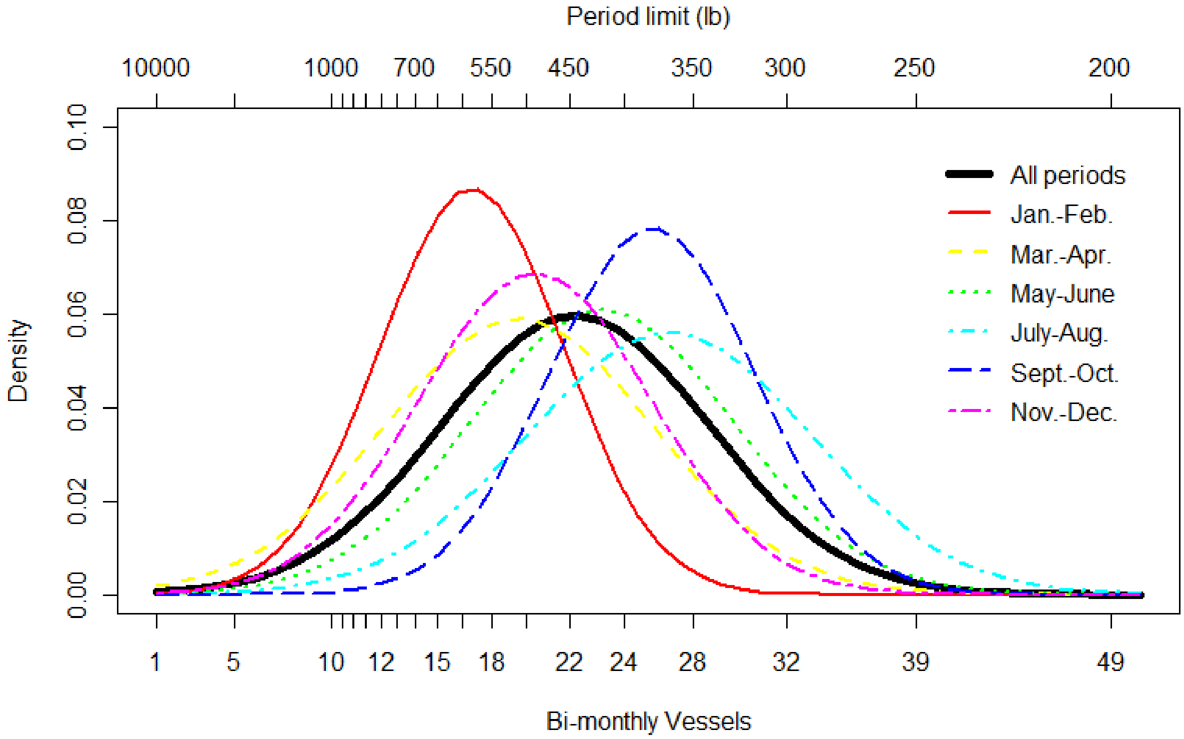

Figure A-8. Normal probability density function distribution for bi-monthly trips that caught blackgill rockfish in each bi-monthly period across all years and all combined bi-monthly periods for the limited entry fishery south of 40.10. Secondary x-axis identifies the bi-monthly blackgill rockfish trip limits associated with the number of trips that would reach the blackgill harvest guideline for the 2013.

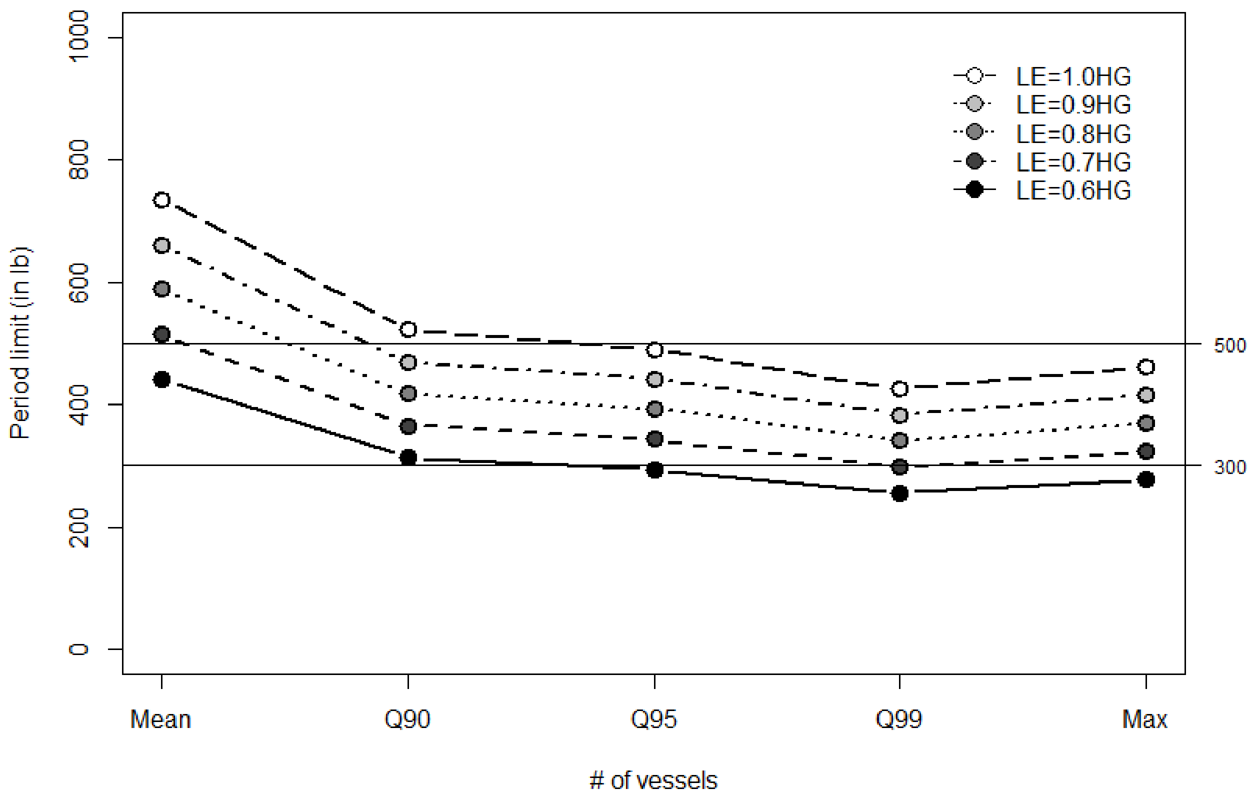

Figure A-9. Bi-monthly period limits (in pounds) of blackgill rockfish under different estimates of vessels in the limited entry (LE) fishery for different scenarios of harvest guideline (HG) allocation to the limited entry fishery. Horizontal lines are two possible period limits. Points at or below lines would result in yearly catches at or below the HG.

Table A-20. Number of vessels and the associated bi-monthly period limits for several measures along the normal probability density distribution summarized for years, bi-monthly periods, and all years/periods combined for all nontrawl gears and areas.

A) Limited Entry

	# Vessels					Bi-monthly limit (lb)				
Time	Mean	Q=90%	Q=95%	Q=99%	Maximum	Mean	Q=90%	Q=95%	Q=99%	Maximum
Year										
2005	25	31	33	36	28	388	313	294	269	346
2006	25	36	39	45	35	388	269	249	216	277
2007	25	28	29	30	27	388	346	334	323	359
2008	20	29	32	37	29	485	334	303	262	334
2009	23	34	37	43	32	422	285	262	226	303
2010	16	19	20	22	18	606	511	485	441	539
Bi-monthly period										
Jan-Feb	17	23	25	28	22	571	422	388	346	441
Mar-Apr	19	28	31	35	28	511	346	313	277	346
May-June	24	32	34	39	32	404	303	285	249	303
July-Aug	27	36	39	44	35	359	269	249	220	277
Sept-Oct	26	33	35	38	32	373	294	277	255	303
Nov-Dec	20	28	30	34	27	485	346	323	285	359
All years, periods	22	31	33	38	35	441	313	294	255	277

B) Open Access N 38°

	# Vessels					Bi-monthly limit (lb)				
Time	Mean	Q=90%	Q=95%	Q=99%	Maximum	Mean	Q=90%	Q=95%	Q=99%	Maximum
Year										
2005	1	2	3	3	2	100	50	33	33	50
2006	1	2	3	3	2	100	50	33	33	50
2007	2	5	6	7	6	50	20	17	14	17
2008	1	2	2	3	2	100	50	50	33	50
2009	1	2	2	2	1	100	50	50	50	100
2010	3	5	6	7	6	33	20	17	14	17
Bi-monthly period										
Jan-Feb	1	2	3	3	2	100	50	33	33	50
Mar-Apr	1	2	2	2	1	100	50	50	50	100
May-June	2	3	3	3	2	50	33	33	33	50
July-Aug	2	5	6	7	6	50	20	17	14	17
Sept-Oct	3	5	6	7	6	33	20	17	14	17
Nov-Dec	1	2	2	2	1	100	50	50	50	100
All years, periods	2	3	4	5	6	50	33	25	20	17

B) Open Access S 38°

	# Vessels					Bi-monthly limit (lb)				
Time	Mean	Q=90%	Q=95%	Q=99%	Maximum	Mean	Q=90%	Q=95%	Q=99%	Maximum
Year										
2005	14	17	18	20	17	455	375	354	318	375
2006	17	23	24	27	22	375	277	265	236	289
2007	14	19	21	24	19	455	335	303	265	335
2008	12	20	22	26	21	531	318	289	245	303
2009	20	27	29	33	26	318	236	220	193	245
2010	18	28	31	36	26	354	227	205	177	245
Bi-monthly period										
Jan-Feb	11	14	15	17	14	579	455	424	375	455
Mar-Apr	14	18	19	21	17	455	354	335	303	375
May-June	18	26	29	33	26	354	245	220	193	245
July-Aug	18	26	29	33	26	354	245	220	193	245
Sept-Oct	18	26	28	32	26	354	245	227	199	245
Nov-Dec	15	23	25	29	21	424	277	255	220	303
All years, periods	16	23	25	29	26	398	277	255	220	245

Table A-21. Blackgill pounds per vessel by year and bi-monthly period for the A) Limited Entry, B) Open Access North of 38○, and C) Open Access South of 38○ fixed gear fisheries.

A) Limited Entry

Year	Bi-monthly period					
	Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.	Nov.-Dec.
2005	294	277	86	197	118	131
2006	220	465	81	152	539	389
2007	79	166	113	179	140	173
2008	67	103	675	121	143	562
2009	1151	596	455	460	441	256
2010	216	530	428	373	730	743

B) Open Access N 38°

Year	Bi-monthly period					
	Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.	Nov.-Dec.
2005	26	0	13	161	10	2
2006	0	2	16	8	13	14
2007	12	4	12	0	30	30
2008	0	0	0	0	14	10
2009	0	0	32	1	6	0
2010	1	3	12	11	32	8

C) Open Access S 38°

Year	Bi-monthly period					
	Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.	Nov.-Dec.
2005	559	257	191	296	876	448
2006	237	427	308	268	306	175
2007	180	874	559	517	63	60
2008	233	323	190	198	46	80
2009	315	156	265	673	181	222
2010	164	361	523	497	678	896

Table A-22. Bi-monthly period limits that correspond to various catch thresholds and years used to calculate vessel average catch for nontrawl fleets.

		Average catch years	
Fleet	Catch threshold	2005-2010	2008-2010
Limited Entry	**238**	**768**	1137
	300	865	1218
	448	1019	**1586**
	500	1115	1710
	750	1232	1967
	1000	1315	2226
	Maximum	1586	2675
Open access S 38°	208	582	394
	249	676	**399**
	254	688	402
	282	**739**	402
	500	1002	416
	750	1344	359
	1000	2117	300
	Maximum	2880	422

A.6 Nearshore

A.6.1 Modeling Open Access Impacts

Impacts associated with the directed open access daily-trip-limit fishery targeting sablefish are modeled using the primary sablefish model described above. Nearshore commercial fisheries in waters off Oregon and California are modeled separately from offshore efforts targeting sablefish.

A.6.2 Modeling Nearshore Commercial Impacts

The nearshore commercial model incorporates fleet-wide discard estimates by depth from West Coast Groundfish Observer Program (WCGOP) data, landings data from PacFIN, and depth-specific discard mortality rates derived by the Groundfish Management Team (GMT) (refer to 2009/2010 Harvest Specifications and Management Measures FEIS for full description of model). The WCGOP began pilot coverage of vessels targeting nearshore rockfish and associated species, such as cabezon and kelp greenling, in January 2003 for the California nearshore fishery and in May 2004 for the Oregon nearshore/rockfish fisheries. Data from these vessels from January 2003 – December 2009 were averaged for analyses. Data from 2009 were the most recently available data at the time of the analysis. Although the number of observed trips has increased since the WCGOP began monitoring the fleet, coverage levels are still lower than for other fleets and thus greater uncertainty in estimating discard relationships exists (Table A-23).

Table A-23. Summary of WCGOP observer coverage (2003-2009)

Area/Depth	# Trips	# Sets	# Vessels
North of 42° N lat.			
0-10 fm	484	632	85
10-20 fm	540	713	81
> 20 fm	48	53	27
42° to 40° 10' N lat.			
0-10 fm	160	215	23
10-20 fm	216	256	21
> 20 fm	37	41	10
South of 40° 10' N lat.			
0-10 fm	335	542	83
10-20 fm	241	317	65
> 20 fm	40	63	20

In 2010-11, the nearshore model structure was modified to include finer area stratifications and used modified landings data to project overfished species impacts. These modifications would facilitate management, provide greater protection to stocks while minimizing adverse impacts to communities, and provide the best estimate of fishery needs. No changes are proposed to the model for 2013-14.

The nearshore model is stratified into three areas based on available WCGOP data: (1) north of 42° N lat; (2) between 42° and 40°10' N lat; and (3) south of 40°10' N lat. These finer area stratifications facilitate overfished species impact projections on a smaller scale, reduce adverse actions to lower bycatch areas, and allowed incorporation of state specific management measures.

Instead of using a single previous year landings data to project overfished species impacts, average landings were used as the best estimate of fishery needs. As a starting point, average landings from the last four years (2007-2010) were used for both Oregon and California; the year with the lowest landings was excluded for projections. Landings data were adjusted from this starting point based on new information (i.e., change in ACL) or based on increased availability in overfished species (i.e., higher nearshore allocation of yelloweye). Opportunities were maximized for this fishery where available while staying within available overfished species impacts.

Table A-25, Table A-26, Table A-27summarize the ratios of observed discarded and retained catch for each of the three depth intervals (0-10 fm, 11-20 fm, and 21-50 fm) used to model impacts in nearshore commercial fisheries.

A.6.3 Allocation of Overfished Species (Canary and Yelloweye Rockfish) Between States

In 2011-12, a de-facto allocation for canary (OR = 26.7 percent; CA = 73.3 percent) and yelloweye rockfish (OR = 72.7 percent; CA = 27.3 percent) was used which resulted from specific landings that were meant to keep both fisheries at harvest levels similar to previous years.

For 2013-14, the GMT maintained the 2011-12 status quo allocations for modeling impacts. In addition, two alternative relationships were examined to demonstrate the tradeoffs of varying overfished species allocations. Equal catch sharing (50:50) and reverse status quo were chosen to bracket the upper and lower ranges of landings and management measures (Table A-24).

Table A-24. Comparison of canary and yelloweye rockfish allocations for Oregon and California under three catch sharing alternatives.

		Status Quo	Equal Sharing	Reverse Status Quo
OR	Canary	26.7%	50%	73.3%
	Yelloweye	72.7%	50%	27.3%
CA	Canary	73.3%	50%	26.7%
	Yelloweye	27.3%	50%	72.7%

Table A-25. Average Bycatch and discard rates (2003-2009) from the commercial nearshore projection model north of 42° N. latitude.

NORTH of 42° N. lat.	Observed discard (mt) 0-10 fm	Observed discard (mt) 11-20 fm	Observed discard (mt) > 20 fm	Observed retained (mt) 0-10 fm	Observed retained (mt) 11-20 fm	Observed retained (mt) > 20 fm	% of observed landings by depth 0-10 fm	% of observed landings by depth 11-20 fm	% of observed landings by depth > 20 fm	Discard mortality rate 0-10 fm	Discard mortality rate 11-20 fm	Discard mortality rate > 20 fm
Rebuilding species												
Bocaccio	0.000	0.000	0.000	0.000	0.000	0.000				30%	54%	100%
Canary rockfish	0.149	0.548	0.059	0.000	0.001	0.000				32%	54%	100%
Darkblotched rockfish	0.000	0.000	0.000	0.000	0.082	0.000						
Widow rockfish	0.000	0.000	0.000	0.000	0.005	0.005				32%	54%	100%
Yelloweye rockfish	0.061	0.471	0.063	0.000	0.001	0.000				32%	56%	100%
Other species												
Black rockfish	1.305	1.231	0.043	24.369	23.738	0.821	49.8%	48.5%	1.7%	23%	42%	90%
Blue rockfish	0.619	1.336	0.079	0.955	1.390	0.135	38.5%	56.0%	5.4%	29%	49%	100%
Cabezon	0.481	0.833	0.006	3.444	8.347	0.368	28.3%	68.7%	3.0%	7%	7%	7%
Kelp greenling	0.626	0.656	0.024	3.876	3.679	0.149	50.3%	47.7%	1.9%	7%	7%	7%
Lingcod	3.636	5.325	0.414	3.596	7.475	0.616	30.8%	64.0%	5.3%	7%	7%	7%
Other minor nearshore rockfish	0.089	0.200	0.013	1.777	4.243	0.367	27.8%	66.4%	5.7%	24%	48%	100%

Table A-26. Average bycatch and discard rates (2003-2009) from the commercial nearshore projection model north of 42° N. latitude to 40°10' N. latitude.

42° to 40°10' N. lat.	Observed discard (mt)			Observed retained (mt)			% of observed landings by depth			Discard mortality rate		
	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm
Rebuilding species												
Bocaccio	0.000	0.000	0.000	0.000	0.001	0.000				30%	54%	100%
Canary rockfish	0.069	0.486	0.142	0.000	0.000	0.000				32%	54%	100%
Darkblotched rockfish	0.000	0.000	0.000	0.000	0.000	0.000						
Widow rockfish	0.000	0.026	0.005	0.002	0.062	0.003				32%	54%	100%
Yelloweye rockfish	0.013	0.131	0.223	0.000	0.000	0.000				32%	56%	100%
Other species												
Black rockfish	0.124	0.089	0.002	15.420	16.375	1.216	44.5%	52.3%	3.2%	23%	42%	90%
Blue rockfish	0.186	0.440	0.045	1.356	5.082	0.884	18.1%	70.7%	11.2%	29%	49%	100%
Cabezon	0.186	0.179	0.040	0.583	0.455	0.172	46.6%	39.7%	13.8%	7%	7%	7%
Kelp greenling	0.199	0.180	0.016	0.130	0.201	0.003	37.7%	61.4%	0.9%	7%	7%	7%
Lingcod	0.614	1.132	0.120	1.199	1.840	0.876	30.4%	47.9%	21.7%	7%	7%	7%
Other minor nearshore rockfish	0.002	0.009	0.010	0.494	1.046	1.057	18.9%	41.5%	39.7%	24%	48%	100%

Table A-27. Average bycatch and discard rates (2003-2009) from the commercial nearshore projection model south of 40°10' N. latitude.

SOUTH of 40°10' N. lat.	Observed discard (mt)			Observed retained (mt)			% of observed landings by depth			Discard mortality rate		
	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm
Rebuilding species												
Bocaccio	0.000	0.001	0.001	0.000	0.000	0.051				30%	54%	100%
Canary rockfish	0.012	0.271	0.085	0.000	0.000	0.000				32%	54%	100%
Cowcod	0.000	0.000	0.000	0.000	0.000	0.000						
Darkblotched rockfish	0.000	0.000	0.000	0.000	0.000	0.000						
Widow rockfish	0.000	0.000	0.000	0.000	0.001	0.000				32%	54%	100%
Yelloweye rockfish	0.000	0.010	0.006	0.000	0.000	0.000				32%	56%	100%
Other species												
Black rockfish	0.100	0.102	0.008	0.385	0.402	0.044	46.3%	48.4%	5.3%	23%	42%	90%
Blue rockfish	0.231	0.368	0.169	0.410	0.314	0.054	52.7%	40.4%	6.9%	29%	49%	100%
Cabezon	2.110	0.269	0.038	4.591	0.191	0.070	94.6%	3.9%	1.4%	7%	7%	7%
Deeper nearshore rockfish	0.157	0.193	0.036	1.751	3.501	0.455	30.7%	61.3%	8.0%	23%	48%	100%
Kelp greenling	0.602	0.155	0.062	0.344	0.026	0.00635	91.5%	6.8%	1.7%	7%	7%	7%
Lingcod	1.555	1.343	0.118	1.809	1.390	0.129	54.4%	41.8%	3.9%	7%	7%	7%
Shallow nearshore rockfish	0.739	0.530	0.096	3.464	1.210	0.339	69.1%	24.1%	6.8%	25%	49%	100%

A.7 Washington Recreational

The Washington Ocean Sampling Program (OSP) generates catch and effort estimates for the recreational boat-based groundfish fishery, which are provided to Pacific States Marine Fisheries Commission (PSMFC) and incorporated directly into RecFIN. The OSP provides catch in total numbers of fish, and also collects biological information on average fish size, which is provided to RecFIN to enable conversion of numbers of fish to total weight of catch. Boat egress from the Washington coast is essentially limited to four major ports, which enables a sampling approach to strategically address fishing effort from these ports. Effort estimates are generated from exit-entrance counts of boats leaving coastal ports while catch per effort is generated from angler intercepts at the conclusion of their fishing trip. The goal of the program is to provide information to RecFIN on a monthly basis with a one-month delay to allow for inseason estimates. For example, estimates for the month of May would be provided at the end of June. Some specifics of the program are:

Exit/entrance count - boats are counted either leaving the port (4:30 AM - end of the day) or entering the port (approximately 8:00 AM through end of the day) to give a total count of sport boats for the day.

Interview - boats are encountered systematically as they return to port; anglers are interviewed for target species, number of anglers, area fished, released catch data and depth of fishing (non-fishing trips are recorded as such and included in the effort expansion). The OSP collects information on released catch but does not collect information on the condition of the released fish. Therefore, released catches must be post-stratified as live or dead based upon an assumed discard mortality rate. Onboard observers are deployed on charter vessels throughout the salmon season primarily to observe hatchery salmon mark rates but also to collect rockfish discard information on these trips.

Examination of catch - catch is counted and speciated by the sampler. Salmon are electronically checked for coded wire tags and biodata is collected from other species.

Sampling Rates - vary by port and boat type. Generally, at boat counts less than 30, the goal is 100 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, one permanent technician generating in-season estimates of groundfish catch, approximately twenty-two port samplers, three on-board observers and one data keypuncher.

Volume of data - Between 20,000 and 30,000 boat interviews completed per season coastwide.

Data Expansion:
Algorithm for expanding sampled days:

$$\frac{\text{Exit Count}}{\text{Total boats sampled}} * P_s \text{ sampled} = P_t$$

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:

$$\text{Total Weekday Catch} = \frac{\Sigma(P_t) \text{ on sampled weekdays}}{\text{number weekdays sampled}} * \text{ no. of weekdays in stratum}$$

$$\text{Total Weekend Catch} = \frac{\Sigma(P_t) \text{ on sampled weekend days}}{\text{number weekend days sampled}} * \text{ no. weekend days in stratum}$$

Total weekend catch + total weekday catch = total catch in stratum

Notes on Data Expansion:
Salmon and halibut catch estimates are stratified by week; catch estimates for 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, albacore)

Washington Recreational Fishery Impact Modeling

A.7.1 Pre-Season Catch Projections

Projected impacts for Washington's recreational fishery are essentially based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in RecFIN. This is especially true if recreational regulations remain consistent.

Washington's management measures have relied on the use of depth closures in waters deeper than 20 or 30 fathoms since 2005 and therefore historical catch estimates will be representative of projected mortalities. Depth restrictions for Washington's recreational fisheries are primarily designed to reduce encounters with yelloweye and canary rockfish but are especially restrictive to keep yelloweye rockfish impacts below the Washington recreational fishery harvest target. Because the ACL alternative and resulting Washington recreational harvest target for yelloweye rockfish that is being considered for 2013-2014 is only slightly higher than the yelloweye harvest target adopted for 2011-2012 no changes to depth restrictions or other management measures are being proposed for this management cycle and as such the most recent catch and effort estimates from 2011 is the basis for projected catch for 2013-2014.

A.7.2 Inseason Catch Projections for 2013-2014

Inseason catch projections are based upon the most recent OSP estimates and incorporated in RecFIN (with a one-month time lag) with subsequent months extrapolated from the pre-season catch projections. Beginning in 2009, depth dependant mortalities have been applied uniformly to all discarded fish coast wide through RecFIN. It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons will continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

A.8 Oregon Recreational

A.8.1 Harvest and discard mortality calculations

Groundfish impacts by recreational anglers in Oregon are estimated and tracked inseason by the Oregon Department of Fish and Wildlife (ODFW). Impacts consisting of weights of harvested fish and released fish that are presumed to die (discard mortality) are estimated for ocean boat anglers using Oregon Recreational Boat Survey (ORBS) data and are estimated for shore and estuary anglers using Shore and Estuary Bank Survey (SEBS) data from 1998-2002 (discontinued after 2002). Impacts are monitored inseason for black rockfish (RF), blue RF, yelloweye RF, canary RF, other nearshore RF species complex (quillback , China , grass , brown , and copper RF), greenlings species complex (rock and kelp greenling), cabezon, and lingcod.

Methods: Ocean boat fishery
Harvest and discard mortality estimates (mt) are calculated by month and are typically completed within thirty days of the end of the month. Harvest estimate calculations, number of harvested fish multiplied by the average weight of harvested fish, remain the same as in previous cycles.

Discard mortality estimate calculations, number of discarded fish multiplied by average weight of discarded fish multiplied by discard mortality rate, remain the same as well. However, a new method for calculating discard mortality rates is now being used due recent availability of released fish by depth data obtained by ORBS. Starting in March 2009, anglers were asked the depth they fished. Previous discard mortality rate estimates used depth of release data from observed charter trips. The new method is advantageous because: (a) greater sample sizes (e.g., > 1000 vs 51 yelloweye rockfish), (b) incorporates private boat data, (c) accounts for monthly variations in catches (fixed rates previously used for all months), (d) same methodology used by the Recreational Fisheries Information Network (RecFIN) and (e) estimates should be closer to what is actually occurring. The new ORBS depth data is also very useful for economic modeling because percentages of effort by depth bin can be calculated and potential decreases in angler trips due to proposed depth restrictions can be modeled. Mean weights of discarded fish continue to be calculated from observed charter trips (updated with newest data) since accurate weights of discarded fish cannot be obtained from angler reported releases.

Only a fraction (typically > 20 percent) of anglers are interviewed; therefore, a total discard mortality rate is applied to expanded total discards. Since discard mortality rates vary by depth bin (Table A-28), the total discard mortality rate is the sum of the products, by depth bin, of the proportion of fish released (from ORBS data) multiplied by the discard mortality rate (from GMT depth dependent discard mortality matrix; Table A-28). An example of a total discard mortality rate is shown in Table A-29.

Table A-28. GMT discard mortality rates for select rockfish species by depth bin. The discard mortality rates of cabezon, lingcod, and greenling species are 7%, regardless of depth, to account for hooking mortality (as these fish do not suffer barotrauma).

	Mortality rate				
Species	< 10 fm	11-20 fm	21-30 fm	31-40 fm	> 40 fm
Black RF	11%	20%	29%	63%	63%
Blue RF	18%	30%	43%	100%	100%
Brown RF	12%	22%	33%	100%	100%
China RF	13%	24%	37%	100%	100%
Copper RF	19%	33%	48%	100%	100%
Quillback RF	21%	35%	52%	100%	100%
Canary RF	21%	37%	53%	100%	100%
Yelloweye RF	22%	39%	56%	100%	100%

Table A-29. Sample calculation of the new method for calculating total discard mortality using data of fish release by depth (obtained from angler interviews). Total discard mortality rate is multiplied by released fish to determine total discard mortality (mt).

Depth bin (fm)	Fish	Proportion		Mortality rate		Product	
0-10	6	0.133	x	0.22	=	0.029	
11-20	24	0.533	x	0.39	=	0.208	
21-30	12	0.267	x	0.56	=	0.149	
> 30	3	0.067	x	1.00	=	0.067	
					∑ =	0.453	= Total mortality rate

Methods: Shore and estuary

Landings and discard impacts for shore and estuary caught species were modeled on a season total basis using the 1998-2002 averages from the discontinued Oregon SEBS program. This fishery is managed for a year-round season, as it does not impact yelloweye or canary rockfish. The metric tons were adjusted for changes in length limits applied to cabezon and greenling since that period. Cabezon and greenling that were landed from 1998-2002 that would be sub-legal under current regulations are now considered discards. A mortality rate of 7 percent was applied to all species discarded in the shore and estuary fishery to account for hooking mortality, as the waters are not deep enough to cause mortality from barotrauma.

A.8.2 Groundfish fishery projection model

Introduction:

Depth restriction is the main management method used by ODFW in the recreational groundfish fishery to reduce overfished species impacts, particularly yelloweye rockfish. Further depth restrictions may be implemented inseason if anglers are projected to attain overfished species caps before the end of the season with existing preseason depth restrictions. Exceeding overfished species caps can result in complete closure of the recreational groundfish fishery (and possibly the Pacific halibut fishery), regardless of remaining quota of harvestable species. Implementing shallower depth restrictions reduces overfished species impacts by reducing catches (catch rates increase with depth) and decreasing discard mortality (mortality rate increases with depth). Depth restrictions can also affect impacts of harvestable groundfish species (e.g., impacts to groundfish more commonly caught in shallower waters may increase if anglers are restricted to shallower waters).

Old and new model descriptions:
The old depth restriction impact model was developed before angler reported catch rate and effort by bin data existed and consequently used scaling rules based on observed charter data to project impacts by depth restriction and month (Table A-30). Projected impacts by depth restriction were calculated by multiplying three year mean impacts during status quo depth restrictions by the scaling rule of the proposed depth restriction.

Table A-30. Scaling rules by depth restriction and month used in the old model to project discard mortality of yelloweye rockfish in the groundfish fishery. Values were multiplied by three year means of observed impacts during status quo months (1.00 denotes status quo depth restriction) to project impacts given proposed depth restrictions.

	Depth restriction (fm)				
Month	Any	40	30	25	20
Jan	1.00	0.71	0.71	0.61	0.29
Feb	1.00	0.71	0.71	0.61	0.29
Mar	1.00	0.71	0.71	0.61	0.29
Apr	1.40	1.00	1.00	0.86	0.41
May	1.40	1.00	1.00	0.86	0.41
Jun	1.40	1.00	1.00	0.86	0.41
Jul	1.40	1.00	1.00	0.86	0.41
Aug	1.40	1.00	1.00	0.86	0.41
Sep	1.40	1.00	1.00	0.86	0.41
Oct	1.00	0.71	0.71	0.61	0.29
Nov	1.00	0.71	0.71	0.61	0.29
Dec	1.00	0.71	0.71	0.61	0.29

The old model relied, due to lack of better data, on the unlikely assumption that observed charter data was representative of the entire fleet (charter and private anglers). The old model also relied on fixed discard mortality rates, which has been shown to be incorrect (Table A-31).

Table A-31. Total discard mortality rate of yelloweye rockfish in the groundfish fishery for the new calculation method (2009 and 2010) versus the old method (fixed for all years).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	0.39	0.38	0.79	0.48	0.46	0.42	0.41	0.38	0.39	0.35	0.00	0.35
2009	0.77	0.52	0.88	0.42	0.42	0.54	0.41	0.35	0.39	0.54	0.39	0.75
Old	0.66	0.66	0.66	0.51	0.51	0.51	0.51	0.51	0.51	0.66	0.66	0.66

The new depth restriction projection model no longer requires these flawed assumptions since it uses newly acquired data of angler reported catch rate and effort by depth bin to provide better estimates of where anglers fish, how angler behavior may be affected by depth restrictions, and what actual discard mortalities are.

The new depth restriction impact model, outlined in Table A-32, utilizes the new data of angler reported catch rate and effort by depth bin. To increase sample sizes for catch rates and proportions of anglers by depth bin, data from months with similar status quo depth restrictions is pooled (Jan-Mar; Apr-Sept; Oct-Dec). Pooling also occurs across years to further increase sample sizes. Catch rates and proportions of anglers by depth bin vary among pooling periods but are the same within a period, average groundfish anglers is a three year mean for the month, and the rest of the variables are fixed for all months (fish weight, discard mortality rate by depth bin, and weight conversion). Table A-32 models discard mortality, and can be changed to model harvest by replacing discard mortality rates to 1.00 for all depth bins (catch rate is also change to harvested per angler instead of released per angler).

Table A-32. Example of data and calculations used in the new depth restriction projection model for the groundfish fishery and an example of the difference in estimates between a 40 fm depth restriction and a 30 fm depth restriction. This example projects discard mortality and a harvest projection can be made by changing the discard mortality rates to 1.00 for all depth bins (and changing catch rates from discarded per angler to harvest per angler).

Depth bin (fm)	Catch per angler		Proportion of anglers		avg. anglers		Mean fish weight (kg)		Discard mort. rate		Kg to mt conv.		Impact by bin
					40 fm depth restriction								
<10 fm	0.013	x	0.381	x	12185	x	1.289	x	0.22	x	0.001	=	0.016
10-20	0.041	x	0.489	x	12185	x	1.289	x	0.39	x	0.001	=	0.123
20-25	0.129	x	0.063	x	12185	x	1.289	x	0.56	x	0.001	=	0.071
25-30	0.126	x	0.018	x	12185	x	1.289	x	0.56	x	0.001	=	0.020
30-40	0.027	x	0.050	x	12185	x	1.289	x	1.00	x	0.001	=	0.021
													∑ = 0.252 = Expected impact
					30 fm depth restriction								
<10 fm	0.013	x	0.400	x	12185	x	1.289	x	0.22	x	0.001	=	0.017
10-20	0.041	x	0.515	x	12185	x	1.289	x	0.39	x	0.001	=	0.129
20-25	0.129	x	0.066	x	12185	x	1.289	x	0.56	x	0.001	=	0.075
25-30	0.126	x	0.019	x	12185	x	1.289	x	0.56	x	0.001	=	0.021
													∑ = 0.242 = Expected impact

Table A-32 also shows how differences in projected impacts by depth restriction are calculated. All variables remain the same except for the proportion of anglers by depth bin. No declines in angler trips are assumed because we know little of changes in angler behavior in response to regulatory changes and it is better to have models that overestimate impacts for catch accounting and conservation purposes. In this example, the proportion of anglers that fished the 30-40 fm depth bin (dark grey box) are proportionally redistributed among the available depth bins given a 30 fm depth restriction (light grey boxes). This was done instead of a shift to the next deepest depth bin available because deep water trips are typically specialty trips for large lingcod (anecdotal evidence) and it is assumed that these displaced anglers would return to “typical bottomfish trips”.

An advantage to the new model is that variables can easily be adjusted provided due evidence. For example, if we develop a method to better predict angler effort.

A summary table of projected outputs by depth restrictions by month is automatically updated given new data and is used for management purposes (Table A-33). Two versions exist of the model for projecting impacts by depth restriction in the groundfish fishery. The preseason version uses data prior to the projection year and the inseason version uses data from the projection year when it becomes available. The data pooling rules are the source of change for the inseason version.

Table A-33. Summary table of projected canary rockfish impacts (mt) by month and depth restriction from the groundfish fishery.

Groundfish fishery projected impacts

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<20 fm	0.040	0.052	0.075	0.200	0.336	0.605	0.537	0.568	0.255	0.082	0.012	0.021
<25 fm	0.045	0.059	0.085	0.239	0.401	0.722	0.640	0.677	0.304	0.090	0.013	0.023
<30 fm	0.045	0.059	0.085	0.253	0.425	0.765	0.679	0.718	0.322	0.099	0.014	0.025
<40 fm	0.046	0.059	0.085	0.259	0.434	0.782	0.693	0.733	0.329	0.166	0.023	0.042
>40 fm	0.091	0.118	0.171	n/a	n/a	n/a	n/a	n/a	n/a	0.273	0.038	0.069

Average weights used in models

Average weights of released yelloweye rockfish and canary were assumed to increase with depth in the old calculation method and the old groundfish depth projection model; however, the same weights are used in the new versions because there does not appear to be a relationship between depth and weight of either species (Figure A-10; from catch data from observed charter trips). Fixed mean weights were consequently used for yelloweye rockfish (1.29 kg) and canary rockfish (0.69 kg) in the new method for calculating discard mortality and in the new groundfish depth projection model. Data of weights of fish caught beyond 40 fm is lacking and should be addressed in the future to determine if the same average weights are applicable to deep water (> 40 fm).

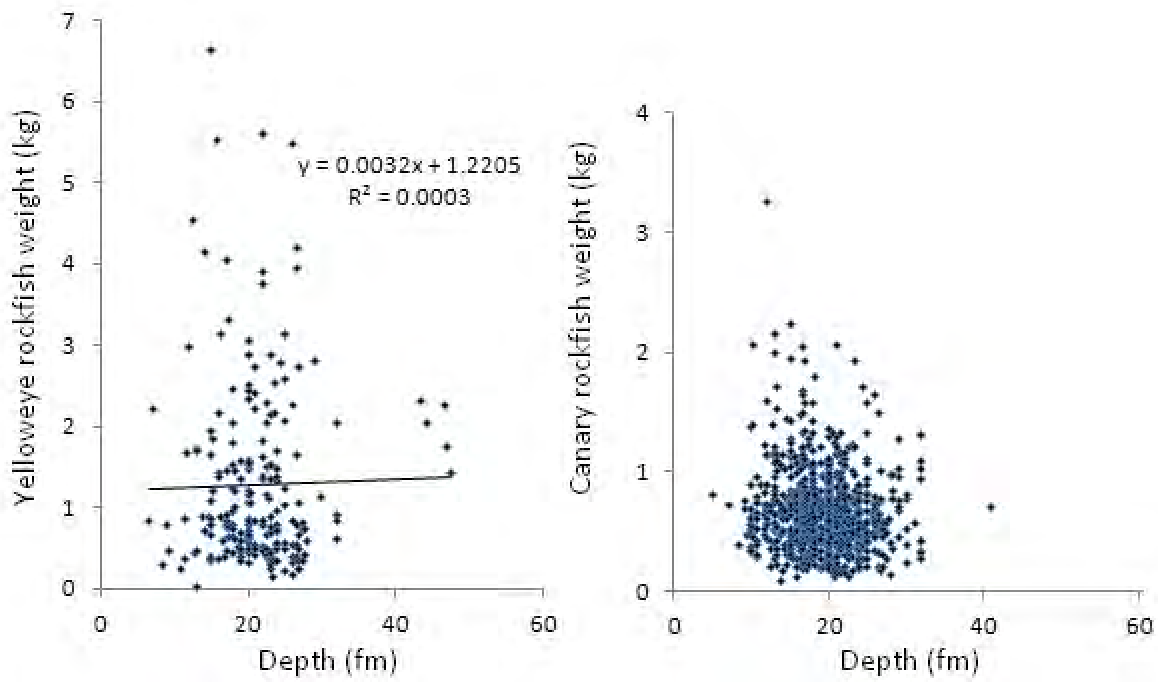

Figure A-10. Relationship between depth and weight of released yelloweye rockfish and canary rockfish from observed charter trips, 2006-2010.

Incorporation of variance into the groundfish projection model

Point estimates of depth restriction models are valuable for setting preseason depth restrictions by month. However, greater than expected impacts of yelloweye rockfish often lead to greater inseason depth restrictions. Incorporation of variance into the yelloweye rockfish projection model allows for development of prediction intervals that are useful for management decisions because it gives managers a better understanding of potential ranges of impacts.

Yelloweye rockfish encounters are extremely variable (Figure A-11) and difficult to predict. For example, June 2011 discards (~950 fish; outlier dot) were more than twice expected.

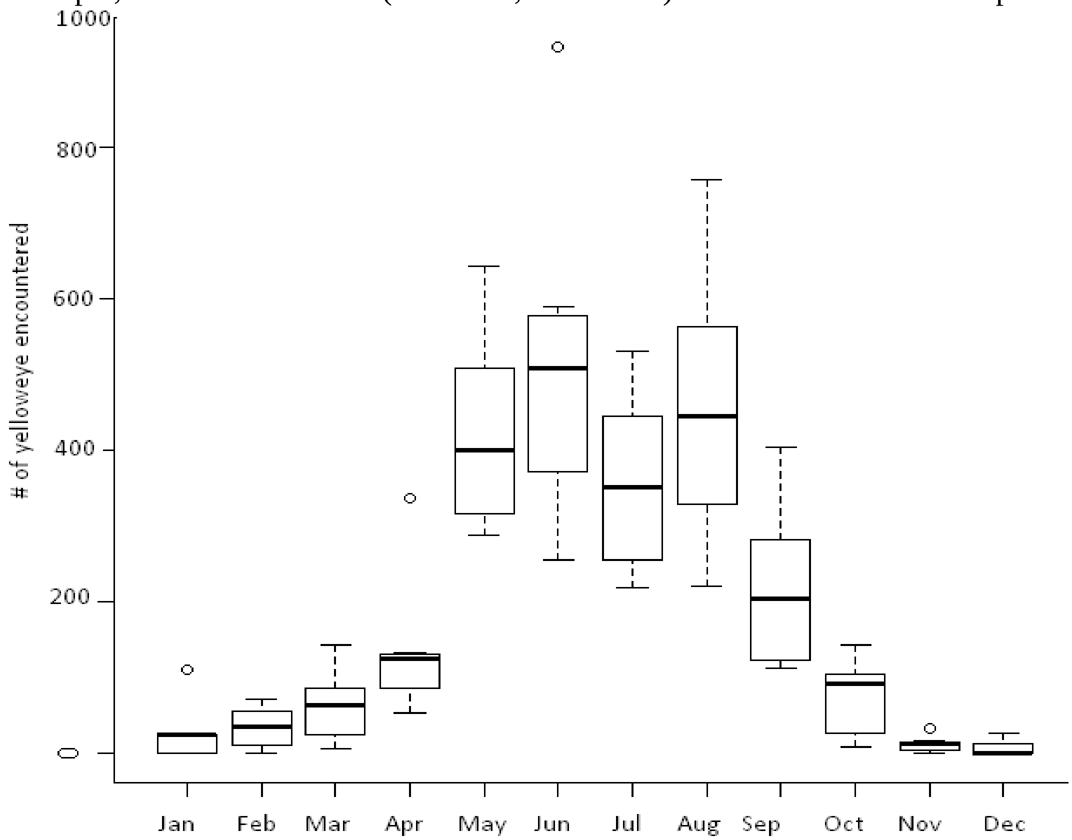

Figure A-11. Number of yelloweye rockfish encountered (discarded and harvested illegally) by month from recreational anglers in Oregon, 2004-2011.

Variation in yelloweye rockfish discards is attributed to variance in effort (total and by depth bin) and catch rates because the other variables are fixed (e.g., average fish weight, discard mortality rates). Catch rates (discarded per angler) and angler trips are also highly variable (Figure A-12 and Figure A-13).

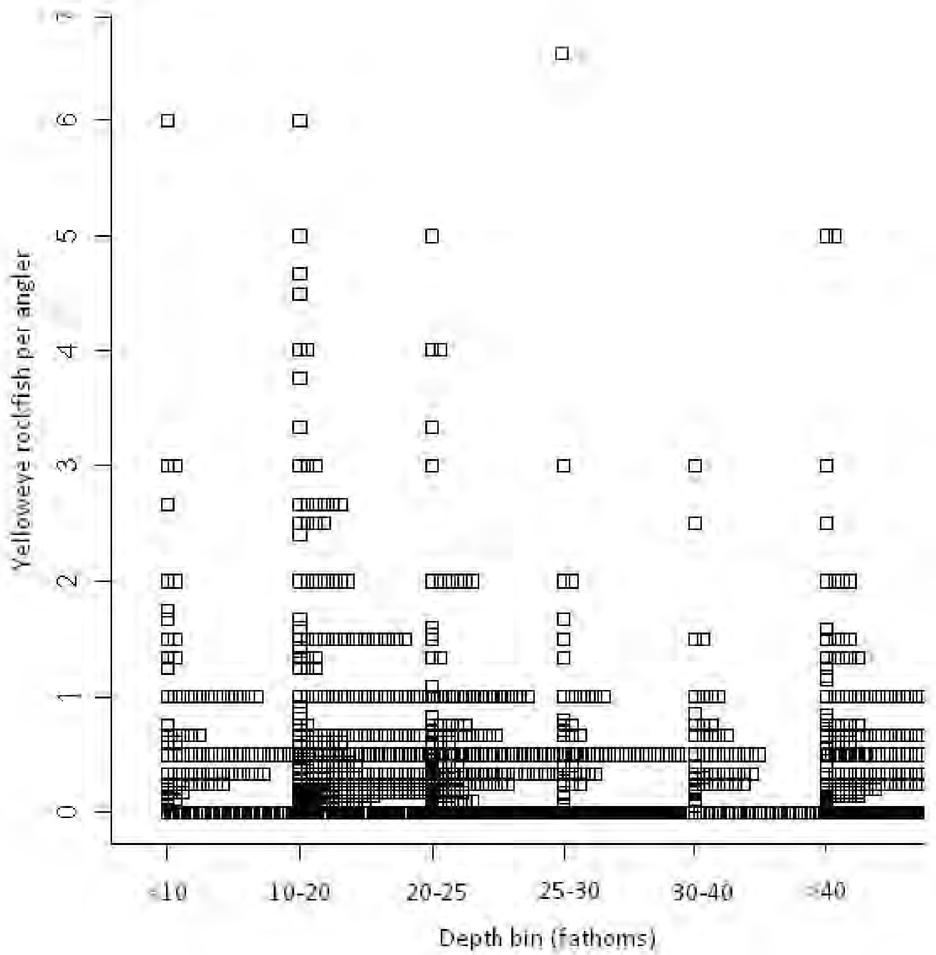
Yelloweye rockfish per angler
0
1
2
3
4
5
6
7
<10
10-20
20-25
25-30
30-40
>40
Depth bin (fathoms)

Figure A-12. Yelloweye rockfish catch rates (discards per angler) by depth bin.

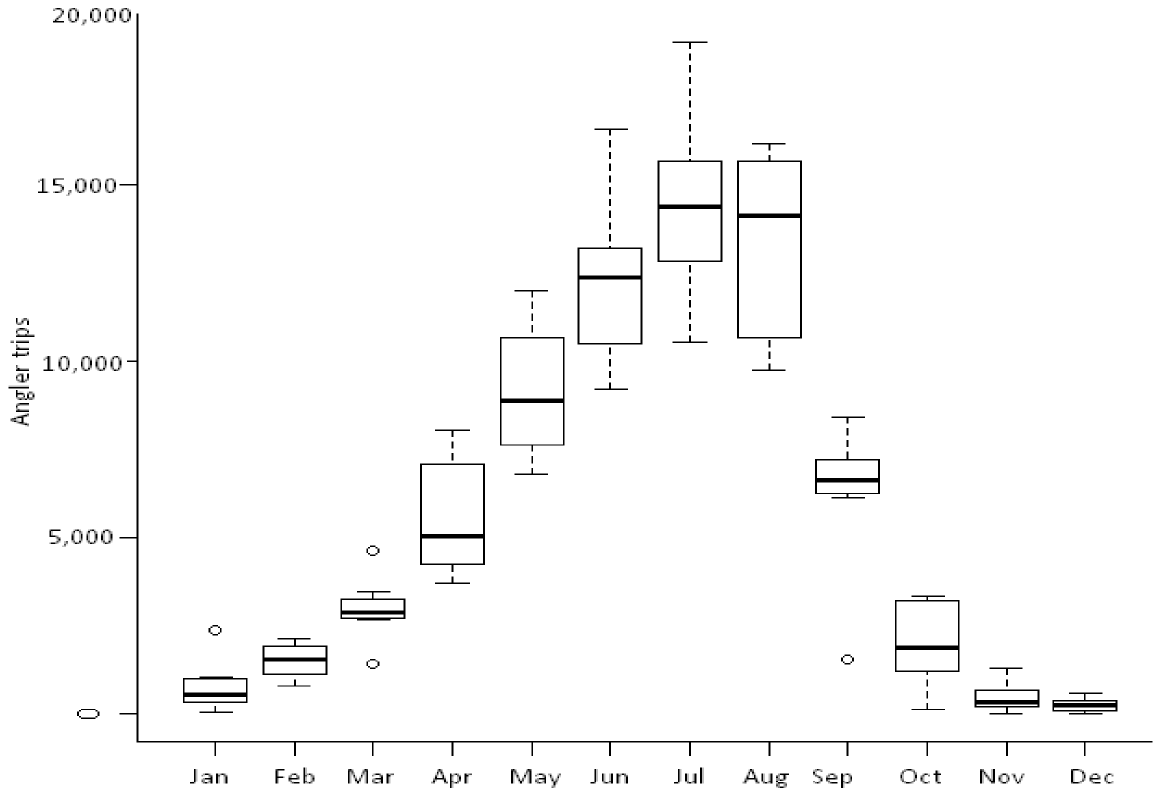

Figure A-13. Groundfish angler trips by month, 2004-2011.

Due to all the variation in variables used in modeling, a standard error based prediction interval would likely provide too wide of bands for management purposes (i.e., upper bounds above harvest guide line for all depth restrictions and a negative lower bounds, especially if a small alpha value is used). Further, carryover of variances to develop prediction intervals would require complex calculations that may be beyond the skill sets of fishery managers.

For simplicity and to simulate more probable yelloweye rockfish impacts, pseudo prediction intervals were developed using upper and lower ranges of catch rates and angler effort. Combined record high catch rates and effort would represent a worst case scenario, whereas combined record low catch rates and effort would represent a best case scenario. Although possible, it is unlikely that record catch rates and effort would coincide (either high or low); therefore, actual impacts would not be expected outside of the pseudo prediction interval bands. Expected impacts, with pseudo prediction intervals, for a year round 30 fm depth restriction are shown in Figure A-14.

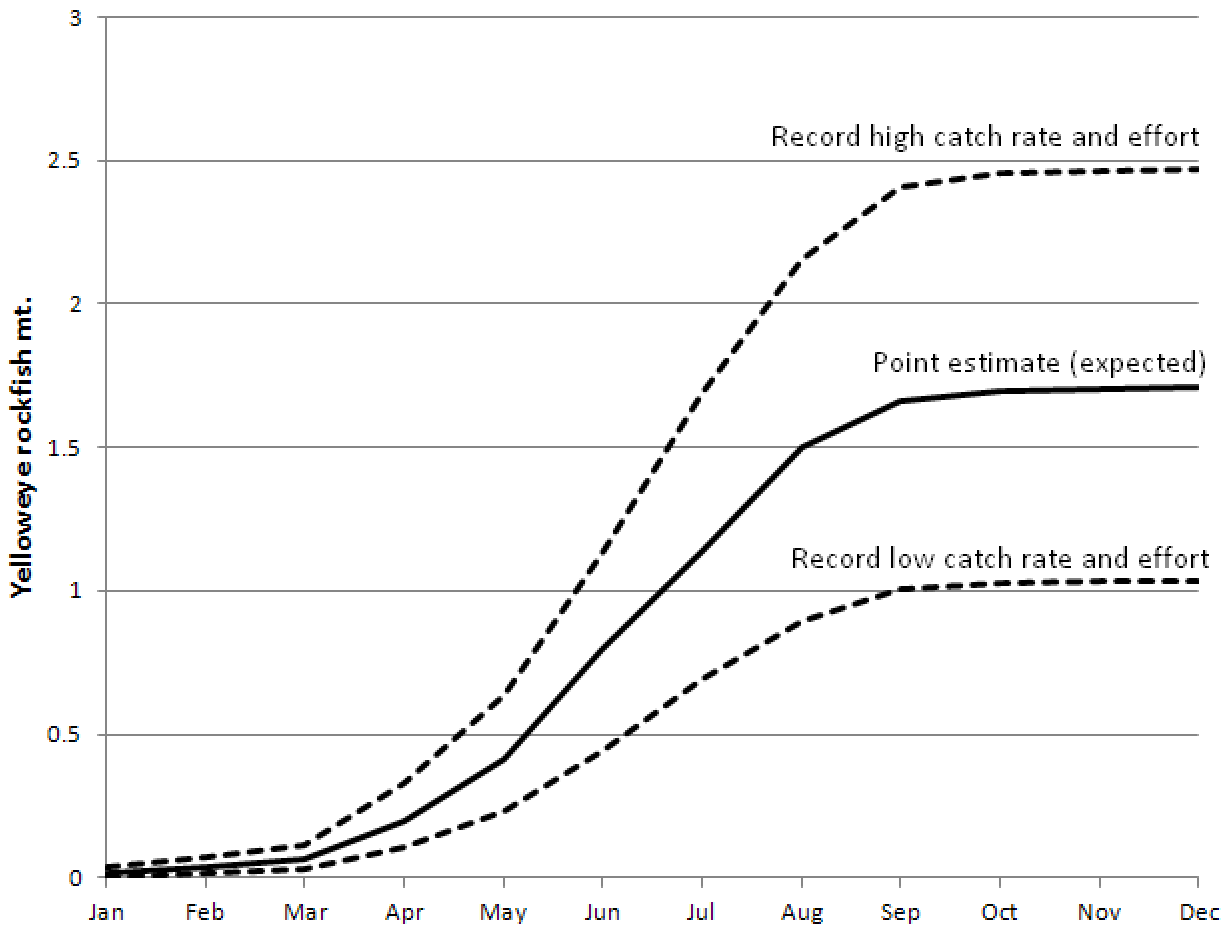

Figure A-14. Expected cumulative yelloweye impacts (average catch rates and effort) for a year round 30 fm depth restriction and pseudo (not standard error derived) prediction intervals (record high and low catch rates and effort).

A.8.3 Projected species impacts from the groundfish projection model

Five depth restriction alternatives were modeled for yelloweye rockfish (RF), canary RF, black RF, blue RF, greenlings (kelp greenling and rock greenling combined), cabezon, and other nearshore rockfish (brown, copper, China, grass, and quillback RF combined). The modeled depth restrictions were: < 20 fm, < 25 fm, <30 fm, < 40 fm, and > 40 fm (all-depths). Variables used in calculations were calculated by depth bin: 0-10 fm, 10-20 fm, 20-25 fm, 25-30 fm, 30-40 fm, and > 40 fm. Depth bins are similar to those used by the GMT due to similar discard mortality rates, but some GMT depth bins are split to allow projections of depth restrictions that could be less restrictive for management purposes. For example, a 20 fm depth restriction severely hinders groundfish fishing for Garibaldi, but a 25 fm restriction does not. Harvested and released impacts were calculated for species with federal landing caps (as required) and harvested impacts only for species with state landings caps. Tables of projected harvest and release impacts were created for each depth restriction alternative. Year totals for constant depth restrictions are summed, and combinations of depth restrictions during different months can be calculated by summing the corresponding month/depth values.

Black rockfish

Annual black rockfish harvest impacts are projected to be less than 310 mt for all depth restriction alternatives (Table A-34). Greater harvests are expected with shallower depth restrictions because effort in deep bins, with lesser catch rates, would be shifted to shallower bins, with greater catch rates. Black rockfish release mortality impacts are projected to be less than 4.2 mt for all depth restriction alternatives and are projected to increase as depth restrictions become shallower (Table A-35).

Table A-34. Projected black rockfish harvests impacts (mt) by month and by depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	4.67	6.04	8.74	22.02	36.96	66.53	59.02	62.42	28.05	9.00	1.26	2.26	306.97
<25 fm	4.61	5.98	8.64	21.72	36.47	65.65	58.24	61.59	27.67	8.71	1.22	2.19	302.70
<30 fm	4.61	5.98	8.64	21.56	36.19	65.16	57.80	61.13	27.47	8.56	1.20	2.15	300.46
<40 fm	4.51	5.85	8.45	21.38	35.89	64.61	57.32	60.62	27.24	8.12	1.14	2.04	297.19
40+ fm	4.08	5.29	7.65	n/a	n/a	n/a	n/a	n/a	n/a	7.01	0.98	1.76	n/a

Table A-35. Projected black rockfish discard mortality (mt) by month and by depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.05	0.07	0.10	0.30	0.50	0.90	0.80	0.84	0.38	0.13	0.02	0.03	4.11
<25 fm	0.05	0.07	0.10	0.29	0.48	0.87	0.77	0.82	0.37	0.12	0.02	0.03	3.98
<30 fm	0.05	0.07	0.10	0.28	0.48	0.86	0.76	0.81	0.36	0.12	0.02	0.03	3.93
<40 fm	0.05	0.07	0.10	0.28	0.47	0.85	0.76	0.80	0.36	0.11	0.02	0.03	3.89
>40 fm	0.05	0.06	0.09	n/a	n/a	n/a	n/a	n/a	n/a	0.09	0.01	0.02	n/a

Blue rockfish

Blue rockfish harvests are projected to be less than 40.0 mt for all depth restriction alternatives (Table A-36). Greater harvests are expected with intermediate depth restrictions (25-30 fm) because effort in deep bins, with lesser catch rates, would be shifted to intermediate depth bins, with greatest catch rates.

Table A-36. Projected blue rockfish harvest impacts (mt) by month and by depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.63	0.82	1.19	0.84	1.41	2.53	2.25	2.37	1.07	1.06	0.15	0.27	14.59
<25 fm	0.66	0.85	1.23	0.89	1.49	2.68	2.38	2.52	1.13	1.15	0.16	0.29	15.43
<30 fm	0.66	0.85	1.23	0.89	1.50	2.70	2.39	2.53	1.14	1.17	0.16	0.29	15.51
<40 fm	0.65	0.84	1.22	0.89	1.49	2.68	2.38	2.52	1.13	1.11	0.16	0.28	15.33
>40 fm	0.59	0.76	1.10	n/a	n/a	n/a	n/a	n/a	n/a	0.97	0.14	0.24	n/a

Other nearshore rockfish species complex (brown, quillback, China, grass, and copper RF)

Other nearshore rockfish harvest impacts are analyzed by individual species, but are summed in this report because of the aggregate state landing cap for these species. Harvest estimates are projected to be less than 12.0 mt for all depth restriction alternatives (Table A-37). Unlike for black rockfish and blue rockfish, lesser harvest impacts are expected with shallower depth restrictions because effort in deep bins, with greatest catch rates, would be shifted to shallower bins, with lesser catch rates.

Table A-37. Projected other nearshore rockfish harvest impacts (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.14	0.18	0.26	0.63	1.07	1.92	1.70	1.80	0.81	0.36	0.05	0.09	9.00
<25 fm	0.15	0.20	0.28	0.82	1.37	2.47	2.19	2.32	1.04	0.40	0.06	0.10	11.40
<30 fm	0.15	0.20	0.28	0.86	1.44	2.59	2.30	2.43	1.09	0.41	0.06	0.10	11.92
<40 fm	0.15	0.19	0.28	0.86	1.45	2.61	2.31	2.45	1.10	0.39	0.06	0.10	11.94
>40 fm	0.14	0.18	0.26	n/a	n/a	n/a	n/a	n/a	n/a	0.34	0.05	0.08	n/a

Greenling species complex (rock greenling and kelp greenling)

Greenlings harvests are analyzed by individual species, but are summed in this report because of the aggregate landing cap for these species. Harvest estimates are projected to be less than 6.5 mt for all depth restriction alternatives (Table A-38). Greater harvest impacts are expected with shallower depth restrictions because effort in deep bins, with lesser catch rates, would be shifted to shallower bins, with greater catch rates.

Table A-38. Projected greenlings harvest impacts (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.11	0.14	0.21	0.45	0.76	1.37	1.21	1.28	0.58	0.17	0.02	0.04	6.34
<25 fm	0.11	0.14	0.21	0.45	0.76	1.37	1.21	1.28	0.58	0.16	0.02	0.04	6.33
<30 fm	0.11	0.14	0.21	0.45	0.75	1.36	1.20	1.27	0.57	0.16	0.02	0.04	6.29
<40 fm	0.11	0.14	0.20	0.45	0.75	1.35	1.19	1.26	0.57	0.15	0.02	0.04	6.22
>40 fm	0.10	0.13	0.19	n/a	n/a	n/a	n/a	n/a	n/a	0.13	0.02	0.03	n/a

Cabezon

Cabezon impacts are only projected through August because harvest rate is not available in latter months due to early attainment of the cabezon quota in years since depth data become available (2009). Impacts for all depth restrictions are projected to be less than 24.0 mt harvested and 1.2 mt released (Table A-39 and Table A-40). Cabezon catch rates are greater in shallow depth bins; therefore, cabezon impacts are expected to be greater for shallow depth bins.

Table A-39. Projected cabezon harvest impacts (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.38	0.49	0.71	1.97	3.31	5.96	5.28	5.59	na	na	na	na	23.68
<25 fm	0.41	0.52	0.76	1.92	3.22	5.80	5.15	5.44	na	na	na	na	23.23
<30 fm	0.41	0.52	0.76	1.90	3.19	5.75	5.10	5.39	na	na	na	na	23.02
<40 fm	0.40	0.52	0.75	1.89	3.17	5.71	5.06	5.36	na	na	na	na	22.86
>40 fm	0.39	0.51	0.73	n/a	n/a	n/a	n/a	n/a	n/a	na	na	na	n/a

Table A-40. Projected cabezon discard mortality (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.06	0.08	0.11	0.08	0.13	0.24	0.21	0.22	n/a	n/a	n/a	n/a	1.12
<25 fm	0.06	0.07	0.11	0.08	0.13	0.23	0.21	0.22	n/a	n/a	n/a	n/a	1.11
<30 fm	0.06	0.07	0.11	0.08	0.13	0.23	0.20	0.22	n/a	n/a	n/a	n/a	1.10
<40 fm	0.06	0.07	0.11	0.08	0.13	0.23	0.20	0.22	n/a	n/a	n/a	n/a	1.09
>40 fm	0.05	0.07	0.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Yelloweye rockfish

Yelloweye rockfish harvest has been prohibited since 2004; therefore, the majority of impacts are now due to discard mortality. Yelloweye rockfish impacts are projected to be less than 1.8 mt for all depth restriction scenarios (Table A-41). Shallower depth restrictions are expected to reduce yelloweye rockfish impacts due to lesser catch rates and discard mortality rates in shallow water depth bins.

Table A-41. Expected yelloweye rockfish discard mortality by month and depth restriction in the bottomfish fishery.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.015	0.019	0.027	0.077	0.130	0.233	0.207	0.219	0.098	0.016	0.002	0.004	1.046
<25 fm	0.016	0.020	0.029	0.113	0.189	0.340	0.302	0.319	0.144	0.025	0.003	0.006	1.507
<30 fm	0.016	0.020	0.029	0.123	0.206	0.372	0.330	0.349	0.157	0.030	0.004	0.008	1.643
<40 fm	0.021	0.028	0.040	0.126	0.212	0.382	0.339	0.358	0.161	0.068	0.010	0.017	1.762
>40 fm	0.051	0.066	0.095	n/a	n/a	n/a	n/a	n/a	n/a	0.140	0.020	0.035	n/a

Canary rockfish

Canary rockfish release impacts are projected to be less than 3.7 mt for all depth restriction alternatives (Table A-42). Shallower depth restrictions are expected to reduce catch rockfish release impacts due to lesser catch rates and mortality rates in shallow water depth bins.

Table A-42. Expected canary rockfish discard mortality (mt) by month and depth restriction in the bottomfish fishery.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.040	0.052	0.075	0.200	0.336	0.605	0.537	0.568	0.255	0.082	0.012	0.021	2.782
<25 fm	0.045	0.059	0.085	0.239	0.401	0.722	0.640	0.677	0.304	0.090	0.013	0.023	3.297
<30 fm	0.045	0.059	0.085	0.253	0.425	0.765	0.679	0.718	0.322	0.099	0.014	0.025	3.488
<40 fm	0.046	0.059	0.085	0.259	0.434	0.782	0.693	0.733	0.329	0.166	0.023	0.042	3.652
>40 fm	0.091	0.118	0.171	n/a	n/a	n/a	n/a	n/a	n/a	0.273	0.038	0.069	n/a

A.8.4 Pacific halibut fishery projection model

Yelloweye rockfish and canary rockfish are typically the only groundfish species with impact limits caught in the Pacific halibut fishery; therefore, Pacific halibut fishery projection models exist only for these species.

Old and new projection models

The old model was ratio based and projected 0.00557 mt of yelloweye rockfish and 0.003065 mt of canary rockfish per 1,000 lbs of Oregon Pacific halibut quota. However, a ratio based projection method appears inappropriate because there does not appear to be a relationships between Oregon Pacific halibut quota and yelloweye rockfish catches (Figure A-15; $R^2 < 0.01$) nor canary rockfish catches (Figure A-16; $R^2 < 0.01$) (given in fish due to change in discard mortality calculations). Yelloweye rockfish and canary rockfish may be unrelated to Pacific halibut quota because of different habitat preferences of the fish (i.e., rocky reefs for rockfish and gravel/sand for Pacific halibut).

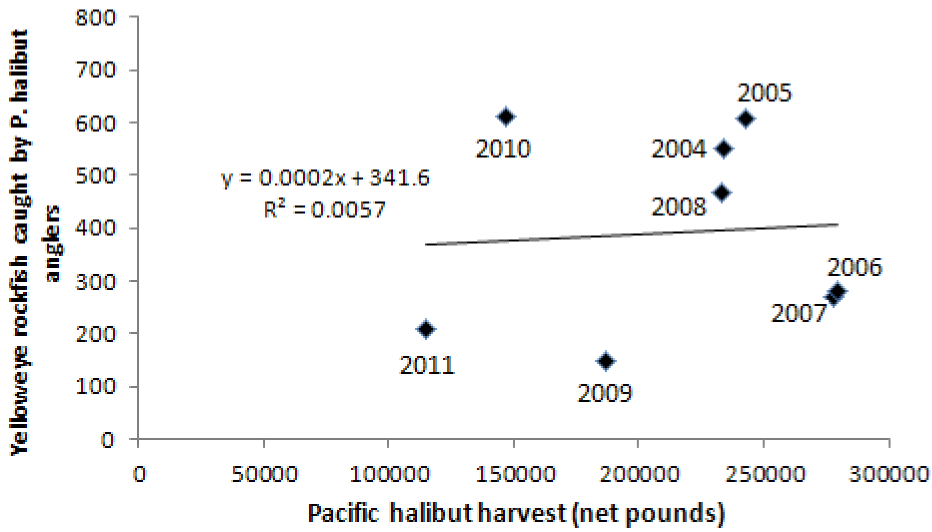

Figure A-15. Relationship between yelloweye rockfish catches (discards) and Oregon Pacific halibut quota.

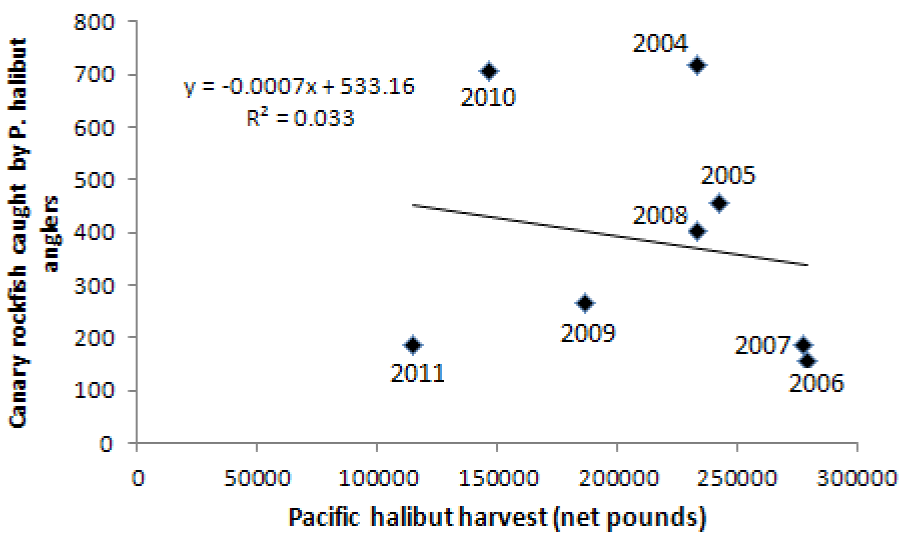

Figure A-16. Relationship between canary rockfish catches (discards) and Oregon Pacific halibut quota.

Instead of using a ratio based approach, the new Pacific halibut model simply uses mean impacts, regardless of quota (0.49 mt for yelloweye rockfish and 0.69 mt for canary rockfish).

Incorporation of variance into the Pacific halibut projection model

Prediction intervals (not confidence intervals) for a one year prediction of canary rockfish and yelloweye rockfish were made for α=0.1 and 0.2 values using the following formula.

$$\bar{X} \pm K \cdot s \qquad K = t_{1-\alpha/k,\, n-1}\sqrt{\frac{1}{n} + \frac{1}{m}}$$

k = number of sampling periods interested in
m = number of samples per sampling period
n = number of background samples
$1-\alpha/2k$ = level of confidence

The yelloweye rockfish prediction intervals were 0.49 ± 0.68 (α=0.1) and ± 0.405 (α=0.2). The canary rockfish prediction intervals were 0.69 ± 0.44 (α=0.1) and ± 0.26 (α=0.2). These wide ranges make it difficult to project future impacts of these species from the Pacific halibut fishery.

A.8.5 Bag limit models

Bag limits have been used by ODFW to manage the recreational groundfish fishery since 1976. The rockfish, greenling, and cabezon (RGC) aggregate bag limit encompasses the most commonly harvested groundfish species. The RGC bag limit since 2004 has ranged from five to ten fish. This variation was used to determine if RGC bag limits can be used to alter angler catch rates and impacts of RGC target species or incidentally caught overfished species. Only black rockfish and blue rockfish catch rates appear to be affected by differences in RGC bag limits; therefore, RGC bag limits only appear to be effective at manipulating impacts (mt landed) of those species. Catch rates of other species included in the RGC bag limit, including overfished species, are not expected to be affected by RGC bag limit adjustments (catch rates unrelated to RGC bag limits). Of RGC species, cabezon are least affected by bag limits. Even year-round one cabezon sub-bag limits are not expected to result in significant cabezon harvest reductions.

Introduction:
Bag limits are a commonly used fisheries management method for controlling harvests. Only anglers with catches within the scope of bag limit changes are affected. For example, a bag limit reduction from six fish to four fish will not affect the catches of those anglers that caught zero to four fish. Bag limits reductions would be expected to reduce releases of overfished species (harvest prohibited) because anglers may catch bag limits in less time, resulting in decreased fishing effort. However, bag limit reductions may not reduce prohibited species impacts if releases of these species are more dependent on where anglers fish than how long they fish.

Analysis of adjustments to the rockfish, greenling, and cabezon (RGC) aggregate bag limit:
Analysis of bag limit adjustments used data from angler interviews from the Oregon Recreational Boat Survey (ORBS) since 2004 (first year yelloweye rockfish and canary rockfish harvest was prohibited). The RGC bag limit has been five through eight and ten (Table A-43). RGC bag limit analysis was performed for black rockfish (RF), blue RF, greenlings (rock greenling and kelp greenling combined), cabezon, other nearshore RF (brown RF, grass RF, China RF, quillback RF, and copper RF combined), yelloweye RF, and canary RF.

Table A-43. RGC bag limits by month and by year, 2004-2011.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	10	10	10	10	10	10	10	10	10	10	10	10
2005	8	8	8	8	8	8	8,5	5	5	5	5	5
2006	6	6	6	6	6	6	6	6	6	6	6	6
2007	6	6	6	6	6	6	6	6	6	6	6	6
2008	6	6	6	6	6	6	6,5	5	5	5	5	5
2009	6	6	6	6	7	7	7	7	7	7	7	7
2010	7	7	7	7	7	7	7	7	7	7	7	7
2011	7	7	7	7	7	7	7	7	7	7	7	7

Black RF

A percentage of anglers caught RGC bag limits that were comprised only of black RF for all RGC bag limits (5, 6, 7, 8, 10; Table 5-2); therefore, adjustments to RGC bag limits can be used to alter black RF harvests. Differences between black RF harvests under different RGC bag limits were made by (a) multiplying the percent of anglers that caught zero fish by zero, the percent that caught one by one, the percent that caught two by two, and so on until 10 for each RGC bag limit, (b) summing those products for each RGC bag limit, and (c) comparing the total values for each RGC bag limit. Angler catch rates that exceed bag limits were removed due to probable data errors (e.g., 57 black RF per angler under a five RGC limit). Projections of black RF catches under two, three, four and nine RGC bag limits were also made by shifting the percentage of anglers that caught the bag limit under a greater RGC bag limit to the bag limit of a lower RGC bag limit. For example, a projection of a nine RGC bag limit was made from the 10 RGC bag limit by deleting the 7.5 percent of angers that caught 10 fish and by adding that 7.5 percent to the percentage that caught nine fish. Projections of two, three, and four RGC bag limits were made from when the RGC bag limit was six rather than five due to much greater sample size (78,729 anglers vs. 10,343 anglers). A multiplier table was then created to compare black RF harvests under different RGC bag limits (Table A-44). To determine differences between harvests for a given month under different RGC bag limits, multiply the harvest impact estimate by the multiplier.

Table A-44. Percent of bottomfish anglers that caught 0-10 black RF (fish/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 black RF under 2, 3, 4, and 9 RGC bag limits. Projected angler percentages of 2-4 bag limits were based off data from when the bag limit was 6 instead of 4 due to a greater sampler size.

	Bag limit								
fish/ang	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	11.7	11.7	11.7	12.8	11.7	12.0	10.8	13.1	13.1
1	12.7	12.7	12.7	17.9	12.7	15.0	11.5	9.2	9.2
2	75.6	11.2	11.2	15.5	11.2	14.5	9.9	7.9	7.9
3	0.0	64.4	12.3	15.8	12.3	12.8	9.9	7.5	7.5
4	0.0	0.0	52.1	21.4	14.6	11.0	11.2	8.7	8.7
5	0.0	0.0	0.0	16.7	21.1	12.6	12.3	7.2	7.2
6	0.0	0.0	0.0	0.0	16.4	12.8	12.3	7.7	7.7
7	0.0	0.0	0.0	0.0	0.0	9.3	13.8	9.1	9.1
8	0.0	0.0	0.0	0.0	0.0	0.0	8.2	10.6	10.6
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	11.5

10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5
total	100	100	100	100	100	100	100	100	100

Table A-45 calculation of a bag limit of 4 (based off 6) example: The percentage of anglers that would have caught 1-3 fish is the same for bag limits of 4 and 6 (would not have been affected by a bag limit of 4). Those that caught 5 or 6 fish (with a bag of 6) would have had their catches reduced to 4 fish with a bag limit of 4, so the expected percentage of anglers catching the limit with a 4 fish bag limit is the sum of the anglers that caught 4-6 fish with a bag limit of 6 (14.6 + 21.1 + 14.6 = 52.1).

Table A-45. Multiplier table to compare differences in black RF harvests (mt) under different RGC bag limits.

	Bag from:								
Bag to:	2	3	4	5	6	7	8	9	10
2	1.000	0.718	0.585	0.618	0.490	0.495	0.406	0.339	0.333
3	1.393	1.000	0.814	0.860	0.683	0.690	0.566	0.472	0.464
4	1.711	1.228	1.000	1.057	0.839	0.847	0.695	0.579	0.570
5	1.619	1.163	0.946	1.000	0.794	0.802	0.658	0.548	0.540
6	2.040	1.465	1.192	1.260	1.000	1.010	0.829	0.691	0.680
7	2.019	1.450	1.180	1.247	0.990	1.000	0.820	0.684	0.673
8	2.462	1.768	1.439	1.520	1.207	1.219	1.000	0.834	0.821
9	2.953	2.120	1.726	1.824	1.448	1.463	1.200	1.000	0.985
10	2.999	2.153	1.753	1.852	1.470	1.486	1.218	1.016	1.000

Blue RF

The same bag limit analysis was used for blue RF and black RF. As for black RF, RGC bag limits can be used to adjust blue rockfish impacts, although to a much lesser degree because a lesser percentage of anglers are catching RGC bag limits that consist only of blue RF (<1%;Table A-46) than black RF (7.5 percent-16.7 percent). Accordingly, the blue RF multiplier table shows lesser impacts due to RGC bag limit changes than for black RF (Table A-47).

Table A-46. Percent of anglers that caught 0-10 blue RF (BRF/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 blue RF under 2, 3, 4, and 9 RGC bag limits.

	Bag limit								
Fish/ang.	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	96.37	96.37	96.37	95.00	96.34	90.92	95.36	93.24	93.24
1	3.12	3.12	3.12	4.24	3.12	7.63	4.05	5.82	5.82
2	0.35	0.35	0.35	0.40	0.35	0.94	0.39	0.60	0.60
3	0.16	0.09	0.09	0.17	0.09	0.25	0.06	0.22	0.22
4	0.00	0.08	0.05	0.16	0.05	0.12	0.10	0.05	0.05
5	0.00	0.00	0.02	0.02	0.03	0.04	0.01	0.01	0.01
6	0.00	0.00	0.00	0.00	0.02	0.07	0.01	0.04	0.04
7	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.03	0.03
8	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01

9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
total	100	100	100	100	100	100	100	100	100

Table A-47. Multiplier table to compare differences in blue RF harvests (mt) under different RGC bag limits.

	Bag from:								
Bag to:	2	3	4	5	6	7	8	9	10
2	1.00	0.92	0.89	0.65	0.88	0.56	0.25	0.50	0.50
3	1.08	1.00	0.97	0.71	0.96	0.61	0.27	0.55	0.55
4	1.12	1.03	1.00	0.73	0.98	0.63	0.28	0.56	0.56
5	1.53	1.41	1.37	1.00	1.35	0.86	0.39	0.77	0.77
6	1.13	1.05	1.02	0.74	1.00	0.64	0.29	0.57	0.57
7	1.78	1.64	1.59	1.16	1.57	1.00	0.45	0.90	0.89
8	3.94	3.64	3.53	2.57	3.48	2.22	1.00	1.99	1.98
9	1.99	1.83	1.78	1.30	1.75	1.12	0.50	1.00	1.00
10	1.99	1.83	1.78	1.30	1.75	1.12	0.50	1.00	1.00

Other nearshore RF (China, quillback, copper, brown, and grass RF combined)

Other nearshore RF bag limit analysis was the same as used for black RF. Unlike for black RF and blue RF, RGC bag limits do not appear to affect other nearshore RF catch rates since (a) 0 percent of anglers caught RGC bag limits that comprised only of other nearshore RF, (b) the percentage of anglers that caught 0, 1, 2, and 3 other nearshore RF were similar for all RGC bag limits, and (c) greater than 99 percent of anglers caught fewer than 2 other nearshore RF for all RGC bag limits (Table A-48).

Table A-48. Percent of anglers that caught 0-10 other nearshore RF (fish/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 other nearshore RF under 2, 3, 4, and 9 RGC bag limits.

	Bag limit								
Fish/ang.	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	92.75	92.75	92.75	95.63	92.75	92.79	95.82	95.01	95.01
1	6.45	6.45	6.45	4.02	6.45	6.61	3.97	4.82	4.82
2	0.80	0.61	0.61	0.28	0.61	0.41	0.18	0.09	0.09
3	0.00	0.18	0.12	0.07	0.12	0.13	0.03	0.07	0.07
4	0.00	0.00	0.06	0.00	0.05	0.04	0.00	0.01	0.01
5	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
total	100	100	100	100	100	100	100	100	100

Greenlings (kelp greenling and rock greenling)

RGC bag limits would be expected to have little to no impact on greenlings catch rates since (a) fewer than 0.01 percent of anglers harvested RGC bag limits that were comprised only of greenlings, (b) the percentage of anglers that caught 0, 1, 2, and 3 greenlings were similar for all RGC bag limits, and (c) greater than 99 percent of anglers caught fewer than 2 greenlings for all RGC bag limits (Table A-49).

Table A-49. Percent of anglers that caught 0-10 greenlings (fish/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 greenlings under 2, 3, 4, and 9 RGC bag limits.

	Bag limit								
Fish/ang.	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	96.4	96.4	96.4	95.0	96.3	90.9	95.4	93.2	93.2
1	3.1	3.1	3.1	4.2	3.1	7.6	4.0	5.8	5.8
2	0.4	0.4	0.4	0.4	0.4	0.9	0.4	0.6	0.6
3	0.2	0.1	0.1	0.2	0.1	0.3	0.1	0.2	0.2
4	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total	100	100	100	100	100	100	100	100	100

Overfished rockfish: Yelloweye RF and canary RF

Since harvest of yelloweye and canary RF is prohibited, anglers can continue to catch and release these species until they stop fishing (due to RGC attainment or other). Lesser overfished species releases would be expected with reduced RGC bag limits because of reduced fishing effort per angler (less time to catch limit). However, there is a curvilinear relationship between RGC bag limit and percentages of anglers releasing 1-4 yelloweye or canary RF (peaks at RGC bag limit of 7; Figure A-17 and Figure A-18). The curvilinear relationship may be due to the rebuilding of the stocks; greater catches have occurred in recent years (7 and 6 RGC bag limits) than earlier years (8 and 10 RGC bag limits). It is also possible that encounters of overfished stocks may be more related to where an angler fishes than how long they fish.

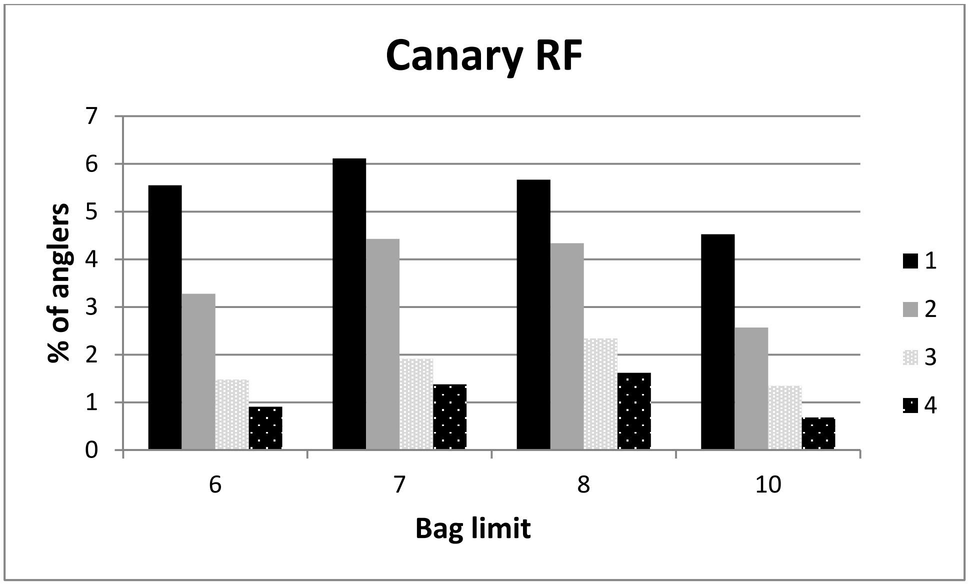

Figure A-17. Percentage of anglers that caught 1-4 canary rockfish under 6-10 RGC bag limits.

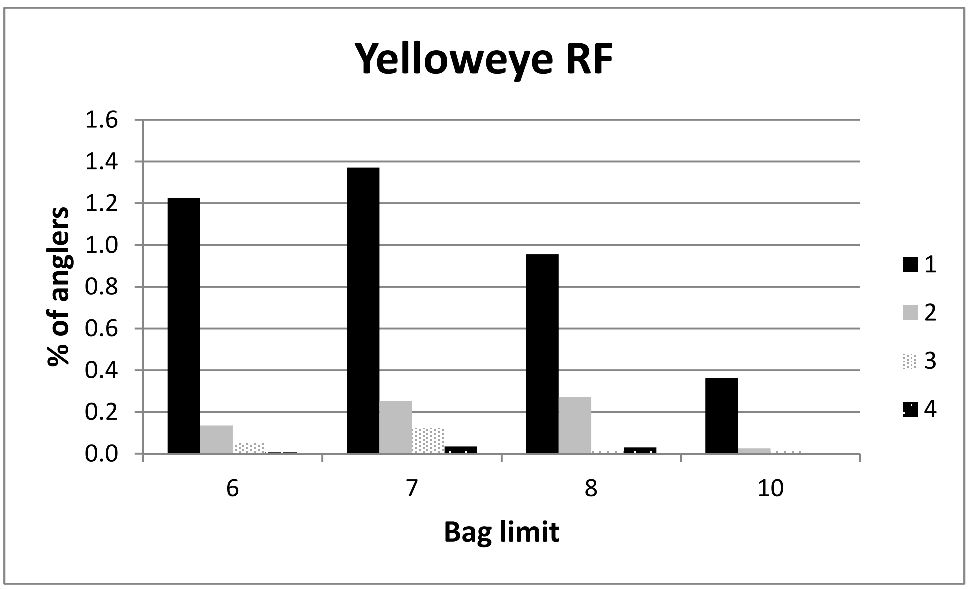

Figure A-18. Percentage of anglers that caught 1-4 yelloweye rockfish under 6-10 RGC bag limits.

Cabezon:

Inseason closure of cabezon retention has occurred before October in all years since 2004 (due to attainment of quota), and closures have occurred during July in 2010 and 2011.

Only 3.3 percent of anglers that kept cabezon kept more than one when permitted (cabezon harvest could equal RGC bag); therefore, cabezon catch rates or harvest impacts would not be expected to be significantly altered by reductions in the RGC bag limit or even one cabezon sub-bag limits (only one can be cabezon)(Table A-50). As evidence, the earliest inseason closure of cabezon occurred in the only year (2011) with a one cabezon sub-bag limit. Accordingly, year-round retention of cabezon may not be able to occur with per angler bag or sub-bag limits. A one cabezon per boat bag limit could result in year-round harvest opportunities, but would disproportionally impact vessels with multiple anglers (e.g., charters).

Table A-50. Expected cabezon harvests (mt) with a one cabezon per boat limit, one cabezon per angler limit, and a seven cabezon per angler limit.

	Bag limit		
Month	1 / boat	1 / angler	7 (RGC)
Jan	0.24	0.41	0.43
Feb	0.31	0.52	0.54
Mar	0.43	0.73	0.77
Apr	1.01	1.53	1.63
May	1.76	2.66	2.84
Jun	2.31	3.49	3.73
Jul	2.97	4.50	4.81
Aug	2.23	3.38	3.61
Sep	1.23	1.87	2.00
Oct	n/a	n/a	n/a
Nov	n/a	n/a	n/a
Dec	n/a	n/a	n/a
Total	12.49	19.09	20.37

Notes: Used 2008-2011 data. Impacts for a seven cabezon bag limit were calculated for each month by multiplying average catch rate by average cabezon weight (kg) by average angler trips by .001 (kg to mt conversion). One cabezon per angler impacts were calculated with the same formula, but reducing all catch rates greater than one to one. Impacts for a one cabezon per boat limit were calculated with the same formula, but reducing catch rates greater than one per boat to one. Estimates were not made for Oct-Dec because cabezon retention was prohibited for those months in all years (cabezon releases averaged less than 0.2 mt for October and less than 0.1 mt for Nov and Dec).

A.8.6 Multivariate forecasting: yelloweye rockfish (excluding management regulations)

Yelloweye rockfish have been the most constraining groundfish species because annual catch limits of this species have generally been obtained before catch limits of other non-overfished groundfish species or species complexes. Therefore, the objective of most management measures is to reduce yelloweye rockfish impacts, to allow greater utilization of other groundfish stocks. The ability to accurately predict yelloweye catches could increase the effectiveness of management measures. Unfortunately, yelloweye rockfish catches are rare (Figure A-19), highly variable (Figure A-20), and do not appear to be strongly related to economic indicators (e.g., gas prices, stock market, unemployment), weather (e.g., wind, waves, or ocean condition (wind and waves interaction together), or strength of other fisheries (e.g., tuna, halibut, and salmon harvests) (Figure A-21). Weak relationships between the mentioned indicators and yelloweye impacts would lead to poor goodness of fit with multivariate analysis (e.g., regression), and would lead to wide prediction intervals with little value for management purposes. Until more accurate predictions of yelloweye rockfish impacts can be made, inseason management of groundfish fisheries will have to remain reactionary.

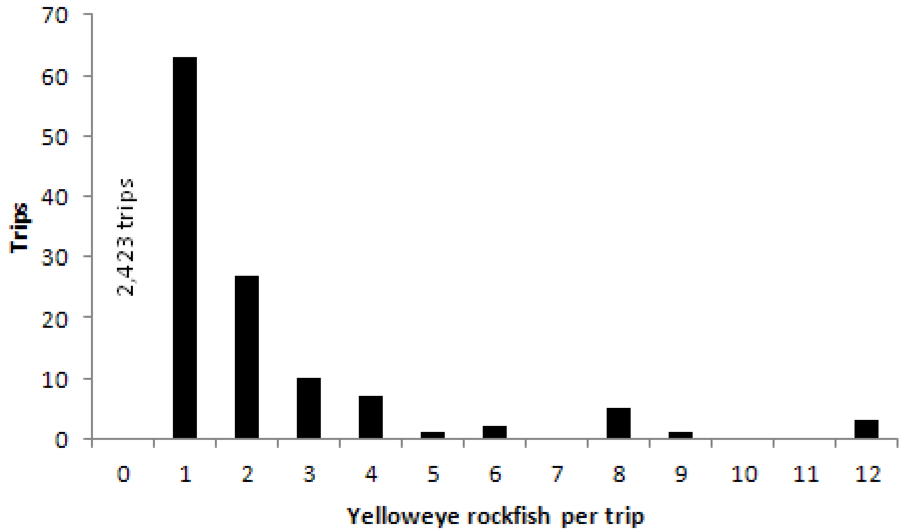

Figure A-19. Yelloweye rockfish per angler trip for June 2011.

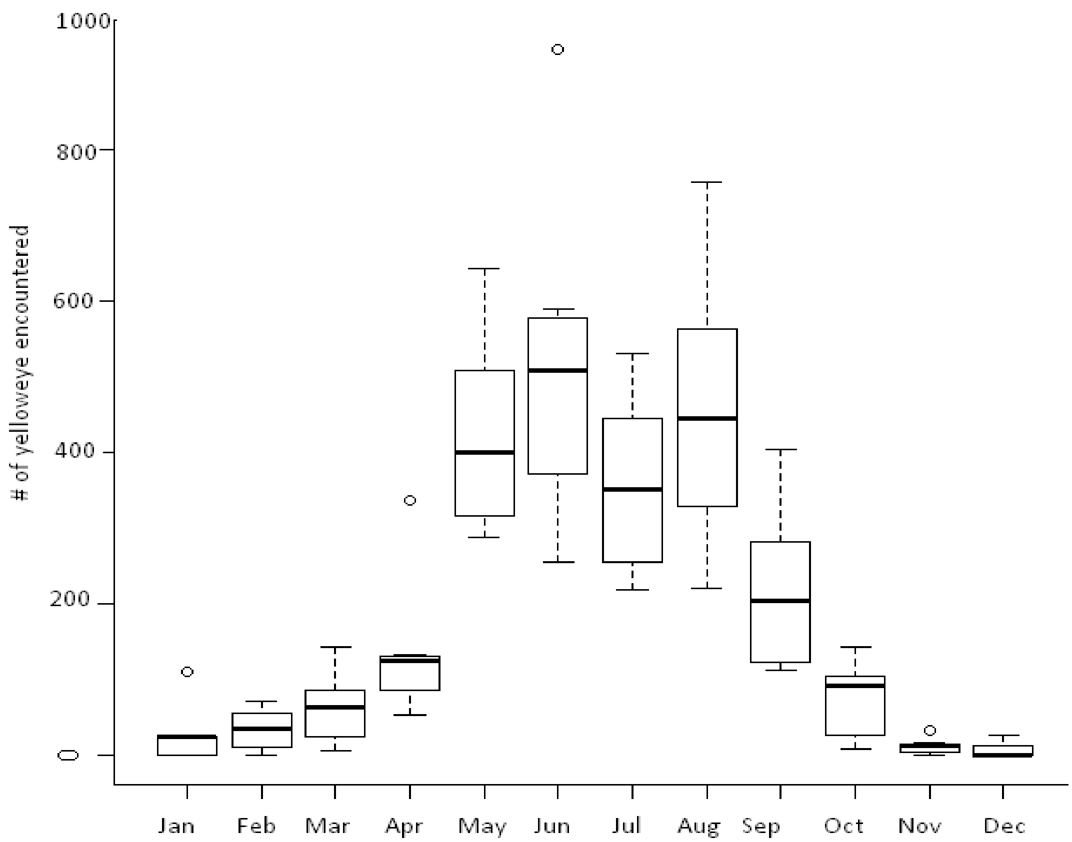

Figure A-20. Yelloweye rockfish encounters (landed + released) by month for the bottomfish fishery, 2004-2011.

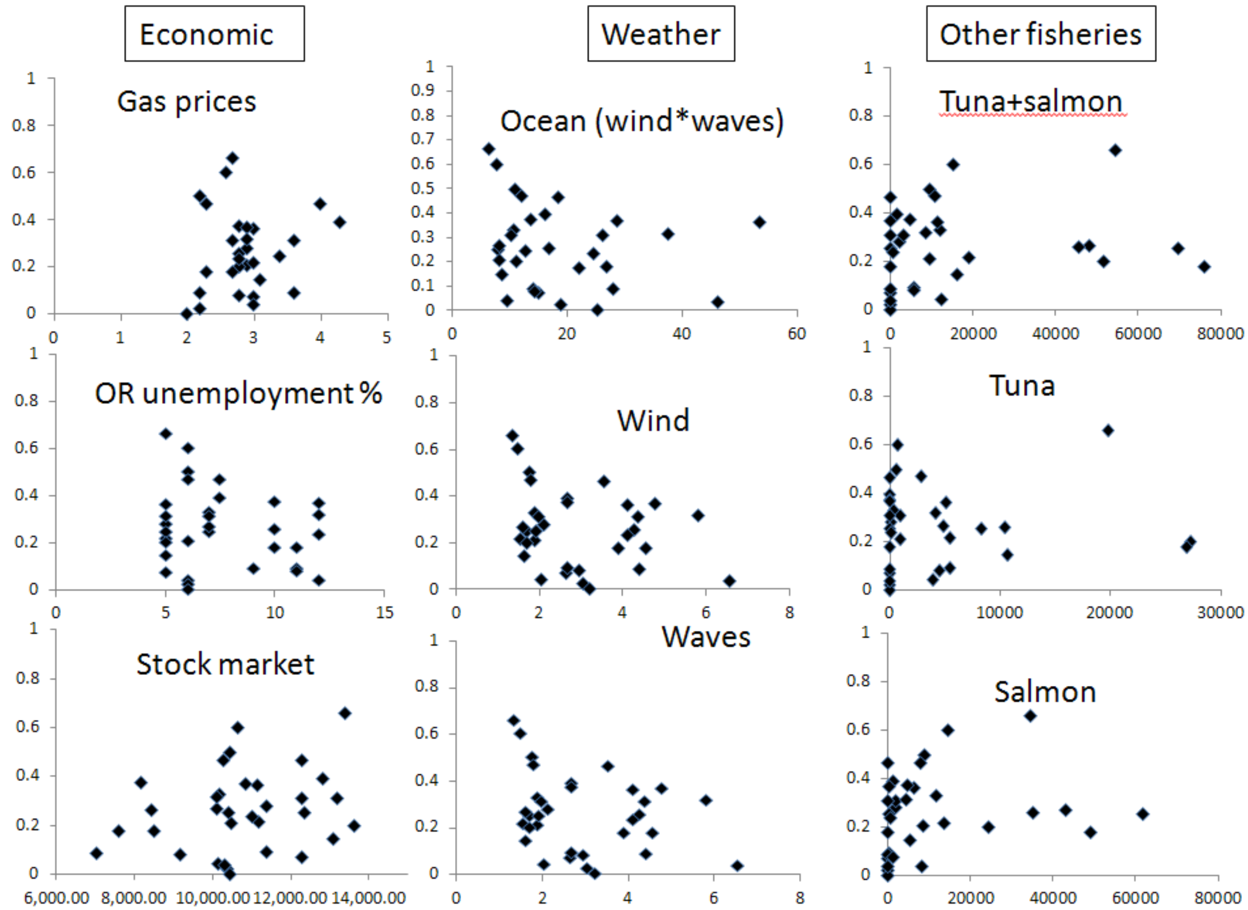

Figure A-21. Relationship between yelloweye impacts and economic indicators, weather, and strength of other fisheries for months with < 40 fm depth restrictions (months with majority of impacts), 2004-2010. y axis = mt of yelloweye rockfish; x axis units: gas = $, unemployment = %; stock market = DOW points; ocean = kts X swell feet; wind = kts; waves = swell feet; other fisheries = fish landed).

A.8.7 Model performance

The ability to accurately predict groundfish species impacts (harvests and discards) under different management restrictions is essential to reduce the possibility of inseason closures of fisheries. In Oregon, the ability to predict groundfish species impacts given different depth restrictions in the groundfish fishery is of greatest importance because other management restrictions do not appear capable of significantly manipulating impacts (e.g., bag limits unless set unrealistically low) or have not been examined (e.g., additional area closures). Of particular concern is the ability to accurately predict yelloweye rockfish impacts since they are the most limiting species to groundfish management in Oregon (only species in which quotas are typically obtained and because impacts cannot be reduced by prohibiting harvest because retention is always prohibited). Although the same models are used to predict impacts of all groundfish species with impact caps, only the ability of models to predict yelloweye rockfish impacts is examined, due to their relative importance, by comparing actual versus expected impacts.

Effects of new data source for determining discard mortality rates

Acquiring data of anger catches and efforts by depth has given ODFW a much greater understanding of where anglers fish, how angler behavior may be affected by depth restrictions, and what actual discard mortalities are than when only observed charter data on fish releases was available (see section 1). This newly acquired information shows that discard mortalities rates fluctuate and that the assumption of fixed discard mortalities used in previous calculations of discard mortalities was consequently inaccurate. Since the same fixed discard mortalities were used in both the old projection model and old discard mortality rate calculations, this created a greater chance of more aligned estimates and projections (although more inaccurate) than with the new projection model, which has to account for the variable discard mortality rates of the new calculation method.

Old model performance 2007-2009: actual versus expected impacts for discard mortality from groundfish fishery

Prior to 2010, the new and old projection models cannot be compared because data necessary for the new model (catch rate and effort by depth) did not exist (first obtained in 2009 but need a full year of data for the model). Therefore, it was only possible to compare actual versus expected values for the old model. Only three years were compared (2007-2009) because this model is no longer used and because three years of comparisons were sufficient enough to prove that the old model had poor predictive abilities.

The close to expected year end totals for yelloweye rockfish discard mortalities from the groundfish fishery for 2009 (-11.7 percent error) and 2008 (-6.1 percent error) are misleading because substantial monthly positive and negative errors cancelled each other out (typically > ± 20 percent; Table A-51). The -38.6 percent error in 2007 is more representative of the true predictive ability of the old model.

The old model was also fairly poor at predicting total discard mortality from the Pacific halibut fishery and harvest from all fisheries (Table A-51). The old model appeared to be fairly accurate at predicting total impacts (discard mortality plus harvest) in 2007 (3.4 percent error) and 2008 (2.0 percent error), but this was misleading because substantial errors of the different fisheries canceled each other out.

Table A-51. Comparison of actual versus expected yelloweye rockfish discard mortalities from the groundfish fishery by month and year for the old model (2007-2009). Actual and expected values are in metric tons; depth = depth restriction; negative error = projection < actual.

	2009					2008					2007				
Month	Depth	Expected	Actual	Actual-Expected	% error	Depth	Expected	Actual	Actual-Expected	% error	Depth	Expected	Actual	Actual-Expected	% error
Jan	All	0.010	0.119	0.109	-91.6	All	0.046	0.045	-0.001	2.0	All	0.041	0.0469	0.006	-12.6
Feb	All	0.019	0.075	0.056	-75.1	All	0.077	0.076	-0.002	2.0	All	0.035	0.0523	0.017	-33.1
Mar	All	0.085	0.100	0.015	-15.3	All	0.162	0.159	-0.003	2.0	All	0.172	0.2562	0.084	-32.9
Apr	40	0.064	0.087	0.023	-26.1	40	0.360	0.312	-0.048	15.3	40	0.041	0.0696	0.029	-41.1
May	40	0.148	0.176	0.028	-16.1	40	0.537	0.466	-0.071	15.3	40	0.147	0.2496	0.103	-41.1
Jun	40	0.220	0.376	0.156	-41.4	40	0.454	0.393	-0.060	15.3	40	0.085	0.1438	0.059	-40.9
Jul	40	0.205	0.175	-0.030	17.0	20	0.107	0.159	0.051	-32.4	40	0.117	0.1986	0.082	-41.1
Aug	40	0.370	0.259	-0.111	42.7	20	0.121	0.179	0.058	-32.4	40	0.388	0.6598	0.272	-41.2
Sep	40	0.177	0.077	-0.100	129.9	40	0.047	0.090	0.043	-47.9	40	0.184	0.3127	0.129	-41.2
Oct	All	0.084	0.168	0.084	-50.2	40	0.095	0.211	0.116	-54.9	All	0.114	0.1696	0.056	-32.8
Nov	All	0.026	0.011	-0.015	139.4	40	0.028	0.061	0.034	-54.9	All	0.019	0.0289	0.010	-34.2
Dec	All	0.054	0.032	-0.022	68.8	40	0.012	0.027	0.015	-54.9	All	0.009	0.0126	0.004	-28.7
Total		1.461	1.655	0.194	-11.7		2.046	2.178	0.132	-6.1		1.352	2.201	0.849	-38.6

Table A-52. Comparison of actual versus expected yearly yelloweye rockfish discard mortalities, harvests, and total impacts (2007-2009). Negative error = projection < actual.

	Discard mort. GF fishery			Discard mort. P. halibut fishery			Harvest (all fisheries)			Total impacts (all)		
Year	expected	actual	% error	expected	actual	% error	expected	actual	% error	expected	actual	% error
2009	1.461	1.656	-11.8	0.974	0.312	212.2	0.055	0.075	-26.7	2.490	2.043	21.9
2008	2.046	2.178	-6.1	1.200	1.010	18.8	0.068	0.062	9.7	3.314	3.250	2.0
2007	1.352	2.201	-38.6	1.548	0.590	162.3	0.053	0.064	-17.2	2.953	2.855	3.4

New model performance 2010-2011: actual versus expected impacts for discard mortality from groundfish fishery

The old projection model became obsolete when it was discovered that assumption of fixed discard mortality rates was incorrect for the groundfish fishery; therefore, there is no need to compare the predictive ability of the old and new models for the discard mortality from the groundfish fishery.

Instead, projected discard mortality from the groundfish fishery is compared with two variations of the new model. The preseason version of the new model uses only data prior to the projection year and the inseason version uses monthly data from the projection year when it becomes available. The inseason version was expected to have better predictive abilities because it could incorporate trends from the projection year that would be expected to continue for the entire year (e.g., greater than expected catch rates from Jan-May would be expected to result in greater than expected catch rates for the rest of the year).

As expected, the inseason version was better at predicting total year discard mortality than the preseason version for 2010 (-12.6 percent and -21.4 percent error, respectively) and 2011 (-6.8 percent and -11.2 percent error, respectively) (Table A-53). Percent error for the inseason version was greatest during months with relatively low impacts (typically > 20 percent and often nearly 100 percent or greater; Jan-Mar and Sep-Dec). Discard mortality is very difficult to accurately project during these months because efforts are much less than during summer months (small sample size issue) and catch rates are highly variable. Of greater concern is the ability to accurately predict discard mortality during summer months (Jun-Aug) when the majority of impacts occur. Percent error with the inseason version was less than 20 percent for each of these months during 2010 and during July of 2011. The relatively large percent error during June 2011 (-63.3 percent) was due more than double record yelloweye rockfish discards (released fish) for the month (due to record catch rates and record effort). Inclusion of the record June 2011 catch rate data into model caused the inseason projections for July-Sept to increase, but actual catch rates returned to normal, resulting in projections greater than what actually occured for the period.

Table A-53. Actual versus expected yelloweye rockfish discard mortalities from the groundfish fishery for the preason (PRE; using data before projection year) and inseason (IN; using data for the projection year when available) versions of the new projection method. Negative error = projection < actual.

		2011							2010								
		Expected (mt)		Actual (mt)	Actual - expected		% error			Expected (mt)		Actual (mt)	Actual - expected		% error		
Month	Depth	PRE	IN		PRE	IN	PRE	IN	Depth	PRE	IN		PRE	IN	PRE	IN
Jan	All	0.027	0.027	0.023	-0.004	-0.004	19.1	19.1	All	0.022	0.022	0.012	-0.010	-0.010	76.3	76.3
Feb	All	0.047	0.047	0.029	-0.018	-0.018	64.2	64.2	All	0.026	0.026	0.035	0.009	0.009	-24.7	-24.7
Mar	All	0.071	0.071	0.026	-0.045	-0.045	174.1	174.1	All	0.056	0.056	0.063	0.007	0.007	-10.7	-10.7
Apr	40	0.104	0.102	0.052	-0.052	-0.050	99.4	95.6	40	0.082	0.086	0.033	-0.049	-0.053	151.8	164.1
May	40	0.177	0.174	0.165	-0.012	-0.009	7.2	5.4	40	0.148	0.155	0.313	0.165	0.158	-52.8	-50.5
Jun	40	0.205	0.201	0.547	0.342	0.346	-62.6	-63.3	40	0.172	0.180	0.181	0.009	0.001	-5.1	-0.6
Jul	20	0.172	0.236	0.210	0.038	-0.026	-18.1	12.4	40	0.280	0.224	0.241	-0.039	0.017	16.2	-7.0
Aug	20	0.147	0.203	0.151	0.004	-0.052	-2.9	34.1	20	0.099	0.157	0.132	0.033	-0.025	-24.9	19.1
Sep	20	0.072	0.099	0.055	-0.017	-0.044	29.9	78.7	20	0.044	0.069	0.062	0.018	-0.007	-28.9	11.5
Oct	All	0.061	0.048	0.136	0.075	0.088	-55.2	-64.7	20	0.021	0.023	0.004	-0.017	-0.019	420.8	470.4
Nov	All	0.014	0.012	0.001	-0.013	-0.011	834.8	701.3	20	0.006	0.006	0.000	-0.006	-0.006	no impacts	
Dec	All	0.01	0.008	NA	NA	NA	NA	NA	20	0.003	0.003	0.005	0.002	0.002	-39.1	-39.1
Total		1.097	1.220	1.396	0.299	0.176	-21.4	-12.6		0.959	1.007	1.080	0.121	0.073	-11.2	-6.8

Model comparison for predicting discard mortality in Pacific halibut fishery

Near 100 percent discard mortalities of yelloweye rockfish caught in the Pacific halibut fishery make it possible to compare the old and new models for projecting discard mortality in the fishery. Both methods are much simpler than the groundfish discard mortality models: the old method is ratio based and projects 0.00557 mt of yelloweye rockfish per 1,000 lbs of Pacific halibut quota for Oregon fisheries and the new method assumes 0.455 mt total, regardless of the Oregon quota (see section 4).

The new model resulted in a smaller mean percent error than the old model (-15 percent and 95 percent, respectively) and consequently appears to be the better projection model (Table A-54). Inconsistencies in percent errors with the old model means that a simple ratio approach would not fit the data well or have accurate predictive abilities.

Table A-54. Actual versus expected yelloweye rockfish discard mortality from the Pacific halibut fishery. Negative error = projection < actual.

		Expected		Actual - Expected		% error	
Year	Actual	New	Old	New	Old	New	Old
2011	0.531	0.466	1.044	0.065	-0.513	-12	97
2010	0.770	0.466	0.886	0.304	-0.116	-39	15
2009	0.312	0.466	1.036	-0.154	-0.724	49	232
2008	1.010	0.466	1.200	0.544	-0.190	-54	19
2007	0.590	0.466	1.264	0.124	-0.674	-21	114
				Mean error =		-15	95

A.8.8 Model output use in management

Model outputs are used to keep projected impacts within catch limits while minimizing potential reductions in angler trips. An example of a potential 3.5 mt canary rockfish harvest guideline (HG) is used to outline the steps in the process.

The first step in the process is to create regulatory and season framework options to keep projected impacts within catch limits. Model outputs of projected impacts from the Pacific halibut fishery and from the groundfish fishery, by depth restriction, are used to keep total projected impacts within 3.5 mt HG (Table A-55). Status quo regulations are projected to result in impacts (4.68 mt) greater than the HG (Option SQ; Table A-56). Projected impacts can be kept within the HG by either limiting the groundfish fishery to 20 fm for the entire year and keeping the Pacific halibut fishery open (3.47 mt; Option 1; Table A-56) or by limiting the groundfish fishery to 30 fm for the entire year and closing the Pacific halibut fishery (3.49 mt; Option 2; Table A-56).

Table A-55. Projected canary rockfish impacts (mt) by month and depth restriction from the groundfish fishery and from the Pacific halibut fishery.

Groundfish fishery projected impacts

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<20 fm	0.040	0.052	0.075	0.200	0.336	0.605	0.537	0.568	0.255	0.082	0.012	0.021
<25 fm	0.045	0.059	0.085	0.239	0.401	0.722	0.640	0.677	0.304	0.090	0.013	0.023
<30 fm	0.045	0.059	0.085	0.253	0.425	0.765	0.679	0.718	0.322	0.099	0.014	0.025
<40 fm	0.046	0.059	0.085	0.259	0.434	0.782	0.693	0.733	0.329	0.166	0.023	0.042
>40 fm	0.091	0.118	0.171	n/a	n/a	n/a	n/a	n/a	n/a	0.273	0.038	0.069

(Pacific halibut projection = 0.690 mt)

Table A-56. Regulatory options of potential depth restrictions by month for the groundfish fishery and presence/absence (present unless specified) to keep projected impacts (mt) of canary rockfish (CAN) within a 3.5 mt HG.

Option	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	CAN
SQ	all-depth			40 fm						all-depth			4.68
1	20 fm												3.47
2	30 fm --No Pacific halibut												3.49

The next step is to determine which option results in the fewest potential decrease in angler trips. Potentially eliminated groundfish trips are calculated by multiplying the percent of sampled trips that occured seaward of a proposed depth restriction during months with status quo depth restrictions by expanded total trips for the month (the new angler effort by depth data is vital for this calculation). All Pacific halibut trips are deducted if this fishery is closed. These estimates are upper range projections because anglers would have had the option of fishing shallower permissible depths or could have fished for other species. If all displaced anglers would have found substitute fishing opportunities, then the lower range of the projected decrease in angler trips would be zero. Socioeconomic survey data on potential changes in angler behavior due to proposed restrictions would be beneficial for point estimate projections.

Option 1 would be preferred instead of Option 2 because of fewer potential reductions in angler trips (Table A-57). Potential decreases in angler trips with Option 1 are 8,493 (9 percent) and 26,567 (28.3 percent) for Option 2. This example only has two regulatory options to simply outline how calculations and decisions are made. Five to ten options are typically analyzed and are discussed with members of the public before a decision on regulations is made.

Table A-57. Comparison of potential decreases in angler trips by fishery and port for Options 1 and 2 of Table 7-2.

	Decline in trips with Option 1									Status quo trips					
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
Port	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	% decrease
Astoria	12	9	21	0	0	0	12	9	21	37	243	159	148	587	3.5
Garibaldi	1789	2525	4314	0	0	0	1789	2525	4314	3548	3812	574	2457	10392	41.5
Pacific City	5	24	29	0	0	0	5	24	29	337	2753	6	705	3801	0.8
Depoe Bay	970	129	1099	0	0	0	970	129	1099	9208	1713	1211	552	12684	8.7
Newport	546	135	680	0	0	0	546	135	680	10984	5089	1781	9505	27359	2.5
Florence	0	0	0	0	0	0	0	0	0	0	0	0	241	241	0.0
Winchester	5	7	13	0	0	0	5	7	13	5	31	0	265	302	4.2
Charleston	365	917	1282	0	0	0	365	917	1282	3221	5794	325	969	10309	12.4
Bandon	141	229	370	0	0	0	141	229	370	932	1094	79	423	2527	14.6
Port Orford	7	62	70	0	0	0	7	62	70	30	430	147	104	711	9.8
Gold Beach	145	190	335	0	0	0	145	190	335	731	2372	9	106	3218	10.4
Brookings	191	89	281	0	0	0	191	89	281	3146	15472	19	3127	21764	1.3
Total	4178	4315	8493	0	0	0	4178	4315	8493	32181	38804	4310	18602	93896	9.0

	Decline in trips with Option 2									Status quo trips					
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
Port	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	% decrease
Astoria	12	9	21	159	148	307	171	156	328	37	243	159	148	587	55.8
Garibaldi	407	1863	2269	574	2457	3031	981	4320	5300	3548	3812	574	2457	10392	51.0
Pacific City	0	0	0	6	705	711	6	705	711	337	2753	6	705	3801	18.7
Depoe Bay	279	49	329	1211	552	1763	1490	601	2091	9208	1713	1211	552	12684	16.5
Newport	380	97	477	1781	9505	11286	2161	9602	11763	10984	5089	1781	9505	27359	43.0
Florence	0	0	0	0	241	241	0	241	241	0	0	0	241	241	100.0
Winchester	5	7	13	0	265	265	5	273	278	5	31	0	265	302	92.2
Charleston	49	362	411	325	969	1294	374	1332	1705	3221	5794	325	969	10309	16.5
Bandon	0	7	7	79	423	502	79	430	509	932	1094	79	423	2527	20.1
Port Orford	0	0	0	147	104	251	147	104	251	30	430	147	104	711	35.3
Gold Beach	95	0	95	9	106	115	104	106	209	731	2372	9	106	3218	6.5
Brookings	15	19	34	19	3127	3146	34	3146	3180	3146	15472	19	3127	21764	14.6
Total	1242	2413	3655	4310	18602	22912	5552	21015	26567	32181	38804	4310	18602	93896	28.3

Potential decreases in angler trips (Table A-57) are used in conjunction with economic survey data to determine potential decreases in saltwater angler expenditures (i.e., gas, lodging, food, charter tickets, tackle, bait, licenses, etc.) by county in Oregon (Table A-58).

Option 1 is projected to reduce annual saltwater angler expenditures by $5.160 million, and more than half of this loss would be expected from Tillamook County (Table A-58). Option 2 is projected to reduce annual saltwater angler expenditures by $14.265 million (nearly three times that of Option 1).

Table A-58. Expected decreases in saltwater angler expenditures (all costs related to fishing trip) by county for Options 1 and 2 (Table 7-2).

	Status quo		Option 1		Option 2	
County	$ (millions)	Trips	Δ trips	Δ $	Δ trips	Δ $
Clatsop	5.766	5,545	-21	-0.022	-328	-0.341
Tillamook	21.235	24,026	-4,343	-3.838	-6,011	-5.313
Lincoln	21.466	51,353	-1,779	-0.744	-13,854	-5.791
Lane	2.628	814	0	0	-241	-0.778
Douglas	6.998	6,386	-13	-0.014	-278	-0.305
Coos	8.365	17,722	-1,652	-0.78	-2,215	-1.046
Curry	5.183	27,273	-685	-0.13	-3,640	-0.692
Total	71.641	133,119	-8,493	-5.528	-26,567	-14.265

Notes: $= angler expenditures (i.e., gas, lodging, tackle, etc.); trips = angler trips for all target species (e.g., tuna, salmon, bottomfish, halibut); Δ trips = projected decline in angler trips for Options 1 and 2; Δ $ = projected decrease in angler expenditures from Options 1 and 2 . Clatsop= Astoria; Tillamook= Garibaldi and Pacific City; Lincoln= Depoe Bay and Newport; Lane= Florence; Douglas= Winchester Bay; Coos= Charleston and Bandon; Curry= Port Orford, Gold Beach, and Brookings.

A.9 California Recreational Catch and Effort Model

Recreational fisheries management for multi-species assemblages in California presents many challenges. In recent years, declining stocks of several rockfish species have dictated recreational groundfish management seasons and depths in California. Increasingly complex restrictions have been necessary to keep total catch of depleted species within the reduced limits that are necessary to rebuild the stocks while providing fishing opportunity.

Prior to 2000, the recreational daily bag limit for rockfish was 15 fish per angler with no closed months or depths. Beginning in 2000, the daily bag limit was reduced to 10 fish. Regulations have changed each year since 2000, making analyses of the effects of particular regulations difficult. In addition, regulations have become more region-specific, adding to the difficulty of modeling projected catches.

A.9.1 Methodology Used to Project Recreational Catches for 2013-14

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 used for 2013-14 is the same as for 2011–12. The 2008-2010 data from the California Recreational Fishery Survey (CRFS) program serves as a baseline. The model output predicts expected catch under any combination of season and depth fishing restrictions for each of the regions

A.9.2 Changes to the RecFISH Model for 2013-2014

The CRFS estimates from 2008 to 2010 were inputted into the RecFISH model to determine the proposed season structure and species projected impacts. The proportion of catch by depth applied to the depth dependent mortality rates to derive Management Area Specific discard mortality rates were updated and applied to the 2008-2010 CRFS estimates. In addition, the proportion of catch by time and by depth in the historical catch were revised as described below, to better reflect the seasonality of effort North of Point Arena and the proportion of catch by depth North of 40° 10' min N. Latitude respectively.

A.9.3 Model Assumptions

The following assumptions were made for projecting impacts in the California recreational fishery.

- 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 applied to account for increased effort in a smaller fishing area.
- Discard Mortality: Depth-dependent mortality rates for discarded rockfish are applied to the discarded fish (B2 & B3) in 10-fm increments. When projecting the 2013-14 season catch, discard catch estimates are multiplied by the proportion of catch in a given 10-fm depth increment times the depth-dependent mortality rate for the corresponding depth for each species.

A.9.4 Methodology Used to Calculate Annual Unrestricted Catch

- Pull (A+B1+B2+B3) Catch for each year from RecFIN[1]: Specify species and select the parameters month and district under Define Table Layout.
- Pull historical catch by depth (1999-2000, most recent years unregulated by depth) from the RecFIN boatdepth3 CDFG private access website. 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.
- Pull historical catch through time (1993-1999, the most recent years unregulated by monthly closure) from RecFIN[2] : Calculate average percent catch by wave 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.
- For each management region and species, calculate total regulated catch based on months that each set of regulations was in effect. For example, if fishing was only open from 0-60 fm for March-December, sum total catch for those months only. Each management region should 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.
- 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 by the depth where fishing was open. This is the total expected catch for all depths. For example, if fishing for a MR set was open less than 20 fm, divide the total catch by the percentage of the catch less than 20 fm using the appropriate Depth Profile (historical unregulated catch data) for each species and region.
- Effort Shift. If the depth restriction is confined to 20 or 30 fm, we assume a shift in effort in shallower depth occurred for these months. To account for this effect, apply an effort shift factor to the constrained depth zone. For example, if a 0-20 fm restriction was in

[1] http://www.psmfc.org/recfin/forms/est2004.html
[2] http://www.psmfc.org/recfin/forms/est.html

effect multiply the total expected catch for all depths by 1.393 to calculate final total expected catch for those months. Similarly, use a factor of 1.276 if fishing was restricted within 30 fm. No effort shift is applied for depth restrictions greater than 30 fm.

- Accounting for Closed Months. After expanding to all depths and removing effort shift (if needed), sum all final expected catch values across all 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 percent catch by wave 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.
- Input expected annual unregulated catch for each region-species into the Catch by Year Table in the RecFISH Model database. The weighting of the different years' data to be used by the model in projecting catch can be selected at the model-user interface.

A.9.5 Description of the Catch Projection Model (RecFISH)

To improve the accuracy of catch estimates north of Point Arena for all rockfish including yelloweye rockfish, the following method was applied when modeling the effect of depth restrictions on rockfish species.

- For expanding baseline input catch data from regulated seasons to all depths, unregulated depth distribution of catch data from other areas can be used to supplement the existing historical data; these data must be from unregulated years to be able to expand to all depths. In the Northern Management Area, data from 1999-2003 were used (years unregulated by depth), recent unregulated Oregon catch by depth (1999-2003), and 1999-2000 data from the North-Central area that is north of Point Arena (for bathymetric and fishing effort similarities to the North). For the North-Central area, additional data from dockside party charter catch by depth data from 1999-2000 were used.

A.9.6 Inputs and Key Parameters for the Model

Weighting of Base Years: Base year data 2008-2010 were given nearly equal weighting by applying a 0.99 decay function. This is the same approach used in 2011-12.

Base Year Catch: CRFS catch estimates were summed for angler retained fish ("A" fish), angler-reported dead fish ("B1" fish), and a proportion of CRFS reported discarded fish derived ("B2" fish) using depth-based mortality estimates. Base year catch estimates are assumed to be for an unrestricted fishery that is open year-round at all depths. Therefore, for each year, a back calculation method was used to obtain an estimate for what catch would have been had the fishery been open for all months and at all depths. This back calculation uses month and depth catch proportions derived from historical catch estimates from seasons unregulated by month and depth.

Historical Catch By Month: Estimates of historical catch (in percent) by two-month period were calculated for each region based on Marine Recreational Fisheries Statistics Survey (MRFSS) data (weight of A+B1) from 1993-99, which was a time period when seasons and depths were unconstrained. Proxies were considered on a species by species basis for regions where there was a lack of catch data for that area. Monthly estimates of percent catch then were divided equally (50:50) for each pair of months.

Historical Catch by Depth: Estimates of percent catch by depth were calculated for each region based on MRFSS depth sample data (numbers caught A+B1 for CPFV and A+B1+B2 for PR) from 1999-2000, which was a time period when depths were unconstrained. Proxies were considered on a species by species basis for regions where there was a lack of catch data for that area.

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A.9.7 Determining the Proportion of Angler Reported Unavailable Dead Catch for Yelloweye and Canary Rockfish that was Composed of Discarded Dead Fish:

CRFS uses several different catch types in generating catch estimates which include A, B1, B2 etc. The B1 category includes disposition such as retained (filleted fish, fish given away, used for bait or otherwise unavailable) and fish discarded dead. Unfortunately, since CRFS began in 2004, the disposition of the B1 has not been recorded for the majority of private and rental trips which are sampled in the PR1 mode. Therefore, it is not possible to separate the discarded dead fish from the retained unavailable fish in B1 without use of a proxy for the proportion of fish discarded dead. Attempts have been made to apply the available data to the B1 fish, but few data exist for species such as yelloweye and canary rockfish, which are not allowed to be retained.

To estimate the proportion of yelloweye and canary rockfish B1 catch that is discarded dead, a "compliance factor" (CF) was determined for each management area for all groundfish species using CRFS data from 2008 to 2010. The CF was calculated by dividing B2 catch by total catch (A+B1+B2); this represents the proportion of fish reported discarded live by anglers. The CF is used as a proxy for the proportion of B1 that is discarded dead, and so it is multiplied by the B1 catch to estimate the total fish discarded dead. This amount is added to the known B2 catch to calculate total discards. This value is then multiplied by depth dependant mortality rate to obtain the discard mortality. Total mortality is the sum of retained catch (A+B1, less the proportion of B1 designated discarded dead) plus discard mortality. Because CFs are conservative, the proportions of B1 that are considered unavailable dead (filleted, used for bait, given away) are be biased high; this could result in an overestimate of total mortality.

A.10 California Recreational: Bocaccio Size Limit

Length data from the California Recreational Fisheries Survey (CRFS) from 2005 to 2010 were used to analyze the projected impacts to bocaccio as a result of removing the recreational size limit; both raw sample and estimate data were used.

The following steps were taken to calculate the increase in projected impacts expected as a result from removing the recreational size limit. The total weight of all sampled released fish (CRFS type "3" and "3d" catch types) was calculated along with the total weight of all sampled released fish under 10 inches. This was done to determine the proportion of fish under ten inches out of the total sampled fish. This proportion was then multiplied by the estimated weight of released fish ("B2" fish) to get the estimated weight of all fish under 10 inches. The estimated weight of fish under ten inches was then divided by the total weight of encountered fish (A+B1+B2) to determine what percentage of fish under ten inches is accounted for in the total encounters. That percentage was then applied to CDFG's RecFISH catch projection model results for bocaccio to determine the expected increase in projected impacts as a result of removing the size limit.

A.11 California Recreational: Greenling Bag Limit

RecFIN raw sample data were extracted and downloaded from the public web page for two time periods: 1995-2001 and 2009-2010. The years 1995-2001 were used as a base comparison time period because during those years there was a greenling ten-fish bag limit. These data were extracted from the Marine Recreational Fisheries Statistical Survey (MRFSS). The years 2009-2010 were chosen as a recent period because a greenling two-fish bag limit was in place and landings were very equal to or above the annual

TAC allocation for those years. The 2009-2010 RecFIN estimate data for greenlings were also extracted from the California Recreational Fisheries Survey (CRFS)

For each time period, three types of data were extracted: type 1, type 2, and type 3 so that summaries captured the header data and the A (kept) + B1 (unavailable dead) + B2 (released alive) fish. Only data from northern California (north of Point Conception) data were used; all modes and fishing areas within this area were included. Data were extracted and downloaded as comma delimited text files and converted into Access tables capturing the following fields:

- Type 1 records (header information)
- Type 2 records (B fish) – fish returned
- Type 3 records (A fish) – fish that were kept and available for inspection

Using Access, two tables were created for each time period: one table for the type 2 fish and one for the type 3 fish with four identification/update fields added to each table.

- A "Type" field was added to identify all "A" fish (type 3 records) or "B" fish (type 2 records) based upon the extracted record type (3 or 2)
- A "Trip type" field was identified and was updated with a "Y" for any record where:
  - greenlings (kelp, rock, genus, or family) were in the SP_CODE field
  - greenlings were identified in the PRIM1 or PRIM2 fields
    1. PRIM1 were fish identified by the angler as the primary target for the trip
    2. PRIM2 were the secondary target
- A "Trip type 2" field that was identified and was updated for all records that met any of the following criteria (using the Trip type 2 sub-codes as follows):
  - 1 = records where PRIM1 or PRIM2 were greenling
  - 2 = records where the SP_CODE (species code) was a greenling
  - 3a = records where the MODE_f was 2 or 5 (beach/bank) and PRIM1 or PRIM2 was cabezon, lingcod, rockfish genus, or monkeyface prickleback
  - 3b = records where the MODE_f was 2 or 5 and the SP_CODE was greenling, cabezon, lingcod, rockfish genus, or monkeyface prickleback
  - 3c = records where the MODE_f was 5 and the SP_CODE was any shallow nearshore rockfish
  - 4a = records where the MODE_f was 6, 7, or 8 and PRIM1 or PRIM2 was any shallow nearshore rockfish, cabezon, or monkeyface prickleback
  - 4b = records where the MODE_f was 6, 7, or 8 and the SP_CODE was any shallow nearshore rockfish, cabezon, or monkeyface prickleback
- A "GL" field that was identified and was updated for any record that had greenlings in the SP_CODE field
- All records that had a "Trip type 2" identifier as per any of the above were then used to update all "Trip type" records to a "Y" status – meaning that any bag/trip that was updated to a "Y" status (as per above) was identified and categorized as one that either had greenling as part of the bag or had the potential to have had a greenling
- Therefore, all records with a "Y" in the "GL" field were identified as greenling bags and any record with a "Trip type" identified as a "Y", but had a null value for the "GL" field were identified as a zero greenling bag
- Once a record was identified accordingly, all the records belonging to that bag (based on the same bag ID_CODE number) were updated so that each bag (in its entirety) had a uniform "Trip type" code identifier

Using both the updated main A fish and B fish tables, greenling COUNT tables were created that summed the number of greenlings per bag (based on the ID_CODE (using the Group By query function)) and the number of anglers per bag (using the CNTRBTRS (number of contributors – or anglers) field).

- Aggregate bags (bags with more than one angler) were factored in by dividing the number of greenlings per bag by the number of anglers resulting in many bags with a fractional amount of greenling(s) per bag
- Many bags had a zero or null value in the CNTRBTRS field and to correct for this a temporary table was created for A fish and B fish where the ID_CODE records were grouped and the CNTRBTRS was also grouped (where CNTRBTRS was >0 or not null). The temporary table and main tables were then linked and the main tables were then updated for those records missing a CNTRBTRS value. This yielded a more robust anglers/bag set of data which were used to update the 0 or null values in the A and B fish greenling COUNT tables. Type 1 records were not used because many records in those database tables also had 0 or null values in the CNTRBTRS field.

Bins were then set-up that summed the number of bags (based on the grouped ID_CODE) for all potential greenling trips where greenlings were not part of the bag (zero bag trips) and those where greenlings made up part of the bag. After the bin counts were completed, the estimated take at the two-fish, five-fish, and 10-fish levels were calculated for the base period using the following:

- A summed total (count) for each bin was calculated using this summary method:
  0 bags – no greenlings per bag
  0.01 – 1 greenling per bag
  1.01 – 2 greenlings per bag
  2.01 – 3 greenlings per bag
  Etc.
- A percent for each bin was calculated from the overall total number of bags (excluding those categorized as zero bags) with a cumulative running total noted at the two-fish bag level, the five-fish bag level, and at the 10-fish bag level
- For this base period, the percent difference between the two-fish, five-fish, and 10-fish amounts were noted
- Using the same method for the two-year recent period (2009-2010), the percent for the two two-fish bin was calculated, which included all bags that were in excess of the two-fish bin as part of the two-fish percentage.
- A 20 percent buffer was applied (i.e. the calculated percentage was increased by 20 percent) and the higher percentage was multiplied by the 50 mt new TAC allocation amount to estimate the status quo amount.
- To the two-fish percentage the difference between the two-fish and five-fish percentages was added from the base period to get a hypothetical five-fish bin percentage
- The five-fish percentage was multiplied by 50 mt amount to calculate that estimated harvest amount
- To the five-fish percentage the difference between the five-fish and 10-fish percentage was added from the base years and multiplied by 50 mt to estimate the harvest amount with a 10-fish bin

Assumptions used in the Model

- Since this model estimates (predicts) the amount of fish that potentially would be taken, all A fish (those retained in the bag), and B1 and B2 (fish returned dead or alive or eaten or given away, etc.) were included
- Only data from north of Point Conception were used because few greenling are taken south
- It is assumed that the number of bags per bin reflects a proportional amount of greenlings that would be taken

- Zero bags were identified using the above criteria to ascertain the number of bags (trips) where greenlings could have reasonably been taken as part of the fishing trip taking into consideration the mode and associated species for the mode
- The associated species used in the categorization criteria focused on those species commonly caught or potentially could be caught with greenlings from the same fishing area, method of catch, and habitat
- A 20 percent buffer was factored in to account for possible future (2012-2013) catch increases as the most conservative estimate possible
- For the base period, the differences between bin percentages were calculated using only bins with fish (the zero bins were excluded) because this yielded slightly higher percentage differences and was a more conservative approach

Appendix B: ANALYSIS OF THE INTEGRATED ALTERNATIVES

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

September 2012

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This apendix provides more detailed information behind the analysis of the integrated alternatives, compared to what was presented in Chapter 2, Section 2.4. The impacts of implementing the strategic combination of overfished species ACLs along with the management measures necessary to stay within those ACLs or achieve other management objectives outlined in the GFMP are presented by fishery and alternative.

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B.1 Shorebased IFQ

Predictions of total catch were made for a suite of alternatives with varying allocation structures, using a new catch-projection model for the shorebased IFQ fishery, to compare predicted impacts across the range of alternatives and enable community-level economic analyses, for the biennial groundfish harvest specifications environmental impact statement (See Appendix A for more information on the modeling platform). The species-specific allocations that varied the most among alternatives were those of canary rockfish and Pacific ocean perch, the levels of which varied in different combinations, in and out of phase, in order to elucidate potential constraints of each on predicted target catch. Variation in allocations of other species was either comparatively very low, or occurred only between the No Action alternative and all others.

The Preferred Alternative, Alternative 1, and Alternative 2 with canary and Pacific ocean perch (POP) allocations in the middle of the range that was analyzed, are predicted to produce lower levels of constraint (< 6 percent, measured as proportion of vessels which caught 100 percent of one or more rebuilding species QPs, and whose predicted target catch was limited as a result) than the other alternatives, except for Alternatives 6, and 7, which had allocations of canary in the middle of the range, and POP allocations at the high end of the range. Alternatives 3, 4, and 5, with different combinations of a low allocation for either canary or POP, with a medium or high allocation for the other species of those two, were predicted to produce higher levels of constraint (near 20 percent) on target catch. The term "constrained" is defined for this analysis as a vessel catching 100% of its QP for a particular rebuilding or other bycatch species, at which point it would be prevented from catching further target species, for which QP of the limiting bycatch species would be needed; this is more fully explained later in this document. The level of constraint was quantified as percent of the total vessels, which were limited by their QP of bycatch species (among those which caught IFQ species in the fishery). Alternative 2 is the same as the Preferred Alternative.

At the April 2012 meeting the Council added Alternative 8, which is the same as the Preferred Alternative, except for a higher for canary rockfish ACL (147 mt). Catch projections for this alternative were subsequently made and revealed that catches in the IFQ fishery are the same as under the Preferred Alternative and Alternative 1. This overview, prepared before the Council adopted Alternative 8, does not include it, but the results of the subsequent analysis are discussed below (see page B-36).

In those alternatives where constraint levels were low (< 6 percent under the Preferred Alternative, Alternative 1, and Alternative 2), higher numbers of vessels were predicted to attain their full quota pounds for target species categories such as sablefish north of 36° N. lat., or Pacific whiting, and where constraint levels were higher, there were corresponding negative differences in numbers vessels attaining full QP of target species categories.

Predicted catch of rebuilding species under all alternatives was less than No Action. Predicted catch of target species categories rose and fell predictably among alternatives, negatively covarying with levels of constraint by rebuilding species.

From an absolute standpoint, catch estimates for several species in this analysis are likely to be biased low for several reasons. Due to the rapid timeline for production of the DEIS, input data had to be truncated at less than one full year. This meant that December catch was imputed, based on monthly catch trends from 2010 and 2011, and vessel account input data (amount of QP available for each vessel) was frozen at November 28. Outcomes of this included that actual December catch was higher than expected, likely due delays in the winter crab season, which was shown to distract participation from IFQ, early in 2011. The results also cannot account for additional QP trading which happened between November 28 and December 15 (the closing date for QP trading); trading during this time period would theoretically enable purchase of QP for potentially constraining bycatch species, and thus enable more target catch.

From a relative standpoint, although the aforementioned assumptions need to be noted, the current analysis still allows for fair comparison among the proposed alternatives, in terms of relative catch and bycatch constraint. Modeling is always limited by the available data, and this analysis utilized the best data which were available at the time the analysis needed to be performed. In short, substantial differences were apparent among the alternatives, which should allow an informed choice of the appropriate alternative among them by the Council.

Variation in allocations among alternatives

Across the range of alternatives, the only fleet allocations that vary substantially are those of canary rockfish, Pacific ocean perch (POP), Petrale sole, widow rockfish, English sole, arrowtooth flounder, and sablefish, north of 36° N. lat. The allocation levels of canary rockfish and POP vary among individual alternatives. Cowcod allocations vary between the Preferred Alternative (34 percent to trawl and 66 percent to non-trawl) and the remaining alternatives (66 percent to trawl and 34 percent to non-trawl). Petrale sole, widow rockfish, English sole, arrowtooth flounder, and sablefish, north of 36° N. lat. allocations only vary between the No Action Alternatives and all others. Petrale sole and widow rockfish allocations are more than twice that of the No Action Alternative, in the other alternatives analyzed. Sablefish allocations are approximately 20 percent lower in all other alternatives than the No Action Alternative (Table B-2). Arrowtooth flounder allocations for alternatives other than No Action are less than half of No Action, and English sole allocations are approximately one third less.

Levels of the proposed allocations for canary rockfish and POP vary between low, medium, and high levels, in and out of phase with one another, among alternatives (Figure B-1, Table B-1). This approach could reveal which species or combination of allocation levels for these species is responsible for projected differences in target catch, attainment, or number of constrained vessels. See Table B-2 for the range of proposed allocations analyzed, for all IFQ species categories. Further, the cowcod allocations vary between the Preferred Alternative (34 percent to trawl and 66 percent to non-trawl) and the remaining alternatives (66 percent to trawl and 34 percent to non-trawl).

Catch of lingcod was projected coastwide using the model, because that is how the allocations and QP distribution were structured in the observed data (2011). Distribution of catch north and south of 40°10' N. lat. , as well as north and south of 42° N. lat. was estimated using haul-level catch data from the West Coast Groundfish Observer Program, of the Northwest Fisheries Science Center. Those distributions were then applied to the coastwide model projections. Lingcod catch estimates are presented north and south of 40°10' N. lat. for the Preferred Alternative and Alternatives 1 through 7, and north and south of 42° N. lat. for the No Action Alternative. See Table B-2 for the specific levels of lingcod allocations and Table B-5, Table B-8, Table B-9, Table B-12, Table B-14, Table B-16, Table B-18, Table B-20, Table B-22, and Table B-23 for predicted catch by area, for lingcod and the remaining species categories.

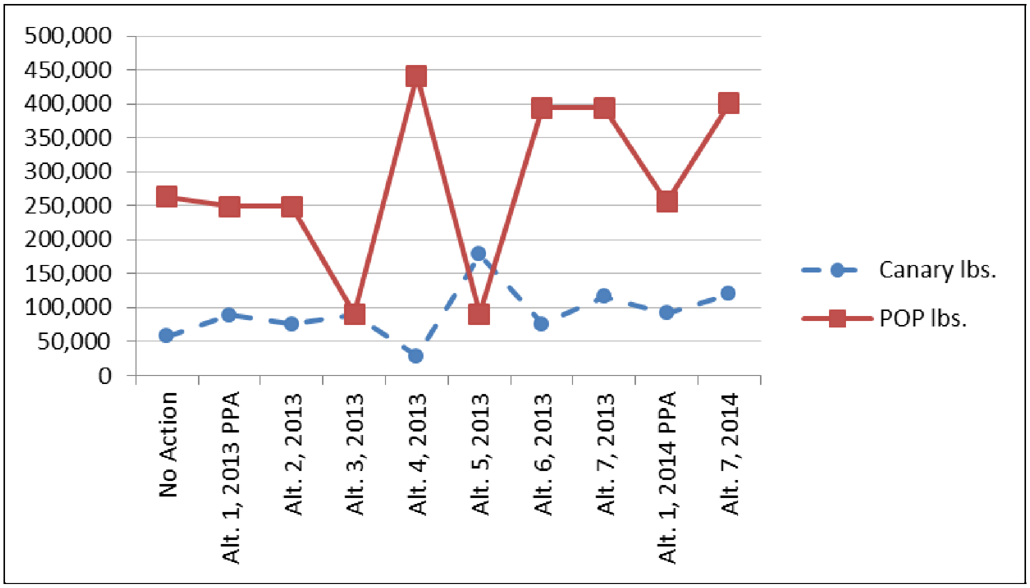

Figure B-1. Illustration of how allocations of canary rockfish and Pacific ocean perch (POP) vary across the range of alternatives.

Table B-1. Variation in IFQ fishery allocation level for canary rockfish and Pacific ocean perch, in pounds, nominally, and percentage of the No Action Alternative, among the alternatives.

Alternative	Canary lbs.	Canary nom.	POP lbs.	POP nom.	Can. % of No Action	POP % of No Action
No action	57,761	med-low	263,452	med	100%	100%
2013 Preferred and Alt. 1	88,846	med	249,122	med	154%	95%
Alt. 2, 2013	75,398	med	249,122	med	131%	95%
Alt. 3, 2013	88,846	med	90,390	low	154%	34%
Alt. 4, 2013	28,219	low	440,925	high	49%	167%
Alt. 5, 2013	178,354	high	90,390	low	309%	34%
Alt. 6, 2013	75,398	med	394,627	high	131%	150%
Alt. 7, 2013	116,625	med-high	394,627	high	202%	150%
2014 Preferred and Alt. 1	91,492	med	255,736	med	158%	97%
Alt. 7, 2014	120,152	med-high	401,241	high	208%	152%

Table B-2. Range of allocations for the shorebased IFQ fishery, in pounds, used to inform model-based catch projections, for the 2013-2014 groundfish harvest specifications.

IFQ Species a/	No Action, 2012	2013 Preferred & Alt. 1	Alt. 2, 2013	Alt. 3, 2013	Alt. 4, 2013	Alt. 5, 2013	Alt. 6, 2013	Alt. 7, 2013	2014 Preferred & Alt. 1	Alt. 7, 2014	2011 obs.
Bocaccio S. of 40°10	132,277	169,535	169,535	169,535	169,535	169,535	169,535	169,535	175,929	175,929	132,277
Canary rockfish	57,761	88,846	75,398	88,846	28,219	178,354	75,398	116,625	91,492	120,152	57,100
Cowcod S. of 40°10 b/	3,968	2,205/4,189	4,189	4,189	4,189	4,189	4,189	4,189	2,205/4,189	4,189	3,968
Darkblotched rockfish	548,819	590,839	590,839	590,839	590,839	590,839	590,839	590,839	615,090	615,090	552,997
POP N. of 40°10	263,452	249,122	249,122	90,390	440,925	90,390	394,627	394,627	255,736	401,241	263,148
Petrale sole	2,324,995	5,460,850	5,460,850	5,460,850	5,460,850	5,460,850	5,460,850	5,460,850	5,593,128	5,593,128	1,920,226
Yelloweye rockfish	1,323	2,205	2,205	2,205	2,205	2,205	2,205	2,205	2,205	2,205	1,323
Arrowtooth flounder	20,861,131	8,496,616	8,496,616	8,496,616	8,496,616	8,496,616	8,496,616	8,496,616	7,661,064	7,661,064	27,406,105
Chilipepper S. of 40°10	2,934,904	2,440,517	2,440,517	2,440,517	2,440,517	2,440,517	2,440,517	2,440,517	2,369,969	2,369,969	3,252,370
Dover sole	49,018,682	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,018,682
English sole	21,037,611	14,032,423	14,032,423	14,032,423	14,032,423	14,032,423	14,032,423	14,032,423	11,587,496	11,587,496	41,166,808
Lingcod	3,991,800	3,791,951	3,791,951	3,791,951	3,791,951	3,791,951	3,791,951	3,791,951	3,589,126	3,589,126	4,107,873
N of 40°10	-	2,702,867	2,702,867	2,702,867	2,702,867	2,702,867	2,702,867	2,702,867	2,546,339	2,546,339	-
S of 40°10	-	1,089,084	1,089,084	1,089,084	1,089,084	1,089,084	1,089,084	1,089,084	1,042,786	1,042,786	-
N of 42°	1,851,883	-	-	-	-	-	-	-	-	-	-
S of 42°	2,139,917	-	-	-	-	-	-	-	-	-	-
Longspine thornyheads N. of 34°27	4,219,648	4,100,598	4,100,598	4,100,598	4,100,598	4,100,598	4,100,598	4,100,598	3,992,572	3,992,572	4,334,839
Minor shelf rockfish N. of 40°10	1,150,813	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,150,813
Minor shelf rockfish S. of 40°10	189,598	179,897	179,897	179,897	179,897	179,897	179,897	179,897	179,897	179,897	189,598
Minor slope rockfish N. of 40°10	1,828,779	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,828,779
Minor slope rockfish S. of 40°10	831,958	824,529	824,529	824,529	824,529	824,529	824,529	824,529	831,143	831,143	831,958
Other flatfish	9,253,683	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,253,683
Pacific cod	2,502,247	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,502,247
Pacific halibut (IBQ) N. of 40°10	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524
Pacific whiting	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442
Sablefish N. of 36°	5,438,804	4,023,436	4,023,436	4,023,436	4,023,436	4,023,436	4,023,436	4,023,436	4,376,176	4,376,176	5,613,719
Sablefish S. of 36°	1,133,352	1,327,183	1,327,183	1,327,183	1,327,183	1,327,183	1,327,183	1,327,183	1,439,619	1,439,619	1,170,390
Shortspine thornyheads N. of 34°27'	3,120,533	3,084,267	3,084,267	3,084,267	3,084,267	3,084,267	3,084,267	3,084,267	3,053,402	3,053,402	3,156,138

IFQ Species a/	No Action, 2012	2013 Preferred & Alt. 1	Alt. 2, 2013	Alt. 3, 2013	Alt. 4, 2013	Alt. 5, 2013	Alt. 6, 2013	Alt. 7, 2013	2014 Preferred & Alt. 1	Alt. 7, 2014	2011 obs.
Shortspine thornyheads S. of 34°27	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231
Splitnose rockfish S. of 40°10	3,206,513	3,351,026	3,351,026	3,351,026	3,351,026	3,351,026	3,351,026	3,351,026	3,476,690	3,476,690	3,045,245
Starry flounder	1,480,404	1,657,876	1,657,876	1,657,876	1,657,876	1,657,876	1,657,876	1,657,876	1,666,695	1,666,695	1,471,586
Widow rockfish	755,348	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	755,348
Yellowtail rockfish N. of 40°10	6,850,556	6,148,692	6,148,692	6,148,692	6,148,692	6,148,692	6,148,692	6,148,692	6,155,306	6,155,306	6,821,455

a/ All area designations are north latitude.

b/ The trawl allocation of cowcod is 2,205 pounds under the Preferred Alternative and 4,189 pounds under the Action Alternatives

B.1.1 IFQ: No Action Alternative

Under the No Action Alternative, Table B-3 and Table B-4 list the Rockfish Conservation Area boundaries that with no changes would be in effect, for trawl gear and fixed gear, respectively, in 2013 and 2014. For the trawl boundaries, it should be noted that the seaward line during March to April from 45°46' to 48°10' was changed from 200 fm to 150 fm, to take effect in 2012. Model-based catch projections were made under the RCA structure that was in place during 2011, since those are the current data which exist to inform the model of catch under IFQ; this includes the 200 fm seaward line during March and April, from 45°46' to 48°10'. As explained in the November 2011 GMT statement, we examined time-weighted average bycatch rates from WCGOP, from 2005 to 2010, data which are available for this area, during this period (Table B-5). It generally shows increased bycatch rates of rebuilding species in Period 2, in the area seaward of 150 fm, versus the area seaward of 200 fm, indicating that if the seaward RCA were moved from 200 fm to 150 fm during periods 1 and 2 of 2012, that the probability of encountering darkblotched rockfish, Pacific ocean perch, widow rockfish and yelloweye rockfish will likely be slightly higher than if the No Action seaward boundaries remained in place. However, this fishery is now managed under IFQ, and attainment of these rebuilding species is currently very low (NMFS report under Agenda Item E.6.b., Status Report on the 2011 Rationalized Trawl Fishery), at 17%, 19%, 35% and 6% respectively, as of October 11, 2011. Fishing behavior, and bycatch rates, could potentially be different than those observed during pre-IFQ. We also note that the request was made for a relatively small area of the coast (45°46' to 48°10' N. lat.).

Table B-3. Rockfish Conservation Area (RCA) boundaries for trawl gear, under the No Action Alternative.

<table>
<tr><th>Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North of 48°10'</td><td colspan="2">shore – ^{m}200</td><td colspan="2">shore - 200</td><td colspan="4">shore - 150</td><td colspan="2">shore - 200</td><td colspan="2">shore - ^{m}200</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - ^{m}200</td><td colspan="2">75 - 150*</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="4">75 - 150</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="2">75 - 200</td><td colspan="2">75 - 200</td><td colspan="2">100 - 200</td><td colspan="2">75 - 200</td><td colspan="2">75 - ^{m}200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 - 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">shore - 150</td></tr>
</table>

^{m} Superscript “m” designates the modified 200 fm seaward line.
* This 150 fm line was not in place for 2011, rather it was 200 fm.

Table B-4. Rockfish Conservation Area (RCA) boundaries for fixed gear (applies to vessels under the gear switching provision, under the No Action Alternative.

Area	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
North of 46° 16'	shore - 100 fm
45° 03’ 83” - 46° 16’	30 - 100 fm
43° - 45° 03’ 83”	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)
42° - 43°	20 - 100 fm
40° 10’ - 42°	20 fm depth contour - 100 fm
34° 27’ - 40° 10’	30 fm - 150 fm line
South of 34° 27’ (w/islands)	m - 150 fm line

Table B-5. Time-weighted average, pre-IFQ bycatch rates of rebuilding species, seaward of 150 fm and 200 fm, for Period 2, over the years 2005-2010, in the area north of 40°10'N. lat.

Species	> 150 fm	> 200 fm
Bocaccio rockfish	0.0001%	0.0001%
Canary rockfish	0.0030%	0.0044%
Cowcod rockfish	0.0000%	0.0000%
Darkblotched rockfish	0.7734%	0.5875%
POP	0.5384%	0.3041%
Widow rockfish	0.0084%	0.0061%
Yelloweye rockfish	0.0002%	0.0001%

No Action Alternative (2012), allocations and projections
Allocations to the IFQ fleet, projected total catch, and projected attainment under the No Action Alternative (2012) are listed in Table B-2, along with those for 2011, for comparison. Inclusion of 2011 estimates also gives the opportunity for discussion of methods and assumptions of this analysis. Total catch for December of 2011 was imputed, as described in the model section, since this analysis was begun in early December of 2011. Most allocations differed little between No Action and 2011, except the Petrale sole allocation was 17% higher for 2012, and the allocations for arrowtooth flounder and English sole were substantially lower in 2012. More vessels were predicted to be constrained by rebuilding species in 2011 (39%) than in 2012 (14%). For instance, 23% of vessels were predicted to be constrained by Petrale sole, compared with <6% in 2012. Also, 13% of vessels were predicted to be constrained by canary rockfish in 2011, compared with <6% of vessels in 2012, although the canary rockfish allocation was only approximately 700 pounds smaller in 2011 than 2012. See Table B-2 for the allocation levels of those alternatives analyzed.

The relatively sharp projected differences in the number of vessels constrained by a bycatch species between 2011 and 2012 (and the other alternatives) is primarily due to the Petrale sole allocation being smaller in 2011 than 2012 (and the other alternatives). In addition, the estimated number of vessels constrained in 2011 could be amplified somewhat, due to a potential artifact which would stem from the incomplete 2011 catch data used as an input for the analysis. Specifically, to accommodate the schedule for the DEIS, the expected attainment of target species was adjusted without an available mechanism for a concomitant redistribution of QP; the model uses a snapshot of QP distribution (from early December, in this analysis), a routine for dynamic redistribution of QP is not yet part of the model. Use of a final snapshot of vessel QP-distribution may have allowed for vessel operators to make further bycatch allowances for their anticipated December catch. Nonetheless, the same assumptions were applied to all alternatives, and these model projections should enable a fair comparison among them. This projection model and all of the inputs represent the best scientific information available at the time the analysis was performed.

The term "constrained" is defined for this analysis as a vessel catching 100% of its QP for a particular rebuilding or other bycatch species. For a particular vessel-specific catch estimate to be labeled as bycatch-constrained within the model, the amount of target species catch estimated according to the amount of rebuilding species QP available to that vessel, and its bycatch rates of that particular rebuilding species, must be smaller than the estimate of target catch made using the target species attainment rates and QP amounts. That is, the projection of target catch which was produced by the bycatch limited routine in the model was smaller than that of the target QP limited routine.

As noted in the model description, catch projections for target species with a strong relationship between 2011 catch and 2011 QP, such as Pacific whiting, sablefish, chilipepper rockfish, and thornyheads are likely to be more reliable when allocations change dramatically than those with weak relationships between these two variables, such as English sole, minor slope rockfish, and arrowtooth flounder. Thus, for the projection for English sole catch to drop dramatically, proportionate with the allocation, although it is dramatically underutilized, is not necessarily realistic, as its catch levels are weakly related to vessel QP of this species. Other factors are likely more important for predicting the catch of such a species, such as market factors, and/or processor limits.

For target species, catch estimates and expected attainments, as well as numbers of vessels predicted to attain 100% of their target QP varied little between the No Action Alternative (2012) and 2011 (Table B-6 and Table B-7).

Table B-6. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between the No Action Alternative and early estimates for 2011 (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation 2011	Catch 2011	Attainment 2011	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	132,277	7,507	6%	100%	103%	103%
Canary rockfish	57,761	7,651	13%	57,100	7,886	14%	99%	103%	104%
Cowcod south of 40°10' N.	3,968	39	1%	3,968	40	1%	100%	103%	103%
Darkblotched rockfish	548,819	121,713	22%	552,997	123,411	22%	101%	101%	101%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	263,148	71,893	27%	100%	103%	103%
Petrale sole	2,324,995	1,334,856	57%	1,920,226	1,380,462	72%	83%	103%	125%
Yelloweye rockfish	1,323	102	8%	1,323	106	8%	100%	104%	104%
Arrowtooth flounder	20,861,131	4,096,046	20%	27,406,105	5,216,797	19%	131%	127%	97%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	3,252,370	699,533	22%	111%	108%	97%
Dover sole	49,018,682	16,668,724	34%	49,018,682	16,359,774	33%	100%	98%	98%
English sole	21,037,611	152,809	1%	41,166,808	287,762	1%	196%	188%	96%
Lingcod coastwide	3,991,800	526,447	13%	4,107,873	528,701	13%	103%	100%	98%
Lingcod north of 40°10' N.	-	-	-	-	525,000	-	-	-	-
Lingcod south of 40°10' N.	-	-	-	-	3,701	-	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,334,839	2,082,564	48%	103%	101%	98%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,150,813	28,529	2%	100%	97%	97%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	189,598	4,880	3%	100%	99%	99%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,828,779	290,473	16%	100%	97%	97%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	831,958	90,356	11%	100%	98%	98%
Other flatfish	9,253,683	1,528,418	17%	9,253,683	1,480,532	16%	100%	97%	97%
Pacific cod	2,502,247	576,976	23%	2,502,247	558,302	22%	100%	97%	97%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	66,733	26%	100%	97%	97%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,631,339	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	5,613,719	4,914,623	88%	103%	102%	98%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,170,390	831,938	71%	103%	102%	99%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,156,138	1,454,071	46%	101%	99%	98%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,045,245	54,965	2%	95%	94%	99%
Starry flounder	1,480,404	28,135	2%	1,471,586	27,370	2%	99%	97%	98%
Widow rockfish	755,348	295,502	39%	755,348	297,163	39%	100%	101%	101%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,821,455	1,306,405	19%	100%	99%	99%

Table B-7. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative.

IFQ species category	No action	2011	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	13%	≥ 7%
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	9%	≥ 3%
Pacific ocean perch north of 40°10' N.	< 6%	11%	≥ 5%
Petrale sole	< 6%	23%	≥ 17%
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	< 6%	(-) ≥ 4%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	< 6%	(-) ≥ 5%
English sole	< 6%	< 6%	-
Lingcod	8%	< 6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	6%	-5%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	≥ 2%
Pacific halibut (IBQ) north of 40°10' N.	9%	< 6%	(-) ≥ 3%
Pacific whiting	28%	22%	-6%
Sablefish north of 36° N.	41%	25%	-16%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	< 6%	(-) ≥ 8%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	11%	(-) ≥ 5%
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

Projected catch and attainment of allocations for rebuilding species were slightly higher for 2011 (1 to 4 percent higher), with the exception of attainment for Petrale sole, which was 25% higher in 2011 than under No Action, coinciding with a lower allocation in 2011. Projected catch differed very little between 2011 and No Action, with the exception of arrowtooth flounder (88 percent higher in 2011) and English sole (27 percent higher in 2011), which were driven primarily by expected vessel attainment. As discussed earlier in this section, these two projections are not particularly informative.

B.1.2 IFQ: Preferred Alternative

The Preferred Alternative differs from the No Action Alternative in that the allocation of canary rockfish is 154% of that for No Action and the cowcod allocation percentage is the opposite of that under No Action (34 percent non-trawl and 66 percent trawl). The POP allocation is nearly the same, at 95% of No Action. This alternative is considered a medium level for canary rockfish, and medium for POP, considering the range of alternatives. Allocations under the Preferred Alternative for both widow rockfish and Petrale sole are more than double than the No Action alternative, and the same can be said of the action alternatives. The arrowtooth flounder allocation is less than half in the action alternatives compared to No Action, and the sablefish allocation north of 36° N. lat. is approximately 20% less in the action alternatives compared to No Action. Thus, projected catch and attainment will often differ to the same degree between the action alternatives, except where canary rockfish or POP are predicted to limit access to target species for some fishermen.

Projected catch varies predictably along with allocation levels in the Preferred Alternative (Table B-8 and Table B-9), revealing the relative low level of bycatch constraints on target catch in this alternative (Table B-10). The percentage of vessels constrained by rebuilding species was less than 6% under the Preferred Alternative for 2013, while that number was 14% for the No Action Alternative. This difference is likely due to the higher allocation of canary rockfish under the Preferred Alternative.

The percentage of vessels predicted to attain 100% of their target QP was higher for a few species in the Preferred Alternative than No Action, including sablefish north of 36° N. lat. (9%), Pacific whiting (6%), and minor slope rockfish north of 40°10' N. (4%). The predicted numbers of vessels to reach their target species QP limits are equal under the Preferred Alternative. Other metrics vary little between the Preferred Alternative and No Action.

When examining the range of proposed alternatives, comparing numbers of vessels constrained by rebuilding species, one sees higher levels of constraint for the No Action Alternative, Alternatives 3, 4, and 5, than for the Preferred Alternative, Alternative 1, Alternative 2, Alternative 6, and Alternative 7 for 2013 or 2014 (Figure B-2, Table B-8). It implies a threshold of constraint for canary rockfish (within this range of allocations) of approximately 75,000 to 80,000 pounds, below which, the predicted number of constrained vessels increases. The resolution of a threshold for POP is less precise, due to the difference between the medium and low levels of allocation, but it appears to lie somewhere beneath 250,000 pounds. When the POP allocation was at the low level, at approximately 90,000 pounds, and the canary allocation was at either the low or high levels, the number of constrained vessels was relatively equal, at 19% of the fleet (Alternatives 3 and 5). With the low canary allocation and the high POP allocation (Alternative 4), the constraint level was still at 17 percent of vessels. When the POP allocation was higher, but the canary rockfish allocation was at the medium level, of higher than 75,000 pounds (Alternative 6), the constraint level was much lower, at less than 6%. In 2011, the predicted number of vessels constrained by QP of rebuilding species was much higher, but as discussed earlier, most of the difference in predicted constraint between 2011 and 2012 was due to the lower Petrale sole allocation in 2011.

Predicted attainment levels are lower for rebuilding species under the Preferred Alternative, than for No Action, ranging between 38 percent and 90 percent of No Action. Predicted attainment for target species under the Preferred Alternative is generally equal to No Action levels, except for widow rockfish, which is only 33 percent of No Action. Widow rockfish catch was predicted in the model as a rebuilding species, using bycatch rates, and operating under an assumption of no targeting. Predicted attainment under the Preferred Alternative in 2014 is essentially equal to that of the 2013 Preferred Alternative, and does not warrant specific discussion, yet the results are listed in Table B-9 for completeness. Nine percent more vessels are expected to catch their full QP amount of sablefish north of 36° N. lat. under the Preferred Alternative than No Action, due to the lower allocation for all alternatives other than No Action.

Table B-8. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between the Preferred (PA) for 2013 and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation 2013 PA	Catch 2013 PA	Attainment 2013 PA	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	88,846	6,885	8%	154%	90%	59%
Cowcod south of 40°10' N.	3,968	39	1%	2,205	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,170	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	249,122	59,791	24%	95%	85%	90%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,096	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,572	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,734,220	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,213	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,810	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,304	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod north of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,009,498	49%	97%	98%	100%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,760	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,055	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,626	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,476	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,068	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	200,218,033	98%	100%	99%	99%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,589,688	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,453,189	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	287,374	13%	292%	97%	33%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,182,477	19%	90%	89%	99%

Table B-9. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between the Preferred Alternative (PA) for 2014, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation 2014 PA	Catch 2014 PA	Attainment 2014 PA	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	175,929	6,644	4%	133%	91%	68%
Canary rockfish	57,761	7,651	13%	91,492	6,862	7%	158%	90%	57%
Cowcod south of 40°10' N.	3,968	39	1%	2,205	36	1%	106%	93%	88%
Darkblotched rockfish	548,819	121,713	22%	615,090	107,966	18%	112%	89%	79%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	255,736	59,413	23%	97%	85%	88%
Petrale sole	2,324,995	1,334,856	57%	5,593,128	1,182,762	21%	241%	89%	37%
Yelloweye rockfish	1,323	102	8%	2,205	90	4%	167%	88%	53%
Arrowtooth flounder	20,861,131	4,096,046	20%	7,661,064	1,506,454	20%	37%	37%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,369,969	530,711	22%	81%	82%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,741,680	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	11,587,496	84,407	1%	55%	55%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,589,126	474,054	13%	90%	90%	100%
Lingcod north of 40°10' N.	-	-	-	2,546,339	470,735	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,042,786	3,318	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	3,992,572	1,958,461	49%	95%	95%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,763	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,197	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	831,143	92,694	11%	100%	101%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,753	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,485	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,101	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	200,928,317	98%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,376,176	3,905,913	89%	80%	81%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,439,619	1,032,130	72%	127%	127%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,053,402	1,439,593	47%	98%	98%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,476,690	63,385	2%	108%	109%	100%
Starry flounder	1,480,404	28,135	2%	1,666,695	31,677	2%	113%	113%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	289,045	13%	292%	98%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,155,306	1,187,145	19%	90%	90%	100%

Table B-10. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for No Action, the 2013 PA, and the 2014 PA.

IFQ species category	No action	2013 PA	2014 PA	2013 dif.	2014 dif.
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Canary rockfish	< 6%	< 6%	< 6%	-	-
Cowcod south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Darkblotched rockfish	< 6%	< 6%	< 6%	-	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	< 6%	-	-
Petrale sole	< 6%	< 6%	< 6%	-	-
Yelloweye rockfish	< 6%	< 6%	< 6%	-	-
Arrowtooth flounder	10%	12%	12%	2%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Dover sole	11%	11%	11%	0%	0%
English sole	< 6%	< 6%	< 6%	-	-
Lingcod	8%	9%	9%	1%	1%
Longspine thornyheads north of 34°27' N.	11%	12%	12%	1%	1%
Minor shelf rockfish north of 40°10' N.	7%	9%	9%	2%	2%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Minor slope rockfish north of 40°10' N.	6%	10%	10%	4%	4%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Other flatfish	10%	9%	9%	-1%	-1%
Pacific cod	< 6%	6%	6%	-	-
Pacific halibut (IBQ) north of 40°10' N.	9%	12%	12%	3%	3%
Pacific whiting	28%	33%	33%	6%	6%
Sablefish north of 36° N.	41%	50%	50%	9%	9%
Sablefish south of 36° N.	< 6%	< 6%	< 6%	-	-
Shortspine thornyheads north of 34°27' N.	14%	15%	15%	1%	1%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	< 6%	-	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Starry flounder	< 6%	< 6%	< 6%	-	-
Widow rockfish	< 6%	< 6%	< 6%	-	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	< 6%	-	-

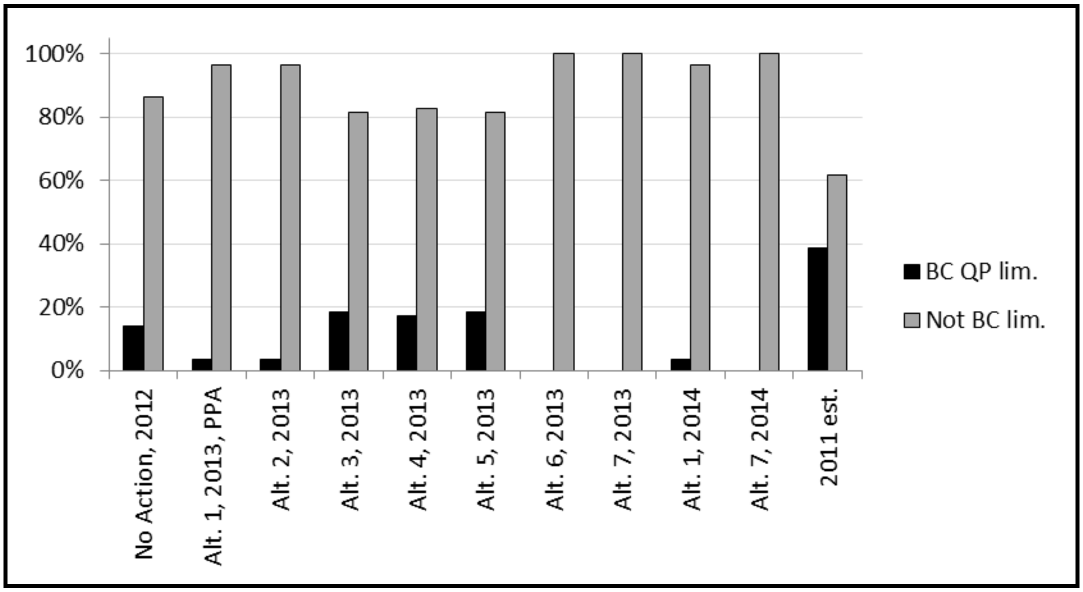

Figure B-2. Percent of vessels in the fleet, whose target attainment was predicted to be limited by QP of bycatch species, versus those not limited by QP of bycatch species, by alternative.

Table B-11. Percent of vessels in the fleet, whose target attainment was predicted to be limited by QP of bycatch species, versus those not limited by QP of bycatch species, by alternative.

Alternative	BC QP limited %	Not BC limited %
No action, 2012	14%	86%
Preferred Alt. 2013 and Alt 1	< 6%	> 94%
Alt. 2, 2013	< 6%	> 94%
Alt. 3, 2013	19%	81%
Alt. 4, 2013	17%	83%
Alt. 5, 2013	19%	81%
Alt. 6, 2013	0%	100%
Alt. 7, 2013	0%	100%
Alt. 1, 2014	< 6%	> 94%
Alt. 7. 2014	0%	100%
2011 est.	39%	61%

B.1.3 IFQ: Alternative 1 (2013)

Alternative 1 is the same as the Preferred Alternative, except the cowcod allocation is higher (4,189 pounds) compared to the Preferred Alternative (2,205 pounds). The reduced cowcod allocation did not result in changes to the projected mortalities for other species; therefore the conditions are the same as described under the Preferred Alternative.

B.1.4 IFQ: Alternative 2 (2013)

Alternative 2 differs from the No Action Alternative in that the allocation of canary rockfish is 131% of that for No Action, only slightly lower than in the Preferred Alternative. The POP allocation is nearly the same (95% of No Action). The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 2 (Table B-12). Predicted catch of canary rockfish under Alternative 2 is 90 percent of that under No Action, the same as under the Preferred Alternative. This alternative is considered to have a medium level of allocation for canary rockfish and for POP, considering the range of alternatives.

Other projected catch results are also essentially the same as for the Preferred Alternative. Catch of rebuilding species is predicted to be slightly lower than the No Action Alternative, although the allocations are slightly higher (Table B-12). This is due to predicted catch of target species remaining very similar in aggregate, by vessel, since rebuilding species are predicted as bycatch.

The slightly lower canary rockfish allocation also did not result in additional numbers of vessels predicted to be constrained by rebuilding species. Predicted numbers of vessels constrained by rebuilding species are all less than 6%, thus enabling a higher proportion of vessels to catch 100 percent of their QP for target species such as sablefish north of 36° N., whiting, and minor slope rockfish north of 40°10' N. (Table B-13). Other metrics vary little between the Alternative 2 and No Action, including predicted attainment. Where they do differ, these differences are essentially the same as between the Preferred Alternative and No Action (see the Preferred Alternative section).

Table B-12. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 2 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 2, 2013	Catch Alt. 2, 2013	Attainment Alt.2, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	75,398	6,885	9%	131%	90%	69%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,170	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	249,122	59,791	24%	95%	85%	90%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,096	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,572	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,734,220	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,213	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,810	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,304	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod N of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod S of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,009,498	49%	97%	98%	100%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,760	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,055	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,626	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,476	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,068	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	200,218,033	98%	100%	99%	99%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,589,688	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,453,189	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	287,374	13%	292%	97%	33%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,182,477	19%	90%	89%	99%

Table B-13. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 2 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 2, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	-
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	12%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	11%	0%
English sole	< 6%	< 6%	-
Lingcod	8%	9%	1%
Longspine thornyheads north of 34°27' N.	11%	12%	1%
Minor shelf rockfish north of 40°10' N.	7%	9%	2%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	10%	4%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	9%	-1%
Pacific cod	< 6%	6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	12%	3%
Pacific whiting	28%	33%	6%
Sablefish north of 36° N.	41%	50%	9%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	15%	1%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.5 IFQ: Alternative 3 (2013)

Alternative 3 differs from the No Action Alternative in that the allocation of canary rockfish is 154% of that for No Action, the same as the Preferred Alternative. The POP allocation is only 34 percent of the No Action level. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 3 (Table B-14). This alternative is considered to have a medium level of allocation for canary rockfish and a low level for POP, considering the range of alternatives.

Catch of rebuilding species is predicted to be lower than the No Action Alternative (Table B-14). The same is true for attainment, except for POP, which has higher attainment due to a combination of the low allocation in this alternative (Alternative 3), and bycatch-driven prediction of catch for this rebuilding species.

The lower POP allocation of Alternative 3 resulted in a predicted 19 percent of vessels being constrained by this species, compared with less than 6 percent under no action (Table B-15). Catch of POP under Alternative 3 was 55 percent of that under No Action. Catch of canary rockfish was 80 percent of that predicted under the No Action Alternative.

Table B-14. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 3 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 3, 2013	Catch Alt. 3, 2013	Attainment Alt. 3, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	88,846	6,098	7%	154%	80%	52%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	85,823	15%	108%	71%	65%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	90,390	38,363	42%	34%	55%	160%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,029,418	19%	235%	77%	33%
Yelloweye rockfish	1,323	102	8%	2,205	78	4%	167%	77%	46%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,319,875	16%	41%	32%	79%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	14,272,816	29%	100%	86%	86%
English sole	21,037,611	152,809	1%	14,032,423	94,502	1%	67%	62%	93%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	429,835	11%	95%	82%	86%
Lingcod north of 40°10' N.	-	-	-	2,702,867	426,826	16%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,009	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	1,674,247	41%	97%	81%	84%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	24,712	2%	101%	84%	83%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	202,183	12%	94%	68%	72%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	90,074	11%	99%	98%	99%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,368,547	15%	100%	90%	90%
Pacific cod	2,502,247	576,976	23%	2,495,633	503,501	20%	100%	87%	87%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	55,120	21%	100%	80%	80%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	182,256,102	89%	100%	90%	90%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,074,980	76%	74%	64%	86%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	946,940	71%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,185,802	38%	99%	81%	82%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,085	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	30,714	2%	112%	109%	97%
Widow rockfish	755,348	295,502	39%	2,204,623	237,628	11%	292%	80%	28%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,043,894	17%	90%	79%	88%

Table B-15. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 3 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 3, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	19%	≥ 12%
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	6%	-4%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	6%	-5%
English sole	< 6%	< 6%	-
Lingcod	8%	< 6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	8%	-3%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	6%	-3%
Pacific whiting	28%	26%	-2%
Sablefish north of 36° N.	41%	40%	-1%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	8%	-6%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.6 IFQ: Alternative 4 (2013)

Alternative 4 differs from the No Action Alternative in that the allocation of canary rockfish is 49 percent of that for No Action, and the POP allocation is 167 percent of the No Action level. This alternative is considered to have a low allocation of canary rockfish, and a high allocation of POP, considering the range of alternatives. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 4 (Table B-16).

Catch of rebuilding species is predicted to be lower for Alternative 4 than the No Action Alternative (Table B-16). The same is true for attainment, except of course for canary rockfish, which has higher attainment due to the low allocation in this alternative (Alternative 4).

The lower canary allocation of Alternative 4 resulted in a predicted 18 percent of vessels being constrained by this species, compared with less than 6 percent under no action (Table B-17). Catch of canary rockfish under Alternative 4 was 70 percent of that under No Action. The higher allocation of POP resulted in less than 6 percent of vessels being constrained by this species. Predicted catch of POP under Alternative 4 was 71 percent of that under No Action.

Table B-16. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 4 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 4, 2013	Catch Alt. 4, 2013	Attainment Alt. 4, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,529	4%	128%	89%	70%
Canary rockfish	57,761	7,651	13%	28,219	5,325	19%	49%	70%	142%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	94,749	16%	108%	78%	72%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	440,925	49,959	11%	167%	71%	43%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,036,690	19%	235%	78%	33%
Yelloweye rockfish	1,323	102	8%	2,205	68	3%	167%	67%	40%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,481,265	17%	41%	36%	89%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	447,956	18%	83%	69%	83%
Dover sole	49,018,682	16,668,724	34%	49,019,784	15,347,281	31%	100%	92%	92%
English sole	21,037,611	152,809	1%	14,032,423	87,841	1%	67%	57%	86%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	442,388	12%	95%	84%	88%
Lingcod north of 40°10' N.	-	-	-	2,702,867	439,291	16%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,097	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	1,822,354	44%	97%	89%	91%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	22,439	2%	101%	76%	76%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,544	3%	95%	92%	97%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	249,414	15%	94%	84%	89%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	75,053	9%	99%	82%	82%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,375,737	15%	100%	90%	90%
Pacific cod	2,502,247	576,976	23%	2,495,633	457,552	18%	100%	79%	80%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	60,562	24%	100%	88%	88%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	179,508,151	88%	100%	89%	89%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,313,775	82%	74%	69%	93%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	930,577	70%	117%	115%	98%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,302,196	42%	99%	89%	90%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	57,356	2%	105%	99%	94%
Starry flounder	1,480,404	28,135	2%	1,657,876	27,797	2%	112%	99%	88%
Widow rockfish	755,348	295,502	39%	2,204,623	242,608	11%	292%	82%	28%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,017,591	17%	90%	77%	86%

Table B-17. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 4 for 2013, and the No Action Alternative.

Species	No action	Alt. 4, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	18%	≥ 12%
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	-
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	8%	-2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	8%	-3%
English sole	< 6%	< 6%	-
Lingcod	8%	6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	10%	-1%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	8%	-1%
Pacific whiting	28%	26%	-2%
Sablefish north of 36° N.	41%	41%	0%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	12%	-2%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.7 IFQ: Alternative 5 (2013)

Alternative 5 differs from the No Action Alternative in that the allocation of canary rockfish is 309 percent of that for No Action, and the POP allocation is only 34 percent of the No Action level. This alternative is considered to have a high allocation of canary rockfish, and a low allocation of POP, considering the range of alternatives. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 5 (Table B-18).

Catch of rebuilding species is predicted to be lower for Alternative 5 than the No Action Alternative (Table B-18). The same is true for attainment, except for POP, which has higher attainment due to the low allocation in this alternative.

The lower POP allocation of Alternative 5 resulted in a predicted 19 percent of vessels being constrained by this species, compared with less than 6 percent under No Action (Table B-19). Catch of canary rockfish under Alternative 5 was 80 percent of that under No Action. The higher allocation of canary rockfish resulted in less than 6 percent of vessels being constrained by this species. Predicted catch of POP under Alternative 5 was 55 percent of that under No Action.

Table B-18. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 5 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 5, 2013	Catch Alt. 5, 2013	Attainment Alt. 5, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	178,354	6,098	3%	309%	80%	26%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	85,823	15%	108%	71%	65%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	90,390	38,363	42%	34%	55%	160%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,029,418	19%	235%	77%	33%
Yelloweye rockfish	1,323	102	8%	2,205	78	4%	167%	77%	46%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,319,875	16%	41%	32%	79%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	14,272,816	29%	100%	86%	86%
English sole	21,037,611	152,809	1%	14,032,423	94,502	1%	67%	62%	93%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	429,835	11%	95%	82%	86%
Lingcod north of 40°10' N.	-	-	-	2,702,867	426,826	16%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,009	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	1,674,247	41%	97%	81%	84%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	24,712	2%	101%	84%	83%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	202,183	12%	94%	68%	72%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	90,074	11%	99%	98%	99%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,368,547	15%	100%	90%	90%
Pacific cod	2,502,247	576,976	23%	2,495,633	503,501	20%	100%	87%	87%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	55,120	21%	100%	80%	80%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	182,256,102	89%	100%	90%	90%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,074,980	76%	74%	64%	86%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	946,940	71%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,185,802	38%	99%	81%	82%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,085	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	30,714	2%	112%	109%	97%
Widow rockfish	755,348	295,502	39%	2,204,623	237,628	11%	292%	80%	28%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,043,894	17%	90%	79%	88%

Table B-19. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 5 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 5 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	19%	≥ 13%
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	6%	-4%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	6%	-5%
English sole	< 6%	< 6%	-
Lingcod	8%	< 6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	8%	-3%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	6%	-3%
Pacific whiting	28%	26%	-2%
Sablefish north of 36° N.	41%	40%	-1%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	8%	-6%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.8 IFQ: Alternative 6 (2013)

Alternative 6 differs from the No Action Alternative in that the allocation of canary rockfish is 131 percent of that for No Action, and the POP allocation is 150 percent of the No Action level. This alternative is considered to have a medium allocation of canary rockfish, and a high allocation of POP, considering the range of alternatives. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 5 (Table B-20).

Catch of rebuilding species is predicted to be lower for Alternative 6 than the No Action Alternative. The same is true for attainment (Table B-20). Predicted numbers of vessels constrained by rebuilding species are all less than 6%, thus enabling a higher proportion of vessels to catch 100 percent of their QP for target species such as sablefish north of 36° N., whiting, and minor slope rockfish north of 40°10' N. (Table B-21).

Catch of canary rockfish under Alternative 6 was 90 percent of that under No Action. The higher allocation of canary rockfish under Alternative 6, compared to No Action, resulted in less than 6 percent of vessels being constrained by this species. Predicted catch of POP under Alternative 6 was 85 percent of that under No Action.

Table B-20. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 6 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 6, 2013	Catch Alt. 6, 2013	Attainment Alt. 6, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	75,398	6,900	9%	131%	90%	69%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,176	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	394,627	59,793	15%	150%	85%	57%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,565	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,869	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,745,565	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,219	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,879	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,373	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,012,468	49%	97%	98%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,766	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,348	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,820	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,494	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,121	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,720,185	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,591,809	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,454,645	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	291,333	13%	292%	99%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,189,649	19%	90%	90%	100%

Table B-21. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 6 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 6, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	-
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	12%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	12%	1%
English sole	< 6%	< 6%	-
Lingcod	8%	10%	2%
Longspine thornyheads north of 34°27' N.	11%	13%	2%
Minor shelf rockfish north of 40°10' N.	7%	11%	4%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	11%	5%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	11%	1%
Pacific cod	< 6%	8%	≥ 2%
Pacific halibut (IBQ) north of 40°10' N.	9%	13%	4%
Pacific whiting	28%	37%	9%
Sablefish north of 36° N.	41%	53%	12%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	16%	2%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.9 IFQ: Alternative 7 (2013 and 2014)

Alternative 7 for 2013 differs from the No Action Alternative in that the allocation of canary rockfish is 202 percent of that for No Action, and the POP allocation is 150 percent of the No Action level. For 2014, the canary allocation is 208 percent of No Action, and the POP allocation is 152 percent of No Action. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 7 (Table B-22). These two alternatives are considered to have medium and medium-high allocations of canary rockfish, respectively, and medium and high allocations of POP, respectively, considering the range of alternatives.

Catch of rebuilding species is predicted to be lower for Alternative 7 than the No Action Alternative (Table B-22). The same is true for attainment. Predicted numbers of vessels constrained by rebuilding species are less than 6% for each one, including canary rockfish and POP, thus enabling a higher proportion of vessels to catch 100 percent of their QP for target species such as sablefish north of 36° N., whiting, and minor slope rockfish north of 40°10' N. (Table B-23).

Table B-22. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 7 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2013	Catch Alt. 7, 2013	Attainment Alt. 7, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	116,625	6,900	6%	202%	90%	45%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,176	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	394,627	59,793	15%	150%	85%	57%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,565	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,869	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,745,565	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,219	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,879	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,373	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,012,468	49%	97%	98%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,766	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,348	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,820	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,494	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,121	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,720,185	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,591,809	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,454,645	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2013	Catch Alt. 7, 2013	Attainment Alt. 7, 2013	Allocation comparison	Catch comparison	Attainment comparison
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	291,333	13%	292%	99%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,189,649	19%	90%	90%	100%

Table B-23. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 7 for 2014, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2014	Catch Alt. 7, 2014	Attainment Alt. 7, 2014	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	175,929	6,644	4%	133%	91%	68%
Canary rockfish	57,761	7,651	13%	120,152	6,870	6%	208%	90%	43%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	36	1%	106%	93%	88%
Darkblotched rockfish	548,819	121,713	22%	615,090	107,968	18%	112%	89%	79%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	401,241	59,414	15%	152%	85%	56%
Petrale sole	2,324,995	1,334,856	57%	5,593,128	1,182,923	21%	241%	89%	37%
Yelloweye rockfish	1,323	102	8%	2,205	90	4%	167%	88%	53%
Arrowtooth flounder	20,861,131	4,096,046	20%	7,661,064	1,506,557	20%	37%	37%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,369,969	530,711	22%	81%	82%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,745,565	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	11,587,496	84,409	1%	55%	55%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,589,126	474,088	13%	90%	90%	100%
Lingcod north of 40°10' N.	-	-	-	2,546,339	470,770	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,042,786	3,319	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	3,992,572	1,959,451	49%	95%	95%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,766	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,348	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	831,143	92,694	11%	100%	101%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,820	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,494	23%	100%	100%	100%

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2014	Catch Alt. 7, 2014	Attainment Alt. 7, 2014	Allocation comparison	Catch comparison	Attainment comparison
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,121	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,720,185	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,376,176	3,906,708	89%	80%	81%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,439,619	1,032,130	72%	127%	127%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,053,402	1,440,089	47%	98%	98%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,476,690	63,385	2%	108%	109%	100%
Starry flounder	1,480,404	28,135	2%	1,666,695	31,677	2%	113%	113%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	291,132	13%	292%	99%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,155,306	1,190,929	19%	90%	90%	100%

Predicted catch of canary rockfish under Alternative 7 was 90 percent of that under No Action. Predicted catch of POP under Alternative 7 was 85 percent of that under No Action. The same is true of predictions for Alternative 7 in 2014 (Table B-24).

Table B-24. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 7 for 2013 and 2014, and the No Action Alternative.

IFQ species category	No action	Alt. 7, 2013	Alt. 7, 2014	2013 dif.	2014 dif.
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Canary rockfish	< 6%	< 6%	< 6%	-	-
Cowcod south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Darkblotched rockfish	< 6%	< 6%	< 6%	-	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	< 6%	-	-
Petrale sole	< 6%	< 6%	< 6%	-	-
Yelloweye rockfish	< 6%	< 6%	< 6%	-	-
Arrowtooth flounder	10%	12%	12%	2%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Dover sole	11%	12%	12%	1%	1%
English sole	< 6%	< 6%	< 6%	-	-
Lingcod	8%	10%	10%	2%	2%
Longspine thornyheads north of 34°27' N.	11%	13%	13%	2%	2%
Minor shelf rockfish north of 40°10' N.	7%	11%	11%	4%	4%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Minor slope rockfish north of 40°10' N.	6%	11%	11%	5%	5%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Other flatfish	10%	11%	11%	1%	1%
Pacific cod	< 6%	8%	8%	-	-
Pacific halibut (IBQ) north of 40°10' N.	9%	13%	13%	4%	4%
Pacific whiting	28%	37%	37%	9%	9%
Sablefish north of 36° N.	41%	53%	53%	12%	12%
Sablefish south of 36° N.	< 6%	< 6%	< 6%	-	-
Shortspine thornyheads north of 34°27' N.	14%	16%	16%	2%	2%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	< 6%	-	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Starry flounder	< 6%	< 6%	< 6%	-	-
Widow rockfish	< 6%	< 6%	< 6%	-	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	< 6%	-	-

Distribution of IFQ catch by area, gear type and depth

Model-based predictions of distribution of catch among areas, gear types, or depth were not produced. Currently, the information most indicative of future catch distribution according to these factors is 2011 catch data. The most recent, detailed, total catch data available (for which depth and gear information was available) at the time of this analysis was from the WCGOP, dated October 4, 2011.

Within non-whiting trips, 4.4 percent of the catch at this time was taken with fixed gear, and 95.6 percent was taken with some type of trawl gear. The total non-whiting catch at this time was 25,945,928 pounds. The distribution of catch between gear types as of early October, 2011, followed a north to south cline, where north of 40°10’ N. lat., 98 percent of non-whiting catch was taken with trawl gear, from 36° to 40°10’ N. lat., trawl accounted for 95 percent, from 34°27’ to 36° N. lat., 86 percent was taken with trawl gear, and finally, south of 34°27’, all non-whiting catch was taken with fixed gear, although it was a small percentage of the overall non-whiting catch (Table B-25). At that time these data were recorded, 86.5 percent of total catch for the sector was from declared whiting trips, with the remainder, 13.5%, from non-whiting trips. The total catch for the sector at this time was 192,352,890 pounds.

Table B-25. Distribution of IFQ total catch among areas and depths, for non-whiting trips, as of October 4, 2011.

Gear type	North of 40°10'	36° to 40°10'	34°27' to 36°	South of 34°27'	Total
Fixed gear	1.9%	4.8%	86.4%	100.0%	4.4%
Trawl	98.1%	95.2%	13.6%	0.0%	95.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Within each gear type (for non-whiting trips), most fixed gear catch was taken in the area from 34°27' to 36° N. lat. (46%), followed by 37 percent north of 40°10' N. lat. Another 12 percent of fixed gear catch was taken between 36° and 40°10' N. lat., with the remaining 5 percent coming from south of 34°27'. Within trawl catch, 89 percent came from north of 40°10' N. lat., approximately 11% was taken between 34°27' to 36° (Table B-26).

Table B-26. Distribution of IFQ total catch among areas and gears, for non-whiting trips, as of October 4, 2011.

Area	Fixed gear	Trawl	Total
North of 40°10'	37.4%	88.9%	86.6%
36° to 40°10'	11.7%	10.7%	10.8%
34°27' to 36°	45.9%	0.3%	2.4%
South of 34°27'	5.0%	0.0%	0.2%
Total	100.0%	100.0%	100.0%

For non-whiting trips, the vast majority of catch was taken deeper than 100 fm (84%). This was the distribution north of 36° N. lat., however, south of 36° N. lat., all catch was taken deeper than 100 fm (Table B-27). For whiting trips, 41.4 percent of catch was taken deeper than 100 fm, while 58.6% was taken at depths less than 100 fm (all mid-water trawls).

Table B-27. Distribution of IFQ total catch among areas and depths, for non-whiting trips, as of October 4, 2011.

Depth	North of 40°10'	36° to 40°10'	34°27' to 36°	South of 34°27'	Total
> 100 fm	83.5%	84.1%	100.0%	100.0%	84.0%
< 100 fm	16.5%	15.9%	0.0%	0.0%	16.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

B.1.1 IFQ: Alternative 8 (2013)

Alternative 8 is the same as the Preferred Alternative except for a larger canary rockfish ACL (147 mt 116 mt) and a lower cowcod allocation. Model projections of total catch for IFQ species categories, shows that this small increase in the allocation of canary rockfish was not enough to free access to additional target species catch, under the conditions inherent in the model input data, from the first 11 months of this fishery. It also suggests that access to target species in the IFQ fishery under the Preferred Alternative, as viewed through this version of the model and set of conditions, would be limited more by quota pounds of POP than by canary rockfish.

Running the model with Alternative 8 yielded no difference from the Preferred Alternative in projected total catch across all IFQ species, at the fleet level, or for individual vessels. Within the confines of this analysis, and considering the assumptions inherent in this version of the IFQ model, increasing the canary allocation is not expected to yield additional target catch, compared with the Preferred Alternative.

The allocation structure of Alternative 8 is also very similar to Alternative 7, and making the comparison of projected catch between these two alternatives is informative. Alternative 7 differs from Alternative 8 only in that it has a higher allocation of POP (394,627 versus 249,122 pounds). Alternative 7 also yielded a higher projected catch of 21 IFQ species categories than Alternative 8 (and the Preferred Alternative, which has the same POP allocation as Alternative 8), including Pacific whiting (1,502,152 pounds) and 30,450 pounds of non-whiting catch, including 2,121 pounds of sablefish (north of 36° N. lat.). This is not an enormous difference, however. The difference in projected whiting catch between Alternative 7 and Alaternative 8 is 0.75 percent of the Alternative 8 projection; the difference in projected catch of all other IFQ species is 0.09 percent of the Alternative 8 sum of projections for those species.

In summary, increasing the allocation of POP over the Preferred Alternative while holding the canary allocation constant, resulted in increased projected harvests of target species. However, increasing the allocation of canary rockfish, while holding the POP allocation constant, resulted in no increase in projected harvest. This suggests that access to target species in the IFQ fishery, as interpreted through this model and set of conditions, would be limited under the Preferred Alternative relatively more by POP than by canary rockfish.

The lack of difference in projected catch between the Preferred Alternative and Alternative 8 is logical, given that the inputs to the model were from the most "conservative" 11 months of the new fishery, when fishermen were generally focusing on target species that could be accessed with low chance of encounter with those rebuilding stocks with the smallest allocations, typically shelf species.

However, interpretation within a larger context is needed. In December, when the risks were less, given the amount of time remaining in the season, catch of many rebuilding stocks rose dramatically, which was not captured in the input data for the EIS analyses. Furthermore, after fishermen have gained a year of experience with the new management system of the IFQ fishery, including experimentation by many in December, future behavior could be different than 2011. An increase in the diversity of catch among species categories is already evident from comparing the first three months of 2012 to that of 2011.

Although the total catch through March, 2012 differs little from that in early 2011, catches of some species do show differences, and it suggests that fishermen are more confident early this year in the IFQ fishery than the same time last year (see page 6 of http://www.pcouncil.org/wp-content/uploads/I7b_SUP_GMT_APR2012BB.pdf). Currently, the species with the highest attainment is petrale sole, which is reportedly at 34 percent of its allocation, versus 26 percent at the same time in 2011; a 61 percent increase. Darkblotched rockfish currently shows the second highest attainment among species categories, with approximately 10 percent of its allocation reached, versus five percent for the same time period in 2011, an increase of more than 100 percent.

There are notable increases in attainment for several other species as well, including bocaccio, canary, chilipepper, and minor slope rockfish north and south of 40°10' N. lat., shortspine thornyheads, north of 34°27' N. lat, and sablefish, south of 36° N. lat. Dover sole, lingcod and yelloweye rockfish showed slightly lower attainment rates versus the same time in 2011 (by one to two percent).

Among those stocks which normally show low attainment, and thus reporting catch differences as attainment diminishes comparisons of catch between years, chilipepper rockfish currently shows 33,883 pounds caught so far this year, versus 57 pounds this time last year (Table 3). Yellowtail rockfish currently shows nearly double the catch in early 2011 (51,366 pounds in 2012 versus 27,102 pounds in 2011, an increase of 190 percent), all of which was retained. Splitnose rockfish also showed a sharp increase in catch, from 2,565 pounds early in 2011, to 17,308 pounds so far in 2012, an increase of 675 percent. Thirty-four percent of the splitnose catch in early 2012 was retained, versus 20 percent early in 2011.

B.2 Non-Nearshore

B.2.1 Sablefish Trip Limits

The following section discusses catch projections and trip limit analyses for the four fixed gear, daily trip limit (DTL) fisheries, including both limited entry (LE) and open access (OA), north and south of 36° N. lat. for 2011. Hereafter, they will be referred to as follows: LE North, LE South, OA North, and OA South.

Proposed trip limits for 2013 and 2014 in the fixed gear, sablefish, DTL fisheries were produced through iteration using GMT catch projection models (models described briefly below, and in detail in the 2011-2012 EIS).

Proposed trip limits in the Preferred Alternative for 2013 and 2014 were reduced or increased to bring projected catch to within new management targets, resulting from changes to the sablefish ACLs for the areas north and south of 36° N. lat. Landings projections were approximately 91 percent of the landings target, in order to produce trip limits which are likely to result in full attainment of harvest guidelines, while providing sufficient catch buffer, appropriate for the uncertainty in accuracy of estimated landings data, and normal uncertainty associated with statistical model projections. This strategy was supported by the Council in establishing sablefish DTL trip limits for 2012, in the November, 2011 Council meeting.

For 2013, in the LE North fishery, proposed trip limits for 2013 were reduced to approximately 85 percent of No Action levels; for the OA North fishery, proposed trip limits were reduced to 68 percent of No Action. In the area south of 36° N. lat., harvest guidelines were higher than No Action (due to a slightly higher sablefish ACL for 2013 and 2014 in this area). For LE South, proposed trip limits were 104 percent of no action; for OA South, 108 percent. Trip limits for 2014 were slightly higher than for 2013 (2 to 5 percent higher) across all four sablefish DTL fisheries, due to higher ACLs in 2014.

Analytical description

The purposes of this analysis are to compare predicted landings between the No Action Alternative and the Preferred Alternative, under their resultant regional allocations, and fishery harvest guidelines, for the four fixed gear, sablefish daily trip limit (DTL) fisheries, including limited entry (LE) and open access (OA), both north and south of 36° N. lat.

The ACLs, regional allocations, and fishery LTs only vary between the No Action Alternative, versus the Preferred Alternative and all other alternatives, within each year. Levels of these three harvest control points vary only between years (2013-2014), and between No Action and all other alternatives. Within this analysis, “harvest guidelines” is defined as numerical management harvest objectives which are not quotas. These are either cited in regulation or calculated from other higher level numerical management objectives appearing in regulation. These harvest guidelines were reduced to account for discard mortality, the method and rationale for which is described below, to produce “landings targets”, which were used in projection modeling to predict landings, and determine necessary trip limits.

Model description

The catch projection models used in this analysis are linear regression models that relate trip limits to monthly or bimonthly landings, separately for each fishery. Detailed descriptions of the models can be found in Appendix A. of the 2011-2012 harvest specifications EIS.

Limited entry models were specified as described in the 2011-2012 EIS. Minor differences in model specification were made in the open access models for 2013-2014. Sablefish ex-vessel revenue and fuel prices were removed as predictor variables in the open access North and South models. Although these variables present a meaningful picture in retrospect, when their historical values are known, they do not provide valuable information for making projections of future catch, since fuel prices and sablefish prices in the future are not known, are subject to substantial variability, and either assumptions or projections must be made about these would-be predictor variables themselves. Error in assumptions regarding future values of these variables introduces bias and significantly affects accuracy of projections; using them inflates apparent accuracy and precision, producing unrealistically high multiple-R^2 values and low standard errors for the regressions. Trip limits, on the other hand, are known (are set by the Council process), and their use for projecting catch into the future presents a realistic picture of uncertainty. Data from years 2004-2006, when there was extremely small variation in trip limits, and provided little information content for the model, were removed from the OA South model, and resulted in increased model fit.

Model input data

Landings and catch data were acquired from PacFIN using the query “slct_ves_sabl_arid_DTL_no_EFP.sql”. As described in the GMT inseason statements from the April, June, September, and November 2011 Council meetings, data from this query were found this year to have two substantial problems, both of which were corrected before use in the analysis for these harvest specifications. First, historical landings of sablefish with fixed gear, in the LE North, DTL fishery were substantially underestimated from 2004 through 2011, as the software in the PacFIN database which estimates division of fixed gear sablefish landings between the primary tier fishery and DTL fisheries was malfunctioning. The software has since been modified to make the most accurate division of catch between the two fisheries which is currently possible, and the GMT and Council are working on a long-range solution that would provide direct catch accounting, which would replace the currently necessary computational estimation procedure. Second, gear-switching provisions under IFQ lead to misattribution of IFQ landings of sablefish using fixed gear, to the various sablefish DTL fisheries. This has also been corrected, and screening procedures have been put in place both in PacFIN and with the states to flag and remove IFQ fish tickets from the “slct_ves_sabl_arid_DTL_no_EFP.sql” query for the sablefish DTL projection models.

Accounting for discards and discard mortality

Landings targets which appear in this section have been reduced from harvest guidelines that would appear in regulation, where applicable, in order to account for discard mortality. The harvest guideline (a specified numerical harvest objective that is not a quota) was multiplied by 15.9% (discard rate estimate), and by 20% (discard mortality rate estimate), and then that product (estimated dead discarded sablefish) was subtracted from the harvest guideline, resulting in a “landings target”, which projected landings should be beneath, in order to keep total catch within the harvest guideline. The estimated discard rate used by GMT was taken from the 2010 West Coast Groundfish Observer Program (WCGOP) Total

Mortality Report. In the 2009-10 management cycle, the discard rate estimate was the same, and was derived from data in the 2007 WCGOP Total Mortality Report, which was the most recent available data at that time. That discard mortality rate estimate was taken from information in Davis (2001, LTtp://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2001.tb00495.x/abstract), Shirrippa and Colbert (2005, LTtp://www.pcouncil.org/wp-content/uploads/Sable05_complete.pdf), and Shirrippa (2007, LTtp://www.pcouncil.org/wp-content/uploads/Sable07v3_0.pdf). Shirrippa (2005) used experimental data and sea surface temperature to predict varying release mortality by gear. The GMT considered that Davis (2001) demonstrated high sensitivity to temperature and deck time, along with high variability of predicted discard mortality in Shirrippa (2005) informed by sea surface temperature data, and adopted an estimate of 20%. This value was also adopted by Taylor 2011 in the current sablefish stock assessment.

No Action Alternative

Area restrictions

Under No Action, the following Rockfish Conservation Area boundaries for use of fixed gear, from 2012 regulations, would remain in place for 2013 and 2014 (Table B-28).

Table B-28. Rockfish Conservation Area (RCA) boundaries for fixed gear, under the No Action Alternative.

Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
North of 46° 16'	shore - 100 fm					
45° 03’ 83” - 46° 16’	30 - 100 fm					
43° - 45° 03’ 83”	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)					
42° - 43°	20 - 100 fm					
40° 10’ - 42°	20 fm depth contour - 100 fm					
34° 27’ - 40° 10’	30 fm - 150 fm line					
South of 34° 27’ (w/islands)	m - 150 fm line					

Projected Landings (No action)

Projected landings under the No Action Alternative are presented in Table B-29. The GMT and the Council considered, while constructing and adopting them, respectively, the uncertainty in the landings data seen during 2011 (in terms of correctly separating primary tier landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings) along with the normal uncertainty associated with projection models, the No Action trip limit structures for 2012 for each fishery presented here. The No Action Alternative resulted in projected attainments in the range of 91% to 93%, aiming to enable harvest of a high proportion of the HG, yet accommodating previously described uncertainty.

Table B-29. Model-projected landings under the No Action Alternative, for the fixed-gear, sablefish, DTL fisheries. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	LT	No act. projection	% of LT
LE N.	North of 36° N. lat.	265	242	91%
OA N.	North of 36° N. lat.	419	381	91%
LE S.	South of 36° N. lat.	380	353	93%
OA S.	South of 36° N. lat.	309	284	92%

These trip limits can be adjusted inseason as needed to influence higher or lower catch as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure (which was appreciated by the GAP, in their statement, in the November 2011 Council meeting), and to avoid starting the year with highly variable trip limits, such as resulted from the "rolling over" of 2010 trip limits into 2011, due to unforeseeable delays in implementation.

Table B-30. Trip limits for sablefish DTL fisheries under No Action.

<table>
<tr><th>Area</th><th>Fishery</th><th>Jan-Feb</th><th>Mar-Apr</th><th>May-Jun</th><th>July-Aug</th><th>Sept-Oct</th><th>Nov-Dec</th></tr>
<tr><td rowspan="2">North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)</td><td>LE N.</td><td colspan="6">1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.</td></tr>
<tr><td>OA N.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 900 lb., not to exceed 1,800 lb. per 2 mo.</td></tr>
<tr><td rowspan="2">South of 36° N. lat.</td><td>LE S.</td><td colspan="6">1,800 lb. per week</td></tr>
<tr><td>OA S.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 1,350 lb., not to exceed 2,700 lb. per 2 mo.</td></tr>
</table>

Preferred Alternatives and Alternatives 1-8

Preferred Alternative for 2013

Projected landings under the Preferred Alternative, and all action alternatives, are presented in Table B-31. As with the No Action Alternative, we considered the uncertainty in the landings data seen during 2011 (in terms of correctly separating primary tier landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The Preferred Alternative results in of projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for all action alternatives, within each year.

Table B-31. 2013 Model-projected landings for trip limits under the Preferred Alternative for the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	LT	Preferred Alternative Projection	% of LT
LE N.	North of 36° N. lat.	197	179	91%
OA N.	North of 36° N. lat.	291	266	91%
LE S.	South of 36° N. lat.	446	405	91%
OA S.	South of 36° N. lat.	362	330	91%

Projected landings under the Preferred Alternative were lower than No Action for the LE North and OA North fisheries (74 percent and 70 percent of No Action, respectively), and higher than No Action for the LE South and OA South (115 percent and 116 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table B-32 and Figure B-3.

Table B-32. 2013 Model-projected landings for trip limits under the Preferred Alternative (equal to alternatives other than No Action), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	Prefered Alternative Projection	No Action Projection	% of No Action
LE N.	North of 36° N. lat.	179	242	74%
OA N.	North of 36° N. lat.	266	381	70%
LE S.	South of 36° N. lat.	405	353	115%
OA S.	South of 36° N. lat.	330	284	116%

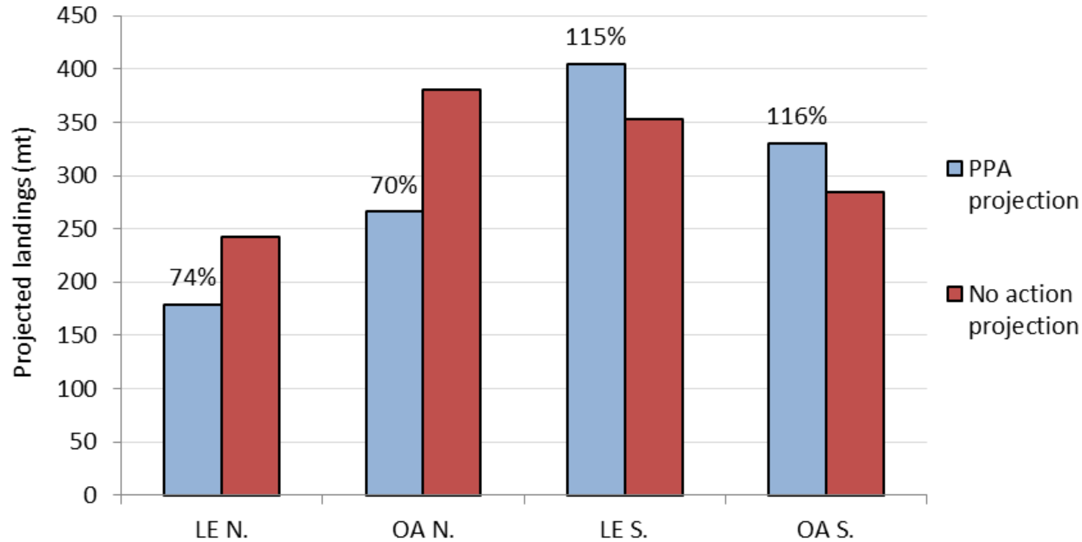

Figure B-3. Projected landings for 2013 under the Preferred Alternative and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show the Preferred Alternative projection as a percentage of No Action.

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table B-33), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 800 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 290 pounds per week and 580 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 80 pounds per week was possible in the LE South fishery, while an increase of 110 pounds per week and 220 pounds per bimonthly period was possible in the OA South fishery.

Table B-33. 2013 Proposed trip limits for 2013 in sablefish DTL fisheries under the Preferred Alternative, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,880 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.					

Preferred Alternative for 2014

Projected landings under the Preferred Alternative for 2014 are presented in Table B-34. As with the No Action Alternative, we considered uncertainty in the landings data seen during 2011 (in terms of correctly separating primary tier landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The Preferred Alternative for 2014 results in projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2014 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the Preferred Alternative and all alternatives other than No Action, within each year.

Table B-34. Model-projected landings for trip limits under the Preferred Alternative (PA), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	LT PA	PA projection	% of LT
LE N.	North of 36° N. lat.	214	194	91%
OA N.	North of 36° N. lat.	319	290	91%
LE S.	South of 36° N. lat.	483	441	91%
OA S.	South of 36° N. lat.	393	359	91%

Projected landings under the Preferred Alternative were lower than No Action for the LE North and OA North fisheries (80 percent and 76 percent of No Action, respectively), and higher than No Action for the LE South and OA South (125 percent and 126 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table B-35 and Figure B-4.

Table B-35. Model-projected landings for trip limits under the Preferred Alternative (PA), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	PA projection	No Action Projection	% of No Action
LE N.	North of 36° N. lat.	194	242	80%
OA N.	North of 36° N. lat.	290	381	76%
LE S.	South of 36° N. lat.	441	353	125%
OA S.	South of 36° N. lat.	359	284	126%

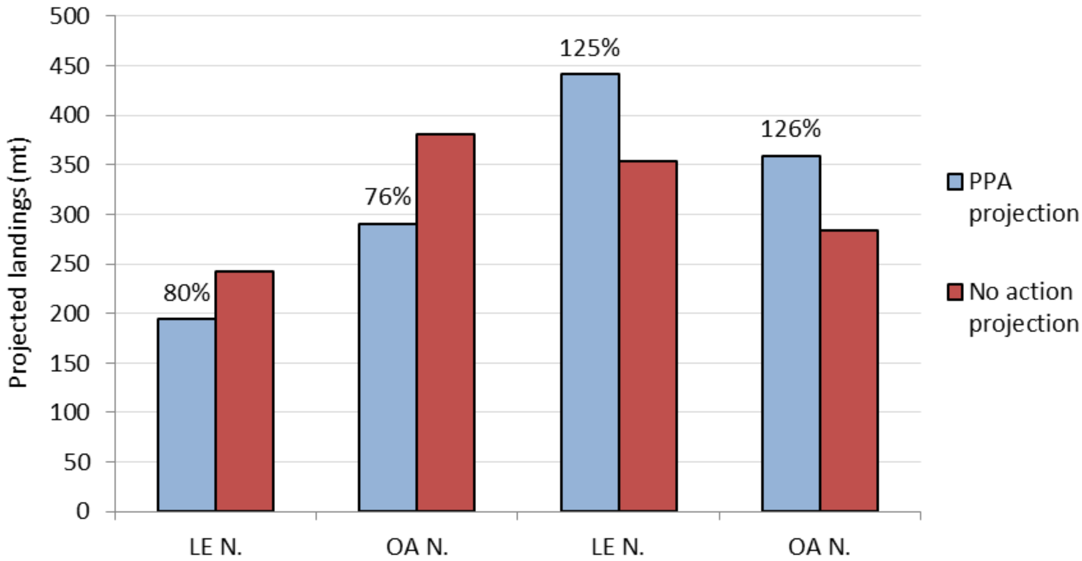

Figure B-4. Projected landings for 2014 under the Preferred Alternative and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show Preferred Alternative projection as a percentage of No Action.

Table B-36. Proposed trip limits for 2014, in sablefish DTL fisheries under the Preferred Alternative, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N	1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.					
	OA N	300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.					
South of 36° N. lat.	LE S	1,930 lb. per week					
	OA S	300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.					

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table B-36), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 600 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 225 pounds per week and 450 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 130 pounds per week was possible in the LE South fishery, while an increase of 175 pounds per week and 350 pounds per bimonthly period was possible in the OA South fishery.

B.2.2 Non-nearshore Fixed Gear

B.2.2.1 Non-Nearshore: No Action Alternative

The non-nearshore bycatch model projects overfished species mortality for both the limited entry fixed gear sector and the open access daily trip limit fishery fishing seaward of the non-trawl RCA in areas north of 36° N. latitude. Sablefish is the primary target and provides the main source of revenue in both sectors. Over the years 2005-2010, sablefish accounted for 95 percent of groundfish ex vessel revenue earned by the non-nearshore limited entry fixed gear sector in this area (Table B-37) and 93 percent of the non-nearshore open access sector (Table B-38). Other key target stocks in these sectors include Pacific halibut, shortspine and longspine thornyheads, blackgill rockfish, and for some vessels, dogfish.

Table B-37. Non-nearshore limited entry fixed gear sector ex-vessel revenues by top species, 2005-2010 (source: PacFIN).

	Total ex-vessel $ (2005-2010)	% of total
Sablefish	$63,304,213	94.9%
Pacific halibut	$1,116,932	1.7%
Shortspine thornyhead	$718,962	1.1%
Dogfish	$390,574	0.6%
Unspecificed slope rockfish	$212,770	0.3%
Longspine thornyhead	$192,545	0.3%
Other	$780,944	1.2%
Total	$66,716,940	--

Table B-38. Non-nearshore open access sector ex-vessel revenues by top species, 2005-2010 (source: PacFIN).

	Total ex-vessel $ (2005-2010)	% of total
Sablefish	$14,023,294	92.7%
Lingcod	$435,586	2.9%
Pacific halibut	$273,744	1.8%
Grenadier	$50,948	0.3%
Dogfish	$42,812	0.3%
Blackgill rockfish	$25,454	0.2%
Other	$272,933	1.8%
Total	$15,124,771	--

Yelloweye rockfish and canary rockfish are the two key rebuilding stocks affecting these sectors in that there is a small margin between recent catch and the sector's allocations of these stocks. Other rebuilding stocks are caught by these sectors as well, yet the catch has so far remained sufficiently below their respective sector allocations.

The non-trawl RCA is the main management measure for mitigating bycatch of the rebuilding stocks. Seaward expansion of the RCA is the main option for additional reductions in catch of yelloweye and canary. As in past cycles and discussed below, the WCGOP data suggests that overall encounters with these stocks would decrease as the RCA is extended seaward (Table B-39).

Table B-39. WCGOP bycatch rates, by 25 fathom (fm) depth category, of canary rockfish and yelloweye rockfish (lbs. of catch per 1,000 lbs. of landed sablefish) in the non-nearshore fixed gear sectors for the years 2002-2009 in the area north of 40° 10' N. latitude.

	canary rockfish	yelloweye rockfish
>100 fm	1.6	0.7
>125 fm	1.2	0.4
>150 fm	1.2	0.2

The circumstances in these two sectors remain very similar to those analyzed in the 2011-12 FEIS. The analysis of the non-nearshore sectors and related effects on fishing communities in that FEIS remains generally applicable here. Bycatch projections have been updated with WCGOP data from 2009 and the model now incorporates data collected from 2002 to 2009. Data from 2009 was the most recently available data at the time of the analysis. The other main change from 2011-12 comes from the changed sablefish ACL. As highlighted above, sablefish provides the main source of revenue for these sectors. With bycatch rates remaining mostly stable in recent years, the revenue-based economic impact analysis used here are therefore most sensitive to changes in the sablefish ACL. In these 2013-14 integrated alternatives, the expected sablefish harvest only varies with the No Action alternative because of the different sablefish ACL value associated with that alternative. There will therefore be no contrast in the quantitative revenue projections between the action alternatives.

Table B-40. Sablefish harvest projections for the non-nearshore, limited entry fixed gear sector under the action alternatives based on the Preferred 2013-2014 sablefish ACLs for the area north of 36^0 N. latitude.

	Limited Entry (all catch estimates are expressed as metric tons (mt))					
Sablefish N. of 36	**Total Catch Share**	**Observed Discard Rate**	**Assumed Discard Mortality (20%)**	**Landed Catch Projection**	**Primary Season**	**LEFG DTL**
No Action	1,823	16%	58	1,764	1,500	264
2013	1,362	16%	43	1,318	1,121	198
2014	1,477	16%	47	1,430	1,216	215

Table B-41. Sablefish harvest projections for the non-nearshore open access sector under the action alternatives based on the Preferred 2013-2014 sablefish ACLs for the area north of 36^0 N. latitude.

		Open Access (all catch estimates are expressed as metric tons (mt))					
Sablefish N. of 36	**OA Share**	**Incidental OA removal**	**Directed OA Total Catch Share**	**Observed Discard Rate**	**Assumed Total Discards**	**Assumed Discard Mortality (20%)**	**Directed OA Landed Catch Share**
No Action	450	17	433	16%	69	14	419
2013	336	35	301	16%	48	10	292
2014	365	35	330	16%	52	10	319

Seaward RCA Boundary	36°- 40° 10'	40°10'- Col/Eur 43°	Col/Eur 43°- Cascade Head 45.064°	Cascade Head 45.064°- Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°
Shoreward boundary to 100 fm					
100 fm					
125 fm					
150 fm					
>150 fm					

Figure B-5. No Action Alternative: Non-trawl RCA seaward configuration. The shoreward configuration of the RCA is driven by the nearshore model. Grey shading indicates areas closed to fishing.

Table B-42. No Action Alternative: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013-14 Sector allocations (mt)
Canary rockfish	2.3
Yelloweye rockfish	1.3

Limited Entry North of 36° N. latitude

Under the No Action alternative and the corresponding carryover of the 2012 sablefish ACL, the limited entry fixed gear sector is projected to land 1,764 mt of sablefish (Table B-40). This amount is 3 percent less than the equivalent projection used for 2012 because of updated information on the proportion of the sablefish catch that is discarded at sea.

At this level of activity, the model projects overfished species mortality reported in Table B-43. These projections are lower than the values projected for these sectors in 2012 and remain below the allocation under the No Action alternative (Table B-42). Therefore, no changes to management measures would be required.

Table B-43. No Action Alternative: Modeled-overfished species projected mortality for the limited entry fixed gear sector north of 36° N. latitude.

Species	Projected Mortality (mt)
Bocaccio	0.0
Canary rockfish	1.7
Darkblotched rockfish	3.2
Pacific ocean perch	0.3
Yelloweye rockfish	0.7

Open Access Sablefish DTL north of 36° N. latitude

The projected mortality for the open access sector under the No Action alternative are also similar to the 2011-12 estimates. The No Action projection is that 419 mt of sablefish will be landed by this sector in the areas north of 36° N. latitude. At this level of landings, the projected mortality of yelloweye rockfish remains at 0.1 mt and the projection for canary rockfish increases by 0.1 mt compared to 2011-12 (Table

B-44). This slight increase in the canary impact would not exceed the allocation for this sector (Table B-42) and so no RCA adjustment would be needed under the No Action Alternative.

Table B-44. No Action Alternative: Modeled-overfished species projected mortality for the open access sablefish daily trip limit fishery north of 36° N. latitude.

Species	Projected Mortality (mt)
Bocaccio	0.0
Canary rockfish	0.3
Darkblotched rockfish	0.7
Pacific ocean perch	0.0
Yelloweye rockfish	0.1

B.2.2.2 Non-Nearshore: Preferred Alternative

Under the all action alternatives, the sablefish north of 36° N. latitude ACL decreases substantially relative to 2011-12. This decrease translates directly into lower expected mortality of rebuilding stocks in the two non-nearshore sectors. As to the two key rebuilding stocks in these sectors, the Preferred Alternative sector allocations would allow the non-nearshore sectors yelloweye mortality of 1.1 mt for both 2013 and 2014, and canary mortality of 3.6 mt and 3.7 mt for 2013 and 2014, respectively (Table B-45).

This expected decrease in yelloweye and canary rockfish mortality are not substantial enough to consider relaxation of the seaward boundary of the non-trawl RCA from its baseline configuration. Reducing the seaward extent of the RCA boundary would be expected to increase encounters with canary, yelloweye, and other shelf rockfish stocks like bocaccio. The RCA was established at 100 fathoms because the 100 fm depth contour marks the transition between shelf and slope habitats. If fishing areas are reopened on the shelf, catch of shelf rockfish stocks like canary and yelloweye could increase substantially. In addition, estimates of yelloweye catch in these sectors have shown variability in recent years with estimates of actual catch differing by more than 50 percent higher and lower than the bycatch projections from the non-nearshore model. Such volatility requires some caution when interpreting and planning based on projected mortality. The GMT and NWFSC will further evaluate this variability and the management uncertainty it creates in preparation for future cycles.

Table B-45. Preferred Alternative: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	3.6	3.7
Yelloweye rockfish	1.1	1.1

Limited Entry North of 36° N. latitude
The limited entry fixed gear sector are projected to land 1,315 mt and 1,427 mt of sablefish in 2013 in 2014, respectively, under the action alternatives. These amounts represent a 19-25 percent decrease relative to the No Action Alternative. The corresponding mortality projections for the rebuilding stocks are listed in Table B-46.

Table B-46. Preferred Alternative: Modeled-overfished species projected mortality for the limited entry fixed gear sector north of 36° N. latitude.

Species	Projected Mortality 2013 (mt)	Projected Mortality 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	1.3	1.4
Darkblotched rockfish	2.4	2.6
Pacific ocean perch	0.2	0.2
Yelloweye rockfish	0.5	0.6

Open Access Sablefish DTL north of 36° N. latitude

The open access DTL sector is projected to land 291 mt and 319 mt of sablefish in the area north of 36° N. latitude during 2013 and 2014, respectively, under this alternative. Landings at these levels correspond to the projected mortality shown in Table B-47.

Table B-47. Preferred Alternative: Open access fixed gear north of 36° N. latitude projected mortality of overfished species.

Species	Projected Mortality 2013 (mt)	Projected Mortality 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	0.2	0.2
Darkblotched rockfish	0.5	0.5
Pacific ocean perch	0.0	0.0
Yelloweye rockfish	0.1	0.1

B.2.2.1 Non-Nearshore: Alternative 1

Alternative 1 includes the same management measures for the non-nearshore fishery as the Preferred Alternative and has the same projected mortalities.

B.2.2.2 Non-Nearshore: Alternative 2

The two-year allocation of yelloweye rockfish under this alternative to the non-nearshore sectors is, again, 1.1 mt for 2013 and 2011; and the two-year allocations of canary rockfish proposed under this alternative are 3.0 mt and 3.1 mt for 2013 and 2014, respectively (Table B-45). The expected landings of sablefish and projected mortality of rebuilding stocks are identical to the Preferred Alternative (Table B-46 and Table B-47) and the current RCA configuration could be maintained.

Table B-48. Alternative 2: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	3.0	3.1
Yelloweye rockfish	1.1	1.1

B.2.2.3 Non-Nearshore: Alternative 3

The two-year allocation of yelloweye rockfish and canary rockfish—the two key bycatch stocks in the non-nearshore sectors—are identical to those under the Preferred Alternative (Table B-45). The expected sablefish landings and projected overfished species mortality is identical to those under the Preferred Alternative as well (Table B-46 and Table B-47).

B.2.2.4 Non-Nearshore: Alternative 4

Under this alternative, the proposed two year allocation of canary rockfish—1.1 mt in 2013 and 1.2 mt in 2014 (Table B-49) - is a substantial reduction compared to No Action and would require an adjustment to the seaward boundary of the non-trawl RCA to keep projected canary mortality within the sector allocations. The non-nearshore fixed gear sectors would need a two-year canary allocation of at least 1.5 mt in 2013 and 1.6 mt in 2014 to maintain the current RCA configuration. As under all other action alternatives, the two-year allocation of yelloweye rockfish to the non-nearshore sectors is 1.1 mt in both 2013 and 2014.

Table B-49. Alternative 4: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	1.1	1.2
Yelloweye rockfish	1.1	1.1

To reduce canary mortality to within the two year allocations proposed under this alternative, the seaward boundary would have to be pushed to 150 fathoms in all areas north of 40°10’ N. latitude (Figure B-6), which would extend the non-trawl RCA to its largest size yet. As in past cycles, it is assumed that the sectors will achieve full harvest of their sablefish allocations irrespective of where the RCA boundaries are established. Sablefish are highly valuable and still available at depths beyond 150 fathoms. Nonetheless, this assumption has not been tested in areas north of 40° 10’ N. latitude.

The RCA expansion would be expected to raise the cost of harvest and, in turn, to potentially lower profits. However, without data from logbooks and other economic information from these sectors, the potential effects of a seaward expansion of the non-trawl RCA are not well understood. In general, the expansion could push vessels into less productive fishing grounds and lower catch rates. As highlighted in the 2011-12 FEIS, increased gear conflicts both within the sector and with the bottom trawl sector is another concern involved with seaward RCA expansion. The expansion would create longer-distance runs to fishing grounds that could also increase costs and reduce profits. In addition, if catch rates are indeed lowered then overall time on the water could increase. These longer travel distances could especially affect the open access sector where trip limits generally allow less sablefish harvest opportunity per vessel. The longer distance to and time spent on the fishing grounds could also cause safety concerns for smaller vessels.

Dogfish targeting by fixed gear vessels is another factor the Council has considered over the last few cycles when evaluating a seaward expansion of the non-trawl RCA. The level of income provided by this stock is small relative to the overall coastwide revenue provided by sablefish (Table B-37 and Table B-38), and so the loss of dogfish opportunity may not register in the revenue projections among these integrated alternatives. Yet dogfish have provided an important source of income to certain vessels operating off northern Washington both before and after implementation of the RCA. The current RCA configuration already covers significant dogfish fishing grounds and an expansion to 150 fathoms would likely eliminate fishing opportunity for this stock completely.

In 2009, concerns over yelloweye bycatch caused the Council to move the RCA boundary out to 125 fathoms in the area between 43° N. latitude and Cascade Head. The Council exempted the directed halibut fishery, which is only open a few days per year, from this change and only held vessels participating in that fishery to the 100 fathom seaward RCA boundary. If the Council took the same approach here, the directed halibut fishery would not be affected by the RCA expansion. A deeper RCA reduces access to halibut and would be expected to increase gear conflicts. The directed Pacific halibut fishery is a derby-style fishery where a vessel's harvest is limited to what can be taken during the limited opening of the fishery.

Seaward RCA Boundary	**36°- 40° 10'**	**40°10'- Col/Eur 43°**	**Col/Eur 43°- Cascade Head 45.064°**	**Cascade Head 45.064°- Pt. Chehalis 46.888°**	**North of Pt. Chehalis 46.888°**
Shoreward boundary to 100 fm					
100 fm					
125 fm					
150 fm					
>150 fm					

Figure B-6. Alternative 4, Non-trawl RCA seaward configuration. Grey shading indicates areas closed to fishing.

Limited Entry North of 36° N. latitude

With the seaward boundary of the RCA north of 40° 10' N. latitude extend from 100 fathoms to 150 fathoms, the projected mortality for the limited entry fixed gear sector are those shown in Figure B-6. As in the other action alternatives, these projected mortalities are based on the assumption that the limited entry fixed gear sector will land 1,315 mt of sablefish in 2013 in the area north of 36° N. latitude with that number increasing to 1,427 mt in 2014.

Table B-50. Alternative 4. Modeled-overfished species projected mortality for the limited entry fixed gear sector north of 36° N. latitude.

Species	Projected Mortality 2013 (mt)	Projected Mortality 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	0.9	1.0
Darkblotched rockfish	3.4	3.7
Pacific ocean perch	0.2	0.2
Yelloweye rockfish	0.2	0.2

Open Access Sablefish DTL north of 36° N. latitude

Table B-51 shows projected mortality in the open access fixed gear north of 36° N. latitude with the seaward boundary of the RCA north of 40° 10' N. latitude extend from 100 fathoms to 150 fathoms. As in the other action alternatives, the projected mortality is based on the assumption that the limited entry fixed gear sector will land 1,315 mt of sablefish in 2013 in the area north of 36° N. latitude with that number increasing to 1,427 mt in 2014.

Table B-51. Alternative 4. Open access fixed gear north of 36° N. latitude projected mortality of overfished species.

Species	Projected Impacts 2013 (mt)	Projected Impacts 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	0.1	0.1
Darkblotched rockfish	0.6	0.7
Pacific ocean perch	0.0	0.0
Yelloweye rockfish	0.0	0.0

B.2.2.5 Non-Nearshore: Alternative 5

As described under the No Action alternative, canary rockfish and yelloweye rockfish are the two key bycatch stocks in the non-nearshore sectors. The two year allocations for canary rockfish are 7.2 mt and 7.3 mt, respectively, under Alternative 5 (Table B-52). The expected sablefish landings and projected mortality of rebuilding stocks under this alternative are identical to those under the Preferred Alternative (Table B-46 and Table B-47). The RCA configuration in place for 2011 and 2012 could be maintained under this alternative. As highlighted in the discussion under the Preferred Alternative, the 1.1 mt of yelloweye mortality allowed to this sector are too low to consider any liberalization of the seaward boundary of the RCA.

Table B-52. Alternative 5: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	**2013**	**2014**
Canary rockfish	1.1	1.2
Yelloweye rockfish	1.1	1.1

B.2.2.6 Non-Nearshore: Alternative 6

The two year allocations proposed under this alternative are identical to those under Alternative 2 for the key rebuilding stocks—yelloweye rockfish and canary rockfish (Table B-48)—as are the expected landings of sablefish and projected mortality of rebuilding stocks (Table B-46 and Table B-47). As under Alternative 2, the current RCA configuration could be maintained under this alternative.

B.2.2.7 Non-Nearshore: Alternative 7

As discussed under the other alternatives, canary rockfish and yelloweye rockfish are the two key bycatch stocks in the non-nearshore sectors. The two year allocations for canary rockfish proposed under this alternative are 4.7 mt and 4.8 mt, respectively. The two-year allocation of yelloweye rockfish, as under all other action alternatives, is 1.1 mt in both 2013 and 2014 (Table B-53).

The expected sablefish landings and projected mortality of rebuilding stocks under this alternative are identical to those under the Preferred Alternative (Table B-46 and Table B-47). The RCA configuration in place for 2011 and 2012 can be maintained. As highlighted in the discussion under the Preferred Alternative, the 1.1 mt of yelloweye allocation for this sector is too low to consider any liberalization of the seaward boundary of the RCA.

Table B-53. Alternative 7: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	4.7	4.8
Yelloweye rockfish	1.1	1.1

B.2.2.8 Non-Nearshore: Alternative 8

Alternative 8 includes the same management measures for the non-nearshore fishery as the Preferred Alternative and has the same projected mortalities.

B.3 Nearshore

B.3.1 Nearshore: No Action Alternative

Under the No Action alternative, landing projections for 2013-14 would be based on final inseason action taken in September 2011 (Table B-54). Those projections were originally calculated in March 2011 using average landings for each species from the three highest years from 2007 to 2010. Overfished species impact projections would be stratified into three areas[1]: (1) north of 42° N. latitude; (2) between 42° N. latitude and 40° 10' N. latitude; and (3) south of 40° 10' N. latitude. The overfished species allocations would be divided between Oregon and California[2] based on the result from the final preferred alternative in 2011-12 (2011-2012 FEIS).

Under the No Action alternative, depth restrictions would remain unchanged (30 fm north of 43° N. latitude; 20 fm[3] between 43° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N. latitude and 34° 27' N. latitude; 60 fm south of 34° 27' N. latitude) (Figure B-7).

Some Oregon and California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, destroyed vessels, and limited the fishermen's ability to access and/or sell catches. Crescent City, which typically provides some of the highest historical nearshore landings in northern California, was hit hard by this disaster. As a result, the landings originally projected for this fishery, particularly between 42° N latitude and 40° 10' N. latitude, are not likely to materialize and actual overfished species mortality will likely be lower than projected. Although Brookings was also heavily impacted by this tsunami, and provides much of the southern Oregon nearshore landings, damage to Port Orford and other Oregon ports was light or nonexistent. Oregon nearshore fisheries therefore were uninterrupted by the tsunami north of Brookings, and actual landings by the Oregon nearshore fishery will approximate the projected landings shown in Table B-54. The 2011 landings in Oregon may have exceeded projected landings had the tsunami not occurred.

As discussed in the 2011-12 FEIS, the nearshore fishery is not modeled based upon full attainment of non-overfished species allocations and this fishery will continue to be held at reduced levels compared to historic harvests due to restrictions imposed by overfished species caps and restrictive RCAs. Indeed, historical state landing caps are, in many cases, unattainable under the No Action alternative, resulting in

[1] Prior to 2011, the nearshore model was stratified north and south of 40° 10' N latitude. In 2011, the model was modified to incorporate a finer area stratification to allow each state to manage their fishery independently
[2] Washington does not have a commercial nearshore fishery.
[3] The 20 fm RCA is defined by depth, not waypoints.

lost economic opportunities. Public testimony and advisory body comments summarized in the 2011-12 FEIS speak to the hardships faced by the nearshore fisheries in both states as a result of the low allocation of yelloweye rockfish and the restrictive RCAs under the No Action alternative. In particular, the ports of Port Orford, Brookings, Eureka, and Crescent City have been negatively impacted by the reduced trip limits and restricted access to productive fishing grounds as a result of the non-trawl RCA closures implemented to reduce mortality of overfished species, particularly yelloweye. These ports would produce substantially higher landings of target species under the less restrictive RCAs and/or landing caps that were available prior to 2009.

Increased competition for space, gear conflicts, reduced access to productive fishing grounds, and potentially increased local depletions of some fish stocks may have resulted from the more restrictive management measures first implemented in 2009. These measures forced individuals to shift their historical fishing effort from deeper to shallow depths (see above). The most recent data on proportion of catch by depth from West Coat Groundfish Observer Program reveal that substantial fishing effort occurred deeper than 20 fm prior to 2009, especially off northern California. Fishing effort at 20 – 30 fm depths was significant in some cases, reaching as much as 40 percent of the fishing effort for some nearshore species in northern California and 6 percent of the fishing effort off Oregon (Table B-55). Competition for space and the potential for local depletion become even more problematic when the recreational fishery is open because it operates in similar depths to the nearshore fishery.

The No Action alternative is modeled assuming the bycatch rates, weather, and market conditions applied or experienced in 2011 and 2012 will be the same in 2013 and 2014. Under the No Action alternative, this fishery would be held to the projected yelloweye allocation, 1.1 mt, which is equal to the yelloweye allocation imposed for the 2011 and 2012 fisheries. Although overfished species mortality in 2011 may be lower than projected, the projected mortality in 2013 and 2014 could be higher due to some unforeseen event or to natural variation in annual catches. Few management measures remain available to further reduce yelloweye mortality in this fishery (if needed); drastic reductions to landed catch or total fishery closure between 43° N. latitude and 40° 10' N. latitude would be required to further reduce yelloweye mortality. Depth restrictions shallower than 10 fm are ill advised because fishing would occur in very shallow waters. Modifications to depth restrictions or reductions in landed catch south of 40° 10' N. latitude could provide some savings for canary rockfish but would provide little (if any) savings of yelloweye rockfish because this is an area of low bycatch for that species.

Projected mortality of overfished species under the No Action alternative is summarized in Table B-56.

Table B-54. No Action: Nearshore fishery projected total landings by area for 2013-14.

Area	Projected Total Landings (mt) 2013-14
Grand Total	**499**
Black rockfish	197
Blue rockfish	17
Cabezon	95
Deeper nearshore rockfish	36
Kelp greenling	22
Lingcod	52
Other minor nearshore rockfish	21
Shallow nearshore rockfish	59
North of 42º N. lat.	
Black rockfish	111

Blue rockfish	3
Cabezon	25
Kelp greenling	20
Lingcod	28
Other minor nearshore rockfish	11
42º - 40º10' N. lat.	
Black rockfish	82
Blue rockfish	11
Cabezon	7
Kelp greenling	0
Lingcod	8
Other minor nearshore rockfish	10
South of 40º10' N. lat.	
Black rockfish	4
Blue rockfish	3
Cabezon	63
Deeper nearshore rockfish	36
Kelp greenling	1
Lingcod	16
Shallow nearshore rockfish	59

Table B-55. Summary of observed nearshore landings by area and depth from 2003 through 2010 (source: West Coast Groundfish Observer Program, 2010).

	% of observed landings by depth		
NORTH of 42° N. lat.	**0-10 fm**	**11-20 fm**	**> 20 fm**
Black rockfish	49.8%	48.5%	1.7%
Blue rockfish	38.5%	56.0%	5.4%
Cabezon	28.3%	68.7%	3.0%
Kelp greenling	50.3%	47.7%	1.9%
Lingcod	30.8%	64.0%	5.3%
Other minor nearshore rockfish	27.8%	66.4%	5.7%
42° to 40°10' N. lat.	0-10 fm	11-20 fm	> 20 fm
Black rockfish	44.5%	52.3%	3.2%
Blue rockfish	18.1%	70.7%	11.2%
Cabezon	46.6%	39.7%	13.8%
Kelp greenling	37.7%	61.4%	0.9%
Lingcod	30.4%	47.9%	21.7%
Other minor nearshore rockfish	18.9%	41.5%	39.7%
SOUTH of 40°10' N. lat.	0-10 fm	11-20 fm	> 20 fm
Black rockfish	46.3%	48.4%	5.3%
Blue rockfish	52.7%	40.4%	6.9%
Cabezon	94.6%	3.9%	1.4%
Deeper nearshore rockfish	30.7%	61.3%	8.0%
Kelp greenling	91.5%	6.8%	1.7%
Lingcod	54.4%	41.8%	3.9%
Shallow nearshore rockfish	69.1%	24.1%	6.8%

Shoreward RCA Boundary	**South of 34°27'**	**34°27' - 40°10'**	**40°10' - 42°**	**42°- 43°**	**43° - 46°16'**	**North of 46°16'**
Shore						
20 fm						
30 fm						
60 fm						

Figure B-7. No Action: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing.

Table B-56. No Action: Overfished species bycatch projections for the nearshore fixed gear fisheries for 2013-2014.

Species	Area	Projected Total Impacts (mt) 2013-14	Allocation (mt) 2013-14[a/]
Bocaccio	Total	0.5	
	OR: North of 42º	0	n/a
	CA: 42º - 40º10'	0	
	CA: South of 40º10'	0.5	0.7
Canary	Total	3.2	4.0
	OR: North of 42º	0.8	
	CA: 42º - 40º10'	0.8	
	CA: South of 40º10'	1.6	
Cowcod	Total	0	
	OR: North of 42º	0	n/a
	CA: 42º - 40º10'	0	
	CA: South of 40º10'	0	0.9[b/]
Darkblotched	Total	0.2	n/a
	OR: North of 42º	0.2	
	CA: 42º - 40º10'	0	
	CA: South of 40º10'	0	
Yelloweye	Total	1.0	1.1
	OR: North of 42º	0.7	0.8
	CA: 42º - 40º10'	0.2	0.3
	CA: South of 40º10'	0.1	

[a/] represents nearshore share of non-trawl allocation
[b/] non-trawl allocation

B.3.2 Nearshore: Preferred Alternative

The Preferred Alternative is the same as Alternative 1, which is described in the next section. The preferred RCA structure is 30 fm in Oregon and maintaining the status quo structure in California (described as Alternative 1b in the next section).

B.3.3 Nearshore: Alternative 1

Under the Alternative 1, the allocations of canary and yelloweye rockfish to the nearshore fishery are higher than the No Action alternative. Although both states will have some increased opportunity compared to No Action, management measures will continue to be more restrictive and landings lower than years prior to 2009 (2009-2010 FEIS). As such, nearshore fishermen continue to be negatively impacted by the reduced trip limits and restricted access to productive fishing grounds, as a result of the non-trawl RCA closures, implemented to reduce mortality of overfished species, particularly yelloweye.

Similar to the No Action alternative, Alternative 1 is modeled assuming the bycatch rates, weather, and market conditions experienced in 2011 and 2012 will be the same in 2013 and 2014, and assumes no variation in landings and mortality. If overfished species mortality is higher than projected, then few management measures are available to further reduce yelloweye bycatch in this fishery (if needed). Further reductions in yelloweye bycatch would require drastic reductions to landed catch or total fishery closure between 43° N. latitude and 40° 10' N. latitude. Depth restrictions shallower than 10 fm are ill advised because of vessel safety concerns.

Based on Council direction, the No Action catch sharing for canary (OR = 26.7%; CA = 73.3%) and yelloweye rockfish (OR = 72.7%; CA = 27.3%) was analyzed in the integrated alternatives. Under this alternative, the tradeoffs between more restrictive depth restrictions and higher reductions in landed catch were explored (Alternatives 1a and 1b). In Oregon, overfished species mortality is projected assuming the same RCA under No Action (20 fm depth restriction between 42° N. latitude to 43° N. latitude) (Alternative 1a) and a 30 fm depth restriction statewide (Alternative 1b). In California overfished species mortality is projected assuming the same RCA under No Action for both sub-alternatives (20 fm between 42° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N latitude and 34° 27' N. latitude; 60 fm south of 34° 27' N. latitude).

North of 42° N. latitude – under Alternative 1a, the RCA configuration (Figure B-7) would be the same as No Action and landings would be increased 8 to 29 percent (depending on the species) relative to No Action (Table B-58) to reflect state landing caps. Lingcod could also be increased by 40 percent relative to the No Action. Under Alternative 1b, a 30 fm RCA configuration would be implemented statewide (Figure B-9) and landings increased 7 percent relative to No Action (Table B-58).

Under Alternative 1a, current state landing caps could be reached, assuming overfished species bycatch rates, weather, and other unforeseen circumstances are similar to 2011 – 2012. However, the shoreward RCA in southern Oregon would still be restricted to 20 fm. As described for the No Action alternative, this narrow fishing depth distribution (< 20 fm) may result in increased gear conflicts, increased probability of local depletions for certain populations, and reduced access to productive fishing grounds. The result is reduced economic efficiency in attaining landing caps. The negative impacts of this 20 fm RCA is most realized by the communities of Brookings and Port Orford.

Pre-2009 fishing grounds would be reopened under Alternative 1b, where the RCA would be returned to 30 fm statewide (Figure B-9). Alternative 1b would reduce gear conflicts, reduce the potential for local depletions, and increase opportunities to fish in productive areas that have been closed for four years. However, under this alternative, landings would be restricted to levels well below historical landing caps for the state of Oregon.

South of 42° N. latitude – under Alternatives 1a and 1b, the RCA configuration and landings would be the same as No Action, except for greenling and lingcod (Table B-58; Figure B-8). Landings of greenling would be increased but are projected to be within the greenling contribution to the Other Fish complex. A small increase in lingcod landings could also be afforded statewide while staying within overfished species allocations.

Under the Alternative 1, the communities of Eureka and Crescent City will continue to be negatively impacted by the 20 fm depth restriction to reduce yelloweye mortality. Gear conflicts and competition for space as described under the No Action alternative will continue without an increase in the yelloweye rockfish allocation to the state. Also as discussed under the No Action alternative, this fishery has historically operated at deeper depths and almost 40 percent of the minor nearshore rockfish and over 20 percent of the lingcod landings were observed in depths greater than 20 fm from 2003 to 2010. Forcing this fishery into shallower depths has made it difficult for the fishermen to prosecute their fishery. Although the area south of 40° 10' N. latitude has lower yelloweye rockfish bycatch, they still do occur and the ability to implement more restrictive management measures on a finer geographic scale is limited. Therefore, if needed, more restrictive management measures (e.g., trip limit reductions and a more restrictive non-trawl RCA) would more than likely be applied to areas where catch did not occur simply due to management limitations.

In addition, the California Fish and Game Commission (Commission) is in the process of implementing marine protected areas (MPAs) in this region. At this time, a total of 20 MPAs, covering approximately 137 sq mi of state waters or about 13 percent of the area north of 40° 10' N. latitude, are included in the Commission's preferred alternative (CDFG 2011). Since these MPAs occur in state waters, many in 20 fm or less, this further limits the available fishing areas for nearshore fishermen and would further exacerbate crowding issues.

Projected landings under Alternative 1 are summarized by area and alternative in Table B-58 and overfished species mortality is summarized in Table B-59**.**

Table B-57. Nearshore apportionment of the non-trawl allocation for canary and yelloweye rockfish for 2013-14.

	No Action (mt)	Alt 1 (mt)	Alt 2 (mt)	Alt 3 (mt)	Alt 4 (mt)	Alt 5 (mt)	Alt 6 (mt)	Alt 7 (mt)
Canary	4.0	6.2/6.4	5.3/5.5	6.2/6.4	2	12.5/12.7	5.3/5.5	8.2/8.4
Yelloweye	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2

Table B-58. Alternative 1: Nearshore target species landings by area and alternative for 2013-2014.

Area	Projected Total Landings (mt) 2013-14	
	Alternative 1a	**Alternative 1b**
Grand Total	**590**	**555**
Black rockfish	224	205
Blue rockfish	18	18
Cabezon	100	97
Deeper nearshore rockfish	36	36
Kelp greenling	49	48
Lingcod	80	70
Other minor nearshore rockfish	24	22
Shallow nearshore rockfish	59	59
North of 42º N. lat.		
Black rockfish	138	119
Blue rockfish	4	4
Cabezon	30	27
Kelp greenling	23	22
Lingcod	40	30
Other minor nearshore rockfish	14	12
42º - 40º10' N. lat.		
Black rockfish	82	82
Blue rockfish	11	11
Cabezon	7	7
Kelp greenling	5	5
Lingcod	20	20
Other minor nearshore rockfish	10	10
South of 40º10' N. lat.		
Black rockfish	4	4
Blue rockfish	3	3
Cabezon	63	63
Deeper nearshore rockfish	36	36
Kelp greenling	21	21
Lingcod	20	20
Shallow nearshore rockfish	59	59

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-8. Alternative 1a: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing.

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-9. Alternative 1b: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing. Diagonal lines represent the latitudinal area where an RCA change was made relative to the No Action configuration.

Table B-59. Alternative 1: Overfished species bycatch projections for the nearshore fixed gear fisheries by area and alternative for 2013-2014.

Species	Area	Projected Total Mortality (mt) 2013-2014		Allocation (mt) 2013-14[a/]
		Alternative 1a	Alternative 1b	
Bocaccio	Total	0.5	0.5	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0.5	0.5	0.9
Canary	Total	3.8	3.7	6.2/6.4
	OR: North of 42º	1.1	1	1.7/1.7
	CA: 42º - 40º10'	0.9	0.9	4.5/4.7
	CA: South of 40º10'	1.8	1.8	
Cowcod	Total	0	0	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	1.0[b/]
Darkblotched	Total	0.3	0.2	n/a
	OR: North of 42º	0.3	0.2	
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	
Yelloweye	Total	1.2	1.2	1.2
	OR: North of 42º	0.87	0.87	0.87
	CA: 42º - 40º10'	0.24	0.24	0.33
	CA: South of 40º10'	0.09	0.09	

[a/]represents nearshore share of non-trawl allocation
[b/]non-trawl allocation

Similar to analyses conducted in the 2011-12 FEIS, two alternate catch sharing relationships to demonstrate the tradeoffs of varying overfished species allocations compared to No Action were examined (Table B-60). An equal catch sharing (50:50) and a reverse of the No Action allocations were used analyzed to bracket the upper and lower ranges of landings and corresponding management measures (Table B-60).

Under the equal catch sharing scenario (Table B-61), Oregon would receive more canary and less yelloweye compared to the No Action catch sharing. Since less catch has historically originated from depths deeper than 20 fm, little yelloweye savings is afforded by implementing a shallower (20 fm) depth restriction. As a result, landed catch would need to be reduced by 14 percent relative to No Action alternative to stay within overfished species allocations under this scenario. Under this same scenario, California would be afforded less canary rockfish compared to No Action, but more yelloweye rockfish. A 30 fm depth restriction could be implemented between 42° N. latitude and 40° 10' N. latitude, yet a 35 percent reduction in landed catch would be needed to stay within overfished species allocations. Liberating the depth to 30 fm would reduce gear conflicts, reduce the potential for localized depletion, and increase opportunities to fish in productive areas that have been closed for four years. It would also reduce competition for space when the recreational fishery is open. For the area south of 40° 10' N. latitude, the RCA configuration and landings under No Action could be afforded (including an increase for lingcod and greenling) and stay within overfished species allocations.

Under the reverse No Action scenario, Oregon would receive more canary rockfish, yet substantially less yelloweye rockfish, compared to the No Action catch sharing (Table B-61). As described above, little savings of yelloweye rockfish is afforded by restricting the fishery to 20 fm, therefore, drastic reductions in landed catch of up to 53 percent would be necessary to stay within the yelloweye allocation. Because the fishery is constrained by yelloweye rockfish under this scenario, the higher amount of canary rockfish would go unutilized.

Under this same scenario, California would receive substantially more yelloweye rockfish and less canary rockfish compared to No Action. The small allocation of canary rockfish under this scenario would require increased management measures, which limit access to target species, due to areas of high canary bycatch in all areas of the state except for south of 34º 27' N. latitude, which is an area of low bycatch. As a result, a 20 fm depth restriction would need to be implemented for all areas, except south of 34º 27' N. latitude to stay within the canary allocation in addition to a 10 percent reduction in landed catch. The higher amount of yelloweye afforded under this scenario would not be utilized due to canary rockfish constrains.

Table B-60. Alternative 1: Allocations of canary and yelloweye rockfish for 2013-14 under alternate nearshore catch sharing scenarios.

		No Action	Equal Sharing	Reverse No Action
OR	Canary	1.7	3.1/3.2	4.5/4.7
	Yelloweye	0.87	0.6	0.33
CA	Canary	4.5/4.7	3.1/3.2	1.7
	Yelloweye	0.33	0.6	0.87

Table B-61. Alternative 1: Description of management measures under alternate nearshore catch sharing scenarios.

		Catch Sharing		
	AREA	**No Action**	**Equal Sharing**	**Reverse No Action**
OR	north of 43º	(Alt 1a): RCA=30 fm; Landings=8%-40% increase (Alt 1b): RCA = 30 fm; Landings=7% increase	RCA=30fm; Landings=14% reduction	RCA=30 fm; Landings=53% reduction
	42º-43º	(Alt 1a): RCA=20 fm; Landings=8%-40% increase (Alt 1b): RCA = 30 fm; Landings=7% increase	RCA=20 fm; Landings=14% reduction	RCA=20 fm; Landings=53% reduction
CA	42º - 40º10'	(Alt 1a): RCA=20 fm; Landings=No Action with higher greenling and lingcod (Alt 1b): same as Alt a	RCA=30 fm; Landings=35% reduction	RCA=20 fm; Landings=10% reduction
	40º10' to 34º27'	(Alt 1a): RCA=30 fm; Landings=No Action with higher greenling and lingcod (Alt 1b): same as Alt a	RCA=30 fm; Landings=No Action with higher greenling and lingcod	RCA=20 fm; Landings=10% reduction
	south of 34º27'	(Alt 1a) RCA=60 fm; Landings=No Action with higher greenling and lingcod (Alt 1b) same as Alt a	RCA=60 fm; Landings=No Action with higher greenling and lingcod	RCA=60 fm; Landings=10% reduction

In summary, the nearshore fishery is primarily constricted by yelloweye rockfish under the Preferred Alternative. An additional increase in the yelloweye rockfish allocation to the nearshore fishery may allow for a liberalization of the RCA back to 30 fm for the area between 42º N. latitude and 40º 10' N. latitude and may allow landings that are closer or equal to historic state landing caps. Increased landings may improve economic opportunities to some of the most economically depressed communities in the states of Oregon and California, and liberalized shoreward RCA boundaries. This could help alleviate gear conflicts and reduce pressure on other nearshore stocks.

B.3.4 Nearshore: Alternative 2

Under Alternative 2 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.5 Nearshore: Alternative 3

Under Alternative 3 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.6 Nearshore: Alternative 4

Under Alternative 4, while the allocation of yelloweye rockfish is higher compared to No Action, the allocation of canary rockfish is 50% lower (Table B-57). Both states are severely restricted by the low amount of canary rockfish due to areas of high bycatch; therefore, nearshore landings would have to be reduced between 20 and 45 percent compared to No Action depending on the area and RCA configuration. As such, nearshore fishermen continue to be negatively impacted by the reduced trip limits and restricted access to productive fishing grounds, as a result of the non-trawl RCA closures, implemented to reduce mortality of overfished species, particularly yelloweye.

Based on Council direction, the No Action sharing for canary (OR = 26.7%; CA = 73.3%) and yelloweye rockfish (OR = 72.7%; CA = 27.3%) was analyzed in the integrated alternatives. Under this alternative, the tradeoffs between more restrictive depth restrictions and higher reductions in landed catch (Alternatives 4a and 4b) were analyzed. In Oregon, overfished species mortality is modeled assuming a 20 fm depth restriction statewide for both alternatives. In California, overfished species morality is modeled assuming a 20 fm depth restriction statewide (Alternative 4a) and the same RCA under No Action (20 fm between 42° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N. latitude and 34° 27' N. latitude; 60 fm south of 34° 27' N. latitude) (Alternative 4b).

North of 42° N. latitude – under Alternative 4a and 4b, a 20 fm depth restriction would be implemented statewide and landings would have to be reduced by 40 percent relative to the No Action Alternative (Table B-62; Figure B-10).

It was pointed out earlier that the No Action alternative was already restrictive for the Oregon nearshore fisheries in that historical landing caps were not attainable due to the management measures required to maintain yelloweye rockfish catch below the imposed caps. Under Alternatives 4a and 4b, restricting landings by an additional 40 percent may force fish buyers to leave certain ports, such as Port Orford and Gold Beach, which have no fish processing plants, and Brookings port group (i.e., Port Orford, Brookings, and Gold Beach), which provides the most live fish landings of any other port group along the U.S. west coast). This, coupled with drastic catch restrictions to fishermen, would likely result in many nearshore fishermen leaving the fishery entirely. Coastal communities that would be most impacted by this additional economic hardship have previously been identified as most vulnerable in the 2011-12 FEIS (e.g., Port Orford and Brookings). Furthermore, not only would landings be drastically reduced, but fishing area would be reduced; the RCA north of 43° N. latitude may have to be moved from 30 fm to 20 fm. This additional action may eliminate fishing opportunities for the northern Oregon nearshore fishery because many of the fishing areas and reefs are deeper than 20 fm. Hence, this action would result in disproportionate impacts along the Oregon coast. In addition, the 20 fm depth restriction state-wide may cause crowding issues, competition for space, result in more gear conflicts, and increase the likelihood of local depletions of certain fish stocks.

South of 42° N. latitude – under Alternative 4a, a 20 fm depth restriction would be implemented statewide in addition to a 20 percent reduction in landed catch for all species compared to No Action (Table B-62; Figure B-10). The restrictive RCA statewide is necessary to reduce canary bycatch that occurs south of 40°10' N latitude. The 20 fm depth restriction in addition to the anticipated MPAs discussed under Alternative 1 is likely to cause crowding issues, create competition for space, and result in more gear conflicts. The tsunami damage sustained by the port of Crescent City has not been repaired and this port continues to struggle under current low landings. Further reducing landings as would be required under this alternative will only cause further negative economic impacts to this city. Other ports in the area that did not sustain tsunami damage will still be negatively impacted by the loss of revenue as a result of the reduced landings.

Although few canary catches have been documented south of 34°27' N. latitude, the overfished species impact projection model for the nearshore fishery is unable to differentiate canary rockfish mortality occurring north and south of 34° 27' N. latitude. As a result, the entire RCA south of 40°10' N. latitude would have to be restricted to 20 fm. Since the fishery south of 34°27' N. latitude is allowed to operate out to depths of 60 fm, this would represent a tremendous loss of fishing grounds and could effectively eliminate the fishery in this area because many of the species tend to be found at the deeper depths in this area.

Access to fishing grounds has also been restricted in this area due to the implementation of MPAs. Fifty-four MPAs, encompassing 356 square miles of state waters have been implemented since 2007 in the area between 40° 10' N. latitude and 34° 27' N. latitude (CDFG 2011). An additional 50 MPAs, covering 356 sq mi of state waters, will go into effect on January 1, 2012 for the area south of 34° 27' N. latitude. In total, 104 MPAs covering 711 square miles of state waters will be implemented in this entire area south of 40° 10' N latitude. Similar to the area north of 40° 10' N. latitude, the fishing grounds available to nearshore fishermen has reduced due to the implementation of MPAs and implementing further shallow depth restrictions as would be required under Alternative a would only further exacerbate the crowding issues similar to those for the area north of 40° 10' N latitude.

Under Alternative 4b, maintaining the No Action RCA configuration would require reductions in landed catch of 45 percent and would effectively eliminate this fishery because the operational costs would be greater than any potential profits (Table B-62; Figure B-10).

Although the nearshore fishery may not necessarily be a high volume fishery, it is valuable so small changes to landings can have a large effect on profits. Since many fishermen rely on the nearshore fishery as either a full time source of income, or as part of their fishing portfolio, reductions to landed catch could severely impact not only the individual fishermen, but the coastal communities who rely on upon them.

Projected mortality of overfished species under Alternative 4 are summarized by area and alternative in Table B-63.

Table B-62. Alternative 4: Nearshore fishery projected landings by area and alternative for 2013-2014.

Area	Projected Landings (mt) 2013-14	
	Alternative 4a	Alternative 4b
Grand Total	**393**	**309**
Black rockfish	136	114
Blue rockfish	13	10
Cabezon	71	54
Deeper nearshore rockfish	29	20
Kelp greenling	33	27
Lingcod	49	39
Other minor nearshore rockfish	15	13
Shallow nearshore rockfish	47	32
North of 42º N. lat.		
Black rockfish	67	67
Blue rockfish	2	2
Cabezon	15	15
Kelp greenling	12	12
Lingcod	17	17
Other minor nearshore rockfish	7	7
42º - 40º10' N. lat.		
Black rockfish	66	45
Blue rockfish	9	6
Cabezon	6	4
Kelp greenling	4	3
Lingcod	16	11
Other minor nearshore rockfish	8	6
South of 40º10' N. lat.		
Black rockfish	3	2
Blue rockfish	2	2
Cabezon	50	35
Deeper nearshore rockfish	29	20
Kelp greenling	17	12
Lingcod	16	11
Shallow nearshore rockfish	47	32

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-10. Alternative 4a: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing. Diagonal lines represent the latitudinal area where an RCA change was made relative to the No Action configuration.

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-11. Alternative 4b: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing. Diagonal lines represent the latitudinal area where an RCA change was made relative to the No Action configuration.

Table B-63. Alternative 4: Overfished species bycatch projections for the nearshore fixed gear fisheries by area and alternative for 2013-2014.

Species	Area	Projected Mortality (mt) 2013-14		Allocation (mt) 2013-14[a/]
		Alternative a	Alternative b	
Bocaccio	Total	0	0.3	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0.3	0.9
Canary	Total	2	2	2
	OR: North of 42º	0.5	0.5	0.5
	CA: 42º - 40º10'	0.7	0.5	1.5
	CA: South of 40º10'	0.8	1	
Cowcod	Total	0	0	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	1.0[b/]
Darkblotched	Total	0.12	0.1	n/a
	OR: North of 42º	0.12	0.1	
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	
Yelloweye	Total	0.64	0.62	1.2
	OR: North of 42º	0.42	0.42	0.87
	CA: 42º - 40º10'	0.19	0.10	0.33
	CA: South of 40º10'	0.03	0.10	

[a/]represents nearshore share of non-trawl allocation
[b/]non-trawl allocation

Similar to analyses conducted in the 2011-12 FEIS, two alternate catch sharing relationships were analyzed to demonstrate the tradeoffs of varying overfished species allocations compared to No Action (Table B-64). An equal catch sharing (50:50) and a reverse No Action (i.e., reverse the percentages for each species) were analyzed to bracket the upper and lower ranges of landings and corresponding management measures.

Under the equal sharing scenario (Table B-65), Oregon would receive more canary and less yelloweye compared to No Action catch sharing. The RCA configuration and landings under this scenario would be the same as discussed under Alternative 1. Under this same scenario, California would be afforded less canary rockfish compared to No Action, but more yelloweye rockfish. The RCA configuration and landings under this scenario would be the same as discussed under Alternative 1.

Under the reverse No Action (Table B-65), Oregon would receive more canary rockfish, yet substantially less yelloweye rockfish, compared to No Action and California would receive substantially more yelloweye rockfish and less canary rockfish. The RCA configuration and landings for Oregon would be the same as Alternative 1.

Under this same scenario, California would receive substantially more yelloweye rockfish and less canary rockfish compared to No Action. The RCA configuration would be similar to No Action, except that the area between 40º 10' N. latitude to 34º 27' N. latitude would be modified to 20 fm. In addition, a 70 percent reduction in landed catch would be necessary to stay within the canary allocation.

Table B-64. Alternative 4: Allocations of canary and yelloweye rockfish for 2013-14 under alternate nearshore catch sharing scenarios.

		No Action	Equal Sharing	Reverse No Action
OR	Canary	0.5	1.0	1.5
	Yelloweye	0.87	0.6	0.33
CA	Canary	1.5	1.0	0.5
	Yelloweye	0.33	0.6	0.87

Table B-65. Alternative 4: Description of management measures by area under alternate catch sharing scenarios.

		Catch Sharing		
	AREA	No Action	Equal Sharing	Reverse No Action
OR	north of 43º 42º-43º	(Alt a): RCA=20 fm; Landings=40% reduction (Alt b): same as Alt a	same as Alt 1	same as Alt 1
CA	42º - 40º10'	(Alt a): Landings=45% reduction (Alt b): Landings=20% reduction	RCA=20 fm; Landings=50% reduction	RCA=20 fm; Landings=70% reduction
	40º10' to 34º27'	(Alt a): Landings=45% reduction (Alt b): RCA=20 fm; Landings=20% reduction	RCA=20 fm; Landings=50% reduction	RCA=20 fm; Landings=70% reduction
	south of 34º27'	(Alt a): Landings=45% reduction (Alt b): RCA=20 fm; Landings=20% reduction	RCA=60 fm; Landings=50% reduction	RCA=60 fm; Landings=70% reduction

B.3.7 Nearshore: Alternative 5

Under Alternative 5 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.8 Nearshore: Alternative 6

Under Alternative 6 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.9 Nearshore: Alternative 7

Under Alternative 7 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.1 Nearshore: Alternative 8

Under Alternative 8 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.4 Washington Recreational

B.4.1 Washington Recreational: No Action Alternative

Under the No Action Alternative, Washington recreational fisheries would operate under the 2012 annual catch limits (ACL) for yelloweye rockfish of 17 mt and canary rockfish of 107 mt and the associated Washington recreational harvest guidelines of 2.6 mt for yelloweye rockfish and 2.0 mt for canary rockfish in 2013 and 2014 (Table B-66).

Table B-66. Washington Recreational Allocations under the No Action Alternative.

Species	2013-2014 Recreational Allocation (mt)
Canary rockfish	2.0
Yelloweye rockfish	2.6

Groundfish Seasons and Area Restrictions

Under the No Action Alternative, the Washington recreational fishery would be open year round for groundfish except lingcod. Washington would continue to prohibit the retention of canary and yelloweye rockfish in all areas.

Depth restrictions are the primary tool used to keep recreational mortality of yelloweye and canary rockfish within specified harvest guidelines. Restrictions limiting the depth where groundfish fisheries are permitted are more severe in the area north of the Queets River (Washington management areas 3 and 4) where yelloweye and canary rockfish abundance is higher and therefore caught incidentally at a higher rate. Depth restrictions are less restrictive as you move south along the coast where incidental catch of yelloweye and canary becomes progressively less.

<u>North Coast (Marine Areas 3 and 4)</u>

The retention of bottomfish would be prohibited seaward of a line approximating 20 fathoms from June 1- September 30, except on days that halibut fishing would be open. Fishing for, retention or possession of groundfish and halibut would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) (Figure B-12).

<u>South Coast (Marine Area 2)</u>

The retention of bottomfish, except rockfish, would be prohibited seaward of 30 fathoms from March 15 through June 15, except sablefish and Pacific cod retention would be allowed May 1 through June 15; retention of lingcod would be allowed on days open to the primary halibut season; the retention of lingcod would be prohibited south of 46 deg. 58’ and seaward of 30 fathoms on Fridays and Saturdays from July 1 through August 31; fishing for, retention or possession of lingcod would be prohibited in deepwater areas seaward of a line extending from 47°31.70’ N. lat., 124°45.00’ W. long., to 46°38.17’ N. lat., 124°30.00’ W. long. year round except as allowed on days open to the Pacific halibut fishery (figure 3);

fishing for, retention or possession of bottomfish or halibut would be prohibited in the South Coast YRCA and Westport Offshore YRCA (Figure B-13).

Columbia River (Marine Area 1)

The retention of bottomfish, except sablefish and Pacific cod, would be prohibited with halibut onboard from May 1 through September 30 and; fishing for, retention or possession of lingcod in deepwater areas seaward of a line extending from 46°38.17' N. lat., 124°21.00' W. long. to 46°25.00' N. lat., 124°21.00' W. long would be prohibited year round (Figure B-14).

Table B-67. Washington Recreational Seasons and Groundfish Retention Restrictions under the No Action Alternative.

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

a/ Groundfish retention allowed >20 fm on days when Pacific halibut would be open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of rockfish allowed seaward of 30 fm.
d/ Retention of lingcod allowed seaward of 30 fm on days that the primary halibut season would be open.
e/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 – August 31.
f/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.
g/ Retention of lingcod prohibited in deepwater areas at all times.

Area Restrictions

Under the No Action Alternative, fishing for, retention or possession of groundfish and halibut during the Washington recreational groundfish and Pacific halibut fisheries would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) in the north coast (Figure B-12), and the South Coast and Westport YRCAs in the south coast (Figure B-13) as they were during the 2011 and 2012 seasons.

Fishing for, retention or possession of lingcod would be prohibited seaward of a line connecting the following coordinates from the Queets River (47°31.70' N. lat., 124° 45.00' W. long.) to 46°25.00' N. lat, 124°21.00' W. long., year round except as allowed in Washington Marine Area 2 on days open to the primary halibut fishery (Figure B-14) as was in place in 2012:

47°31.70' N. lat 124°45.00' W. long.
46°38.17' N. lat 124°30.00' W. long.
46°38.17' N. lat 124°21.00' W. long.
46°25.00' N. lat 124°21.00' W. long.

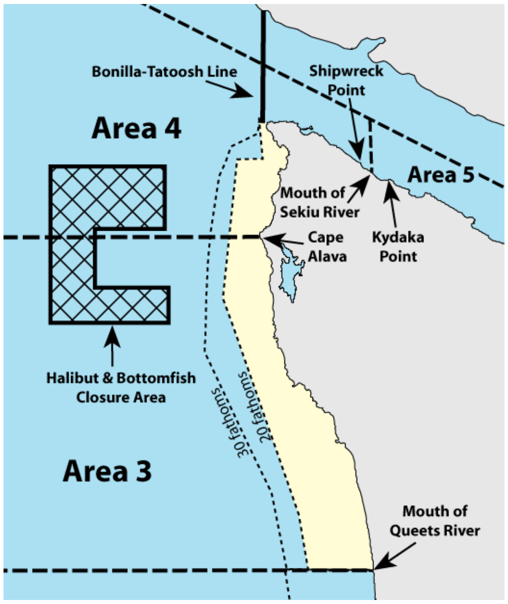

Figure B-12. Washington North Coast C-Shaped YRCA

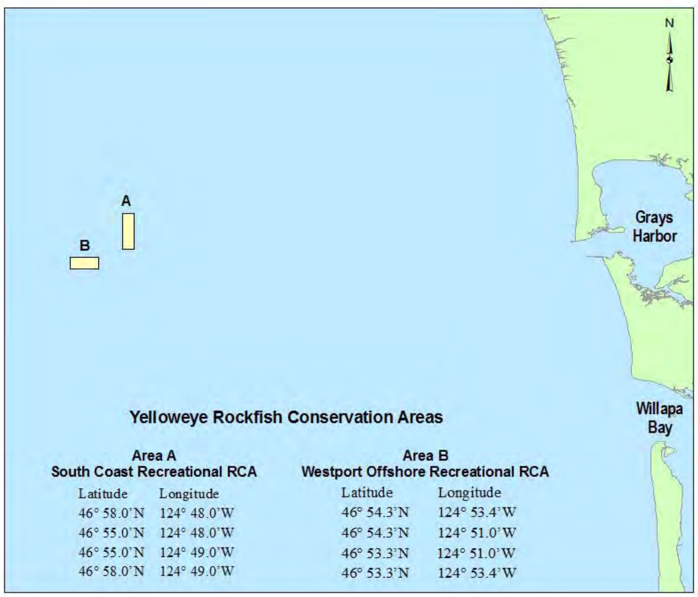

Figure B-13. Washington South Coast and Westport YRCAs

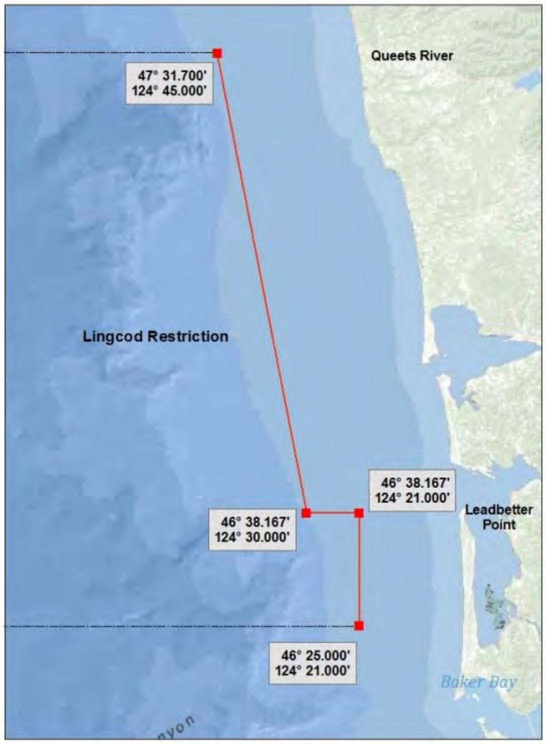

Figure B-14. Washington Lingcod Restricted Area

Groundfish Bag Limits

Under the No Action Alternative the recreational groundfish bag limit would be 12 fish per day including rockfish and lingcod. Of the 12 recreational groundfish allowed to be landed per day, sub limits of 10 rockfish, 2 lingcod and 2 cabezon would apply.

Lingcod Seasons and Size Limits

The lingcod season in Marine Areas 1 through 3 (Washington-Oregon border at 46°16' N Latitude to Cape Alava at 48° 10' N Latitude) would be open from the Saturday closest to March 15 through the Saturday closest to October 15, which was March 12 through October 15 in 2011 and March 17 through October 13 in 2012. Marine Area 4 (Cape Alava to the U.S. Canadian border) was open from April 16 through the Saturday closest to October 15, or October 15, whichever is earlier, which was April 16 through October 15 in 2011 and April 16 through October 13 in 2012.

Under the No Action Alternative there would be no changes to the lingcod seasons and size limits in 2013 and 2014, the season would be as follows:

- Marine Areas 1-3: March 16 through October 12 in 2013 and March 15 through October 18 in 2014. Minimum size, 22 inches.
- Marine Area 4: April 16 through October 12 in 2013 and April 16 to October 15 in 2014. Minimum size, 24 inches.

Pacific Halibut Seasons

It is expected that the Pacific halibut seasons in 2013 and 2014 will be similar to the halibut seasons in 2011 and 2012. There are no changes to the restrictions on groundfish retention during the Pacific halibut season proposed under the No Action Alternative.

Additional Management Measures Analyzed

No additional management measures were analyzed for the No Action Alternative. Management measures outlined under the No Action Alternative will be used to keep recreational harvests of overfished species within specified harvest guidelines for 2013 and 2014.

Projected Impacts and Inseason Management Response

Projected mortality for Washington's recreational fishery are based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in RecFIN. It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons will continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

Washington's Ocean Sampling Program is able to produce estimates of groundfish catch with a one month lag time. Management measures such as more restrictive depth closures, area closures, groundfish retention restrictions or changes to seasons can be implemented immediately through emergency changes to state regulations if inseason catch reports indicate that recreational harvests of overfished species are exceeding pre-season projections to the point where harvest guidelines are at risk of being exceeded.

Table B-68 outlines the projected mortality for overfished species in the groundfish fishery for 2013 and 2014 under the No Action Alternative.

Table B-68. Washington Recreational Harvest Guidelines and Projected Mortality under the No Action Alternative.

No Action Alternative	WA Recreational Harvest Guideline (mt)	Projected Mortality (mt)
Canary rockfish	2.0	1.0
Yelloweye rockfish	2.6	2.4

Community Impacts

Under the No Action Alternative, management measures necessary to keep recreational harvest of yelloweye rockfish within harvest guidelines require closure or significant restriction of the groundfish fishery in areas deeper than 20 and 30 fathoms along a substantial portion of the Washington coast, restrictions on groundfish retention during peak recreational fishing periods, and closed areas. While these restrictions have been effective at keeping recreational catch of overfished species under specified harvest guidelines in the past they are limiting to recreational fishing opportunity since areas are closed, season length is restricted, bag limits are reduced, and retention for some species is prohibited.

Projected mortality of overfished species and angler effort in 2013 and 2014 under No Action management measures are expected to be similar to previous seasons however, if anger effort and fishing success result in catch estimates higher than what is projected, additional fishing restrictions may be needed to ensure that harvest of overfished species do not exceed harvest guidelines.

B.4.2 Washington Recreational: Preferred Alternative

Under the Council's Preferred Alternative, Washington recreational fisheries would operate under ACL's for yelloweye rockfish of 18 mt and canary rockfish of 116 and 119 mt, and the associated Washington recreational harvest guidelines of 2.9 mt for yelloweye rockfish and 3.1 and 3.2 mt for canary rockfish in 2013 and 2014 (Table B-69).

Table B-69. Washington Recreational Allocations under the Preferred Alternative.

Species	2013 Recreational Allocation (mt)	2014 Recreational Allocation (mt)
Canary rockfish	3.1	3.2
Yelloweye rockfish	2.9	2.9

Groundfish Seasons and Area Restrictions

Under the Preferred Alternative, the Washington recreational fishery would operate under the same management measures as the No Action Alternative. The recreational fishery would be open year round for groundfish except lingcod. Washington would continue to prohibit the retention of canary and yelloweye rockfish in all areas.

Depth restrictions are the primary tool used to keep recreational mortality of yelloweye and canary rockfish within specified harvest guidelines. Restrictions limiting the depth where groundfish fisheries are permitted are more severe in the area north of the Queets River (Washington management areas 3 and 4) where yelloweye and canary rockfish abundance is higher and therefore caught incidentally at a higher rate. Depth restrictions are less restrictive as you move south along the coast where incidental catch of yelloweye and canary becomes progressively less.

There is little flexibility to consider less restrictive management measure options that would allow access to higher recreational harvest guidelines under higher canary rockfish ACL alternatives because less restrictive depth restrictions or other management measures that allow access to canary rockfish have the potential to increase yelloweye rockfish mortality.

<u>North Coast (Marine Areas 3 and 4)</u>

The retention of bottomfish would be prohibited seaward of a line approximating 20 fathoms from June 1- September 30, except on days that halibut fishing would be open. Fishing for, retention or possession of groundfish and halibut would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) (Figure B-12).

<u>South Coast (Marine Area 2)</u>

The retention of bottomfish, except rockfish, would be prohibited seaward of 30 fathoms from March 15 through June 15, except sablefish and Pacific cod retention would be allowed May 1 through June 15; retention of lingcod would be allowed on days open to the primary halibut season; the retention of lingcod would be prohibited south of 46 deg. 58' and seaward of 30 fathoms on Fridays and Saturdays from July 1 through August 31; fishing for, retention or possession of lingcod would be prohibited in deepwater areas seaward of a line extending from 47°31.70' N. lat., 124°45.00' W. long., to 46°38.17' N. lat., 124°30.00' W. long. year round except as allowed on days open to the Pacific halibut fishery (figure 3); fishing for, retention or possession of bottomfish or halibut would be prohibited in the South Coast YRCA and Westport Offshore YRCA (Figure B-13).

Columbia River (Marine Area 1)

The retention of bottomfish, except sablefish and Pacific cod, would be prohibited with halibut onboard from May 1 through September 30 and; fishing for, retention or possession of lingcod in deepwater areas seaward of a line extending from 46°38.17’ N. lat., 124°21.00’ W. long. to 46°25.00’ N. lat., 124°21.00’ W. long would be prohibited year round (Figure B-14).

Table B-70. Washington Recreational Seasons and Groundfish Retention Restrictions under the Preferred Alternative.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>3 & 4 (N. Coast)</td><td colspan="5">Open all depths</td><td colspan="4">Open <20 fm June 1-Sep 30 a/</td><td colspan="3">Open all depths</td></tr>
<tr><td>2 (S. Coast)</td><td colspan="2">Open all depths</td><td colspan="4">Open <30 fm Mar 15 - June 15 b/, c/, d/, g/</td><td colspan="2">Open all depths except lingcod prohibited on Fri. and Sat. >30 fm e/,g</td><td colspan="4">Open all depths g/</td></tr>
<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths g/</td><td colspan="5">Open all depths f/, g/</td><td colspan="3">Open all depths g/</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut would be open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of rockfish allowed seaward of 30 fm.
d/ Retention of lingcod allowed seaward of 30 fm on days that the primary halibut season would be open.
e/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 – August 31.
f/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.
g/ Retention of lingcod prohibited in deepwater areas at all times.</td></tr>
</table>

Area Restrictions

The same area restrictions that were in place under the No Action Alternative would be implemented under the Preferred Alternative. Fishing for, retention or possession of groundfish and halibut during the Washington recreational groundfish and Pacific halibut fisheries would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) in the north coast (Figure B-12), and the South Coast and Westport YRCAs in the south coast (Figure B-13) as they were during the 2011 and 2012 seasons.

Fishing for, retention or possession of lingcod would be prohibited seaward of a line extending from the Queets River (47°31.70’ N. lat., 124° 45.00’ W. long.) to 46°25.00’ N. lat, 124°21.00’ W. long., year round except as allowed in Washington Marine Area 2 on days open to the primary halibut fishery (Figure B-14) as was in place in 2012.

Groundfish Bag Limits

No changes to groundfish bag limits would be made under the Preferred Alternative, the recreational groundfish bag limit would be 12 fish per day including rockfish and lingcod. Of the 12 recreational groundfish allowed to be landed per day, sub limits of 10 rockfish, 2 lingcod and 2 cabezon would apply.

Lingcod Seasons and Size Limits

No changes to the lingcod seasons would be made under the Preferred Alternative compared to the No Action Alternative, the lingcod seasons and size limits in 2013 and 2014 would be as follows:

- Marine Areas 1-3: March 16 through October 12 in 2013 and March 15 through October 18 in 2014. Minimum size, 22 inches.

- Marine Area 4: April 16 through October 12 in 2013 and April 16 to October 15 in 2014. Minimum size, 24 inches.

Pacific Halibut Seasons

It is expected that the Pacific halibut seasons in 2013 and 2014 will be similar to the halibut seasons in 2011 and 2012. There are no changes to the restrictions on groundfish retention during the Pacific halibut season proposed under the Preferred Alternative.

Additional Management Measures Analyzed

Washington recreational harvest guidelines for yelloweye and canary rockfish under the Preferred Alternative are similar to what was in place for 2011 and 2012 and as such no additional management measures were analyzed. No Action management measures will be used to keep recreational harvests of overfished species within specified harvest guidelines for 2013 and 2014.

Projected Impacts and Inseason Management Response

Projected mortality for Washington's recreational fishery are based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in RecFIN. It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons will continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

Washington's Ocean Sampling Program is able to produce estimates of groundfish catch with a one month lag time. Management measures such as more restrictive depth closures, area closures, groundfish retention restrictions or changes to seasons can be implemented immediately through emergency changes to state regulations if inseason catch reports indicate that recreational harvests of overfished species are exceeding pre-season projections to the point where harvest guidelines are at risk of being exceeded.

Table B-71 contains the projected mortality for overfished species in the groundfish fishery for 2013 and 2014 under the Preferred Alternative.

Table B-71. Washington Recreational Harvest Guidelines and Projected Impacts under the Preferred Alternative.

	WA Recreational Harvest Guideline (mt) 2013/2014	**Projected Mortality (mt)**
Canary rockfish	3.1 / 3.2	1.0
Yelloweye rockfish	2.9	2.4

Community Impacts

Under the Preferred Alternative, management measures necessary to keep recreational harvest of yelloweye rockfish within harvest guidelines, which are the same as the No Action Alternative, require closure or significant restriction of the groundfish fishery in areas deeper than 20 and 30 fathoms along the majority of the Washington coast, restrictions to groundfish retention during peak recreational fishing periods, and closed areas. While these restrictions have been effective at keeping recreational catch of overfished species under specified harvest guidelines in the past they are limiting to recreational fishing opportunity since areas are closed, season length is restricted, bag limits are reduced, and retention for some species is prohibited.

Projected mortality of overfished species and angler effort in 2013 and 2014 under No Action management measures are expected to be similar to previous seasons however, if anger effort and fishing success result in catch estimates higher than what is projected, additional fishing restrictions may be needed to ensure that harvest of overfished species do not exceed harvest guidelines.

B.4.3 Washington Recreational: Alternative 1

Washington recreational management measures under Alternative 1 are the same as the Preferred Alternative and have the same impacts.

B.4.4 Washington Recreational: Alternative 2

Washington recreational management measures under Alternative 2 are the same as the Preferred Alternative and have the same impacts.

B.4.5 Washington Recreational: Alternative 3

Washington recreational management measures under Alternative 3 are the same as the Preferred Alternative and have the same impacts.

B.4.6 Washington Recreational: Alternative 4

Washington recreational management measures under Alternative 4 are the same as the Preferred Alternative and have the same impacts.

B.4.7 Washington Recreational: Alternative 5

Washington recreational management measures under Alternative 5 are the same as the Preferred Alternative and have the same impacts.

B.4.8 Washington Recreational: Alternative 6

Washington recreational management measures under Alternative 6 are the same as the Preferred Alternative and have the same impacts.

B.4.9 Washington Recreational: Alternative 7

Washington recreational management measures under Alternative 7 are the same as the Preferred Alternative and have the same impacts.

B.4.1 Washington Recreational: Alternative 8

Washington recreational management measures under Alternative 8 are the same as the Preferred Alternative and have the same impacts.

B.4.2 Washington Recreational: Summary of the Integrated Alternatives

Management measures considered for the Washington recreational fishery in 2013 and 2014 are designed to keep overfished species mortality within harvest guidelines based on allocation of the various annual catch limit (ACL) alternatives approved by the Pacific Fishery Management Council for public review.

Yelloweye and canary rockfish are the two overfished species encountered in the Washington recreational fisheries. Management measures analyzed for 2011 and 2012 under the No Action Alternative were designed to keep yelloweye rockfish mortality within the Washington recreational yelloweye harvest guideline of 2.6 mt, and canary harvest guideline of 2.0 mt while allowing access to healthy groundfish stocks. For 2013 and 2014 the Council is only considering one yelloweye rockfish ACL alternative (18 mt), which represents the No Action rebuilding time throughout all of the integrated alternatives. Based on allocations adopted by the Council, the Washington recreational harvest guideline for yelloweye rockfish in 2013 and 2014 under the 18 mt ACL is 2.9 mt. This harvest guideline is very close to the 2.6 mt harvest guideline in place for 2011 and 2012.

Although the integrated alternatives represent a wider range of ACL options for canary rockfish with some recreational harvest guidelines for the Washington recreational fishery higher than was in place for 2011 and 2012, there is no flexibility to analyze less restrictive management measures that would utilize higher canary allocations because they would result in yelloweye rockfish mortality that is higher than the allowed harvest guideline.

Because the Washington recreational harvest guideline for yelloweye rockfish under all of the integrated alternatives is similar to what was in place for 2011 and 2012 and because management measure alternatives that would allow access to higher canary rockfish harvest guidelines would compromise the ability to keep yelloweye mortality to specified levels, Washington is proposing No Action management measures (No Action Alternative) under all of the ACL options presented in the Integrated Alternatives.

With the Washington recreational fishery operating under the same management measures that were in place in 2011 and 2012 for each of the Integrated Alternatives in 2013 and 2014, the projected mortality of overfished species and the number of angler trips in the recreational bottomfish fishery are expected to be the same under each of the Integrated Alternatives.

Table B-72. Washington Recreational Seasons Structure and Groundfish Retention Restrictions by Area for all of the Integrated Alternatives.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>3 & 4 (N. Coast)</td><td colspan="5">Open all depths</td><td colspan="4">Open <20 fm June 1-Sep 30 a/</td><td colspan="3">Open all depths</td></tr>
<tr><td>2 (S. Coast)</td><td colspan="2">Open all depths</td><td colspan="3">Open <30 fm Mar 15 - June 15 b/, c/, d/, g/</td><td colspan="3">Open all depths except lingcod prohibited on Fri. and Sat. >30 fm e/,g</td><td colspan="4">Open all depths g/</td></tr>
<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths g/</td><td colspan="5">Open all depths f/, g/</td><td colspan="3">Open all depths g/</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of rockfish allowed seaward of 30 fm.
d/ Retention of lingcod allowed seaward of 30 fm on days that the primary halibut season is open.
e/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 – August 31.
f/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.
g/ Retention of lingcod prohibited in deepwater areas at all times.</td></tr>
</table>

Table B-73. Washington Recreational Harvest Guidelines and Projected Impacts (mt) under the Integrated Alternatives.

Integrated Alternative	Canary Rockfish		Yelloweye Rockfish	
	Harvest Guideline 2013 / 2014	Projected Impacts 2013 / 2014	Harvest Guideline 2013 / 2014	Projected Impacts 2013 / 2014
No Action	2.0	1.0	2.6	2.4
Alternative 1	3.1 / 3.2	1.0	2.9	2.4
Alternative 2	2.6 / 2.7	1.0	2.9	2.4
Alternative 3	3.1 / 3.2	1.0	2.9	2.4
Alternative 4	1.0	1.0	2.9	2.4
Alternative 5	6.2 / 6.4	1.0	2.9	2.4
Alternative 6	2.6 / 2.7	1.0	2.9	2.4
Alternative 7	4.1 / 4.2	1.0	2.9	2.4

Table B-74. Estimated Effort in the Washington Recreational Bottomfish Fishery (angler trips) under the Integrated Alternatives by Management Area.

Management Area	No Action Alternative	Alternatives 1-8
North Coast		
Charter	781	781
Private	6035	6035
South Coast		
Charter	9788	9788
Private	1483	1483
Columbia River		
Charter	655	655
Private	781	781

B.5 Oregon Recreational

Table B-75. The Integrated Alternatives of overfished species annual catch limits for 2013.

Species	No Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Bocaccio	274	320	320	320	320	320	320	320
Canary	107	116	101	116	48	216	101	147
Cowcod	3	3	3	3	3	3	3	3
Darkblotched	296	317	317	317	317	317	317	317
POP a/	183	150	150	74	247	74	222	222
Petrale	1,160	2,592	2,592	2,592	2,592	2,592	2,592	2,592
Yelloweye	17	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt ACT is implemented.

Table B-76. The Integrated Alternatives of overfished species annual catch limits for 2014.

Species	No Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Bocaccio	274	337	337	337	337	337	337	337
Canary	107	119	104	119	49	220	104	151
Cowcod	3	3	3	3	3	3	3	3
Darkblotched	296	330	330	330	330	330	330	330
POP a/	183	153	153	76	251	76	226	226
Petrale	1,160	2,652	2,652	2,652	2,652	2,652	2,652	2,652
Yelloweye	17	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt ACT is implemented.

B.5.1 Oregon Recreational: No-Action Alternative

The No-Action Alternative analyzes the annual catch limits (ACLs) in place for 2012 (107 mt for canary rockfish and 17 mt for yelloweye rockfish; Table B-75 and Table B-76) and sector specific allocations. Table B-77 shows the allocations, or model targets, for black, canary and yelloweye rockfish (species with a federal harvest guideline) for the Oregon recreational fisheries under the No-Action Alternative.

Table B-77. Oregon recreational allocations or model targets under the No-Action Alternative.

Species	2013 Recreational Allocation or Model Target (mt)	2014 Recreational Allocation or Model Target (mt)
Black rockfish	440.8	440.8
Canary rockfish	7.0	7.0
Yelloweye rockfish	2.4	2.4

Groundfish Seasons and Area Restrictions

Under the No-Action Alternative, the Oregon recreational groundfish fishery will be open offshore year-round, except from April 1 to September 30 when fishing is only allowed shoreward of 40 fm, (Figure B-15), as defined by waypoints, the same as in 2011-2012. Closing the fishery outside of 40 fm from April 1 to September 30, months when angler effort and yelloweye rockfish encounters are greatest, mitigate catches of yelloweye rockfish. The shore-based fishery will be open year-round as depleted canary and yelloweye rockfish are not impacted.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Groundfish Season	Open all depths			Open < 40 fm						Open all depths		
Marine Bag Limit [1]	Ten (10)			1 Fish Cabezon Sub-Bag [2]						Ten (10)		
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

[1] *Marine 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.*

[2] *From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon.*

[3] *Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut*

Figure B-15. Oregon recreational groundfish season structure and bag limits in 2013-14 under the No-Action Alternative.

Area Closures

A yelloweye rockfish conservation area (YRCA) has been in place on Stonewall Bank since 2006 and would also remain under the No Action alternative (Figure B-16). The YRCA is located approximately 15 miles west of the Port of Newport and consists of the high-relief area of Stonewall Bank, an area of high yelloweye rockfish encounters. No recreational fishing for groundfish and Pacific halibut can occur within this YRCA, which is bounded by the following waypoints:

44°37.458’ N lat. 124°24.918’ W long.
44°37.458’ N lat. 124°23.628’ W long.
44°28.710’ N lat. 124°21.798’ W long.
44°28.710’ N lat. 124°24.102’ W long.
44°31.422’ N lat. 124°25.500’ W long.

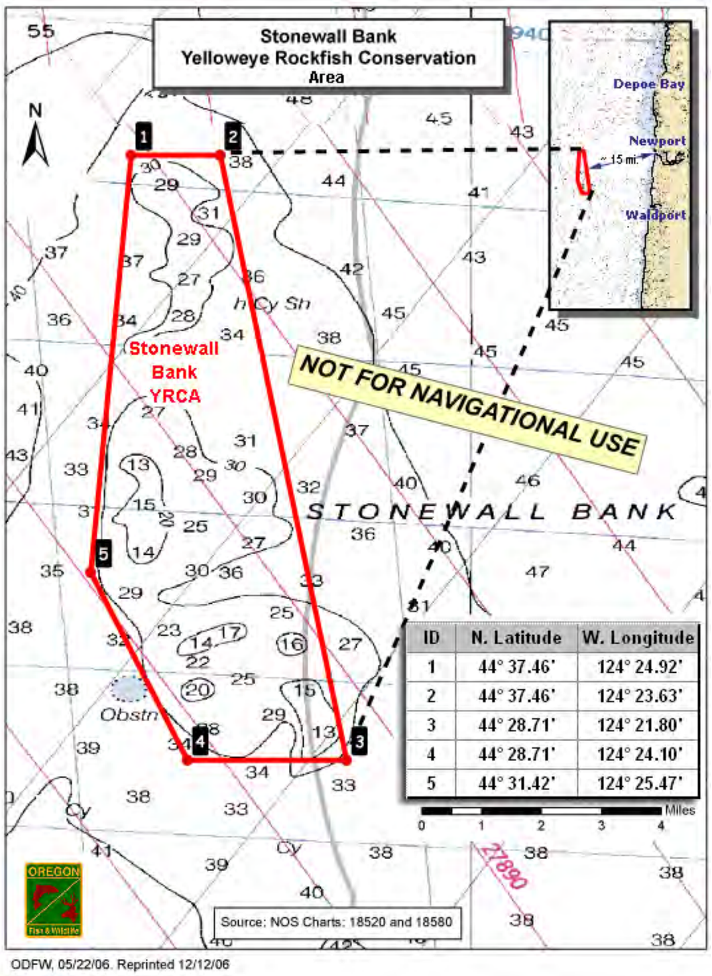

Figure B-16. The Stonewall Bank Yelloweye Rockfish Conservation Area where recreational fishing for groundfish and Pacific halibut is prohibited. Under the No Action alternative, the area would remain closed.

Groundfish Bag Limits and Size Limits

Under the No Action alternative, the marine fish daily bag limit of ten fish in aggregate that was allowed in 2011-2012 Oregon recreational fisheries would carry forward for 2013-2014 (Figure B-15). The 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. During April through September, there was a one fish sub-bag limit for cabezon (of the 10 fish marine bag limit no more than one could be cabezon). This cabezon sub-bag limit would also carry forward for 2013-2014. A flatfish daily bag limit of 25, which includes all soles and flounders except Pacific halibut, was allowed in addition to the marine fish daily bag limit. Additionally a three fish bag limit was allowed for lingcod. Retention of canary and yelloweye rockfish was prohibited in 2011-2012 and would continue to be prohibited under the No Action alternative.

The following minimum size limits applied to 2011-2012 Oregon recreational fisheries and would be carried forward under the No Action alternative:

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

Pacific Halibut Seasons

Under the No-Action Alternative, the recreational Pacific halibut fisheries should be able to proceed as in 2011 and 2012, in regards to days and areas open, etc., depending on the halibut quota. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly limited in 2013 and 2014.

Additional Management Measures Analyzed

Under the No Action Alternative, no additional management measures were analyzed for the Oregon recreational fisheries. Since projected mortality is within the limits for the No Action Alternative, the No Action season structure and regulations should be sufficient, no additional management measures were analyzed.

Projected Impacts and Inseason Management Response

Under the No Action Alternative, and associated season structure and bag limits detailed above, the annual projected mortality of black, canary and yelloweye rockfish are in Table B-78. Table **B-79** shows the recent mortality of the ten most landed species in the Oregon recreational fishery, including black rockfish. Species in Table B-79, other than black rockfish, are not modeled; therefore a projected mortality for 2013-2014 is unavailable. This table represents recent mortality under similar season structure and bag limits to what will be in place under the No Action Alternative and may serve as a proxy for projections.

Table B-78. Projected Mortality of species with Oregon recreational specific allocations under the No-Action Alternative.

Species	Impacts (mt)
Black rockfish	297.7
Canary rockfish	4.7
Yelloweye rockfish	2.5

Table B-79. Recent mortality (mt) of the ten most landed species in the Oregon recreational fishery under the season structure, bag limits, area restrictions, etc. in the No-Action Alternative.

Species	2008	2009	2010	Average
Black rockfish	227.5	267.6	284.1	259.7
Lingcod	75.6	63.2	76.6	71.8
Blue rockfish	14.7	14.4	2.5	10.5
Cabezon	16.0	14.2	15.3	15.2
Yellowtail rockfish	4.8	8.3	6.7	6.6
Kelp greenling	3.5	3.6	6.2	4.4
Vermilion rockfish	5.5	3.6	4.4	4.5
Quillback rockfish	3.9	3.3	4.0	3.7
Copper rockfish	3.6	2.6	3.5	3.2
China rockfish	2.6	2.1	2.4	2.4

Inseason Management Tools

Oregon has a responsive port based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2013 (or 2014) fishery does not proceed as expected.

Inseason management tools, designed to mitigate catches, include bag limit adjustments (including non-retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish mortality, since retention of this species is prohibited. If catch rates indicate that the HGs for yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduced mortality. ODFW will monitor inseason progress toward HGs for canary rockfish and yelloweye rockfish. Regulations will depend upon the timing of the determination for their need.

Adjustments to the marine fish daily-bag limit to no more than 10 fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than 3 fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2011 levels. Season and/or area closures may also be considered if harvest targets or HGs are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit mortality for any managed species. Closing certain days each week would help lengthen the duration of a fishery approaching a harvest guideline.

Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce mortality of nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2013-2014, testing the effectiveness and selectivity of various gears and the survivability of rockfish released at depth.

Directed yellowtail rockfish and/or flatfish fisheries may be implemented inseason, as were implemented in 2004, in the event of a closure of the recreational groundfish fishery due to attainment federal or state HGs or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are within the harvest targets or HGs.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2011 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that yelloweye and canary rockfish mortality is not in excess of the harvest guidelines.

Community Impacts

Depth restrictions for the recreational groundfish fishery are the primary management method used to keep overfished yelloweye and canary rockfish mortality within their respective harvest guidelines (HG) in the Oregon recreational fisheries. Depth restrictions reduce mortality of overfished species because catch rates and discard mortality rates of overfished species are lesser in shallower depths. The depth restrictions under the No Action Alternative are all-depths from Jan-Feb, 40 fm from Apr-Sep, and all-depths Oct-Dec (Figure B-15).

Although depth restrictions reduce mortality of overfished species, they can also decrease angler trips by reducing the quantity and quality of fishable bottomfish grounds. Ports are disproportionately affected by depth restrictions due to varying amounts of fishing grounds by depth (PFMC 2011). For example, Newport is relatively unaffected by a 40 fm depth restriction because the majority (98%) of bottomfish grounds are shallower than 20 fm (Figure B-17). In contrast, Winchester Bay and Florence are greatly impacted by depth restrictions because nearly all bottomfish grounds are deeper than 40 fm. Other ports, such as Garibaldi and Gold Beach, where the majority of bottomfish grounds are between 20-40 fm, are relatively unaffected by 40 fm depth restrictions, but are greatly affected by 20 fm depth restrictions.

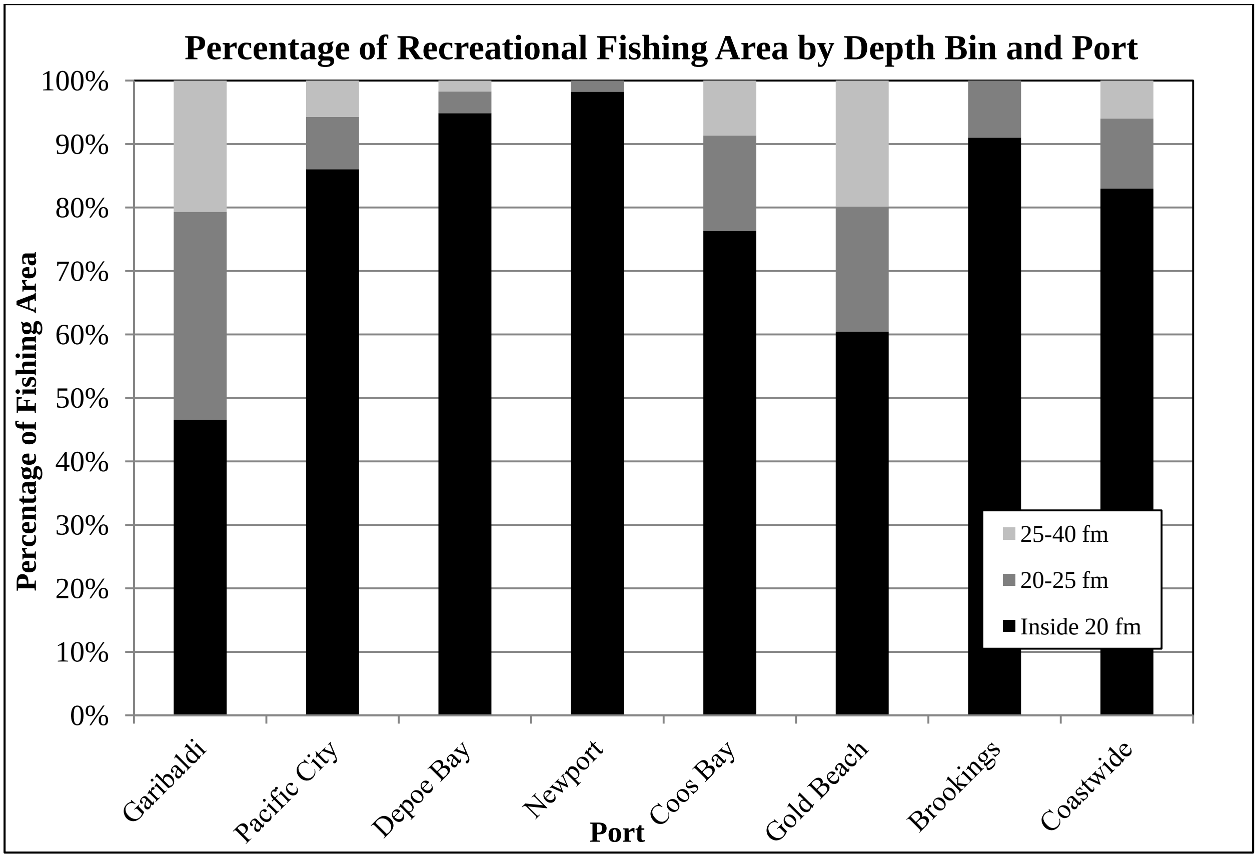

Figure B-17. Percentage of Marine Area by Depth Bin and Port for the Oregon Coast.

Under the No-Acton Alternative, mortality of canary and yelloweye rockfish in the groundfish fishery and the Pacific halibut fishery are projected to be within allocations (Table B-77) and expected angler trips are anticipated to be similar to what has been seen in recent years (Table B-80 andTable **B-81**). However, projections are based on past catch rates and angler trips, and greater than expected values for these parameters could necessitate more conservative inseason depth restrictions and/or closures of the fisheries.

Table B-80. Average bottomfish angler trips per month by port and boat type for months without depth restrictions (all-depth), 2007-2010.

Port	Charter						Private						Total					
	Jan	Feb	Mar	Oct	Nov	Dec	Jan	Feb	Mar	Oct	Nov	Dec	Jan	Feb	Mar	Oct	Nov	Dec
Astoria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Garibaldi	46	125	101	120	17	19	52	63	39	2,225	64	20	98	187	140	2,345	81	39
Pacific City	5	13	24	16	2	2	71	85	126	111	30	26	76	98	150	127	32	28
Depoe Bay	54	191	389	423	57	15	51	75	63	102	23	17	105	266	452	525	80	32
Newport	156	399	870	618	190	78	98	179	193	292	36	66	254	578	1,063	909	226	144
Winchester	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charleston	31	84	125	158	13	14	98	124	189	315	16	40	129	208	314	473	29	54
Bandon	3	5	17	40	14	5	20	23	37	39	10	9	23	27	54	79	24	14
Port Orford	0	0	0	0	0	0	6	7	9	10	2	3	6	7	9	10	2	3
Gold Beach	6	16	30	16	10	3	41	54	72	47	19	18	47	70	102	63	29	21
Brookings	34	66	162	135	81	13	441	393	592	1,939	192	96	475	459	754	2,074	273	109
Total	334	898	1,718	1,525	382	148	878	1,002	1,320	5,079	391	295	1,213	1,900	3,038	6,604	773	443

Table B-81. Average bottomfish angler trips per month by port and boat type for months with 40 fm depth restrictions, 2007-2010.

Port	Charter						Private						Total					
	Apr	May	Jun	Jul	Aug	Sep	Apr	May	Jun	Jul	Aug	Sep	Apr	May	Jun	Jul	Aug	Sep
Astoria	0	8	22	1	6	0	1	113	105	15	6	3	1	121	127	16	12	3
Garibaldi	133	399	761	667	761	400	97	382	454	161	165	92	230	782	1,216	828	925	491
Pacific City	34	51	54	62	55	22	289	650	511	416	325	112	323	701	565	478	380	133
Depoe Bay	602	1,008	1,683	1,687	2,098	1,002	157	362	432	180	159	93	759	1,370	2,115	1,867	2,256	1,095
Newport	991	1,063	1,807	1,612	1,960	1,243	572	1,066	985	616	610	377	1,563	2,129	2,792	2,228	2,570	1,620
Winchester	0	0	4	1	0	0	0	9	7	2	13	0	0	9	11	3	13	0
Charleston	270	436	598	492	620	380	390	902	1,220	626	1,214	661	661	1,339	1,818	1,118	1,833	1,041
Bandon	59	75	193	200	284	39	87	195	184	159	247	84	146	271	377	359	531	122
Port Orford	0	11	19	0	0	0	25	65	57	132	83	33	25	76	76	132	83	33
Gold Beach	63	75	105	137	210	61	126	318	282	362	627	407	189	392	387	499	837	468
Brookings	274	364	504	491	703	320	1,121	2,311	2,499	2,302	2,293	1,294	1,395	2,675	3,003	2,793	2,996	1,614
Total	2,426	3,490	5,749	5,350	6,695	3,465	2,864	6,374	6,737	4,970	5,739	3,154	5,290	9,865	12,487	10,320	12,434	6,619

B.5.2 Oregon Recreational: Preferred

The Preferred Alternative analyzes the Council's preferred ACLs (116/118 mt for canary rockfish and 18 mt for yelloweye rockfish; Table B-75and Table B-76) and allocations.

Table B-82 shows the allocations, or model targets, for black, canary and yelloweye rockfish for the Oregon recreational fisheries under the Preferred Alternative.

Table B-82. Oregon recreational allocations or model targets under the Preferred Alternative.

Species	2013 Recreational Allocation or Model Target (mt)	2014 Recreational Allocation or Model Target (mt)
Black rockfish	440.8	440.8
Canary rockfish	10.9	11.2
Yelloweye rockfish	2.6	2.6

Groundfish Seasons and Area Restrictions

Under the Preferred Alternative, the Oregon recreational groundfish fishery will be open offshore year-round, except from April 1 to September 30 when fishing is only allowed shoreward of 40 fm, the same as under the No-Action Alternative (Figure B-15). Closing the fishery outside of 40 fm from April 1 to September 30, months when yelloweye rockfish bycatch is the highest, mitigates the impacts to depleted yelloweye rockfish. The shore-based fishery will be open year-round as depleted canary and yelloweye rockfish are not impacted.

Area Closures

Under the Preferred Alternative, as in the No-Action Alternative, targeting and retaining groundfish and Pacific halibut will be prohibited year-round in the Stonewall Bank YRCA, a high relief rocky habitat approximately 15 miles offshore from Newport, Oregon (Figure B-16). Targeting and retaining Pacific halibut and groundfish within the Stonewall Bank YRCA was prohibited to reduce yelloweye rockfish bycatch.

Groundfish Bag Limits and Size Limits

Under the Preferred Alternative, the Oregon recreational groundfish fishery will have a marine fish daily-bag-limit of ten fish in aggregate (Figure B-15), the same as the No-Action Alternative. The marine fish daily-bag-limit includes all species other than lingcod, salmon, steelhead, Pacific halibut, flatfish, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine and smelt. This daily-bag-limit provides the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process will likely reduce the marine fish daily-bag-limit from ten fish in aggregate to manage the harvest of the "other nearshore" rockfish complex within the recreational fishery state ocean boat landing cap, which is adopted in the yearly state process. Reducing the marine fish daily-bag-limit will also affect black rockfish harvest rates and may prevent the fishery from harvesting its total allocation. The status of black rockfish was assessed in 2007 as healthy and the Council adopted preferred OY was 1,000 mt for the area off Oregon and California with an Oregon harvest guideline of 580 mt, which has been in place since 2009. Assuming the recreational share continues to be seventy-six percent as determined through the state process, the Oregon recreational fishery harvest guideline for black rockfish would be 440.8 mt. Reductions in the marine fish daily bag limit are not expected to reduce yelloweye rockfish bycatch, since catch rates (per angler day) were similar for 10, 8, 6, or 5 marine fish bag limits.

Under the Preferred Alternative, the Oregon recreational fishery will have a cabezon seasonal sub-bag limit of 1 fish (Figure B-15), concurrent with the seasonal depth restrictions, the same as the No-Action Alternative. This seasonal sub-bag limit is intended to reduce cabezon mortality, while still allowing for at least some retention.

Under the Preferred Alternative, the Oregon recreational fishery will have a lingcod daily-bag-limit of three fish (Figure B-15), the same as the No-Action Alternative. This daily bag-limit provides the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process will likely reduce the lingcod bag limit to two fish for the opening of the 2013 season. In the event the Pacific halibut catch allocation is reduced significantly from 2011 levels or the marine bag limit is further reduced inseason, the lingcod daily bag limit could be increased to three fish so long as the harvest guidelines for depleted canary and yelloweye rockfish are not exceeded.

Under the Preferred Alternative, the Oregon recreational fishery will have a flatfish daily-bag-limit of 25 fish in aggregate (Figure B-15), consistent with the No Action management measures effective since 2007. The flatfish daily-bag limit consists of all soles and flounders except Pacific halibut. Adoption of the flatfish daily-bag-limit of 25 fish in aggregate promotes simplicity in regulations and provides the flexibility to create additional regulations specific to flatfish (i.e. allowed retention of flatfish in the Pacific halibut fishery, or allowed targeting of flatfish in the event of a closure due to rockfish harvest guideline attainment).

The Preferred Alternative includes minimum length limits:

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

These length limits are consistent with the No Action management measures effective since 2007. These length limits are effective tools in reducing harvest of these species, primarily in the shore and estuary fishery.

Pacific Halibut Seasons

Under the Preferred Alternative, the recreational Pacific halibut fisheries should be able to proceed as in 2011 and 2012, in regards to days and areas open, etc., depending on the annual halibut quota. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly limited in 2013 and 2014.

Additional Management Measures Analyzed

In keeping with the Council's intent of limiting the scope and number of changes to the No Action harvest specifications and management measures during the 2013-2014 cycle, no additional management measures were analyzed for the Oregon recreational fisheries. The No Action management measures (bag limits, depth restrictions, etc.) will provide the basis for keeping recreational impacts of overfished species within sector specific harvest guidelines for 2013-2014.

Projected Impacts and Inseason Management Response

Under the Preferred Alternative, and associated season structure and bag limits detailed above, the annual projected mortality of black, canary and yelloweye rockfish are in Table B-83. Table B-79 shows recent mortality of the ten most landed species in the Oregon recreational fishery, including black rockfish. Species in Table B-79, other than black rockfish, are not modeled; therefore a projection for 2013-2014 is unavailable. This table represents recent mortality under similar season structure and bag limits to what will be in place under the No Action Alternative and may serve as a proxy for projections.

Table B-83. Projected mortality of species with Oregon recreational specific allocations under the Preferred Alternative.

Species	Impacts (mt)
Black rockfish	297.7
Canary rockfish	4.7
Yelloweye rockfish	2.5

Inseason Management Tools

Oregon has a responsive port based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2013 (or 2014) fishery does not proceed as expected.

Inseason management action may be implemented in 2013 or 2014 to reduce the mortality in the Oregon recreational groundfish fishery. Inseason management tools, designed to mitigate mortality, include bag limit adjustments (including non-retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish mortality, since retention of this species is prohibited. If catch rates indicate that the HGs for yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduce mortality. ODFW will monitor inseason progress toward recreational harvest guidelines for canary rockfish and yelloweye rockfish. Regulations will depend upon the timing of the determination for their need.

Adjustments to the marine fish daily-bag limit to no more than ten fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than three fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2011 levels. Season and/or area closures may also be considered if harvest targets or HGs are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit mortality of any managed species. Closing certain days each week would help lengthen the duration of a fishery approaching a harvest guideline.

Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce mortality of nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2013-2014, testing the effectiveness and selectivity of various gears and the survivability of rockfish released at depth.

Directed yellowtail rockfish and/or flatfish fisheries may be implemented inseason, as were implemented in 2004, in the event of a closure of the recreational groundfish fishery due to attainment federal or state HGs or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are within the harvest guidelines.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2011 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are not in excess of the harvest guidelines.

Community Impacts

Depth restrictions for the recreational bottomfish fishery are the primary management method used to keep mortality of yelloweye and canary rockfish within their respective harvest guidelines (HG) in the Oregon recreational fisheries. Depth restrictions reduce overfished mortality because catch rates and discard mortality rates of overfished species are lesser in shallower depths. The No Action depth restrictions are all-depths from Jan-Feb, 40 fm from Apr-Sep, and all-depths Oct-Dec.

Although depth restrictions reduce overfished species mortality, they can also decrease angler trips by reducing the quantity and quality of fishable bottomfish grounds. Ports are disproportionately affected by depth restrictions due to varying amounts of fishing grounds by depth (PFMC 2011). For example, Newport is relatively unaffected by a 40 fm depth restriction because the majority (98%) of bottomfish grounds are shallower than 20 fm (Figure B-17). In contrast, Winchester Bay and Florence are greatly impacted by depth restrictions because nearly all bottomfish grounds are deeper than 40 fm. Other ports, such as Garibaldi and Gold Beach, where the majority of bottomfish grounds are between 20-40 fm, are relatively unaffected by 40 fm depth restrictions, but are greatly affected by 20 fm depth restrictions.

Under the Preferred Alternative mortality of yelloweye and canary rockfish in the groundfish fishery (under the No Action depth restrictions) and the Pacific halibut fishery are projected to be within the allocations (Table B-83) and expected angler trips are anticipated to be similar to what has been seen in recent years (Table B-80 and Table B-81). However, projections are based on past catch rates and angler trips, and greater than expected values for these parameters could necessitate more conservative inseason depth restrictions and/or closures of the fisheries.

B.5.1 Oregon Recreational: Alternative 1

Oregon recreational management measures under Alternative 1 are the same as the Preferred Alternative and have the same impacts.

B.5.2 Oregon Recreational: Alternative 2

Oregon recreational management measures under Alternative 2 are the same as the Preferred Alternative and have the same impacts.

B.5.3 Oregon Recreational: Alternative 3

Oregon recreational management measures under Alternative 3 are the same as the Preferred Alternative and have the same impacts.

B.5.4 Oregon Recreational: Alternative 4

Alternative 4 analyzes ACLs of 48/49 mt for canary rockfish and 18 met for yelloweye rockfish (Table B-75 and Table B-76) and sector specific allocations. Table B-84 shows the allocations, or model targets, for black, canary and yelloweye rockfish for the Oregon recreational fisheries. Under Integrated Alternative 4 canary rockfish will be the most restrictive species; therefore all management measures will be designed to reduce canary rockfish mortality from the No-Action Alternative.

Table B-84. Oregon Recreational Allocations or Model Targets under Alternative 4.

Species	2013 Recreational Allocation or Model Target (mt)	2014 Recreational Allocation or Model Target (mt)
Black rockfish	440.8	440.8
Canary rockfish	3.5	3.6
Yelloweye rockfish	2.6	2.6

Groundfish Seasons and Area Restrictions

Under Alternative 4, the Oregon recreational groundfish fishery should able to operate a year round fishery with further depth restrictions (25 or 20 fathoms) than are in place under No Action. The groundfish fishery could be somewhat less restricted (30 fathoms instead of 25 or 20 fathoms) if the recreational Pacific halibut fishery were cancelled (Figure B-18).

Depth management is the main tool used for controlling canary and yelloweye rockfish catch in the Oregon recreational fishery. Two options are shown under Alternative 4: a year round groundfish fishery restricted to inside of 20 fm for the entire year and a year round groundfish fishery restricted to inside of 30 fm year round but with the Pacific halibut fishery cancelled. Both alternatives (4A and 4B) are more restrictive than the 2011-2012 Oregon recreational groundfish season under the No Action alternative. The options in the figure below will be refined for the Final EIS, once the council and public have had the opportunity to discuss the options.

Alt.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SQ	All depth			40 fm						All depth		
4A	20 fm											
4B	30 fm --No Halibut											

Figure B-18. Alternatives for the Oregon recreational fishery season in 2013-14 under Alternative 4.

Area Restriction Alternatives

No changes to the boundary of the Stonewall Bank YRCA would occur from those listed in the No-Action Alternative under Alternative 4, as the YRCA is a yelloweye rockfish savings area and has little effect on canary rockfish bycatch.

Groundfish Bag Limits and Size Limits

Under Alternative 4, the No-Action alternative bag limits for marine fish, lingcod, and flatfish would remain in place (Figure B-19) including no retention of yelloweye or canary rockfish at any time or depth. These daily-bag-limits provide the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process will likely start off each season with reduced marine and lingcod daily bag limits and may increase or further reduced them inseason depending on the progression of the fishery relative to the impact on species with harvest targets/guidelines and state landing caps.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine Bag Limit [1]	Ten (10)			1 Fish Cabezon Sub-Bag [2]						Ten (10)		
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

Marine 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
From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon
Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut

Figure B-19. Oregon recreational groundfish season in 2013-14 under Integrate Alternative 4.

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

Pacific Halibut Seasons

Under Alternative 4A (Figure B-18), the Pacific halibut fishery would be able to proceed as under the No-Action alternative, however the groundfish fishery would have further depth restrictions than the No-Action Alternative. Under Alternative 4B, the groundfish fishery would be somewhat less restricted than under Alternative 4A; however the Pacific halibut fishery would not be allowed. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly limited in 2013 and 2014, if the halibut fishery were allowed to proceed.

Additional Management Measures Analyzed

In keeping with the Council's intent of limiting the scope and number of changes to the No Action harvest specifications and management measures during the 2013-2014 cycle, no additional management measures were analyzed for the Oregon recreational fisheries. The No Action management measures (bag limits, depth restrictions, etc.) will provide the basis for keeping mortality of overfished species within the HGs for 2013-2014.

Projected Impacts and Inseason Management Response

Under Alternative 4, and associated season structure (Alternatives 4A and 4B) and bag limits detailed above, the annual projected mortality of black, canary and yelloweye rockfish are in Table B-85. Table B-79 shows mortality for the ten most landed species in the Oregon recreational fishery, including black rockfish. Species in Table B-79, other than black rockfish, are not modeled; therefore projections for 2013-2014 is unavailable. However it is anticipated that the further depth restrictions may increase catches of nearshore species, such as rockfish in the "other nearshore" group from what has occurred under the No Action regulations.

Table B-85. Projected Impacts of species with Oregon recreational specific allocations under Alternative 4.

Species	Allocation	SQ	Alt. 4A	Alt. 4B
Black rockfish	440.8	297.7	311.1	304.4
Canary rockfish	3.5/3.6	4.7	3.5	3.5
Yelloweye rockfish	2.6	2.5	1.5	1.6

Inseason Management Tools

Oregon has a responsive port based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2013 (or 2014) fishery does not proceed as expected.

Inseason management action may be implemented in 2013 or 2014 to reduce the impacts of the Oregon recreational groundfish fishery. Inseason management tools, designed to mitigate mortality, include bag limit adjustments (including non-retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish mortality, since retention of this species is prohibited. If catch rates indicate that the HGs for yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduce mortality. ODFW will monitor inseason progress toward the HG for canary rockfish and yelloweye rockfish. Regulations will depend upon the timing of the determination for their need.

Adjustments to the marine fish daily-bag limit to no more than 10 fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than 3 fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2011 levels. Season and/or area closures may also be considered if harvest targets are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit mortality of any managed species. Closing certain days each week would help lengthen the duration of a fishery approaching a harvest guideline.

Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce mortality of nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2013-2014, 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 federal or state harvest guidelines or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are within the HGs.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2011 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are not in excess of the HGs.

Community Impacts

Canary rockfish mortality from the bottomfish fishery under the No Action groundfish depth restrictions and the Pacific halibut fishery (4.68 mt) are projected to exceed the HG under Alternative 4 (Table B-84). If the 48 mt canary rockfish ACL is adopted, then much more restrictive bottomfish depth restrictions than No Action and/or closures of the Pacific halibut will be needed to keep projected mortality within the HG (Alternatives 4A and 4B; Figure B-18). As for yelloweye rockfish, greater than expected catch rates of canary rockfish and/or angler trips could result in even more restrictive depths restrictions and/or closures of the fisheries.

Decreases in angler trips from the No Action Alternative are expected for Alternatives 4A and 4B (Figure B-19) if Alternative 4 is adopted. Projections of decreases in groundfish angler trips were calculated by multiplying average groundfish angler trips during months with No Action depth restrictions (Table B-80 and Table B-81) by the percentage of these trips that occurred deeper than the proposed depth restrictions during months with No Action depth restrictions (Table B-86 and Table B-87). This calculation removes angler trips that happened under No Action depth restrictions but would have been illegal under the proposed depth restrictions.

These projections represent the maximum number of angler trips that would have been expected to have been eliminated since anglers would have had the option of fishing shallower (permissible) depths, if possible or desired.

Table B-86. Percentage of bottomfish angler trips by depth bin (column labels) and port during months without depth restrictions (all-depth), 2009-2011. Data is unavailable prior to 2009 because anglers were not asked depth at which they fished.

Port	Charter				Private				Total			
	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30
Astoria	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Garibaldi	19.1	0.0	2.4	78.5	15.8	9.4	0.0	74.8	18.1	3.0	1.6	77.3
Pacific City	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Depoe Bay	69.3	9.0	1.8	19.9	84.1	2.7	0.0	13.2	71.4	8.1	1.5	19.0
Newport	89.6	0.0	0.0	10.4	92.2	0.0	0.5	7.2	90.0	0.0	0.1	9.9
Winchester	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Charleston	76.1	22.2	1.7	0.0	50.7	6.0	2.3	40.9	67.4	16.7	1.9	14.0
Bandon	100.0	0.0	0.0	0.0	79.1	20.9	0.0	0.0	82.0	18.0	0.0	0.0
Port Orford	53.8	0.0	0.0	46.2	85.2	14.8	0.0	0.0	75.0	10.0	0.0	15.0
Gold Beach	0.0	0.0	0.0	0.0	88.0	8.0	4.0	0.0	88.0	8.0	4.0	0.0
Brookings	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0

Table B-87. Percentage of bottomfish angler trips by depth bin (column labels) and port during months with 40 fm depth restrictions, 2009-2011.

Port	Charter				Private				Total			
	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30
Astoria	66.9	0.0	0.0	33.1	96.5	0.0	0.0	3.5	88.2	0.0	0.0	11.8
Garibaldi	53.7	39.7	4.3	2.3	66.5	23.5	8.5	1.5	57.3	35.3	5.4	2.1
Pacific City	98.1	1.9	0.0	0.0	99.0	1.0	0.0	0.0	98.8	1.2	0.0	0.0
Depoe Bay	92.3	5.6	1.4	0.7	94.4	4.9	0.2	0.4	92.6	5.5	1.2	0.6
Newport	96.5	1.8	0.1	1.6	98.4	0.5	0.3	0.8	97.0	1.4	0.2	1.4
Winchester	0.0	0.0	0.0	0.0	76.1	0.0	0.0	23.9	76.1	0.0	0.0	23.9
Charleston	90.6	7.4	0.3	1.7	89.4	7.8	2.0	0.8	89.9	7.6	1.2	1.3
Bandon	83.4	13.9	2.7	0.0	79.1	15.0	5.2	0.8	81.7	14.3	3.7	0.3
Port Orford	76.5	11.8	11.8	0.0	85.5	10.9	3.6	0.0	83.1	11.1	5.8	0.0
Gold Beach	90.0	7.8	0.0	2.2	92.5	6.3	1.2	0.0	91.6	6.8	0.8	0.8
Brookings	92.8	3.0	3.7	0.6	99.2	0.4	0.2	0.2	97.8	1.0	1.0	0.3

The number of 2011 Pacific halibut angler trips (22,884) was used to project the number of trips that would be expected with cancelation of the fishery. Pacific halibut angler trips are related to the quota, and 2011 data was used because 2013-2014 quotas are unknown, but are expected to be similar to 2011.

Table B-88. Projected decreases in angler trips by boat type, port, and fishery for Alternatives 4A and 4B of Figure B-18. The number of trips and percent decrease from No Action regulations is shown for reference.

Port	Decline in trips with Alternative A									Status quo trips					% decrease
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	
Astoria	12	9	21	0	0	0	12	9	21	37	243	159	148	587	3.5
Garibaldi	1,789	2,525	4,314	0	0	0	1,789	2,525	4,314	3,548	3,812	574	2,457	10,392	41.5
Pacific City	5	24	29	0	0	0	5	24	29	337	2,753	6	705	3,801	0.8
Depoe Bay	970	129	1,099	0	0	0	970	129	1,099	9,208	1,713	1,211	552	12,684	8.7
Newport	546	135	680	0	0	0	546	135	680	10,984	5,089	1,781	9,505	27,359	2.5
Florence	0	0	0	0	0	0	0	0	0	0	0	0	241	241	0.0
Winchester	5	7	13	0	0	0	5	7	13	5	31	0	265	302	4.2
Charleston	365	917	1,282	0	0	0	365	917	1,282	3,221	5,794	325	969	10,309	12.4
Bandon	141	229	370	0	0	0	141	229	370	932	1,094	79	423	2,527	14.6
Port Orford	7	62	70	0	0	0	7	62	70	30	430	147	104	711	9.8
Gold Beach	145	190	335	0	0	0	145	190	335	731	2,372	9	106	3,218	10.4
Brookings	191	89	281	0	0	0	191	89	281	3,146	15,472	19	3,127	21,764	1.3
Total	4,178	4,315	8,493	0	0	0	4,178	4,315	8,493	32,181	38,804	4,310	18,602	93,896	9.0
Port	Decline in trips with Alternative B									Status quo trips					% decrease
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	
Astoria	12	9	21	159	148	307	171	156	328	37	243	159	148	587	55.8
Garibaldi	407	1,863	2,269	574	2,457	3,031	981	4,320	5,300	3,548	3,812	574	2,457	10,392	51.0
Pacific City	0	0	0	6	705	711	6	705	711	337	2,753	6	705	3,801	18.7
Depoe Bay	279	49	329	1,211	552	1,763	1,490	601	2,091	9,208	1,713	1,211	552	12,684	16.5
Newport	380	97	477	1,781	9,505	11,286	2,161	9,602	11,763	10,984	5,089	1,781	9,505	27,359	43.0
Florence	0	0	0	0	241	241	0	241	241	0	0	0	241	241	100.0
Winchester	5	7	13	0	265	265	5	273	278	5	31	0	265	302	92.2
Charleston	49	362	411	325	969	1,294	374	1,332	1,705	3,221	5,794	325	969	10,309	16.5
Bandon	0	7	7	79	423	502	79	430	509	932	1,094	79	423	2,527	20.1
Port Orford	0	0	0	147	104	251	147	104	251	30	430	147	104	711	35.3
Gold Beach	95	0	95	9	106	115	104	106	209	731	2,372	9	106	3,218	6.5
Brookings	15	19	34	19	3,127	3,146	34	3,146	3,180	3,146	15,472	19	3,127	21,764	14.6
Total	1,242	2,413	3,655	4,310	18,602	22,912	5,552	21,015	26,567	32,181	38,804	4,310	18,602	93,896	28.3

If the 48 mt Canary rockfish ACL alternative is adopted, Alternative 4A would be the preferred management measure alternative to keep mortality within the HG because fewer declines in angler trips are expected with Alternative 4A (8,493) than with Alternative 4B (26,567; Table B-88). With Alternative 4A, percent decreases of angler trips would be expected to be similar for the charter and private fleets (13% and 11% respectively). Declines would be expected for all ports, except for Florence, which has very few reefs. Garibaldi (41.5% reduction) would be impacted much greater than the other ports because there are few shallow water reefs in depths less than 20 fm (<15%).

Alternative 4A is projected to reduce annual saltwater angler expenditures (i.e., gas, lodging, food, charter tickets, tackle, bait, licenses, etc.) by $5.160 million, and more than half of this loss would be expected from Tillamook County ($3.626 million; Table B-89). Alternative 4B is projected to reduce annual saltwater angler expenditures by $14.265 million (nearly three times that of Alternative A).

Decreases in saltwater angler expenditures by county were calculated by multiplying saltwater angler expenditures (Dean Runyan Associates 2009) by the percent reduction in expected bottomfish angler trips due to the Alternative 4A and 4B depth restrictions and Alternative 4B cancellation of the Pacific halibut fishery.

Table B-89. Expected decreases in saltwater angler expenditures (all costs related to fishing trip) by county if the 48 mt canary rockfish ACL alternative is adopted and Alternatives A or B management measures (Figure B-18) are consequently implemented to keep mortality within the harvest guideline.

County	No Action $ (millions)	No Action Trips	Option 1 Δ Trips	Option 1 % Decrease	Option 1 Δ $	Option 2 Δ Trips	Option 2 % Decrease	Option 2 Δ $
Clatsop	5.766	5,545	-21	0.38	-0.022	-328	5.92	-0.342
Tillamook	21.235	24,026	-4,103	17.08	-3.626	-6,011	25.02	-5.313
Lincoln	21.466	51,353	-1,645	3.20	-0.687	-13,854	26.98	-5.791
Lane	2.628	814	0	0.00	0	-241	29.61	-0.778
Douglas	6.998	6,386	-13	0.20	-0.014	-278	4.35	-0.305
Coos	8.365	17,722	-1,456	8.22	-0.687	-2,214	12.49	-1.045
Curry	5.183	27,273	-650	2.38	-0.124	-3,640	13.35	-0.692
Total	71.641	133,119	-7,888	5.93	-5.16	-26,566	19.96	-14.266

$= millions of dollars of angler expenditures; trips = angler trips for all target species (e.g., tuna, salmon, bottomfish, halibut); Δ trips = projected decline in angler trips; Δ $ = projected decrease in angler expenditures. Clatsop= Astoria; Tillamook= Garibaldi and Pacific City; Lincoln= Depoe Bay and Newport; Lane= Florence; Douglas= Winchester Bay; Coos= Charleston and Bandon; Curry= Port Orford, Gold Beach, and Brookings.

Projected decreases in angler trips and angler expenditures are upper range projections because the model assumes that angler trips that occurred deeper than proposed depth restriction options would be eliminated; however, these anglers could have either fished shallower depths, targeted other species (i.e., salmon, Pacific halibut, or tuna), or moved to ports with greater quantities of groundfish reefs within the proposed depth restrictions. Therefore, it is possible, although unlikely, that there could be minimal declines in angler trips due to Alternatives 4A and 4B (lower range projection No Action trips). The most probable decrease in angler trips is between the upper and lower ranges because it would be assumed that a portion of anglers would not fish given the new regulations and the other portion would find substitute opportunities; however, only range projections can be made given current data. Better predictions of decreases in angler trips and expenditures due to new regulations could be made if data existed regarding potential changes in angler behaviors in response to regulatory changes. This data could be obtained via consultations with anglers or through a socio-economic survey.

B.5.5 Oregon Recreational: Alternative 5

Oregon recreational management measures under Alternative 5 are the same as the Preferred Alternative and have the same impacts.

B.5.6 Oregon Recreational: Alternative 6

Oregon recreational management measures under Alternative 6 are the same as the Preferred Alternative and have the same impacts.

B.5.7 Oregon Recreational: Alternative 7

Oregon recreational management measures under Alternative 7 are the same as the Preferred Alternative and have the same impacts.

B.5.1 Oregon Recreational: Alternative 8

Oregon recreational management measures under Alternative 8 are the same as the Preferred Alternative and have the same impacts.

B.5.2 Oregon Recreational: Summary of the Alternatives

This section summarizes the key effects of the No Action Alternative and the alternative for the Oregon recreational fishery. The alternatives are affected by the alternative ACLs for the overfished species, which are affected by the rebuilding alternatives for these stocks. For the Oregon recreational fishery, canary or yelloweye rockfish are the driving stock, depending on the alternative. This summary focuses on the effects of rebuilding the canary rockfish under alternative rebuilding plans (yelloweye rockfish ACL is held constant under all alternatives), expressed as alternative ACLs, including the time to rebuild the stocks; the corresponding economic implications to groundfish sectors, port groups, and fishing communities; the interaction of overfished species within the marine ecosystem; and the effects on non-groundfish species and the marine ecosystem. Alternative 2013-2014 groundfish management measures are designed to provide fishing opportunities to harvest healthy species within the constraints of alternative overfished species' ACLs. The following tables and figures provide an estimate of the bottom line biological and socioeconomic effects of the alternatives on the Oregon recreational fishery:

Table B-90. Change in Oregon Recreational Fishing Seasons and RCAs by Month under the Integrate Alternatives for 2013.

Alternative	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Action	all depth				40 fm				all depth			
1 (116 mt)	all depth				40 fm				all depth			
2 (101 mt)	all depth				40 fm				all depth			
3 (116 mt)	all depth				40 fm				all depth			
4A (48 mt)	20 fm											
4B (48 mt)	30 fm --No Halibut											
5 (516 mt)	all depth				40 fm				all depth			
6 (101 mt)	all depth				40 fm				all depth			
7 (147 mt)	all depth				40 fm				all depth			

Table B-91. Oregon recreational fishery bag limits under all Alternatives (no differences between the alternatives).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine Bag Limit [1]	Ten (10)				1 Fish Cabezon Sub-Bag [2]				Ten (10)			
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

[1] *Marine 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*
[2] *From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon*
[3] *Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut*

Table B-92. Oregon recreational fishery mortality (in mt) of yelloweye (YE), canary (CAN) and black (BLK) rockfish under the alternatives and associated season structures (Table B-90).

Integrated Alternative	YE	CAN	BLK
No Action	2.5	4.7	297.7
1 (116 mt)	2.5	4.7	297.7
2 (101 mt)	2.5	4.7	297.7
3 (116 mt)	2.5	4.7	297.7
4A (48 mt)	1.5	3.5	311.1
4B (48 mt)	1.6	3.5	304.4
5 (216 mt)	2.5	4.7	297.7
6 (101 mt)	2.5	4.7	297.7
7 (147 mt)	2.5	4.7	297.7

Table B-93. Estimated annual number of charter and private angler trips in the Oregon recreational bottomfish and halibut fisheries under the integrated alternatives and associated season structure.

Alternative	Bottomfish			Halibut			Combined		
	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total
No Action	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
1 (116 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
2 (101 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
3 (116 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
4A (48 mt)	28,003	34,489	62,492	4,310	18,602	22,912	32,313	53,091	85,404
4B (48 mt)	30,939	36,391	67,330	0	0	0	30,939	36,391	67,330
5 (216 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
6 (101 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
7 (147 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897

No Action

If no action were taken by the Council, the 2012 ACLs (17 mt for yelloweye rockfish and 107 mt for canary rockfish) and management measures (season structure, Table B-90; and bag limits Table B-91) currently in place for the Oregon recreational fishery would remain in place for 2013-2014. The season structures, including depth restrictions, are intended to allow for a year round recreational bottomfish fishery, along with the recreational Pacific halibut fishery. Restricting the fishery to inside of 40 fm from April through September is designed to reduce yelloweye rockfish bycatch during months of high angler effort and yelloweye rockfish encounters. The projected mortality of black (297.7 mt), canary (4.7 mt) and yelloweye rockfish (2.5 mt) under this alternative are in Table B-92. The projected numbers of charter and private angler trips (bottomfish, halibut and total) are included in Table B-93 and are similar to what has been seen in recent years under similar season structure. Angler expenditures are also expected to be similar to what has been seen in recent years.

Alternatives 1, 2, 3, 5, 6, and 7

Under Alternatives 1, 2, 3, 5, 6, and 7 the canary rockfish ACL is roughly equivalent to or higher than the No Action Alternative. The yelloweye rockfish ACL under all alternatives is 18 mt (compared to 17 mt under No Action) and will be the most limiting species to Oregon recreational fisheries, similar to the No Action Alternative. Based on this, no changes to the Oregon recreational fishery management measures (bag limit, season structure, size limits, etc.) are proposed. Therefore projected mortality (Table B-92), angler trips (Table B-93), and angler expenditures are expected to be the same as with the No Action Alternative.

Alternative 4

Under Alternative 4, canary rockfish will be the most limiting species to the Oregon recreational fisheries. Management measures will need to be put in place to reduce mortality of canary rockfish compared to No Action. Depth management is the main tool for controlling canary and yelloweye rockfish mortality in the Oregon recreational fishery. Two alternatives (A and B) of season/depth restrictions were considered under Alternative 4 (Table B-90). Alternative A has a year round season open only shoreward of 20 fathoms, with the Pacific halibut fishery proceeding as under the No Action Alternative. Alternative B has a year round season open only shoreward of 30 fm, with the Pacific halibut fishery cancelled. Catch projections for both alternatives A and B under Alternatives 4 are in Table B-92. Projected mortality of canary and yelloweye rockfish are reduced from the No Action Alternative under alternatives A and B. Mortality of black rockfish increases from the No Action Alternative (311.1 mt for alternative A and 304.4 mt for alternative B, Table B-92), however is still below the 440.8 mt harvest guideline. Bag limits for marine fish, lingcod and flatfish under the No Action Alternative would remain in place under both options under Alternative 4. In the Oregon recreational fishery model, changes to the bag limit do not have an effect on the projected mortality of canary or yelloweye rockfish. The seasonal cabezon 1 fish sub-bag limit (of the 7 fish marine bag limit, no more than one can be cabezon; April-September) will also remain in effect under these alternatives, as well as the No Action Alternative. The shore fishery would be a year round fishery as canary and yelloweye rockfish are not impacted. Fishing for sanddabs and "other flatfishes", excluding Pacific halibut, would be legal year round without depth restrictions, except that fishing would be restricted to shoreward of 40 fathoms during any period the groundfish fishery has any depth restrictions. Extensions of the Stonewall Bank YRCA would not be necessary as it is not an area of high canary rockfish encounters.

The depth restrictions and possible cancellation of the Pacific halibut fishery necessary to reduce canary rockfish mortality under Alternative 4 will cause a reduction in the number of angler trips, both charter and private (Table B-93). The reduction in angler trips under alternative A (8,493 or 9% coastwide; Table

B-88) is due to the depth restrictions in the bottomfish fishery. By restricting the bottomfish fishery to inside of 20 fathoms, the quantity and quality of fishing areas is greatly reduced from the 40 fm restriction under the No Action Alternative. The port of Garibaldi is expected to see the greatest decrease, 41.5 percent, as there are few fishable areas inside of 20 fathoms near that port. Additionally, the ports of Charleston/Coos Bay, Bandon, and Gold Beach are projected to have greater than a ten percent reduction in the number of angler trips, while the port of Newport is only projected to have a 2.5 percent decrease in the number of angler trips. The projected decrease in angler expenditures under alternative A is $5.6 million coastwide, the majority ($3.6 million) coming from Tillamook County (port of Garibaldi; Table B-89).

The reduction in angler trips under alternative B (26,657 or 28.3 percent coastwide; Table B-88) is due to a combination of the depth restrictions in the bottomfish fishery (3,655 angler trips) and the cancellation of the Pacific halibut fishery (22,912 angler trips). By restricting the bottomfish fishery to inside of 30 fathoms, the quantity and quality of fishing areas is reduced from the 40 fm restriction under the No Action Alternative, but not as severely as under alternative A. However, cancelling the Pacific halibut fishery causes an even greater reduction in the number of angler trips. The ports of Astoria (5.8%), Garibaldi (51.0%), Newport (43.0%), Florence (100%), Winchester Bay (92.2%), and Port Orford (35.3%) are expected to see the number of angler trips decrease by greater than one third (Table B-88) from the No Action Alternative. The projected decrease in angler expenditures under alternative B is $14.3 million coastwide, with $5.3 million from Tillamook County (port of Garibaldi) and $5.8 million coming from Lincoln County (ports of Depoe Bay and Newport; Table B-89). The decrease in angler expenditures is primarily due to the cancellation of the Pacific halibut fishery.

B.6 California Recreational

B.6.1 California Recreational: No Action

Projected mortality and season structures for 2013-2014 under the No Action alternative are based on CDFG’s updated RecFISH model. Model projections were calculated for the five recreational groundfish management areas using updated 2008, 2009, and 2010 RecFIN estimates; overfished species mortality are reported statewide. Recreational harvest guidelines for the No Action Alternative are reported in Table B-94. Under the No Action alternative, depth constraints and season length remain unchanged statewide (PFMC and NMFS. 2009).

Table B-94. No Action: California recreational allocations/harvest guidelines

Species	Harvest Guideline (mt)
Bocaccio	131
Canary Rockfish	14.5
Cowcod*	0.9
Yelloweye Rockfish	3.1

*Non-trawl allocation

Groundfish Seasons and Area Restrictions

The following recreational season applied in 2012 would remain in place under the No Action alternative (Figure B-20). All divers and shore-based anglers are exempt from the seasonal closures for rockfish, cabezon, greenlings, lingcod, and California scorpionfish.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 12–Oct 31 <20fm						Closed	
Mendocino	Closed				May 12–Aug 15<20fm			Closed				
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 <60fm									

Figure B-20. No Action: California recreational groundfish season structure for 2013-2014.

In 2009, four yelloweye rockfish conservation areas (YRCA) were adopted in the Northern and Mendocino Management Areas for use in management. The YRCAs include habitat in both state and federal waters and can be implemented inseason (if needed) to reduce yelloweye rockfish mortality. To date, these YRCAs have not been implemented but would remain available under the No Action Alternative.

The California Fish and Game Commission (Commission) has implemented or is currently in the process of implementing marine protected areas (MPAs) throughout the entire state. When MPA implementation is complete, more than of 124 MPAs covering approximately 848 square miles (16 percent) of state waters will be in effect (CDFG 2011). Since most of these MPAs occur in state waters, many in 20 fathom or less, the available fishing areas, particularly in the Northern and Mendocino Management Areas, will be reduced.

Groundfish Bag Limits and Size Limits

Under the No Action Alternative, a statewide 10 fish rockfish, cabezon, and greenling bag limit with a sub-bag limit of 2 fish for bocaccio and greenlings and a 3 fish sub-bag limit for cabezon would remain in place. Retention of bronzespotted, canary, cowcod, and yelloweye rockfish was prohibited in 2011-2012 and would continue to be prohibited under the No Action alternative. The following bag limits would also apply:

- California scorpionfish – 5 fish
- Leopard shark – 3 fish
- Lingcod – 2 fish
- Sanddabs – None
- Soupfin shark – 1 fish

There is no bag limit for Pacific sanddab, petrale sole and starry flounder. A bag limit of 10 fish of any one species within the 20 finfish maximum bag limit would apply to the remaining species in the groundfish FMP.

The following minimum size limits applied to 2011-2012 California recreational fisheries would be carried forward under the No Action alternative:

- Bocaccio – 10 inches
- California scorpionfish – 10 inches
- Cabezon – 15 inches
- Kelp greenling – 12 inches
- Leopard shark – 36 inches
- Lingcod – 22 inches

Projected Impacts and Inseason Management Response

Based on the updated model all overfished species, except yelloweye rockfish, are projected to be within allowable limits under the No Action (Table B-95). CDFG's RecFISH projection model was updated with 2010 data from RecFIN. These values are just pre-season projections and actual mortality may be different.

CDFG closely monitors yelloweye rockfish and cowcod – performing weekly tracking using preliminary CRFS field reports. These preliminary CFRS reports are converted into an anticipated catch value (ACV) in metric tons using catch and effort data from previous years. This weekly "proxy" value is then used to approximate catch during the five to eight week lag time in CRFS catch estimates. If angler effort or bycatch of overfished groundfish species changes dramatically from prior years, actual mortality can be higher or lower than projected. Based on the inseason tracking, if any of the overfished species harvest guidelines are projected to be attained inseason, CDFG could enact emergency management actions to slow and/or reduce catches. Management measures include closing one or more recreational groundfish management areas for boat based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

Projections for non-overfished species are provided in Table B-96.

Table B-95. No Action: California recreational projected mortality of overfished species for 2013-2014.

Species	Projected Impacts (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

Table B-96. No Action: California recreational projected mortality of non-overfished species for 2013-2014.

Species	Projected Impacts (mt)
Black Rockfish	161.2
Blue Rockfish	56.7
Cabezon	23.9
California Scorpionfish	77.0
Greenlings	14.4
Lingcod	117.4
Minor Nearshore Rockfish North	7.8
Minor Nearshore Rockfish South	245.7
Widow Rockfish	2.2

Community Impacts

Under the No Action alternative, California communities will continue to be negatively impacted by existing shallow depth restrictions and shorten seasons. The California recreational groundfish fishery has historically operated in deeper depths with longer seasons (PFMC 2003); however, with more restrictive recreational harvest guidelines for overfished groundfish species, communities in all the management areas coast wide have seen drastic reductions in season length and considerable increases in depth restrictions. Management areas north of Point Arena have seen the most restrictive season and depth constraints. Due to these restrictions placed on the groundfish fishery and other marine fisheries in the region (e.g., salmon), many communities along the North Coast have seen a decrease in angler effort. In particular, the northern California ports of Crescent City, Humboldt Bay, Shelter Cove, and Fort Bragg have seen their season length slowly reduced over the past decade.

In addition to reduced season lengths and shallower depth restrictions, California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, and destroyed vessels. Crescent City and Santa Cruz were both highly impacted by the disaster. As a result, boat launch ramps and gas stations were closed for evaluation, and private boat slips were repaired or completely rebuilt in both these communities.

B.6.2 California Recreational: Preferred

The 2013-2014 California recreational groundfish season projected mortality and season structure under Alternative 1 are based on CDFG's updated RecFISH model. Model projections were calculated for the five recreational groundfish management areas using updated 2008, 2009, and 2010 RecFIN estimates; overfished species mortality are reported statewide. Table B-97 depicts Alternative 1 harvest guidelines for the 2013-2014 California recreational groundfish seasons under the preferred and one alternate allocation scheme (option 1, see Appendix C, Section C.3 for more information). The proposed groundfish season structure and depth constraints listed out by recreational management area can be seen in Figure B-22.

Under the Alternative 1 preferred allocation, overfished species allocations to the California recreational fishery are higher than the No Action alternative (Table B-97). Under option 1(alternate allocation), the allocation of cowcod to the non-trawl fishery is higher than under the preferred alternative which contains the No Action allocation percentages. Although there will be some increased opportunity compared to No Action, management measures will still have to be more restrictive than in previous years (PFMC. 2003). Communities such as Shelter Cove will continue to be adversely impacted by the low yelloweye rockfish harvest guideline based on the Council's preferred catch sharing. The recreational fishery will not be able to fully utilize the available canary rockfish allocation under this alternative due to the low amount of yelloweye rockfish.

Table B-97. Alternative 1: California recreational allocations/harvest guidelines for 2013-2014 under the preferred and alternate cowcod allocation.

Species	**Harvest Guideline (mt)**	
	Preferred Allocation	Option 1
Bocaccio	167.9/174.2	167.9/174.2
Canary Rockfish	22.6/23.3	22.6/23.3
Cowcod*	1.0	1.9
Yelloweye Rockfish	3.4	3.4

*The preferred allocation reflects the percentages under the No Action Alternative (66% trawl; 34% non-trawl). Under option a, the allocations are reversed (34% trawl; 66% non-trawl)

Under the Alternative 1, the tradeoffs between depth restrictions in the Southern Management Area were explored to reduce cowcod encounters (Option 60 fm, Preferred 50 fm, Option 40 fm). These depth restrictions could be applied under either the preferred allocation scheme or under the alternative allocation (option 1). Under the 60 fm option, the season structure would be similar to the No Action alternative except for an increase in the season length for the Mendocino Management Area is increased by 18 days compared to No Action (Figure B-21). Under the Council's preferred depth option, the season structures would be similar to the No Action except that the season length in the Mendocino Management areas is increased and the depth restriction in the Southern Management Area would be 50 fm instead of 60 fm (No Action) (Figure B-22). Under the 40 fm option, the season structure would be similar to No Action except that the season length in the Mendocino Management areas is increased and the depth restriction in the Southern Management Area would be 40 fm instead of 60 fm (Figure B-23). All divers and shore-based anglers are exempt from the seasonal closures for rockfish, cabezon, greenlings, lingcod, and California scorpionfish.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 15 – Oct 30 <20fm						Closed	
Mendocino	Closed				May 15 –Sept 2*<20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 <**60fm**									

* Sept 1 in 2014

Figure B-21. Alternative 1 (Option 60 fm): California recreational groundfish season structure and depth constraints for 2013-2014.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 15 – Oct 30 <20fm						Closed	
Mendocino	Closed				May 15 –Sept 2*<20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 **<50fm**									

* Sept 1 in 2014

Figure B-22. Alternative 1 (Preferred 50 fm): California recreational groundfish season structure and depth constraints for 2013-2014.

Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 15 – Oct 30 <20fm						Closed	
Mendocino	Closed				May 15 –Sept 2*<20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 **<40fm**									

* Sept 1 in 2014

Figure B-23. Alternative 1 (Option 40 fm): California recreational groundfish season structure and depth constraints for 2013-2014.

Similar to No Action, yelloweye rockfish conservation areas (YRCA) would be available under this alternative and could be implemented inseason if catches are projected to exceed harvest guidelines.

The Commission has implemented or is currently in the process of implementing MPAs throughout the entire state. When MPA implementation is complete, more than of 124 MPAs covering approximately 848 square miles (16 percent) of state waters will be in effect (CDFG 2011). Since most of these MPAs occur in state waters, many in 20 fathom or less, the available fishing areas, particularly in the Northern and Mendocino Management Areas, will be reduced.

Groundfish Bag Limits and Size Limits

Under Alternative 1 (including the allocation and depth management options), there are no changes to the groundfish bag limits or size limits except for the following:

Bocaccio – The No Action sub-bag limit for bocaccio is two fish, with a minimum size limit of 10 inches. The Council is proposing to increase the sub-bag limit from two fish to three fish under Alternative 1 (including all depth and allocation options). The increase in the sub-bag limit is expected to increase total bocaccio mortality by 11.5 percent (Table B-98, Table B-99, and Table B-100). The Council is also proposing to remove the bocaccio minimum size limit of ten inches under Alternative 1 (all depth and allocation options). Removing the size limit is expected to increase total bocaccio mortality by 0.4 percent (Table B-98, Table B-99, and Table B-100). The proposed changes are not mutually exclusive and the impacts are additive. Currently bocaccio is the only rockfish species in the recreational sector that has a size limit and removing the size limit would reduce regulatory complexity. There are no expected increases to mortality for other overfished species as a result of these management measures.

Greenlings –The No Action sub-bag limit for greenlings is two fish. The Council is proposing to increase the sub-bag limit to 10 fish to maintain consistency with state regulations, which were modified attain the greenling contribution to the Other Fish Complex. The increased bag limit would apply under Alternative 1 (including all depth and allocation options). By increasing the sub-bag limit, the estimated take would be approximately 15 mt (Table B-101). The Council is not proposing any changes to the greenling minimum size restriction. There are no expected increases to other overfished species as a result of this increase.

Additional Management Measures Analyzed

<u>Shelf Rockfish Retention in Cowcod Conservation Area (CCA)</u>

The Council is requesting a modification to existing regulations governing recreational groundfish fishing within the Cowcod Conservation Areas (CCA) to allow retention of shelf rockfish taken during the open season for groundfish within the existing depth constraint of 20 fm. Removing the prohibition on shelf rockfish retention in depths of 20 fm or less in the CCA when fishing for rockfish is open will reduce discard mortality that currently occurs while in pursuit of other species within the 10 fish RCG bag limit. Under the proposed action, recreational anglers will meet their RCG bag limit sooner and with less discarding; reducing the chances of encounters with overfished species. Also, this change will make regulations more consistent with those in other management areas and other fisheries.

Increased mortality of shelf rockfish is expected to be minimal and can easily be accommodated within the recreational harvest guideline with a minimal risk of exceeding the ACLs. No ACLs for target or overfished species are expected to be exceeded as a result of this action.

Projected Impacts and Inseason Management Response

Under Alternative 1 (including all depth and allocation options) the projected mortality of yelloweye rockfish increases by 0.2 mt compared to the No Action alternative, due to the increased season length in the Mendocino Management Area (Table B-98, Table B-99 and Table B-100). No increases to other overfished species are expected. The number of angler trips is expected to increase under this alternative for both private/rental boats (PR) and the commercial passenger fishing vessels (CPFV). CDFG estimates that an increase of approximately 1,600 angler trips on PR boats and 300 angler trips on CPFVs could occur in the Mendocino Management Area.

The projected mortality under the preferred 50 fm depth option includes a decrease of 0.9 mt for bocaccio, 0.1 mt for canary rockfish, and 0.1 mt of cowcod compared to the No Action Alternative (Table B-99 compared to Table B-95).

The projected mortality under the 40 fm depth option includes a decrease of 19.8 mt of bocaccio, 0.3 mt of canary rockfish, and 0.3 mt of cowcod compared to the No Action Alternative (Table B-100 compared to Table B-95).

Projections for non-overfished species for Alternative 1 under all depth options are provided in (Table B-101).

Table B-98. Alternative 1 (Option 60 fm): California recreational projected mortality of overfished species for 2013-2014, including mortality from proposed changes to management measure.

Species	Projected Mortality (mt)	
Bocaccio	Two fish sub-bag limit (No Action)	50.7
	Three fish sub-bag limit	5.8
	Removing 10' minimum size length	0.2
	Total	56.7
Canary Rockfish	11.3	
Cowcod	0.3	
Yelloweye Rockfish	3.4	

Table B-99. Alternative 1 (Preferred 50 fm): California recreational projected impacts to overfished species for 2013-2014, including impacts from proposed changes to management measures.

Species	Projected Impacts (mt)	
Bocaccio	Two fish sub-bag limit (status quo)	44.5
	Three fish sub-bag limit	5.1
	Removing 10' minimum size length	0.2
	Total	49.8
Canary Rockfish	11	
Cowcod	0.2	
Yelloweye Rockfish	3.4	

Table B-100. Alternative 1 (Option 40 fm): California recreational projected impacts to overfished species for 2013-2014, including impacts from proposed changes to management measures.

Species	Projected Impacts (mt)	
Bocaccio	Two fish sub-bag limit (status quo)	27.6
	Three fish sub-bag limit	3.2
	Removing 10' minimum size length	0.1
	Total	30.9
Canary Rockfish	10.8	
Cowcod	0.0	
Yelloweye Rockfish	3.4	

Table B-101. Alternative 1 including Depth Options: California recreational projected mortality of non-overfished species for 2013-2014. Results in parenthesis reflect changes to management measures other than season and depth.

Species	Projected Mortality (mt)		
	Option 60 fm	**Preferred 50 fm**	**Option 40 fm**
Black Rockfish	164.2	164	164.0
Blue Rockfish	57.1	57	56.7
Cabezon	24.2	24.2	24.2
California scorpionfish	77.0	74.4	69.7
Greenlings	14.4 (15.5)	14.4 (15.5)	14.4 (15.5)
Lingcod	119.3	118.9	116.9
Minor Nearshore Rockfish North	7.8	7.8	7.8
Minor Nearshore Rockfish South	248.0	247.1	244.9
Widow Rockfish	2.2	1.9	1.6

Similar to the No Action alternative, inseason management response would include closing one or more recreational groundfish management areas for boat based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions. The preferred depth restriction in the Southern Management Area is 50 fm. If cowcod encounters are tracking higher or lower than projected, inseason action could be taken to modify the depth restrictions accordingly.

Community Impacts

Under the preferred yelloweye rockfish ACL, the California recreational harvest guideline is 3.4 metric tons. This will allow the Mendocino Management Area season length to extend through the Labor Day holiday weekend (September 2 in 2013 and Sept 1 in 2014). Under this scenario, the season length in the Mendocino Management Area would be increased by 18 days relative to No Action, which is a 19.5 percent increase in angler days. Extending the season through Labor Day is critical for this area as it has one of the highest effort and profit potentials because it is the prime camping and fishing season. Extending the season to September 2nd is expected to result in increased profits to business, benefiting local communities. Other California recreational groundfish management areas would not see an extension to the season length or reduction of the depth constraints under this alternative.

Under Alternative 1 (including all depth and allocation options), California communities, particularly in the northern management areas, will continue to be negatively impacted by reduced season lengths and increased depth restrictions. Under Alternative 1, the Northern Management Area would have a five and a half month season length and a depth restriction of 20 fathoms where as the South region in Oregon, which is adjacent to this area, has an unrestricted depth constraint and a year-round season. One would theoretically expect management in both areas to be the same since they are located adjacent to one another – but that is not the case.

Under the preferred depth option (50 fm) and the 40 fm depth option, California communities in the Southern Management Area will be negatively impacted by the shallow depth restrictions compared to the 60 fm depth option (No Action). Although the season length would remain the same, this area would see the shallowest depth restrictions that region has seen since 2003. Redistribution of effort to the remaining fishing grounds and the potential for localized depletion could become more problematic. The higher cowcod allocation afforded under the alternate allocation scenario may alleviate the need to implement shallow depth restrictions.

The California recreational groundfish fishery has historically operated in deeper depths with longer seasons (PFMC. 2003); however, with more restrictive recreational harvest guidelines for the overfished groundfish species, communities in all the management areas coast wide have seen drastic reductions in season length and considerable increases in depth restrictions. Management areas north of Point Arena have been subject to the most restrictive season and depth constraints. Due to these restrictions to the groundfish fishery and other marine fisheries in the region (e.g., salmon), many communities along the north coast have seen a decrease in angler effort. The port of Crescent City often competes with the Oregon ports of Brookings and Gold Beach, where fewer restrictions and lower fuel prices have attracted many anglers who used to fish out of Crescent City (Pomeroy et al. 2010).

In addition to reduced season lengths and shallower depth restrictions, California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, and destroyed vessels. Crescent City and Santa Cruz were both highly impacted by the disaster. As a result, boat launch ramps and gas stations were closed for evaluation, and private boat slips were repaired or completely rebuilt in both these communities.

B.6.1 California Recreational: Alternative 1

California recreational management measures under Alternative 1 are the same as the Preferred Alternative, except for the cowcod allocation. The non-trawl cowcod allocation, which includes the California recreational fishery, is higher under Alternative 1 compared to the Preferred Alternative (1.9 mt compared to 1 mt). The projected mortality under Alternative 1 is the same as described under the Preferred Alternative.

B.6.2 California Recreational: Alternative 2

California recreational management measures under Alternative 2 are the same as Alternative 1 and have the same projected mortality.

B.6.3 California Recreational: Alternative 3

California recreational management measures under Alternative 3 are the same as Alternative 1 and have the same projected mortality.

B.6.4 California Recreational: Alternative 4

The 2013-2014 California recreational groundfish season projected mortality and season structure under Alternative 4 are based on CDFG's updated RecFISH model. Model projections were calculated for the five recreational groundfish management areas using updated 2008, 2009, and 2010 RecFIN estimates; overfished species mortality are reported statewide. Table B-102 depicts the recreational harvest guidelines for the 2013-2014 California recreational groundfish seasons under this alternative including the cowcod allocation option (see Appendix C, section C.3). The proposed groundfish season structure and depth constraints listed out by recreational management area can be seen in Figure B-24, Figure B-25, Figure B-26 and Figure B-27.

Under Alternative 4, the allocations to the California recreational fishery are the same or higher than the No Action alternative except for canary rockfish, which is drastically reduced. As a result, the low canary rockfish allocation based on the Council's catch sharing plan will adversely impact communities statewide. These impacts on communities vary depending on which alternative is being evaluated. The recreational fishery will not be able to fully utilize the available yelloweye rockfish allocation under this alternative due to the low allocation of canary rockfish.

Table B-102. Alternative 4: California allocations/recreational harvest guidelines for 2013-2014 under the preferred and alternate cowcod allocations.

Species	Harvest Guideline (mt)	
	Preferred Allocation	Option 1
Bocaccio	167.9/174.2	167.9/174.2
Canary Rockfish	7.1/7.4	7.1/7.4
Cowcod*	1.0	1.9
Yelloweye Rockfish	3.4	3.4

*The preferred allocation reflects the percentages under the No Action alternative (66% trawl; 34% non-trawl). Under option 1, the allocations are reversed (34% trawl; 66% non-trawl).

Groundfish Seasons and Area Restrictions

Under this alternative, the tradeoffs between different season lengths and depth restrictions were explored (option 4a and 4b). Under option 4a, longer seasons and more restrictive depth constraints were examined; whereas option 4b explored shorter seasons and less restrictive depths.

Under option 4a, the depth restrictions would be more constraining in most management areas compared to the No Action alternative, except for the northern management areas (Figure B-24 and Figure B-25). Due to the low canary rockfish encounter rates, the season length in the Northern and Mendocino Management Areas could be extended under this alternative; the depth restrictions would be shallower as well. The San Francisco and Central Management Areas will see a decrease in season length and a significant increase in the depth restriction compared to the No Action Alternative. The San Francisco and Central Management Areas have historically seen the highest canary rockfish encounters. The Southern Management will see an increase in the depth restriction.

Competition for space with the commercial nearshore fishery and the potential for localized depletion become even more problematic when the recreational fishery is open in the northern management areas because the two fisheries operate in similar depths.

2013												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 1 – Oct 31 < 20fm						Closed	
Mendocino	Closed				May 1 – Oct 31 < 20fm						Closed	
San Francisco	Closed					June 1 – Nov 30 < 20fm						C
Central	Closed					June 1 – Nov 30 < 20fm						C
Southern	Closed		Mar 1 – Dec 31 <40fm									

Figure B-24. Alternative 4 (option 4a): California recreational groundfish season structure and depth constraints for 2013.

2014												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 1 – Nov 30 <20fm							C
Mendocino	Closed				May 1 – Nov 30 <20fm							C
San Francisco	Closed					June 1 – Nov 30 < 20fm						C
Central	Closed					June 1 – Dec 31 < 20fm						
Southern	Closed		March 1 – Dec 31 < 40fm									

Figure B-25. Alternative 4 (option 4a): California recreational groundfish season structure and depth constraints for 2014.

Under option 4b, the season lengths would be more constraining in most management areas compared to the No Action alternative, except for the Southern Management Area (Figure B-26 and Figure B-27). In addition to season length, the Southern and Central Management Areas will see shallower depth restrictions as well. Due to the low canary encounter rates, the depth restrictions would be deeper in the Northern and Mendocino Management Areas under this alternative. The San Francisco and Central Management Areas will see a significant decrease in season length compared to the No Action Alternative. The San Francisco and Central Management Areas have historically seen the highest canary rockfish encounters. The Southern Management will have a shallower depth restriction.

2013												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed					Jun 1-Aug 31 <30fm			Closed			
Mendocino	Closed					Jun 1-Aug 31 <30fm			Closed			
San Francisco	Closed				May 15 - Aug 31 <30fm				Closed			
Central	Closed				May 15 - Aug 31 <30fm				Closed			
Southern	Closed		Mar 1 – Dec 31 < 40fm									

Figure B-26. Alternative 4 (option 4b): California recreational groundfish season structure and depth constraints for 2013.

2014												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed					Jun 1-Aug 31<30fm			Closed			
Mendocino	Closed					Jun 1-Aug 31<30fm			Closed			
San Francisco	Closed				May 1-Aug 31<30fm				Closed			
Central	Closed				May 1-Aug 31<30fm				Closed			
Southern	Closed		March 1 – Dec 31 <40fm									

Figure B-27. Alternative 4 (option 4b): California recreational groundfish season structure and depth constraints for 2014.

Similar to No Action alternative, the YRCAs would be available under this alternative and could be implemented inseason if catches are projected to exceed harvest guidelines.

The Commission has implemented or is currently in the process of implementing MPAs throughout the entire state. When MPA implementation is complete, more than of 124 MPAs covering approximately

848 square miles (16 percent) of state waters will be in effect (CDFG 2011). Since most of these MPAs occur in state waters, many in 20 fathom or less, the available fishing areas, particularly in the Northern and Mendocino Management Areas, will be reduced.

Groundfish Bag Limits and Size Limits

Under Alternative 4, there are no changes to the groundfish bag limits or size limits except for the following:

Bocaccio – Under option 4a and 4b, the No Action sub-bag limit for bocaccio is two fish, with a minimum size of ten inches. The Council is proposing to increase the sub-bag limit from two fish to three fish. The increase in the sub-bag limit is only expected to increase total bocaccio mortality by 11.5 percent (2.3 mt under option 4a and 2.6 under option 4b; Table B-103, Table B-104). The Council is also proposing to remove the minimum size limit of ten inches. Removing the size limit is expected to increase total bocaccio mortality by 0.1 mt (Table B-103, Table B-104). The proposed changes are not mutually exclusive, and the impacts are additive. The proposed changes are not mutually exclusive and the impacts are additive. Currently bocaccio is the only rockfish species in the recreational sector that has a size limit and removing the size limit would reduce regulatory complexity. There are no expected increases to other overfished species mortality as a result of these management measures.

Greenlings – Under option 4a and 4b, the No Action sub-bag limit for greenlings is two fish. The Council is proposing to increase the sub-bag limit to 10 fish to maintain consistency with state regulations, which were modified to reflect the increased contribution to the "other fish" complex analyzed in the 2011-12 FEIS. By increasing the sub-bag limit, the estimated take under option 4a would be approximately 16.9 mt and 17.7 mt (in 2013 and 2014); under option 4b the estimated take would be 10.1 mt and 10.7 mt (Table B-105; Table B-106).

The Department is not proposing any changes to the minimum size restriction. There are no expected increases to overfished species mortality as a result of this increase.

Additional Management Measures Analyzed

Shelf Rockfish Retention in Cowcod Conservation Area (CCA)

Under option 4a and 4b, the Council is requesting a modification to existing regulations governing recreational groundfish fishing within the Cowcod Conservation Areas (CCA) to allow retention of shelf rockfish taken during the open season for groundfish within the existing depth constraint of 20 fm. Removing the prohibition on shelf rockfish retention in depths of 20 fm or less in the CCA when fishing for rockfish is open will reduce discard mortality that currently occurs while in pursuit of other species within the 10 fish RCG bag limit. Under the proposed action, recreational anglers will meet their RCG bag limit sooner and with less discarding; reducing the chances of encounters with overfished species. Also, this change will make regulations more consistent with those in other management areas and other fisheries.

Increased mortality of shelf rockfish are expected to be minimal and can easily be accommodated within the recreational harvest guideline with a minimal risk of exceeding the ACLs. No ACLs for target or overfished species are expected to be exceeded as a result of this action.

Projected Impacts and Inseason Management Response

The projected mortality under option 4a and 4b, compared to the No Action alternative, includes a decrease of 0.1 metric ton of yelloweye rockfish, a decrease of 28 metric tons of bocaccio, a decrease of 4.0 metric tons of canary rockfish and a decrease of 0.3 metric ton of cowcod. The projected mortality for all overfished species under this alternative are anticipated to stay below the harvest recreational guideline (Table B-103; Table B-104).

Projected mortality of non-overfished species is provided in Table B-105 and Table B-106.

Table B-103. Alternative 4 (option 4a and 4b): California recreational projected mortality of overfished species for 2013, including impacts from proposed changes to management measures.

Species	Projected Mortality (mt)	
Bocaccio	Two fish sub-bag limit (No Action)	20.0/22.5
	Three fish sub-bag limit	2.3/2.6
	Removing 10' minimum size length	0.1/0.1
	Total	22.4/22.5
Canary Rockfish	7.1/7.1	
Cowcod	0/0	
Yelloweye Rockfish	2.8/3.1	

Table B-104. Alternative 4 (option 4a and 4b): California recreational projected mortality of overfished species for 2014, including impacts from proposed changes to management measures.

Species	Projected Mortality (mt)	
Bocaccio	Two fish sub-bag limit (No Action)	20.1/22.8
	Three fish sub-bag limit	2.3/2.6
	Removing 10' minimum size length	0.1/0.3
	Total	22.5/25.5
Canary Rockfish	7.4/7.4	
Cowcod	0/0	
Yelloweye Rockfish	2.8/3.0	

Table B-105. Alternative 4 (option 4a and 4b): California recreational projected mortality of non-overfished species for 2013. Results in parenthesis reflect changes to management measures other than season and depth.

Species	Projected Mortality (mt)	
	Option 4a	Option 4b
Black Rockfish	178.0	119.7
Blue Rockfish	36.2	27.9
Cabezon	24.8	17.4
California scorpionfish	77.0	69.7
Greenlings	15.7 (16.9)	9.4(10.1)
Lingcod	112.5	74.7
Minor Nearshore Rockfish North	8.4	4.6
Minor Nearshore Rockfish South	195	142.5
Widow Rockfish	0.4	0.6

Table B-106. Alternative 4 (option 4a and 4b): California recreational projected mortality of non-overfished species for 2014. Results in parenthesis reflect changes to management measures other than season and depth.

Species	Projected Impacts (mt)	
	Option 4a	Option 4b
Black Rockfish	180.4	123.4
Blue Rockfish	37.7	30.1
Cabezon	25.4	18.1
California scorpionfish	69.7	69.7
Greenlings	16.5 (17.7)	10.0 (10.7)
Lingcod	115.9	78.3
Minor Nearshore Rockfish North	8.9	4.6
Minor Nearshore Rockfish South	202.9	152.5
Widow Rockfish	0.4	0.6

Similar to the No Action alternative, inseason management response would include closing one or more recreational groundfish management areas for boat based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

Community Impacts

Under option 4a and 4b, the California recreational harvest guideline for canary rockfish is 7.1 metric ton in 2013 and 7.4 metric ton in 2014. These harvest guidelines make canary rockfish the most constraining species for the recreational sector. The recreational fishery will not be able to fully utilize the available yelloweye rockfish allocation under this alternative due to the low allocation of canary rockfish.

Under the option 4a, the total season length in all the management areas will have been increased by 46 angler days in 2013 (4.6 percent increase) and 137 angler days in 2014 (13.8 percent increase) relative to the No Action alternative. However, due to projected high encounter rates of canary rockfish in deeper water, particularly in the San Francisco, Central and Southern Management Areas, the depth restrictions are increased significantly.

Under option 4a, California communities, particularly in the northern management areas, will continue to be negatively impacted by reduced season lengths and increased depth restrictions. Under this alternative, the Northern Management Area would have a five and a half month season length and a depth restriction of 20 fathoms where as the South region in Oregon, which is adjacent to this area, has an unrestricted depth constraint and a year-round season. One would theoretically expect management in both areas to be the same since they are located adjacent to one another – but that is not the case.

The California recreational groundfish fishery has historically operated in deeper depths with longer seasons (PFMC. 2003); however, with more restrictive recreational harvest guidelines for the overfished groundfish species, communities in all the management areas coast wide have seen drastic reductions in season length and considerable increases in depth restrictions. Management areas north of Point Arena have been subject to the most restrictive season and depth constraints. Due to these restrictions to the groundfish fishery and other marine fisheries in the region (e.g., salmon), many communities along the north coast have seen a decrease in angler effort. The port of Crescent City often competes with the Oregon ports of Brookings and Gold Beach, where fewer restrictions and lower fuel prices have attracted many anglers who used to fish out of Crescent City (Pomeroy et al. 2010).

Under option 4b, the total season length in all the management areas will have been decreased by approximately 300 angler days in 2013 (30 percent decrease) and 254 angler days in 2014 (26 percent decrease) relative to the No Action alternative. However, due to projected high encounter rates of canary rockfish in deeper water, particularly in the San Francisco, Central and Southern Management Areas, the depth restrictions are increased significantly along with a sharp decrease in season length.

Under option 4b, California communities, particularly in the northern management areas, will continue to be negatively impacted by reduced season lengths and increased depth restrictions as described under Alternative a. Management areas north of Point Arena will see the most restrictive season length that region has ever seen.

In addition to reduced season lengths and increased depth restrictions, California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, and destroyed vessels. Crescent City and Santa Cruz were both highly impacted by the disaster. As a result, boat launch ramps and gas stations were closed for evaluation, and private boat slips were repaired or completely rebuilt in both these communities.

B.6.5 California Recreational: Alternative 5

California recreational management measures under Alternative 5 are the same as Alternative 1 and have the same projected mortality.

B.6.6 California Recreational: Alternative 6

California recreational management measures under Alternative 6 are the same as Alternative 1 and have the same projected mortality.

B.6.7 California Recreational: Alternative 7

California recreational management measures under Alternative 7 are the same as Alternative 1 and have the same projected mortality.

B.6.1 California Recreational: Alternative 8

California recreational management measures under Alternative 8 are the same as Alternative 1 and have the same projected mortality.

B.7 References

California Department of Fish and Game. 2011. "Marine Life Protection Act Implementation Update". October 7, 2011. www.dfg.ca.gov/mlpa/pdfs/processupdate100711.pdf

Dean Runyan Associates. 2009. Fishing, hunting, wildlife viewing, and shellfishing in Oregon – 2008 State and County expenditure estimates. http://www.dfw.state.or.us/agency/docs/Report_5_6_09--Final%20(2).pdf (Available November 2010).

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PFMC and NMFS. 2009. Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2009-2010 Pacific Coast Groundfish Fishery Final Environmental Impact Statement Including Regulatory Impact Review and Initial Regulatory Flexibility Analysis. Pacific Fishery Management Council, Portland, OR. January 2009.

Pomeroy, C., Thomson, C. J., Stevens, M. M. 2010. California's North Coast Fishing Communities Historical Perspective and Recent trends, Crescent City Harbor fishing Community Profile. California Sea Grant Extension Program.

Appendix C DETAILED MANAGEMENT MEASURES ANALYSIS

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

**Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service**

September 2012

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This appendix provides detailed information about the new management measures (i.e., management measures that have not previously been analyzed or implemented) being proposed and analysis of modifications to existing management measures.

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C.1 Modifications to the Boundaries Defining the Rockfish Conservation Areas

The following proposed modifications to current Rockfish Conservation Area (RCA) boundary waypoints were adopted for analysis:

- Adjustments of waypoints on the 200 fm RCA boundary requested by the Oregon Department of Fish and Wildlife (ODFW).
- Adjustments to waypoints on the 150 fm RCA boundary where it crosses the modified 200 fm RCA boundary (Agenda Item E.9.b, Supp GAP Report November 2011) and 200 fm RCA boundary (Agenda Item G.9.b, Supplemental GMT Report, September 2011)
- Adjustments to the 150 fm RCA boundary waypoints at Usal and Noyo Canyons (Agenda Item E.9.b, Supp GAP Report November 2011);

Overview of Accountability Measures

RCAs are one type of measure used to keep catches within annual catch limits (ACLs). RCAs affect the collective behavior of harvesters by preventing fishing in areas where bycatch of overfished species is particularly high. Their extent varies by season and gear type to target fishing activities associated with higher bycatch. The boundaries of RCAs are defined by depth contours since a correlation between depth and the distribution (or catch) of overfished species has been demonstrated through an analysis of trawl logbook and survey data. The boundary depth contours defined by waypoints in Federal regulations (at 50 CFR 660.391-660.394) only approximate actual isobaths for two reasons. First, the waypoints defining the lines were defined using available bathymetry, which may have limited accuracy. Second, for enforcement purposes the lines defined by the waypoints are a more generalized, or simplified, representation of isobaths.

Other measures more directly constrain catch on an individual vessel level. These are:

- Individual fishing quota (IFQ) management for the shoreside trawl fleet (with cumulative landing limits for some non-target, non-overfished management units)
- Co-op allocations to the at-sea whiting fleets (catcher vessels delivering to at-sea processors and catcher-processors)
- Permit based sablefish allocations to vessels in the limited entry fixed gear fleet during the primary season
- Daily and cumulative landing limits for the open access fixed gear sectors and limited entry fixed gear outside the primary season

Only catch share management directly controls total catch of most management unit species (including all overfished species) in the trawl sectors with all catch monitored by observers. Daily trip limits and 2-month limits in other sectors only control landings; overfished species total catch (mostly bycatch) must be imputed based on partial observer coverage. RCAs add another layer of precaution by affecting collective behavior and their use is more important in managing those sectors not under catch shares since overfished species bycatch cannot be directly controlled.

“Inseason” management allows measures to be periodically adjusted during the biennial period based on new information and catch projections. These management measures are described in more detail in section 3.3 of the EIS.

Modifications of the 200 fm Depth Contour Described by Waypoints Listed at 50 CFR 660.394

Description of the 200 fm Depth Contour

During the 2011-12 biennial cycle the 200 fm depth contour was used as the seaward boundary of the trawl RCA (which applies to the shoreside sector) January to April and September to December north of 40° N. latitude. The depth contours defining the boundaries of RCAs are listed in trip limit tables published in Federal regulations and in periodic Public Notices announcing changes to groundfish management measures (http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Public-Notices/Index.cfm). This boundary is intended to reduce bycatch of darkblotched rockfish, POP, and petrale sole, although a modified line is applied during the winter months to allow access to areas of higher abundance of petrale sole, an important target species that is currently managed under a rebuilding plan.

Management Issue

The current 200 fm depth contour specified in regulation at 50 CFR 660.74 approximates the 200 fm isobath. To allow greater access to trawl fishing areas for Dover sole, thornyheads, and sablefish (DTS species) while maintaining the intent of the 200 fm line, better alignment of the 200 fm line with the 200 fm isobath is necessary for waters off Oregon.

Management Options

Under **No Action** (described in section 2.2 of the EIS) the 200 fm depth contour created by the waypoints currently listed at 50 CFR 660.74 would be retained in 2013-14.

Under the **Action Alternatives** (Alternatives 1-8 described in section 2.2 of the EIS) the 200 fm depth contour would more closely align with actual bathymetry. This change is based on a proposal submitted by ODFW to modify the 200 fm RCA boundary by adding two waypoints between current waypoints #86 and #88. Current waypoint #87 would be deleted and replaced with the proposed waypoint #2. This change would open an estimated 7.6 square miles to fishing by moving the boundary line shoreward and closer to the 200 fm isobath. Table C-1 lists the waypoint coordinates and Figure C-1 shows the proposed change relative to the existing depth contour under Option 1 (No Action).

As seen in Figure C-1, the depth contour is highly generalized with areas and depths both greater and less than 200 fm on the shoreward side of the line in this region. Visual inspection suggests that this change would open more area in depths greater than 200 fm than shallower areas.

Table C-1. Coordinate list for proposed modification to 200 fm boundary.

		Coordinates	
ID	Name	Degrees, decimal minutes	Decimal degrees
86	Current waypoint	44°38.52' N, 124°49.11 W	44.642, -124.819
1	OR proposed modification	44°21.73' N, 124°49.82' W	44.362, -124.830
2	OR proposed modification	44°17.57' N, 124°55.04'W	44.293, -124.917
87	Current waypoint (deleted)	44°23.30′ N., 124°50.17′ W.	
88	Current waypoint	44°13.19′ N., 124°58.66′ W.	

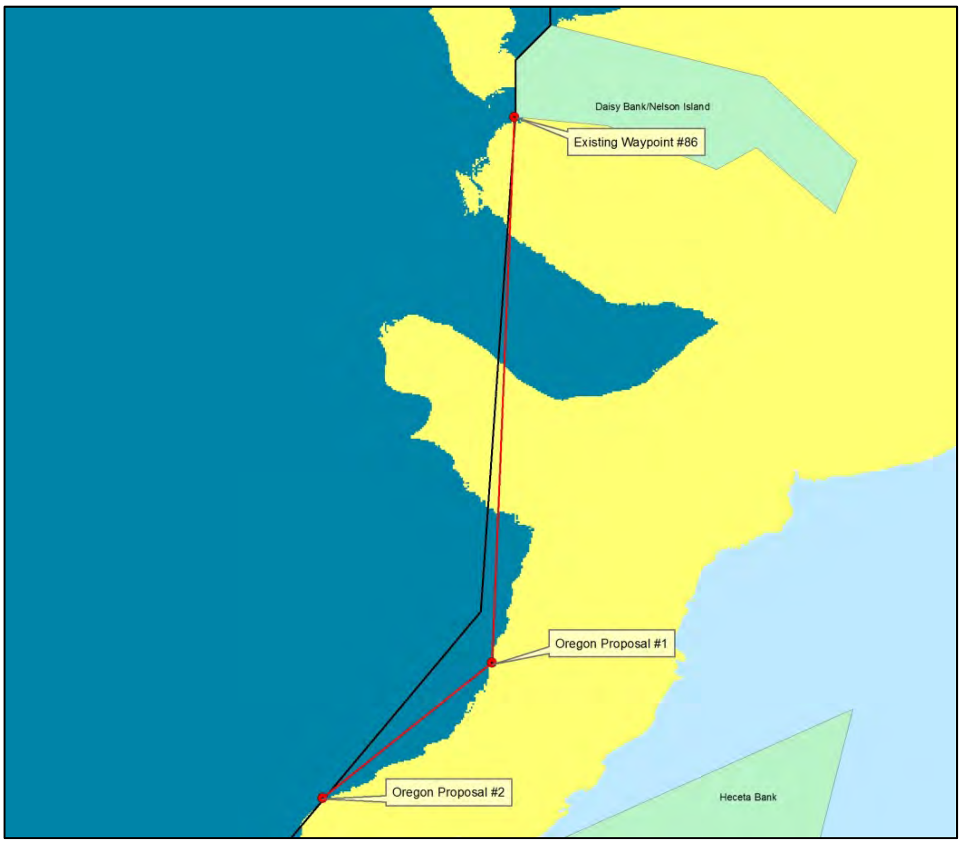


Figure C-1. Modification to the 200 fm depth contour proposed by Oregon. Dark blue: depths greater than 150 fm; yellow: depths between 150 and 75 fm; light blue: depths less than 75 fm. Bathymetry based on *NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11. http://www.ngdc.noaa.gov/mgg/coastal/crm.html*

Comparison of the Management Options

Biological Impacts: The delineation of RCAs was based on an analysis of trawl logbook and survey data to determine the relative abundance and bycatch rates of overfished species according to bottom depth.[1] To the degree that there is a precise correlation between depth and catch rates, under action alternatives there could be a marginal increase in the catch of overfished species, other fish species, and the potential

[1] Pacific Fishery Management Council. 2003. Final environmental impact statement for the proposed groundfish acceptable biological catch and optimum yield specifications and management measures for the 2003 Pacific coast groundfish fishery. Portland, OR. January 2003.

take of protected species occurring in the opened area. But this rationale also supports the presumption that catch rates in the newly opened area would be comparable to rates in the currently open areas greater than 200 fathoms in depth. There is not enough information to quantify such changes, however. By more closely aligning the depth contour with the actual bathymetry in the area this option is intended to meet the objective of RCA management of reducing bycatch rates of overfished species while having a beneficial impact in terms of fishing opportunity. In that sense impacts are within the scope described in previous groundfish harvest specifications EISs, which evaluated the application of this RCA boundary. Depth-based management was first introduced in 2003 to control bycatch of overfished species. Dr. James Hastie of the NWFSC analyzed trawl logbook and other data to correlate overfished species bycatch rates by depth zones. These data were subsequently integrated into a catch projection model he developed for the trawl fishery. Depth-based management has been implemented by defining waypoints for lines approximating various isobaths. Subsequent adjustments to these waypoints are intended to make them more accurately correspond to depth contours. RCA configurations have been evaluated in the harvest specifications EISs since 2003 with respect to their likely performance in mitigating overfished species bycatch. The accountability measures described above and in section 2.2 of the main EIS document provide additional layers of precaution with respect to the catch of groundfish. The risk of exceeding an ACL in the trawl fishery should be no greater than under the current line (No Action) if bycatch rates are not different in the open area than in other areas deeper than 200 fathoms. This inference is based on the same premise used in the original development of depth-based management to control bycatch overfished species, which is that bycatch rates for a given overfished species varies by depth.

Socioeconomic Impacts: The change proposed under the action alternative may have a marginal socioeconomic benefit for the shoreside trawl fishery managed under an RCA with a 200 fathom contour as its seaward boundary, because harvesters could access more area deeper than 200 fathoms where target species occur. Since the 200 fathom contour has not been used, and is not being proposed for use in 2013-14, for managing other commercial and recreational fisheries no socioeconomic effects are expected for these groups. The change in management cost, primarily those associated with enforcement of the RCA boundaries, would be minimal under the proposal. The compliance with the depth contours are monitored with vessel monitoring systems (VMS) that are currently required on all groundfish vessels.

Modifications of the 150 fm Depth Contour Described by Waypoints Listed at 50 CFR 660.393

Description of 150 fm Depth Contour

The 150 fm depth contour was used in the 2011-12 biennial cycle to define the seaward boundary of the trawl RCA north of 45°46’ N. latitude from May to August and between 45°46’ N. latitude and 48°10’ N. latitude in March-April and September to December. It also defined the seaward boundary of the trawl and non-trawl RCA in all bimonthly periods south of 40°10’ N. latitude and around offshore islands in Southern California.

During the 2013-14 biennial period the current configuration of the non-trawl RCA is proposed to remain in place. However, the Council is considering potential changes to the configuration of the trawl RCA which could involve more widespread use of the 150 fathom line as the seaward boundary.

The 150 depth contour is used to reduce the catch of overfished species that are found on the continental shelf including canary rockfish, yelloweye rockfish, and bocaccio.

Management Issue

Changes to the 150 fathom depth contour are proposed to better align it with actual bathymetry in three areas: adjacent to Westport, Washington; at Noyo Canyon, and at Usal Canyon, located off Central

California. As discussed below, the change adjacent to Westport was prompted because the 150 line crosses the 200 fathom depth contour in this area. Depths greater than 150 fathoms at the heads of the two canyons are currently shoreward of the 150 fathom line.

Management Options

Under **No Action** (described in section 2.2 of the EIS) the 150 fathom depth contour defined by waypoints currently listed at 50 CFR 660.73 would remain in effect.

Under the **Action Alternatives** (Alternatives 1-8 in section 2.2 of the EIS) four sets of changes to the 150 fathom depth contour are proposed to better align it with actual bathymetry:

- Modify the 150 fathom depth contour between waypoint #57 and #60 where it currently crosses the 200 fathom depth contour (in waters adjacent to Westport, WA) as requested by the Washington Department of Fish and Wildlife (WDFW)
- Modify waypoints at 50 CFR 660.73 between #191 and #192 and to better align the 150 fm depth contour with actual bathymetry at Noyo Canyon as proposed by the Groundfish Advisory Subpanel (GAP) (Agenda Item E.9.b, Supplemental GAP Report, November 2011)
- Modify waypoints at 50 CFR 660.73 between #186 and #187 and to better align the 150 fm depth contour with actual bathymetry at Usal Canyon as proposed by the GAP (Agenda Item E.9.b, Supplemental GAP Report, November 2011)

Table C-2 shows the revised coordinates for the proposed change between waypoints #57 and #60. As shown in Figure C-2, waypoints #58 and #59 on the 150 fm line would be removed; two new waypoints would be substituted for these where the current 150 fm line intersects with the 200 fm RCA boundary. As shown in Figure C-3 there is a discrepancy between the gridded 3 arc-second Coastal Relief Model (CRM) data developed by the NOAA National Geophysical Data Center and Electronic Navigational Chart (ENC) data for the area in question. The ENC data show a 200 fm depth contour extending into the area encompassed by the 150 fm RCA boundary waypoints 57-60. However, the 200 fm and 150 fm lines were devised independently of one another and having the shallower line crossing the deeper line is inconsistent.

At the November 2011 Council meeting the GAP recommended two adjustments to the 150 fm RCA boundary to enable access to waters greater than 150 fm in Usal and Noyo Submarine Canyons. Based on the 3 arc-second coastal relief model developed by the NOAA National Geophysical Data Center a modification of the gap proposal has been developed that better approximates the 150 fm isobaths in these two submarine canyons. The coordinates for 8 new waypoints for each of these alternative modifications are shown in Table C-3 and Figure C-4 shows the boundaries graphically in relation to the 150 fm isobaths. This proposal would increase the area open to fishing by 1.54 sq. mi. In examining the GAP proposed change against more detailed bathymetry Council staff developed an alternative set of changes intended to better meet the objective of matching lines to actual bathymetry. These waypoint changes are listed in Table C-4. This alternative configuration would increase the open area by 1.95 sq. mi. At the April 2012 Council meeting, the GAP recommended using the revised set of waypoint proposed by Council staff (Agenda Item I.3.b, Supplemental GAP Report, April 2012). This alternative set of waypoints is considered the management proposal included in the action alternatives.

Table C-2. Waypoints for proposed change to 150 fm RCA boundary near Westport, WA.

ID	Name	Degrees, Decimal minutes	Decimal Degrees
57	150-fm (274-m) Contour - Coastwide	46°58.471' N, 124°59.082' W	124.98470, 46.97452
	Computed line intersection	46°58.36' N, 124°59.816' W	124.99693, 46.97266
55	200-fm (366-m) Contour - Coastwide	46°56.8' N, 125°0' W	125.00000, 46.94667
	Computed line intersection	46°56.615' N, 125°0' W	125.00000, 46.94358
60	150-fm (274-m) Contour - Coastwide	46°57.092' N, 124°58.86' W	124.98100, 46.95153

Table C-3. Coordinates for proposed modifications to the 150 fm RCA boundary at Usal and Noyo Submarine Canyons proposed by the GAP.

Name	ID	Coordinates	
		Degrees, decimal minutes	Decimal degrees
Usal Canyon	1	39°49.099 N, 124°6.028 W	39.818, -124.1
Usal Canyon	2	39°48.913 N, 124°4.599 W	39.815, -124.077
Usal Canyon	3	39°48.599 N, 124°4.512 W	39.81, -124.075
Usal Canyon	4	39°48.171 N, 124°5.355 W	39.803, -124.089
Noyo Canyon	1	39°32.98 N, 123°56.43 W	39.55, -123.941
Noyo Canyon	2	39°31.918 N, 123°56.489 W	39.532, -123.941
Noyo Canyon	3	39°31.816 N, 123°56.762 W	39.53, -123.946
Noyo Canyon	4	39°32.275 N, 123°57.354 W	39.538, -123.956

Table C-4. A variation on the GAP proposed changes at Usal and Noyo Canyons developed by Council staff.

Name	ID	Coordinates	
		Degrees, decimal minutes	Decimal degrees
Usal Canyon	1	39°49.098 N, 124°6 W	39.818, -124.1
Usal Canyon	2	39°48.936 N, 124°4.74 W	39.816, -124.079
Usal Canyon	3	39°48.6 N, 124°4.5 W	39.81, -124.075
Usal Canyon	4	39°47.952 N, 124°5.22 W	39.799, -124.087
Noyo Canyon	1	39°32.982 N, 123°56.4 W	39.55, -123.94
Noyo Canyon	2	39°31.644 N, 123°56.16 W	39.527, -123.936
Noyo Canyon	3	39°31.398 N, 123°56.7 W	39.523, -123.945
Noyo Canyon	4	39°32.346 N, 123°57.42 W	39.539, -123.957

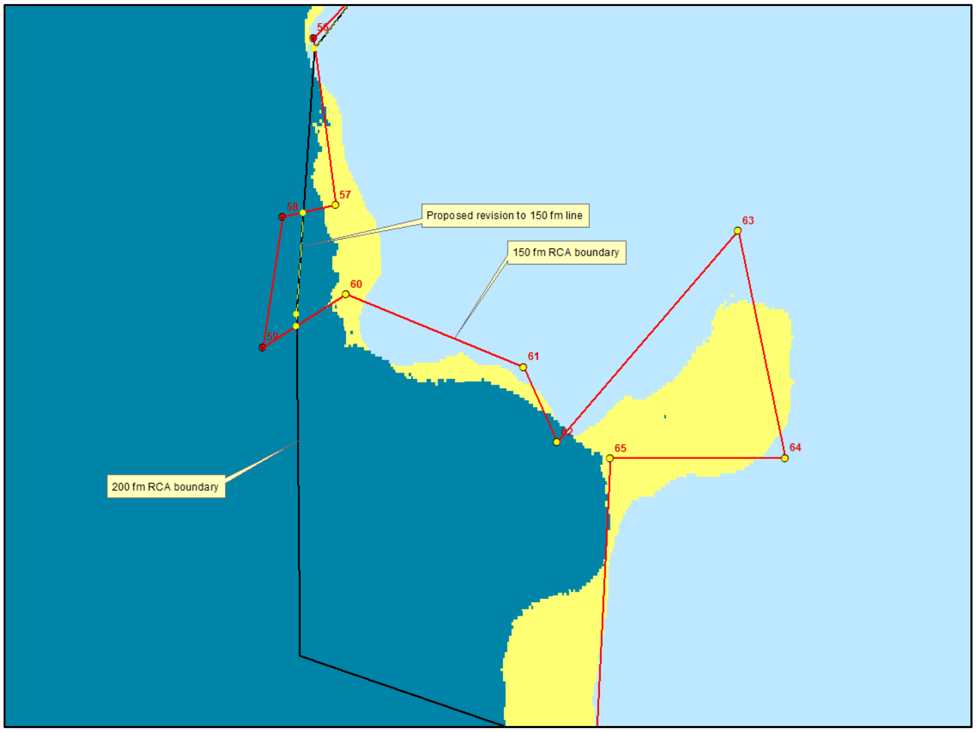


Figure C-2. Change to 150 fm RCA boundary proposed by WDFW. Dark blue fill: depths greater than 200 fm; yellow fill: depths between 200 and 150 fm; light blue fill: depths less than 150 fm. Bathymetry based on *NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11, http://www.ngdc.noaa.gov/mgg/coastal/crm.html.*

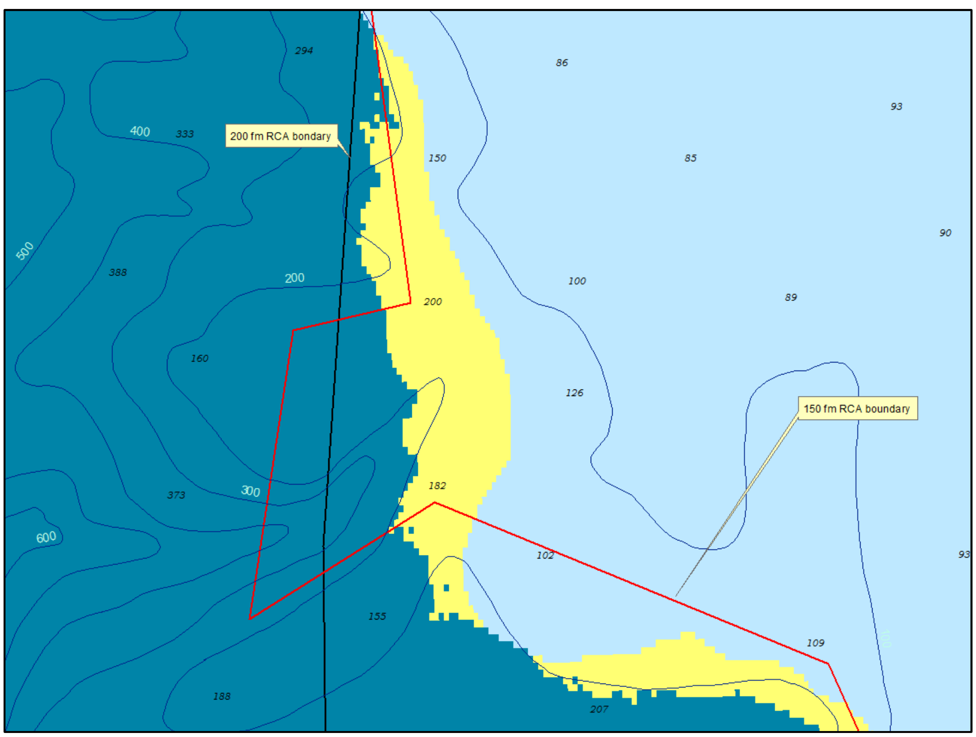


Figure C-3. ENC depths and depth contours shown on CRM gridded depths for area of WDFW proposed revision. ENC data from NOAA ENC®Direct to GIS Coastal data series, obtained 1/25/08, http://www.nauticalcharts.noaa.gov/csdl/ctp/encdirect_new.htm.

a. Usal Canyon

b. Noyo Canyon

Figure C-4. Proposed modifications to the 150 fm RCA boundary at (a.) Usal and (b.) Noyo Submarine Canyons. Dark blue: depths greater than 150 fm; yellow: depths between 150 and 100 fm; light blue: depths less than 100 fm. Bathymetry based on: ***NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11, http://www.ngdc.noaa.gov/mgg/coastal/crm.html***

Comparison of the Management Options

Biological Impacts: As with the proposed modification to the 200 fathom depth contour described above, under the action alternatives the changes to the 150 fathom depth contour adjacent to Westport, Washington, Noyo Canyon, and Usal Canyon are intended to better match it to actual bathymetry. For the reasons discussed above in relation to modification of the 150 fm line, it is reasonable to conclude that a more precise and accurate specification of the line would better conform to the objective of depth-based management. Although the impacts cannot be quantified, the analytical basis for specifying these lines is the correlation between depth and the occurrence of overfished species. To the degree that there is a similar correlation between depth and occurrence for other species, then catch rates in the area opened by this modification should be comparable to other areas greater than 150 fathoms in depth that are already open to groundfish fisheries. Furthermore, the management program includes a variety of other accountability measures, described above and in section 2.2 of the main EIS document, used to constrain catch within ACLs.

Socioeconomic Impacts: The change proposed under the action alternatives may have a marginal socioeconomic benefit for the shoreside trawl fishery and nontrawl fisheries managed using the 150 fathom line as a seaward RCA boundary by allowing access to a small amount of additional fishing area. This management line is not used to manage recreational fisheries. The change in management cost, primarily those associated with enforcement of the RCA boundaries, would be minimal under the proposal. The compliance with the depth contours are monitored with vessel monitoring systems (VMS) that are currently required on all groundfish vessels.

Create a New, Modified 150 fm Depth Contour to Use for the Trawl RCA North of 40°10’ N. Latitude

The background and use of the 150 fathom depth contour is explained above.

Management Issue

With implementation of IFQ management for the shoreside trawl fishery the Council is considering a trawl RCA that would have a 150 fathom seaward boundary year round, because accountability for catch at the vessel level decreases the risk that ACLs will be exceeded. In past biennial cycles a modified 200 fathom depth contour has been applied in the winter months (November-February) north of 40°10’ N. latitude to allow access to specific areas where petrale sole, an important target species during the winter fishery, are more abundant. There are instances where these cutouts encompass depths less than 150 fathoms; if a 150 fathom depth contour is applied year round then some of these more productive cutout areas would be closed to fishing in the winter months. This proposal would create a modified 150 fathom depth contour that could be applied during the winter fishery to keep the cutout areas defined by the modified 200 fathom depth contour open. For the purpose of publication in Federal regulations this new depth contour would include the waypoints for the existing 150 fathom line except for any of the proposed changes described in this section and section 2.3 and incorporated in the Preferred Alternative.

Management Options

Under **No Action** (described in section 2.2 of the EIS) the 150 fathom depth contour defined by waypoints currently listed at 50 CFR 660.393 would continue to be used seasonally (September to April) as the seaward boundary of the trawl RCA.

Under the **Action Alternatives** (Alternatives 1-8 in section 2.2 of the EIS) a new, modified 150 fathom depth contour would be created north of 40°10’ N. latitude for use during the periods when the modified 200 fathom depth contour is currently used as the seaward boundary of the RCA.

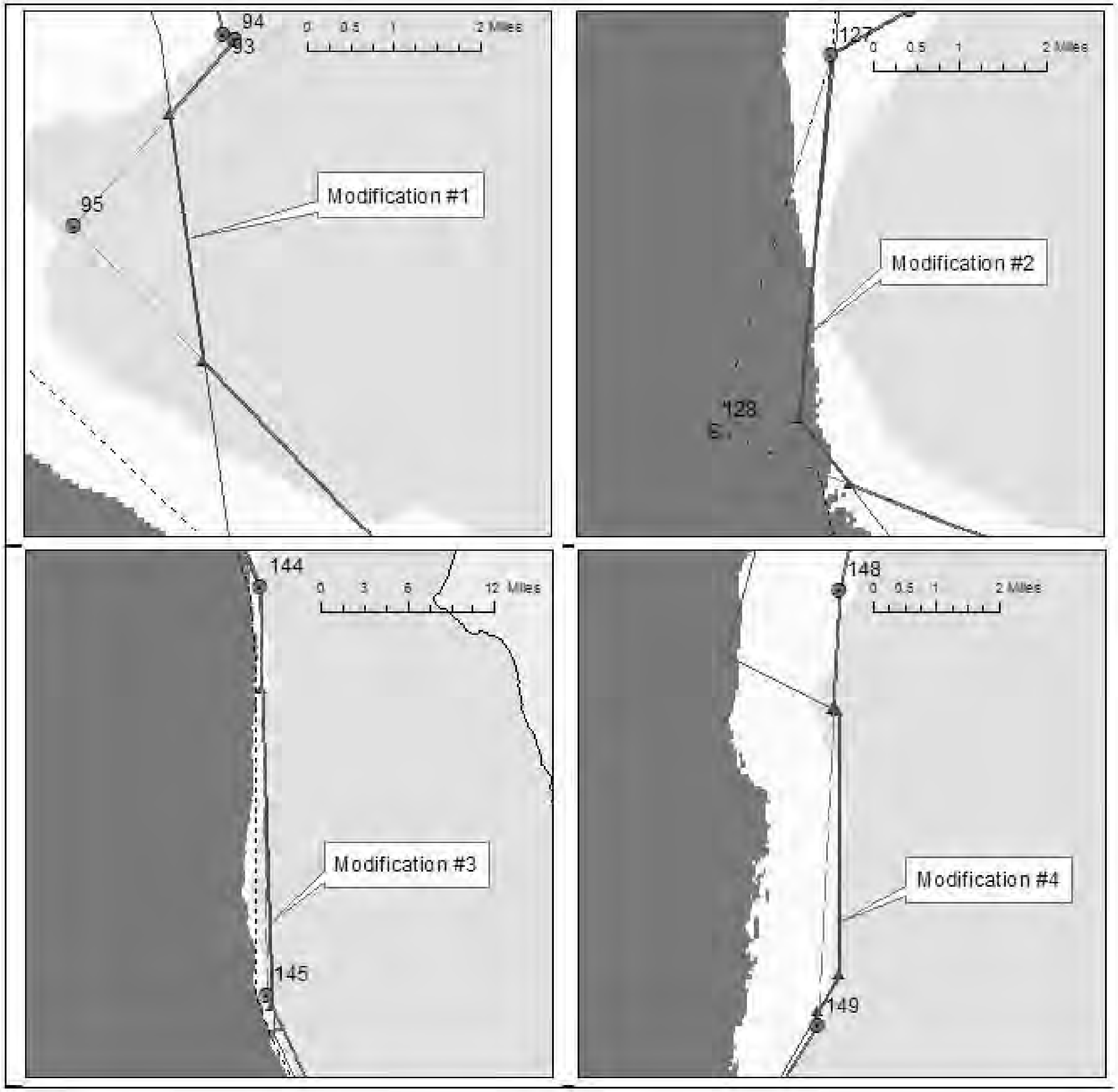
The 150 fm boundary was compared analytically with the modified 200 fm boundary to identify instances where the two lines intersect north of 40°10' N. latitude. A total of 23 instances were identified. Of these, six changes would be made under this option based on two criteria. First, these changes apply only in areas where the modified 200 fm RCA boundary differs in location from the 200 fm RCA boundary (i.e., in the "cutout" areas). Second, a breakpoint in the distribution of the size of the resulting cutout areas was used to eliminate changes smaller than 0.537 sq. mi. (1,389,933 sq. m) in area. [2] Table C-5 shows the coordinates for potential modifications and the area within the RCA that would be eliminated by such a change. (Where the starting and ending waypoints on the existing 150 fathom line are not consecutive the intermediate existing waypoints are deleted and replaced by the proposed changes.) Figure C-5 illustrates these modifications in relation to the 200 and 150 fm isobaths.

If the proposed modified 150 fathom line is implemented an additional 12.8 square miles would be accessible to fishing in the shorebased IFQ fishery compared to a seaward boundary using the unmodified 150 fm RCA depth contour.

[2] ArcMap's feature classification dialog computes breakpoints in distributions for display purposes. The default Jenk's natural breaks algorithm was used to determine the breakpoints and the 0.537 sq. mi. breakpoint was chosen, because of the small areas involved.

Table C-5. Summary of proposed changes to the 150 fm RCA boundary where it intersects the modified 200 fm RCA boundary.

Map Ref.	Waypoint ID	Source	latitude	longitude	Area Affected (sq. miles)
1	94	150-fm (274-m) Contour	45.7658	-124.679	1.855
	57	Computed line intersection	45.75345	-124.695	
	56	Computed line intersection	45.71201	-124.687	
	96	150-fm (274-m) Contour	45.575	-124.505	
2	127	150-fm (274-m) Contour	42.9593	-124.902	3.491
	96	200-fm (366-m) Contour - Petrale	42.89881	-124.91	
	50	Computed line intersection	42.88773	-124.899	
	129	150-fm (274-m) Contour	42.8718	-124.846	
3	144	150-fm (274-m) Contour	41.79667	-124.49	3.900
	49	Computed line intersection	41.69442	-124.491	
	48	Computed line intersection	41.38004	-124.485	
	146	150-fm (274-m) Contour	41.2215	-124.389	
4	148	150-fm (274-m) Contour	40.92667	-124.434	0.885
	45	Computed line intersection	40.89948	-124.436	
	119	200-fm (366-m) Contour - Petrale	40.899	-124.435	
	120	200-fm (366-m) Contour - Petrale	40.8385	-124.436	
	44	Computed line intersection	40.83026	-124.443	
	149	150-fm (274-m) Contour	40.827	-124.443	0.112
5	151	150-fm (274-m) Contour	40.676	-124.535	0.537
	123	200-fm (366-m) Contour - Petrale	40.64783	-124.503	
	40	Computed line intersection	40.63966	-124.503	
	152	150-fm (274-m) Contour	40.62217	-124.488	
6	170	150-fm (274-m) Contour	40.266	-124.434	1.980
	35	Computed line intersection	40.28172	-124.57	
	132	200-fm (366-m) Contour - Petrale	40.2715	-124.575	
	34	Computed line intersection	40.24857	-124.56	
	173	150-fm (274-m) Contour	40.16667	-124.383	


94
93
0 0.5 1 2 Miles
95
Modification #1
127
0 0.5 1 2 Miles
Modification #2
128
144
0 3 6 12 Miles
Modification #3
145
148
0 0.5 1 2 Miles
Modification #4
149

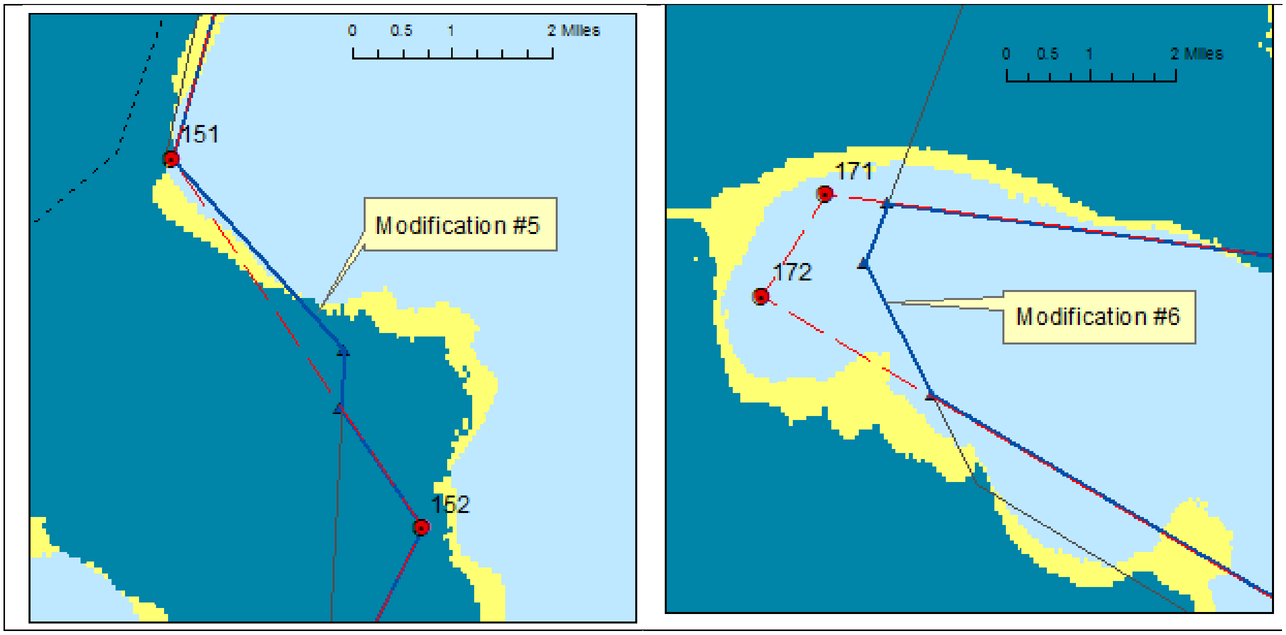


Figure C-5. Proposed modifications mapped with depth interval. Blue line: 150 fm depth contour modification; dashed red line: existing 150 fm depth contour; grey line: modified 200 fm depth contour; dotted grey line: 200 fm depth contour. Dark blue fill: depths greater than 200 fm; yellow fill: depths between 200 and 150 fm; light blue fill: depths less than 150 fm. Bathymetry based on *NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11, http://www.ngdc.noaa.gov/mgg/coastal/crm.html*.

Comparison of the Management Options

Biological Impacts

The biological impacts of inserting the "petrale cutouts" in the 150 fm depth line are not expected to differ substantially from No Action. Areas now open when the modified 200 fm line is in place would remain open if the 150 fm line were substituted during those periods. (Note that as a routine measure RCA boundaries can be adjusted at any time during the management period. But the purpose of the modified line is to increase fishing opportunity for petrale sole during the winter months, November to February.) Biological impacts resulting from these areas being open to fishing, in comparison to areas closed to fishing, include the removal of fish and other species by fishing gear and adverse impacts to EFH as a result of the interaction of fishing gear with EFH. As discussed above and in section 2.2 of the main EIS document, a variety of other accountability measures are included in the management program to mitigate these impacts.

Socioeconomic impacts

Changes in management costs, primarily those associated with enforcement of the RCA boundaries, are expected to be negligible because of existing requirements. The compliance with the depth contours are monitored with vessel monitoring systems (VMS) that are currently required on all groundfish vessels. Implementing a modified 150 fm line instead of a modified 200 fm would increase fishing opportunity for vessels targeting petrale sole, a beneficial socioeconomic impact.

C.2 Management of ACL Set-Asides

Overview

Harvest set-asides are yields taken off the top of a stock's ACL to accommodate catch in tribal fisheries, exempted fishing permit (EFP) activities, research activities, and incidental bycatch in non-groundfish fisheries. Such yields are set aside, or taken off the top of an ACL, before allocating to directed groundfish fisheries in the biennial harvest specifications and management measures process. Specification of set-asides to accommodate these sources of fishing-related mortality are AMs that reduce the risk of exceeding ACLs.

Management Issue

The proposed action is to further clarify the management of "off-the-top" yields set aside for research catches, exempted fishing permit (EFP) activities, and groundfish mortality in non-groundfish fisheries (i.e., incidental open access (OA) fisheries) when deciding harvest specifications and management measures. The proposed action does not contemplate inseason management or reapportionment of set-asides specified to accommodate tribal fisheries[3]. The proposed action would allow flexibility in the management of these "off-the-top" set-asides, including the ability to take inseason action to make changes and redistribute the set asides to other sectors.

Currently the regulations at 660.55(j) state:
(j) Fishery set-asides. Annual set-asides are not formal allocations but they are amounts which are not available to the other fisheries during the fishing year. For the catcher/processor and mothership sectors of the at-sea Pacific whiting fishery, set-asides will be deducted from the limited entry trawl fishery allocation. Set-aside amounts will be specified in Tables la through 2d of this subpart and may be adjusted through the biennial harvest specifications and management measures process.

The purpose of the proposed action is to create a formal process to redistribute unused set-asides amounts inseason to other sectors in the groundfish fishery. The need for the proposed action is to provide an opportunity for full attainment of the annual available harvest for the groundfish fishery in accordance with the requirements of the Magnuson Stevens Act.

Some fishing-related activities where catch is counted against harvest set-asides can be completed inseason (e.g., research and EFPs) and yield that was set aside to cover these activities is then released for other uses. Those uses can include buffers to reduce the risk of exceeding ACLs and reallocation to fishing sectors. The options analyzed contemplate increasingly more flexible use of these set-asides inseason when they are released.

Management Options

Option 1: No Action

Set-asides are established to account for management uncertainty relative to the tribal fisheries, research, EFP and non-groundfish fisheries catch. Under this option, the specification for "fishery harvest guideline" would be derived by subtracting amounts for the following from the annual catch limit (ACL) or fishery-wide annual catch target (ACT), if specified: projected catch for Pacific Coast treaty Indian Tribes (whiting will be addressed through a separate rulemaking), projected scientific research conducted under letters of authorization and scientific research permits issued by NMFS, projected mortality in EFPs, and projected fishing mortality in non-groundfish fisheries (including but not limited to the incidental OA fishery). Under Option 1, unused portions of the set-aside would not be allocated to other

[3] A system to reapportion unused whiting quota from tribal fisheries to non-tribal whiting fisheries is under consideration in a separate rulemaking process.

fisheries during the calendar year. However, if unused portions of the set-aside are identified inseason, they would reduce the risk of exceeding the ACL and allow management measures to be adjusted so they more closely approach or slightly exceed a fisheries HG.

Option 2: Real Time Catch Accounting; Reallocation According to Prescribed Sector Allocations

For activities that are completed before a Council meeting and where data derived from "accurate catch accounting methodology" was used to estimate the total catch, the unused portion of the set-aside may be reapportioned back to the groundfish fishery. As with the No Action Option, set-asides are established to account for projected mortalities relative to the tribal, research, EFP, and bycatch in non-groundfish fisheries. "Accurate catch accounting methodology" means data gathered from sources such as that used by the West Coast Groundfish Observer Program (WCGOP), the Northwest Fisheries Science Center (NWFSC) survey biologists, and tribal co-manager observer programs. When total catch data are available from accurate catch accounting methodologies, the unused portions of the set-asides can be accurately determined shortly after the completion of the activity. When data gathered by using accurate catch accounting methodology are summarized, the uncertainty relative to the total catch from the completed activities no longer exists. The unused proportions of the catch associated with the completed activities would be reapportioned back to the fishery.

The process to reapportion would be structured to be done through an inseason action published in the Federal Register following a Council meeting. At a Council meeting, the Council would review set-asides and recommend any adjustments to be reapportioned. The specified amount of groundfish would be reapportioned back to the "fishery harvest guideline" and out to the sectors in proportion to the original allocations for the calendar year. Because the set-aside amount that is getting reapportioned must be completed before reapportionment occurs, reapportionment would likely only occur later in the year after the September or November Council meetings. For sectors that are already closed for the year, or in the case of the Shorebased IFQ Program, after September 1 where QS accounts are no longer open or able to transfer QP, the Council must determine whether to reopen those sectors or, for the Shorebased IFQ Program, whether to reactivate those accounts.

Option 3: Projected Catch Accounting; Reallocation According to Prescribed Sector Allocations

For activities that are completed before a Council meeting, the "best available information" would be used to estimate the amount of set-asides that would not be used in the calendar year and that amount would be reapportioned back to the groundfish fishery. As with the No Action Option, set-asides are established to account for management uncertainty relative to the tribal, research, EFP, and fishing mortality in non-groundfish fisheries. The "best available information" could include data collected using "accurate catch accounting methodologies" as specified under Option 2 as well as estimates based on more uncertain information, such as those derived from OA fishery models where no- or limited catch data are available. Such projected commercial catches are reported in the PacFIN database in the Quota Species Monitoring (QSM) reports. Projected recreational catches are reported in the RecFIN database.

The process to reapportion is the same as described under Options 2.

Option 4: Projected Catch Accounting; Reallocation According to Sector Needs (Preferred Option)

The process for inseason catch accounting and the ability to use projected catch data as the best available information is the same as described under Option 3.

The process to reapportion is the same as described under Options 2, except that the Council may recommend no reapportionment or a more limited overall amount be reapportioned. Any amount available for reapportionment would be reapportioned to the sectors in proportion to the original allocations for the calendar year, modified to account for Council recommendations with respect to reapportionment to: 1) sectors that are closed; 2) for reapportionments after September 1 in the IFQ sector; and 3) sectors for which catch of the species to be reapportioned would not be projected to be reached.

Comparison of the Options

The primary difference between the No Action option (Option 1) and the alternative options for managing harvest set-asides is the alternative options consider some form of inseason allocation of released set-asides to directed groundfish fisheries, whereas the current system under Option 1 does not. The distinguishing elements informing the alternative options that do consider inseason allocation of released set-asides to directed fisheries are 1) the quality of inseason catch data (i.e., real-time catch accounting vs. projected catch accounting) and 2) reallocation rules (reallocate based on prescribed sector allocations vs. reallocate based on a judgment of sector needs). The discussion that follows explains the tradeoffs between these options and defines the practical limits of inseason action when there are surplus yields available from released set-asides.

Quality of Inseason Catch Data

The quality of inseason catch data and inseason catch tracking systems by fishing sector is a consideration in any reallocation of unused harvest set-asides in any sector since there is less risk of exceeding an ACL if catch monitoring is timely and accurate. The element of catch data quality in the analysis of options is distinguished by real-time catch accounting of landings and discards versus projecting inseason catch based on delayed provision of estimated landings and discards. Catch is currently monitored inseason using real-time catch accounting for the trawl sectors and catch projections for the non-trawl sectors.

Current Catch Accounting by Sector

Trawl catches are tracked inseason using real-time reporting of shorebased IFQ catches (landings plus discards) in the IFQ database managed by the NMFS Northwest Region and real-time reporting of total catches for the at-sea whiting trawl sectors in the NorPAC database. Projections of annual trawl catches based on catches reported to date inseason are not needed in the trawl fishery since the catch is tightly regulated to prescribed quotas. Catch accounting is accurate given that the rationalized trawl fishery requires 100 percent at-sea monitoring of all trawl efforts.

Non-trawl commercial catches and shorebased trawl catches of non-IFQ species are tracked inseason using delayed catch accounting and projections of annual mortalities based on inseason catches to date. Non-trawl commercial catches are updated every other week and reported in the PacFIN Quota Species Monitoring (QSM) reports. Non-trawl catch updates are based on fish ticket landings and estimated discards are based on average historical discard rates observed in the WCGOP program applied to landings of target species. Discard rates and final total annual catches by sector (landings plus discard mortalities) are provided annually by the WCGOP program approximately a year after the end of the season.

Recreational catches are tracked inseason and reported on the RecFIN web site. Recreational catches (landings plus discard mortalities) are updated every other month[4] based on a census of marine anglers conducted in state fishery sampling programs. Inseason recreational catch projections for the year are less certain than those for commercial trawl and non-trawl fisheries.

[4] The state monitors their recreational fisheries closely and can take independent action to manage those fisheries to specified harvest guidelines.

Potential Routine Actions Under the Options Analyzed Based on the Quality of Inseason Catch Data

Under the options considered for routinely reallocating unused harvest set-asides inseason, set-asides for all fishing sectors could be considered for reallocation based on the data quality standard under options 3 and 4. Routine reallocation of unused harvest set-asides can only be considered for set-asides specified for the trawl and tribal sectors under option 2, which imposes a higher data quality standard of real-time and accurate catch accounting. Option 1 (No Action) does not allow routine reallocation of any set-asides.

All options other than the No Action Option 1 would allow routine consideration of reallocation of unused harvest set-asides specified for EFP and research activities since there is real-time and accurate catch accounting for these activities. EFP proposals must contain a mechanism, such as at-sea fishery monitoring, to ensure that the harvest limits for targeted and incidental species are not exceeded and are accurately accounted. Research activities also are controlled activities where catch accounting mechanisms are accurate and reported in a timely manner. Most west coast research activities that affect groundfish are conducted by NMFS (e.g., the annual NWFSC trawl survey) and accurate catch reports are provided routinely in the Council process. Those research activities not conducted by NMFS are only allowed through state and Federal scientific research permits and accurate and timely catch reporting is a condition of these permits.

One consideration in reallocating unused set-asides are that the activities supported by the set-asides need to have been completed or canceled to ensure the set-aside is not still needed. For instance, the set-asides specified to accommodate the incidental bycatch of groundfish species in non-groundfish fisheries (i.e., set-asides for incidental open access) are really not considered in this potential reallocation process since many of those fisheries are outside the jurisdiction and authority of the Council and NMFS; and some of those fisheries tend to occur year round. Since the timing and magnitude of bycatch events in non-groundfish and tribal fisheries is unpredictable, it is not likely that the need to maintain such set-asides can be dismissed inseason until these fisheries are done for the year. Therefore, the contemplated action to routinely reallocate set-asides inseason should be limited to those specified for fisheries that do not continue year-round or set-asides for EFPs and research activities since these activities typically do not continue through the full year. Approved EFPs can also be canceled before implementation and the bycatch caps or total catch limits specified for the EFP activity that define the EFP set-asides can then become available for other uses.

Reallocation Rules

A reallocation of unused set-asides would have to meet certain criteria, such as those allocation principles specified in the FMP allocation framework (FMP section 6.3.1), the FMP socioeconomic framework (FMP section 6.2.3), and practical considerations for managing the risk of exceeding an ACL. These criteria attempt to ensure fair and equitable distribution of harvestable surpluses that reflect dependence on the fishery and provide optimal economic benefits to fishing communities. The objective to extend fishing and marketing opportunities as long as practicable during the fishing year is an especially important criterion in this proposed action.

The dimension of this proposed action needs to be kept in perspective. The amount of yield associated with harvest set-asides are typically low, especially if the set-asides considered for reallocation are limited to those fisheries that do not continue year-round or to EFP or research activities that are completed prior to the end of the year (e.g., see Table 2-46). However, the yield for some species (e.g., canary and yelloweye rockfish) is especially limited and inseason availability of such yield inseason can make the difference between early closure of a fishery when a harvest guideline or allocation is attained and the ability to extend the fishery by reallocating unused harvest set-asides inseason. Therefore, despite the low yields considered for inseason reallocation, the importance of the process for considering a reallocation of these yields is not trivial.

Option 1 (No Action) does not allow a direct reallocation of unused harvest set-asides routinely as an inseason adjustment. Instead, unused set-asides remain as a “buffer” between the ACL and the inseason projection of annual fishing-related mortalities (i.e., landings plus discard mortalities) given management measures in place. The amount of this yield buffer is taken into account when considering the risk of exceeding an ACL under proposed inseason adjustments to the fishery. While this process may work for adjusting management measures for species where there is no prescribed allocation, it provides limited benefit to some sectors that rely on an allocation to maintain a fishing strategy. For instance, the trawl IFQ fishery would not receive a “top off” or provision of additional yield to vessel accounts under Option 1. Benefits could also accrue for the at-sea whiting sectors if additional whiting quota or quota of bycatch species that can limit their ability to attain the whiting quota (i.e., canary, darkblotched, POP, and widow) were able to be added inseason to their annual allocations. While Option 1 may be more responsive to conservation objectives by providing another layer of precaution by maintaining a higher buffer mitigating the risk of exceeding an ACL, it is less responsive to socioeconomic objectives in that it will not allow a process to add unused yield if needed to keep a fishery open.

Options 2, 3, and 4 consider the ability to reallocate unused harvest set-asides as a routine inseason action and in that regard are more responsive to socioeconomic objectives. These options are also adaptive in that there is a deliberate inseason process to weigh the risk of exceeding an ACL versus providing socioeconomic benefits. If the risk of exceeding an ACL is considered too high to reallocate unused yield, then the Council and NMFS can decide not to reallocate to the fishery. If the judgment is that the risk of exceeding an ACL is low and there is a need for additional yield, then all or a portion of the released set-aside can be reallocated to the fishery.

Options 2 and 3 would only allow reallocation according to prescribed allocations, such as those long-term allocations specified in the FMP or the short-term allocations decided in the biennial specifications process. If there is a decision to reallocate some or all of the unused set-aside to the fishery, then all sectors would receive some of that yield. In some cases, not all sectors would need additional yield to maintain fishing opportunities. For instance, an unused set-aside of yelloweye could be reallocated to all sectors, yet only one recreational sector may need that yield to keep the fishery open. The rest of the yield may go unused by the other sectors that received an inseason allocation. While this is not necessarily a bad outcome in that this yield is effectively a buffer against exceeding an ACL, it may not provide enough yield to the sector or sectors that need it to keep a fishing a season open or achieve other socioeconomic objectives. Alternatively, Option 4 allows a reallocation of unused harvest set-asides different from prescribed allocations according to need. For example, using the hypothetical yelloweye case above, if 1 mt of yelloweye yield became available and one sector needed the entire ton to maintain that sector’s fishery and no other sectors needed additional yelloweye yield to maintain their fisheries, then an Option 4 process would be the only one considered in this analysis that would achieve the socioeconomic objectives outlined in the FMP. In all cases, conservation objectives need to be considered by evaluating the risk of exceeding an ACL before any inseason reallocation of unused harvest set-aside is contemplated.

The Council selected Option 4 as their Preferred Alternative.

Biological Impacts: There are no biological impacts associated with the proposed action as long as future inseason decisions to reallocate unused harvest set-asides are precautionary enough to keep total catches within specified ACLs. The biological impacts projected in assessments and analyses presented in this EIS assume the entire ACL is taken but not exceeded; therefore, changing the process to routinely consider reallocation of set-asides adds no additional biological impact.

Socioeconomic Impacts: The preferred Option 4 provides the highest positive socioeconomic impacts relative to the other options analyzed. Reallocating unused harvest set-asides inseason to those sectors that most need it has the greatest potential of the options analyzed to maintain fishing opportunities and provide benefits to fishing-dependent communities.

C.3 Two Year Trawl and Non-Trawl Cowcod Allocation

Background

The 2011-12 trawl and non-trawl allocation for cowcod south of 40°10' N. latitude (66 percent trawl and 34 percent non-trawl) was originally set to align the needs of the trawl fishery with historic catches and accommodate the fleet as it transitioned into a rationalized fishery. Projected impacts in the non-trawl sectors had been estimated at lower levels, and it was thought that the current allocation to this sector would be sufficient to cover the needs of all non-trawl fisheries.

The Council requested that an additional allocation alternative (34 percent trawl and 66 percent non-trawl) be analyzed for cowcod south of 40°10' N. latitude. The change is being requested because recent fishery information reveals that while cowcod encounters have increased in the recreational fishery, the impacts in the trawl sector post-rationalization are lower and suggest the needs of this sector may be different than previously thought.

Summary of Options

No Action - maintain the No Action two-year trawl and non-trawl allocation for cowcod south of 40°10' N. latitude of 66 percent trawl and 34 percent non-trawl.

Option 1, Preferred: Modify two-year allocation - Modify the two-year trawl and non-trawl sector allocation south of 40°10' N. latitude to 34 percent trawl and 66 percent non-trawl.

Comparison of Options

No Action

Under No Action, West Coast Groundfish Observer Program (WCGOP) data indicate that cowcod mortality has been variable between sectors and among years from 2004 to 2011 (Table C-6). A summary of 2011 WCGOP IFQ data south of 40°10' N. latitude revealed that 29 vessels participated in the entire area south of 40°10' N. latitude and 4 vessels made landings south of 34°27' N. latitude (note - these do not represent unique vessels). Only 39 lbs of cowcod were encountered in the IFQ fishery by 4 vessels operating in the area between 40°10' N. latitude and 34°27' N. latitude; zero cowcod were encountered south of 34°27' N. latitude. These data would suggest a transition in the location of fishing activities to more northern areas compared to previous years.

Table C-6. Summary of cowcod mortality in metric tons by sector (trawl: non-trawl) from 2004-2011 summarized from West Coast Groundfish Observer Program (WCGOP) data. Non trawl is comprised of both the commercial fixed gear and recreational fleets.

Year	Trawl	Non-Trawl
2004	0.9	1.1
2005	1.4	0.5
2006	0.9	0.2
2007	2.9	0.3

2008	0.2	0.3
2009	0.5	0.3
2010	0.6	0.4
2011	39 lbs	0.8*

*commercial fixed gear data are not included

Under No Action, cowcod impacts increased in the non-trawl fishery compared to previous years. Although 2011 data is not finalized, preliminary estimates using only recreational data suggest higher impacts based on the increased number of encounters in the recreational fishery south of 34° 27' N. latitude. Impacts in the fixed gear fisheries are largely unknown because few data are available from WCGOP.

Biological Impacts under No Action

Under No Action, total mortality of the trawl and non-trawl sectors is expected to stay within the preferred ACL of 3.0 mt in 2013-14.

Results of the 2009 data report indicate that cowcod are rebuilding slowly. Under No Action, no changes to stock status or rebuilding progress are expected.

Community Impacts under No Action

Under No Action, it is difficult to characterize community impacts in part because of the new trawl rationalization program which was implemented in January 2011. Prior to rationalization when there was no individual accountability, historical impacts in the trawl sector were unpredictable and ranged from 0.2 mt to 2.9 mt. Lower recent trawl cowcod landings for 2011 and the first few months of 2012 indicate that far less encounters are occurring than in the past. If trawl impacts remain the same as they were in 2011, then no changes to community impacts resulting from the trawl sector would be expected. Under the current trawl allocation (1.9 mt), there is still a possibility that the trawl fishery could exceed their allocation if impacts become more unpredictable and more reflective of the pre-rationalized fishery. If fishermen exhaust their individual quota allocations and are unable to obtain additional pounds from the quota share market, it could result in a loss of access to target species and resulting revenues into local communities such as San Francisco, Monterey, and Morro Bay. Since the intent of the rationalization program is to promote individual responsibility, impacts as high as those in 2007 are not expected to recur as the activity resulting in the high encounters is unlikely to be repeated in a rationalized fishery.

Under No Action, opportunities and resulting revenues in the non-trawl fishery could be decreased due to the low allocation of cowcod. Recent fishery information reveals that cowcod encounters have increased in the recreational fishery south of 34° 27' N. latitude. Depending upon the magnitude of this increase, action to implement shallower depth restrictions may be necessary. The number of trips that will be lost due to reduced access to fishing grounds with a 40 fm and 50 fm depth restriction cannot be quantified although public testimony may provide anecdotal insight. Additionally, the current needs of the fixed gear fisheries are largely unknown because few data are available from WCGOP to adequately characterize the needs of this sector. If cowcod interactions increase in this sector, trip limit reductions and/or RCA modifications may be required, which would be very disruptive to the fisheries and communities in southern California.

Option 1, Preferred: Modify the two-year trawl and non-trawl sector allocation to 34 percent trawl and 66 percent non-trawl.

Under option 1, the Preferred Option, the two-year cowcod allocation would be reversed between the trawl and non-trawl sectors. The trawl sector allocation would be 1.0 mt and the non-trawl sector, 1.9 mt.

Biological Impacts compared to No Action

Under option 1, no changes to stock status or rebuilding progress are expected compared to No Action.

Community Impacts compared to No Action

Under option 1, no change to communities would be expected compared to No Action if impacts in the trawl fishery remain similar to those from 2008 to 2011. If impacts are higher than projected, some impacts to the communities of San Francisco, Monterey, and Morro Bay would be expected but the extent is unknown.

Communities south of 34° 27' N. latitude are expected to benefit under option 1 because they are more influenced by changes to management measures in the non-trawl fishery. If cowcod mortality does increase in the non-trawl sector either as a result of increased encounters in the recreational fishery or increased data from WCGOP, the higher non-trawl allocation would likely prevent the need to take inseason action (or lessen the severity of the action) and would be less disruptive to the fisheries.

C.4 Sorting Requirements for Aurora, Shortraker, and Rougheye North of 40°10 N. latitude

Overview

The Council continues to improve methodologies to estimate harvest specifications for species without stock assessments (i.e., data-poor species) and evaluate the performance of the existing stock complexes relative to the revised National Standard 1 Guidelines. In April 2011, a workshop was held to explore assessment methods for data-poor stocks.[5] The SSC reviewed the proceedings and several methods were approved for general use without extensive review of the input data (e.g., historical landings, assumed depletion, assumed apportionment north and south of 40°10’ N. latitude) for use in the 2013-2014 cycle (see Section 2.1).[6] The SSC endorsed the OFL estimates for the component stocks for use in calculating the OFLs for the complexes (i.e., Minor Nearshore, Shelf, Slope Rockfish North and South; Other Flatfish; and Other Fish); however, the SSC noted the methods are dependent upon accurate historical mortality estimates and further investigation of the best possible estimates is a high priority. Further, the SSC said uncertainty in the catch history should be included in evaluating and implementing these data-poor methods.

Also in April 2011, the Council recommended the analysis to evaluate the performance of stock complexes and any necessary management measure alternatives be developed in time to inform decision-making for the 2013-2014 cycle. In August 2011, a PSA analysis conducted by Cope et. al {, 2011 #367} indicated three species in the Minor Nearshore Rockfish complexes (i.e., China, copper, and quillback rockfish) and the Minor Slope Rockfish complexes (i.e., aurora, shortraker, and rougheye rockfish) may be vulnerable to overfishing based on recent estimates of the OFL contributions to the complex as well as the historical landings. The Council received reports from the GMT that outlined the process for conducting a thorough stock complex analysis, provided estimates of mortality for the species identified by Cope et. al {, 2011 #367}, and provided a range of mitigative management measures for consideration.[7] However, given difficulties reconciling historical data, the comprehensive analysis and

[5] Agenda Item E.2.a, Attachment 6, June 2011.
[6] Agenda Item E.2.b, Supplemental SSC Report, June 2011
[7] Agenda Item E.4.a, Supplemental Attachment 7, June 2011; Agenda Item E.4.b, Supplemental GMT Report 2, Agenda Item G.5.a, Attachment 5, September 2011, Agenda Item E.9.b, Supplemental GMT Report 3, November 2011

evaluation is still ongoing. As recommended by the SSC, there is a high priority on reconciling the historical data that informs the OFL estimates.

For the 2013-2014 cycle, the Council explored measures to increase the accuracy of reporting for these stocks to better inform future OFL estimates, estimated from either data-poor methodologies or formal stock assessments, and to better inform the larger stock complex restructuring analysis. Accuracy in reporting is essential to determine if mortality of the component stocks approaches unsustainable levels which could result in a biological impact in the long term. The SSC recommended against using OFL contribution values to evaluate whether overfishing is occurring for component stocks since OFLs are set for stock complexes rather than for individual stocks within a complex.[8] The SSC recommended a comparison of recent catches of the component stocks to the OFL contributions to identify whether stock complexes are working as they were intended. The SSC noted that if catches regularly exceed OFL contribution values, this could indicate a problem with how the stock complexes are structured and justify action in the next management cycle which could include removing the stocks concerned from the complex and prioritizing them for a full assessment.

Background

In recent years (2007-2010), mortality of the Minor Slope Rockfish North complex was between 42 to 48 percent of the optimal yield (OY)[9] and mortality of the Minor Slope Rockfish South was between 24 and 37 percent of the OY (Table C-7). Mortality of the Minor Nearshore Rockfish North complex was between 41 to 94 percent of the OY and Minor Nearshore Rockfish South was between 59 and 71 percent of the OY (Table C-7). Estimates of mortality from 2004 to 2010 indicate that three component stocks within the Minor Slope Rockfish (aurora, shortraker, and rougheye rockfish) and two component species within the Minor Nearshore Rockfish (quillback and China rockfish) complexes have been higher than the estimated OFL contributions for 2013 and 2014 (Table C-8). Reconciliation of the data states provide to Pacfin was occurring at the same time that this analysis was being developed. The reconciled data could impact estimates of the OFL and change the understanding of whether historical mortality exceeded the OFL contributions of these stocks to the minor slope rockfish complex. Rougheye and aurora rockfish have been selected for stock assessments in 2013 to inform the 2015-2016 management cycle. The productivity and susceptibility analysis (Section 4.1.1.2) also indicates that aurora, shortraker, rougheye, China, copper, and quillback rockfish may be vulnerable to overfishing {Cope, 2011 #367}. For 2013-2014, projected mortality for the Minor Nearshore and Minor Slope Rockfish complexes are below the ACL; however, given the estimates of historical mortality, it is possible that mortality of the component stocks could exceed the component OFLs and ABCs.

Table C-9 shows the geographic and depth distribution for the five species in the Minor Slope and Nearshore Rockfish complexes with estimates of historical mortality that are higher than the estimated OFL contributions for 2013-2014. Mortality of aurora, shortraker, and rougheye rockfish primarily occurs in the trawl sector with bottom trawl gear (Table C-10). In contrast, mortality of China and quillback primarily occurs in the non-trawl sectors in the commercial nearshore fixed gear fisheries (limited entry and open access) and recreational fisheries (Table C-11).

[8] Agenda Item I.3.b, Supplemental SSC Report, April 2012
[9] Starting in 2011, annual catch limits were implemented.

Table C-7. Total estimated mortality of the Minor Slope Rockfish complexes north and south relative to annual OYs, 2007-2010 (source: annual NWFSC groundfish mortality reports).

Minor Slope Rockfish Complexes North and South			
	North	South	Sum of North and South OYs
2007-2010 annual OY	1,160 mt	626 mt	1,786 mt
2007 total mortality	522 mt	149 mt	671 mt
% of OY	*45%*	*24%*	*38%*
2008 total mortality	484 mt	189 mt	673 mt
% of OY	*42%*	*30%*	*38%*
2009 total mortality	517 mt	231 mt	750 mt
% of OY	*45%*	*37%*	*42%*
2010 total mortality	562 mt	183 mt	745 mt
% of OY	*48%*	*29%*	*42%*
Minor Nearshore Rockfish Complexes North and South			
	North	South	Sum of North and South OYs
2007-2008 annual OY 2009-2010 annual OY	142 mt 155 mt	654 mt 650 mt	796 mt 805 mt
2007 total mortality	133 mt	466 mt	599 mt
% of OY	*94%*	*71%*	*75%*
2008 total mortality	97 mt	394 mt	491 mt
% of OY	*68%*	*60%*	*62%*
2009 total mortality	63 mt	388 mt	451 mt
% of OY	*41%*	*60%*	*56%*
2010 total mortality	75 mt	384 mt	459 mt
% of OY	*48%*	59%	57%

Table C-8. Mortality Estimates for Vulnerable Species in the Minor Slope Rockfish and Minor Nearshore Rockfish Complex, North and South combined. (Tables 3 and 4, Agenda Item E.9.b; Supplemental GMT Report 3, November 2011).

Minor Slope Rockfish Complexes North and South								
Stock	Coastwide 2013 & 2014 OFL	Mortality Estimates a/						
		2004	2005	2006	2007	2008	2009	2010
Aurora rockfish	41.5	82	53	63	64	50	59	30
Rougheye rockfish	71.5	81	96	79	142	176	158	268
Shortraker rockfish	18.8	14	13	9	32	32	27	30

Minor Nearshore Rockfish Complexes North and South								
Stock	Coastwide 2013 & 2014 OFL	Mortality Estimates a/						
		2004	2005	2006	2007	2008	2009	2010
China rockfish	9.8	22	26	25	30	33	37	33
Quillback rockfish	7.4	12	16	25	28	19	14	10

a/ The commercial values in these columns were derived by summing together WCGOP mortality estimates (landings + discard estimates) from the following commercial fisheries: LE non-whiting trawl, LEFG primary sablefish and DTL, LEFG nearshore, OA directed fisheries, pink shrimp, California halibut, Tribal at-sea, and Tribal Shore-based. The recreational estimates include landings and discard from RecFIN.

Table C-9. Latitudinal and depth distributions of Minor Slope and Minor Nearshore Rockfish complex stocks of highest concern.

Common name	Latitudinal Distribution		Depth Distribution (fm)	
	Overall	Highest Density	Overall	Highest Density
Aurora rockfish	Coastwide	Coastwide	100-420	82-270
China rockfish	N. 34º N. lat.	N. 35º N. lat.	0-70	2-50
Quillback rockfish	N. 36º20' N. lat.	N. 40º N. lat.	0-150	22-33
Rougheye rockfish	Coastwide	N. 40º N. lat.	27-400	27-250
Shortraker rockfish	N. 39º30' N. lat.	N. 44º N. lat.	110-220	110-220

Table C-10. Annual mortality estimates by sector of select component slope rockfish (revised from Table 3, Agenda Item E.9.b; Supplemental GMT Report 3, November 2011).

Species	Fishery	2002	2003	2004	2005	2006	2007	2008	2009	2010
Aurora Rockfish	LE Trawl- North	8.11	27.09	28.78	11.83	14.30	28.76	37.91	50.62	25.11
	LE Trawl- South	48.14	46.47	51.73	41.16	47.88	32.61	11.29	5.66	4.06
	At-sea whiting	N/A	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shoreside whiting	0.01	0.02	0.04	0.02	0.01	0.29	0.03	0.03	0.08
	Pink Shrimp	0.00	0.00	0.02	0.00	0.00	2.42	0.32	0.29	0.07
	California Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LE Primary	0.07	0.15	0.07	0.05	0.03	0.02	0.03	0.05	0.06
	LE Non-Primary	0.85	1.31	0.91	0.29	0.28	0.24	0.28	1.29	0.56
	Fixed Gear Open Access	0.11	0.40	0.33	0.08	0.04	0.06	0.13	0.67	0.23
	Nearshore	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals		**57.29**	**75.45**	**81.88**	**53.43**	**62.53**	**64.41**	**49.99**	**58.61**	**30.17**
Rougheye Rockfish	LE Trawl- North	49.38	57.35	57.17	45.75	61.68	88.77	85.30	122.34	146.48
	LE Trawl- South	0.37	0.05	0.08	0.00	0.00	0.00	0.00	0.00	0.00
	At-sea whiting	N/A	N/A	13.72	35.91	6.57	28.87	72.01	8.56	21.09
	Shoreside whiting	0.00	0.01	0.43	0.00	0.00	2.54	0.62	1.44	5.87
	Pink Shrimp	0.00	0.00	1.67	0.20	0.00	0.11	0.01	0.00	0.02
	California Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LE Primary	4.59	5.73	7.35	10.72	6.58	19.02	9.58	16.69	57.95
	LE Non-Primary	0.10	0.09	0.00	0.68	0.58	0.17	2.69	5.17	14.76
	Fixed Gear Open Access	0.10	0.13	0.00	1.82	0.61	0.51	1.69	2.81	2.98
	Nearshore	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.02	0.00
	Tribal-Shoresd & At-Sea	N/A	N/A	0.40	1.10	2.80	2.30	4.10	1.10	18.40
Totals		**54.54**	**63.36**	**80.82**	**96.17**	**78.84**	**142.29**	**175.99**	**158.13**	**267.54**
Shortraker Rockfish	LE Trawl- North	17.97	24.03	13.76	9.68	8.14	26.29	27.41	23.20	22.30
	LE Trawl- South	0.00	0.00	0.01	0.00	0.00	3.10	0.74	1.75	0.63
	At-sea whiting	N/A	N/A	0.52	0.34	0.41	0.31	0.29	0.17	0.22
	Shoreside whiting	0.00	0.00	0.08	0.00	0.00	1.37	0.21	0.07	1.67
	Pink Shrimp	0.00	0.00	0.00	0.18	0.00	0.02	0.07	0.00	0.00
	California Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LE Primary	0.16	0.65	0.08	2.77	0.29	0.33	2.44	1.36	3.39
	LE Non-Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.57
	Fixed Gear Open Access	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.23
	Nearshore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tribal-Shoresd & At-Sea	N/A	N/A	0.00	0.00	0.00	0.30	0.40	0.00	1.10
Total		**18.14**	**24.70**	**14.45**	**12.96**	**8.83**	**31.73**	**31.55**	**26.56**	**30.11**

Table C-11. Annual mortality estimates by sector of select component nearshore rockfish (from Table 3, Agenda Item E.9.b; Supplemental GMT Report 3, November 2011).

Species		Fishery	Year 2002	2003	2004	2005	2006	2007	2008	2009	2010
China Rockfish	Commercial	LE Trawl- North	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		LE Trawl- South	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Pink Shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		California Halibut	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
		LE Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		LE Non-Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Fixed Gear Opan Access	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Nearshore	NA	11.82	9.71	7.46	8.15	10.78	12.66	11.47	8.35
		Commercial Total	0.02	11.82	9.71	7.46	8.15	10.79	12.66	11.47	8.35
	Rec.	WA	NA	NA	1.79	2.05	2.16	2.18	2.30	1.26	3.49
		OR	NA	NA	1.78	1.89	2.44	2.89	2.89	2.25	2.49
		CA	NA	NA	9.07	14.96	12.24	13.92	15.04	22.21	18.98
		Recreational Total	0.00	0.00	12.64	18.90	16.85	16.99	20.23	25.71	24.95
		Combined Total	**0.02**	**11.82**	**22.35**	**26.36**	**25.00**	**29.78**	**32.89**	**37.18**	**33.30**
Quillback Rockfish	Commercial	LE Trawl- North	0.30	0.12	1.50	0.08	2.13	0.07	0.07	0.08	0.01
		LE Trawl- South	0.03	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00
		Pink Shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		California Halibut									
		LE Primary									
		LE Non-Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
		Fixed Gear Opan Access	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
		Nearshore	NA	2.41	2.65	5.20	5.32	7.67	7.84	2.92	1.62
		Commercial Total	0.33	2.53	4.15	5.28	7.45	8.22	7.91	3.12	1.63
	Rec	WA	NA	NA	2.31	2.33	2.26	2.81	2.28	1.25	1.57
		OR	NA	NA	2.00	2.85	4.51	4.37	3.92	3.38	4.08
		CA	NA	NA	3.39	5.60	10.50	12.44	4.84	5.93	2.91
		Recreational Total	0.00	0.00	7.69	10.78	17.27	19.61	11.05	10.56	8.56
		Combined Total	**0.33**	**2.53**	**11.84**	**16.06**	**24.72**	**27.83**	**18.96**	**13.67**	**10.19**

Management Options

No Action

Harvest specifications (i.e., OFLs, ABCs, and ACLs) for the stock complexes are established in regulation and are calculated by summing the individual contributions of the component stocks.

Regulatory Requirements

Federal regulations (50 CFR 660.55) and the FMP (Section 6.3.2.3) specify Minor Slope Rockfish allocations north and south of 40°10’ N. latitude. For Minor Slope Rockfish North, 81 percent of the fishery harvest guideline (HG)[10] is allocated to the trawl sector and 18 percent to the non-trawl sector. For Minor Slope Rockfish South, 63 percent of the fishery HG is allocated to the trawl sectors, and 37 percent to the non-trawl sectors. Management measures that control slope rockfish mortality in the trawl sectors include individual fishing quota (IFQ) for the shorebased IFQ fishery and co-op management for the at-sea sectors (catcher-processors and motherships). In the non-trawl sectors, the primary management measure that controls slope rockfish landings are bimonthly cumulative limits (hereinafter trip limits) for the limited entry and open access fixed gear fleets. RCAs are also available

[10] Deductions from most groundfish ACLs are made to account for groundfish mortality in the West Coast treaty Indian tribal fisheries, scientific research, non-groundfish target fisheries (hereinafter incidental open access fisheries) and, as necessary, EFPs. The resulting value is called the fishery harvest guideline.

for both sectors which would be effective at controlling slope rockfish mortality. WCGOP data also indicate that movements of the trawl RCA would be effective at reducing aurora, shortraker, and rougheye catch (Table C-12, Table C-13, and Table C-14, respectively). Slope rockfish are also included in the recreational bag limits for the three states; however, they are not the most common target in recreational fisheries.

The limited entry and open access FMP allocations[11] for Minor Nearshore Rockfish are suspended due to overfished species constraints. The Minor Nearshore Rockfish complexes are managed by the West Coast states.[12] California and Oregon implement commercial and recreational allocations through state regulations. Management measures that control nearshore rockfish landings in the trawl sector include trip limits for the shorebased IFQ fishery. Additionally, Oregon and California state regulations limit the amount of nearshore rockfish that can be landed without a state-issued nearshore permit. Generally, vessels with a limited entry trawl permit do not also have a state nearshore permit. Additionally, few nearshore rockfish have been historically landed by the trawl sector (see Table C-11 for China and quillback data). The at-sea sector typically does not encounter nearshore species therefore no management measures are designed for this sector (Table C-11).

In the non-trawl sectors, the primary management measure that controls slope rockfish mortality are trip limits for the limited entry and open access fixed gear fleets. RCAs are also available and may be effective at controlling slope rockfish mortality; however, the shoreward adjustments may need to be extensive which could potentially close entire areas to fishing. Groundfish conservation areas (i.e., local area closures) may also be effective for reducing slope rockfish catch though none have currently been identified.

Data Collection

The WCGOP places observers on vessels at sea to sample the discarded portion of the catch at the species, not complex, level. Coverage rates vary by fishery, year, and area and are described by sector below. Species identification is not always possible due to the dynamic fishing environment. For example, rockfish may fall off a longline prior to observer sampling, in which case reporting would be aggregated to include several species (e.g., shortraker/rougheye) or the entire complex (e.g., slope rockfish).

Federal regulations require sorting prior to first weighing for all species with trip limits, HGs, or ACLs/OYs. All commercial landings are recorded on state fish landing receipts (hereinafter fish tickets). Additionally, vessels that participate in the shorebased IFQ fishery must also submit an electronic fish ticket. Landings in the shorebased IFQ fishery are recorded at the IFQ management unit level, not at the species level (see regulations at 660.140(c)(1)). Landings are sorted and reported on electronic (shorebased IFQ only) or state fish tickets to the Minor Rockfish complex levels (i.e., Minor Nearshore, Minor Shelf, and Minor Slope Rockfish north and south) with a few exceptions. Federal regulations require all commercial landings in California of blue rockfish, which is managed in the Minor Nearshore Rockfish complexes north and south, to be sorted to species. Also, south of 40°10 N. latitude, Federal limited entry and open access trip limits are specified for minor shallow and deeper nearshore rockfish. Therefore, nearshore rockfish landings must be reported to this level.

[11] Nearshore species were not subject to trawl and non-trawl allocations since the majority of catch is in the non-trawl sector (i.e., trawl sector catches were low enough that formal allocations and issuance of IFQ was unnecessary).
[12] Washington does not allow commercial fishing in its territorial waters.

In some instances, state regulations may include additional reporting requirements. In California state regulations require the species, not the complex, be reported on the fish ticket (CDFG Code sections 8043 and 8045). In Oregon, state law requires sorting and reporting of the nearshore species, not the complex (see ORS 635-004-0033).

State port biologists sample commercial landings with coverage levels varying by state, port, month, etc. Port biologists collect biological data (e.g., length, weight, and age) as well as species composition of the market categories (i.e., which species comprise the complex or market category). Species composition samples are generally stratified by gear, port, quarter, market category, and area (INPFC areas).

State regulations also require logbooks for limited entry groundfish trawl vessels which include data on the start and haul locations, time of tow, duration of trawl tow, as well as the total catch for the species and complexes that have Federal sorting requirements. Additionally, Oregon state law requires fixed gear logbooks for vessels participating in the fixed gear fisheries (i.e., nearshore, non-nearshore, and shorebased IFQ under the gear switching provisions). These data are maintained in a state agency database and are available for use in management.

Landings (recorded on fish tickets), logbook data, and port sampling data are reported inseason to the PacFIN database, managed by the Pacific States Marine Fisheries Commission. QSM and GMT reports, which are publically available, are produced twice a month and provide information on landings for all species with ACLs, including stock complexes and the species included in the complexes.[13] Reports can be modified to include species of particular interest to managers. Historically, QSM reports provided estimates of discard; however, due to changes in the fishery, the current QSM reports do not estimate discard. The reports are currently being modified to include discards, which will allow for tracking catch in the commercial fisheries. Five times a year at Council meetings, the GMT reviews the QSM reports and recommends management measures (e.g., trip limits, RCA adjustments, etc.) to the Council which are intended to attain, but not exceed, the ACLs.

In the recreational fisheries, data on released and landed fish are provided at the species level (not complex level). Coverage (or observation) levels vary by state, port, month, etc. Recreational samplers collect biological data (e.g., length, weight, age) on landed catch as well as record angler reported estimates of discard. These data are reported to the Recreational Fisheries Information Network (RecFIN) on a two month lag. Additionally, publically available reports are available on the RecFIN website to enable tracking of species with an ACL as well as component species of the stock complexes.[14] That is, inseason mortality estimates for component species of complexes are available inseason.

Inseason Reporting by Fishery

Shorebased IFQ Fishery

WCGOP observers collect species level discard data at sea from all vessels in the shorebased IFQ fishery. Currently, discard data is available inseason at the IFQ management unit level. Since quotas are issued at the stock complex level, inseason information on discards of the complexes are available, but not for the component stocks. Once data from 2011 are finalized, discard data from 2011 and landed catch from the 2012 year could be used inseason to estimate mortality.

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[13] Reports are available at http://pacfin.psmfc.org/pacfin_pub/qsm.php and http://pacfin.psmfc.org/pacfin_pub/pfmc.php.

[14] Reports are available at http://www.recfin.org/data/estimates/groundfish-management-status-reports.

When the catch is offloaded, catch monitors verify the sorting and weighing of IFQ species at the IFQ management unit level. Since quotas are issued at the stock complex level, no information on the component stocks is provided on the electronic fish ticket. Landings data are reported via electronic fish ticket and are available 24 hours after offload.

State fish tickets are also completed and are uploaded to PacFIN monthly (Washington and Oregon) or bimonthly (California) approximately 2-3 months after the landing date. Generally, species are reported at the complex level unless state law dictates otherwise (see above discussion) or if there is a noteworthy difference in price.

State port biologists sample commercial landings with coverage levels varying by state, port, month, etc. Port biologists collect information that informs the species composition of the complexes (i.e., which species comprise the complex and in what proportion). The species composition data collected by port biologists are submitted to PacFIN as proportions that are used to distribute pounds of fish ticket market category landings to actual species. The proportions are derived as monthly or quarterly aggregates by area, gear, and port and are applied to the fish ticket market category landings in the PacFIN database.

In 2012, landings estimates for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) are available through the PacFIN database for inseason reporting, even though the estimates are not currently reported on the publically available QSM reports. These estimates are derived from the species composition samples collected by the state port biologists. Species-specific discard data from WCGOP are publically available on a one year lag and could be used to estimate discard inseason. For 2013-2014 coastwide estimates of landings and discard for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) could be included in the QSM report or GMT inseason reports and could be considered at Council meetings five times a year. These estimates would be derived from the species composition samples collected by the state port biologists.

At-Sea Whiting Fisheries

At-sea whiting vessels (motherships and catcher-processors) operate north of 40°10 N. latitude and have 100 percent observer coverage. Observers sample unsorted catch to determine species composition of the individual hauls (in contrast to WCGOP observers who sample sorted catch and focus on the discarded portion). Some observations are whole-haul samples (a census) while others are partial-haul samples (i.e., a portion of the haul is randomly sub-sampled). Generally, the samples are a large proportion of each haul (30 percent or more of an individual haul) with nearly 100 percent of all hauls being sampled. For 2012, the data are aggregated at the complex level for inseason reporting; however species level data at the haul level are available in the NORPAC database. An effort is currently underway to provide tow level data from the NORPAC database to the PacFIN database for use in inseason reporting. For 2013-2014 estimates of aurora, shortraker, and rougheye north of 40°10’ N. latitude could be included in QSM or GMT inseason reports and could be considered at Council meetings five times a year.

Non-Trawl Commercial Fisheries

A portion of the non-trawl commercial fisheries are observed at sea by the WCGOP. Between 2006 and 2012, 9-43 percent of all limited entry sablefish fixed gear landings, 4 -15 percent of all non-sablefish limited entry fixed gear landings, and 1-4 percent of all open access landings were observed by the WCGOP (see data at http://www.nwfsc.noaa.gov/research/divisions/fram/observer/sector_products.cfm). The WCGOP sampling priority is on the discarded portion of the catch and data is reported at the species level, when possible.

Federal regulations require landings to be sorted and reported on state fish tickets to the Minor Rockfish complex levels (i.e., Minor Nearshore, Shelf, and Slope Rockfish complexes north and south) with the few exceptions mentioned above. Fish tickets are submitted to the state and are uploaded to PacFIN monthly (Washington and Oregon) or bimonthly (California) approximately 2-3 months after the landing date. Species composition data collected by port biologists are submitted to PacFIN as proportions that are used to distribute pounds of fish ticket market category landings to actual species. The proportions are derived as monthly or quarterly aggregates by area, gear and port and are applied to the fish ticket market category catch values in the PacFIN database.

Fleetwide discard estimates are not available inseason; therefore, discard data from previous years and landed catch from the current year are used inseason to estimate mortality. In 2012, landings estimates for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) are available through the PacFIN database for inseason reporting, even though the estimates are not currently reported on the publically available QSM reports. These estimates are derived from the species composition samples collected by the state port biologists. Species-specific discard data from WCGOP are publically available on a one year lag and could be used inseason to estimate the discarded portion of the catch. For 2013-2014 estimates of landings and discard for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) could be included in the QSM report or GMT inseason reports and could be considered at Council meetings five times a year. These estimates would be derived from the species composition samples collected by the state port biologists.

Recreational Fisheries

In the recreational fisheries, data on released and landed fish are provided at the species, not complex level by state (Washington and California) or PSMFC (Oregon) samplers. These data are reported to the Recreational Fisheries Information Network (RecFIN) on a two month lag. Inseason mortality estimates for the all component species for the nearshore complex and some species in the slope complex are available inseason for Council consideration.

Inseason Response

Commercial

AMs to reduce catch of slope and nearshore rockfish include adjustments to the trawl and non-trawl RCAs and modifications to limited entry and open access fixed gear trip limits. A seaward boundary adjustment of the trawl and non-trawl RCAs from 150 fm to 200 fm would reduce total catch of Minor Slope Rockfish species, including aurora, shortraker, and rougheye rockfish (Table C-12, Table C-13, and Table C-14). RCAs are also available and may be effective at controlling nearshore rockfish mortality; however, the shoreward adjustments may need to be extensive which could potentially close entire areas to fishing. Groundfish conservation areas (i.e., local area closures) may also be effective for reducing nearshore rockfish catch though none have currently been identified.

Trip limits that can be routinely adjusted through inseason action include the Minor Nearshore, Shelf, and Slope Rockfish complexes as well as blue rockfish in California, and for limited entry and open access fixed gears, minor shallow nearshore rockfish and minor deeper nearshore rockfish.

Recreational

Routine management measures to control catch of slope and nearshore rockfish include adjustments to bag limits, season lengths, and depth-based closures.

Table C-12. WCGOP observed trawl catch of aurora rockfish in the area north 40°10’ N. latitude from hauls where the slope rockfish catch was sampled, 2002-2010.

Depth (m)	Depth (fm)	Catch (lb)	Avg Catch/haul (lb)	Catch/effort (hrs)	% of Catch
0-50	0-27	0	0.00	0.00	0.0%
50-100	27-55	84	7.64	2.62	0.1%
100-150	55-82	558	15.51	6.50	0.9%
150-200	82-109	5209	85.40	28.98	8.1%
200-250	**109-137**	19438	19.67	4.23	30.2%
250-300	**137-164**	29404	15.77	3.27	45.7%
300-350	**164-191**	7998	8.82	1.63	12.4%
350-400	191-219	1218	8.77	1.51	1.9%
400-450	219-246	284	9.79	1.37	0.4%
450-500	246-273	33	5.54	0.83	0.1%
500+	273+	80	9.99	1.30	0.1%

Table C-13. WCGOP observed trawl catch of rougheye rockfish in the area north 40°10’ N. latitude from hauls where the slope rockfish catch was sampled, 2002-2010.

Depth (m)	Depth (fm)	Catch (lb)	Catch/haul	Catch/effort (hrs)	% of Catch
0-50	0-27	0	0.00	0.00	0.0%
50-100	27-55	251	7.37	7.37	0.2%
100-150	55-82	972	11.17	11.17	0.9%
150-200	82-109	8614	107.67	107.67	7.9%
200-250	**109-137**	59954	102.84	102.84	54.6%
250-300	**137-164**	30743	69.24	69.24	28.0%
300-350	164-191	7931	51.83	51.83	7.2%
350-400	191-219	808	23.76	23.76	0.7%
400-450	219-246	374	74.78	74.78	0.3%
450+	246+	79	15.72	15.72	0.1%

Table C-14. WCGOP observed trawl catch of shortraker rockfish in the area north 40°10' N. latitude from hauls where the slope rockfish catch was sampled, 2002-2010.

Depth (m)	0-27	Catch (lb)	Catch/haul	Catch/effort (hrs)	% of Catch
0-50	27-55	0	0.00	0.00	0.0%
50-150	55-82	282	35.25	13.42	0.9%
150-200	**82-109**	5237	158.69	45.70	16.8%
200-250	**109-137**	12900	80.12	16.88	41.4%
250-300	**137-164**	9443	48.18	10.95	30.3%
300-350	164-191	2457	23.17	4.61	7.9%
350-400	191-219	444	27.74	4.79	1.4%
400+	219+	416	103.95	12.38	1.3%

Option 1 Establish Federal sorting and reporting requirements for species within the Minor Slope Rockfish complex that are potentially vulnerable to overfishing

Harvest specifications are established at the complex level, which is the same as under No Action. In addition to the existing AMs, a Federal sorting and reporting requirement for aurora, shortraker, and rougheye rockfish north of 40°10' N. latitude would be established. This measure would require processors to sort these species prior to first weighing, after offloading. Reporting would occur on electronic fish tickets (shorebased IFQ only) and state fish tickets. Similar to No Action, 2013-2014 estimates of landings and discard for aurora, shortraker, and rougheye rockfish north of 40'10 N. latitude would be available and could be considered at Council meetings five times a year. The difference between option 1 and No Action is the methodology for estimating the landings of aurora, shortraker, and rougheye north of 40'10 N. latitude. Under No Action, port biologists would sub-sample landings to determine the species composition of the complex and those estimates would be expanded to the rest of the landed catch as well as unsampled landed catch. Under option 1, processors would be required to sort and report these species for all landings north of 40'10 N. latitude and no expansion would be necessary. In the shorebased IFQ fishery, catch monitors would also verify sorting conducted by the processor.

The Council considered but rejected a Federal sorting requirement for three nearshore species (China, copper, and quillback rockfish) considered vulnerable to overfishing in the productivity and susceptibility analysis since existing regulations in Oregon and California already require sorting (there is no nearshore commercial fishery in Washington). The Council's primary objective for the sorting requirement was to increase the accuracy of reporting for these species to better inform future OFL estimates, estimated from either data-poor methodologies or formal stock assessments, and to better inform the larger stock complex restructuring analysis. Accuracy in reporting was also considered essential to determine if mortality of the component species approaches unsustainable levels, which could result in a biological impact in the long term. Additionally, the Council considered that recreational fishery data from Washington, Oregon, and California is already collected and reported at the species level. The RecFIN reports already include estimates of landed and released catches of China, copper, and quillback rockfish which could be considered at Council meetings five times a year. Commercial QSM reports could be modified to report these species as well. Since implementing a sorting requirement for China, copper, and quillback rockfish was not expected to improve the existing data quality, the measure was rejected from more detailed analysis.

Regulation Requirements

Under option 1, regulations would be the same as No Action, except that for the commercial landings where processors and fishermen would be required to sort and report aurora, shortraker and rougheye rockfish north of 40’10 N. latitude prior to first weighing, after offloading. Reporting at the species level, not the complex, would occur on electronic fish tickets (shorebased IFQ only) and state fish tickets.

Inseason Reporting

Shorebased IFQ Fishery

Same as No Action, except that catch monitors would verify that aurora, shortraker and rougheye rockfish north of 40’10 N. latitude are sorted by processors and reported on electronic fish tickets. State fish tickets would also report the three species. Port biologists would sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora rockfish) were present in the species categories.

At-Sea Whiting Fisheries

Same as No Action.

Non-Trawl Fisheries

Same as No Action, except state fish tickets would report aurora, shortraker and rougheye rockfish north of 40’10 N. latitude. Port biologists would sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora) were present in the species categories.

Recreational Fishery

Same as No Action.

Inseason Response

Commercial

Same as No Action.

Recreational

Same as No Action.

Comparison of the Management Options

Biological Impacts

The productivity and susceptibility analysis indicated three species in the Minor Nearshore Rockfish (China, copper, and quillback rockfish) and Minor Slope Rockfish (aurora, shortraker, and rougheye rockfish) complexes may be vulnerable to overfishing based on recent estimates of the OFL contributions to the respective complexes and the historical landings. The proposed option is evaluated to determine if implementation would increase the accuracy of reporting for these species to help inform the OFL estimates to the complex, future assessments, and the larger restructuring analysis. Accuracy in reporting is also essential to determine if mortality approaches unsustainable levels which could result in a biological impact. The following discussion reviews the quality of data collected under the No Action alternative and option 1 to inform which method provides the greatest level of reporting accuracy.

It should be noted that identifying some rockfish to species can be difficult even for trained port biologists, observers, and catch monitors. For instance, within the Minor Slope Rockfish complexes, aurora rockfish is similar in appearance to splitnose, stripetail, rougheye, shortraker, and chameleon rockfishes (Orr et al. 2000). Rougheye is likewise similar to shortraker, blackgill, Pacific ocean perch, sharpchin, and yelloweye rockfish. There is a recent finding that fish historically identified as rougheye consist of a second species as well, blackspotted rockfish (*Sebastes melanostictus*), a situation that is not unprecedented in recent years and that underscores the identification challenge involved with closely related rockfish (Orr and Hawkins 2008).[15] Shortraker rockfish are similar in appearance to rougheye, blackgill, Pacific ocean perch, sharpchin, and redbanded rockfishes. Within the Minor Nearshore Rockfish complexes, quillback is similar to brown rockfish, copper rockfish, and China rockfish (Orr et al. 2000). China is similar to black and yellow rockfish, quillback, and brown rockfish. Differentiating between these similar appearing species can require the counting of head spines and/or gill rakers, inspection of the color of the membrane lining the abdomen (i.e., the peritoneum); or close examination of skin coloration, although coloration can fade substantially after capture and make identification more difficult.

The No Action alternative and option 1 include reporting by observers, catch monitors, and port biologists which have training in rockfish identification. It is assumed that the accuracy of data collected by all three samplers is the same.

Shorebased IFQ Fishery

The sorting requirement does not impact WCGOP discard data collection procedures; therefore, the discard data under both No Action and option 1 is considered equally accurate.

Under No Action, the port biologists' estimates of the species composition of the complex are considered accurate for use in management. Within each stratum, estimates of species composition are expanded to landings based on a weighted average composition of the sampled landings (i.e., species composition samples from landings with larger weights have more influence on the estimated composition of the total landings for that stratum). The weight of a species landed in each stratum is calculated, and the calculated weights are summed across strata to derive the fleetwide estimate for landings of that species. The expansion process can result in statistical errors as a result of factors such as variable sampling coverage, small sample sizes, and the large number of strata. Strata vary by state, but are generally combinations of gear, port, quarter, market category, and INPFC area. Port biologists strive to sample all strata, yet given the diversity in fishing operations, competing sampling priorities (e.g., collecting biological data for upcoming stock assessments), and limited sampling resources, this goal is not always met, and species composition data must sometimes be borrowed from similar strata to inform unsampled strata. For example, in 2011 in Oregon, there were slope rockfish landings in 87 strata, of which 71 were sampled at least once, an 82% sampling coverage rate. Borrowing occurred in 16 (18%) of the landed strata, with most of the borrowing occurring in quarters 3 and 4. Of the 71 strata sampled, 26 had only a single sample, and 14 had two. When strata contain only one sample, variance around the estimates cannot be calculated. In addition, borrowing species composition data adds uncertainty (how well do the borrowed data represent the unsampled strata?) that is not accounted for in traditional error estimates. A detailed exploration of the sampling rates, stratifications, and expansions is ongoing and all three west coast states are committed to providing the most robust data for use in management.

Under option 1, processors north of 40'10 N. latitude would be required to sort and report these species for all landings (i.e., no expansion is necessary) on electronic (shorebased IFQ only) and state fish

[15] Blackspotted rockfish continue to be treated as rougheye rockfish for management purposes because, in part, harvest specifications were calculated using historical catch data that treated the two as a single species.

tickets. Catch monitors would verify that the three species were correctly sorted on fish tickets. Under option 1, the data could be considered more accurate than under No Action, if catch monitors are able to verify sorting by the processors was done correctly.

Port biologists would also sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora rockfish) were present in the species categories. Option 1 could be modified to have either the WCGOP observers or catch monitors conduct species composition sampling of the landed portion of the catch, instead of the sorting requirement. Since WCGOP observers are onboard all shorebased IFQ vessels and catch monitors observe all landings, the expansion would be completed at the trip level instead of expanding all unsampled landings, as is the case with the port biologist data. The rule to implement the catch monitoring program noted that catch monitors provide a role more similar to enforcement than that of the WCGOP observers (75 FR 53360). In 2012, there is only one catch monitor who is not trained as a WCGOP observer; therefore, the ability to accurately identify rockfish species should be the same between catch monitors and WCGOP observers. The option to modify WCGOP or catch monitor duties has not been thoroughly evaluated at this time and it is unclear if it is feasible given existing sampling priorities.

If there are challenges identifying, sorting, and reporting aurora, shortraker, and rougheye to species option 1 could be modified to group the three species together for reporting purposes. Port biologists would still sample the slope rockfish complexes and the category containing aurora, shortraker, and rougheye north of 40°10 N. latitude, which would provide information on the species composition proportions in the categories.

Under both No Action and option 1, the species compositions of the complexes are publically available and could be considered five times a year by the Council.

At-Sea Fishery

The accuracy of the data are the same as under the No Action alternative.

Non-Trawl Commercial Fisheries

Under No Action, the species composition of the slope rockfish landed catch is determined by a sub-sample of landings conducted by port biologists and is available inseason from PacFIN. Under option 1, processors would be required to sort and report aurora, shortraker, and rougheye rockfish for all landings north of 40’10 N. latitude (i.e., no expansion is necessary) on state fish tickets. Port biologists would also sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora rockfish) were present in the species categories. Fleetwide estimates of discard are not available inseason under both No Action and option 1; therefore, the estimates from the previous year would be used.

Similar to the discussion under the shorebased IFQ fishery section, the port biologists’ species composition estimates are expanded under No Action. At this time, it is not possible to distinguish between the accuracy of the estimates between the expanded data provided by port biologists and the data collected under the proposed sorting requirement.

Under both No Action and option 1, data for the non-trawl commercial fisheries are publically available and could be considered five times a year by the Council.

Recreational Fisheries

The accuracy of the data are the same as under the No Action alternative.

Socioeconomic Impacts

Fisherman and Processors

Under option 1, processors (and most likely fishermen) north of 40’10 N. latitude would be required to sort and report aurora, shortraker and rougheye rockfish prior to first weighing, after offloading. Failure to sort these species correctly is subject to enforcement under both Federal and state regulations. The requirement “prior to the first weighing after offloading” allows vessels and buyers some flexibility in whether fish are sorted onboard the vessel or during offloading. Despite this flexibility, the sorting requirement would be expected to increase the existing workload and reporting requirements for fishery participants. Circumstances differ between vessels and buying and processing facilities and so would affect individuals and businesses to different degrees. Some vessels may have more ability to sort and store fish into more categories onboard than others. Many vessels will not sort the catch completely until the time of delivery.

Operations at most processing facilities involve sorting based on visual inspection of large volumes of fish on a fast moving sorting belt. As discussed above, accurate rockfish identification can require the handling and deliberate examination of individual fish. Adding three additional stocks to the sorting requirement would be expected to increase the number of fish needing examination and increase the overall time needed for sorting. Such increased handling may result in decreased product value and delays in processing operations could reduce the overall profitability of the offload. These potential impacts to fish buyers and processors cannot be quantified with available information.

Management Agencies

There is no impact to the WCGOP since observers currently strive to identify all discarded catch to the species and not complex level. The impact of a sorting requirement to the catch monitor program is anticipated to be minimal under option 1. Catch monitor and program staff duties would include outreach to processors (i.e., first receivers) and enhanced species identification training to enable species identification of aurora, shortraker, and rougheye rockfish.

Under option 1, Federal and state groundfish programs may need to invest time and money into outreach programs to increase the accuracy of species identification within the processing community. Increased enforcement may also be necessary to ensure accurate sorting for use in management. For example, current state regulations in California require landings to be reported at the species, not complex level. However, from 2005-2011, an average of 13 percent of the fish tickets reported data at the complex level, instead of the species level. In recent years (2009-2011), the average has declined to 9 percent. From 2005-2011, an average of 40 percent of dealers reported data at the complex level, instead of the species level. In recent years (2009-2011), that average has declined to 31 percent. However, the most commonly reported category is slope rockfish. Historically, given the large number of species landed, the priority was to enforce sorting at the Federal level (i.e., species with an ACL or trip limit) with a secondary priority for enforcing the state sorting requirements (i.e., all species). Enforcement priorities could be modified under both the No Action and option 1. The costs of outreach and enforcement efforts are expected to be minimal to moderate.

Modifications to the electronic fish ticket and the state landing receipt databases would need to accommodate species-specific reporting for the slope species under option 1. Currently, Oregon is the only state that has species codes for aurora, shortraker, and rougheye rockfish north of 40°10 N. latitude. California would need to add codes for rougheye and shortraker and Washington would need to add codes for all three species. Codes for these species are used in each state already as part of the port sampling programs and the species composition data that is uploaded to the PacFIN database. The burden of adding new codes should be minimal.

The Council rejected a Federal sorting requirement for three nearshore species (china, copper, and quillback) since existing regulations in Oregon and California already require sorting (there is no nearshore commercial fishery in Washington). The Council's primary objective for the sorting requirement was to improve the quality of data for use in management. Since this measure would not improve the data quality it was rejected. These three species were identified in the Cope et. al paper as vulnerable and the historical estimates of mortality for china and quillback were higher than the estimated ABC and OFL contributions to the slope rockfish north complex proposed for 2013-2014 (Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). Additionally, the Council considered that recreational fishery data from Washington, Oregon, and California is already collected and reported at the species level.

Considered but Rejected

The Council considered but rejected a coastwide sorting requirement since historical estimates of mortality indicate that mortality of these species south of 40°10' N. latitude has been low in recent years (2008-2010). Further, existing regulations in California (i.e., south of 42° N. latitude) require the species, not the complex, be reported on fish tickets (CDFG Code sections 8043 and 8045). The Council's primary objective for the sorting requirement was to improve the quality of data for use in management. Since this measure would not improve the data quality, it was rejected.

The Council rejected removing the three species from the Minor Slope Rockfish North complex, establishing a new complex or species-specific harvest specifications, and establishing IFQ as the primary catch control until the comprehensive analysis of stock complexes is completed and the historical estimates of mortality are finalized.[16] Methodologies to estimate the species-specific historical mortality estimates by sector need to be finalized, reviewed, and accepted by the Council and its advisory bodies. This step is necessary to inform the OFL and ABC estimates, evaluate the existing allocation structure, and inform any potential modifications to the allocations between the trawl and non-trawl sectors as well as within the trawl sectors (i.e., allocations between the shorebased IFQ, mothership, and catcher-processor sectors).

Current regulations provide a formula for issuing QS in the shorebased IFQ fishery in the event species are removed from an IFQ management unit. For example, if a person holds one percent of a species group (e.g., Minor Slope Rockfish North) before the subdivision, that person will hold one percent of the QS for each IFQ species resulting from the subdivision (e.g., aurora, shortraker, and rougheye rockfish). However, now that species-specific estimates of landings are available, additional options for initial issuance may need to be considered. For example, it is anticipated that individual catch histories of the component species (e.g., aurora, shortraker, and rougheye rockfish) are different than the aggregate Minor Slope Rockfish North landings used in the initial issuance of QS.

Historically, there were no concerns identified for individual species within the complex. Slope rockfish trip limits were routinely increased to attain the OYs for the Minor Slope Rockfish complexes (e.g., trip limits ranged from 1,500 lbs/2 months to a high of 8,000 lbs/2 months in the north). Participants in the shorebased IFQ fishery now have an incentive to voluntarily reduce catch of these species since there is an acknowledgement that historical mortality may have been higher than the estimated OFL and ABC contributions to the complex. Establishing IFQ at the species level would add complexity to the existing program and could result in thinly traded markets, which could negatively impact the performance of the program and the communities involved in the fishery. A thin market results in assets that cannot easily be sold or exchanged without a substantial change in price. There is

[16] Historical data indicate that aurora, shortraker, and rougheye are primarily caught with trawl gears. Further, the FMP allocates 81 percent of the slope rockfish complex to the trawl sector.

potential for gear modifications to avoid certain slope species. For example, recent research demonstrated that selective flatfish trawl gear deployed seaward of the RCA had reduced catches of rougheye rockfishes (59 percent) compared to those hauls with a more typical design for deep water trawling (Hannah et. al, 2011). However, some reductions to target species were also experienced so further work to develop gear modifications is necessary. Ensuring the health and sustainability of the aurora, shortraker, and rougheye stocks is important to industry for maintaining the slope rockfish target strategy as well as providing access to other valuable slope target species (e.g., Dover sole, thornyheads, and sablefish). The Council and NMFS have previously asked industry to voluntarily avoid species with some success, which may be a viable option until the historical estimates are resolved and long term solutions identified.

The Council rejected the option to adopt a species-specific HG along with limited entry and open access trip limits for aurora, shortraker, and rougheye rockfish since estimates of mortality for these species with fixed gears is low (Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). Routine adjustments could be made to the existing slope rockfish fixed gear trip limits, which could reduce mortality of these species.

C.5 Catch Accounting between Limited Entry and Open Access

This action concerns a policy that was inadvertently deleted from the FMP when Amendment 21 was implemented, and clarifies the application of that policy with respect to catch accounting[17] for set-asides. The policy that was inadvertently deleted specified the decision rules for determining the allocation against which a vessel's catch would count, i.e. whether it would count against the limited entry allocation or the open access allocation. As it was specified, the policy also set up the situation in which catch might be deducted from both the ACL as an "off the top" set-aside before sector allocations are made and deducted from an open access or limited entry sector allocation. In this regard, this amendment adds a clarification to eliminate the possibility of a duplicate deduction.

The language at issue specified catch accounting for the division of allocation between the commercial limited entry and open access sectors and was originally contained Section 11.2.2, paragraph 4. Prior to Amendment 21 Section 11.2.2, Paragraph 4 read as follows.

> Any groundfish catch by vessels with an LE permit will be counted against the quota for the limited entry gears while the fishery for the limited entry gear for which its permit is endorsed is open. A vessel may not carry or deploy limited entry gear for which its permit is endorsed when the limited entry fishery for that gear is closed. Once the limited entry fishery for the gear for which the permit is endorsed has closed, any landings by the vessel with exempted gear, or limited entry gears for which no endorsement is held, will count toward the open access quota. The catch of vessels fishing without LE permits will count toward the open access quota regardless of what open access gear is used.

[17] The terms "catch accounting" and "catch," as used in this section, cover the application of a vessel's harvest against a sector allocation. Depending on how the allocations and management measures are specified, harvest may be measured as landings (catch minus discards), catch (including discards), or total mortality (catch minus discard survival). Regardless of the measure used in a particular situation, the management objective is to maintain total mortality within the ACLs.

Amendment 21 created a new division in the commercial allocation of groundfish by splitting it into trawl and non-trawl gears[18,19] and deducting open access incidental catch from the "off the top set aside". FMP language to implement Amendment 21 addressed catch accounting between the trawl and non-trawl sectors. This new division together with Amendment 20 gear switching provisions created complications for vessels with permits endorsed for limited entry trawl gears. The resolution was to specify that the allocation against which a vessel would be fishing will be determined by the fishery declaration made by the vessel.[20] Amendment 21 revised the language of section 11.2.2, paragraph 4 read as follows:

> Amendment 21 Version of Section 11.2.2, Paragraph 4: Groundfish catch will be counted against the allocation to the fishery or sector into which the vessel has declared or is otherwise participating.

While this language substantially simplified paragraph 4, it inadvertently deleted the only place in the FMP where it was clearly specified that if a vessel with limited entry permit landed groundfish that groundfish would count against the limited entry allocation regardless of the gear used, and similarly that any landing by a vessel without a limited entry permit would count against the open access allocation.

The other issue to be addressed is the potential for double counting. Under the current management system prior to the allocation of the groundfish ACLs among the various groundfish sectors, the ACLs are reduced to account for groundfish catch mortality in non-groundfish fisheries (i.e., incidental open access fisheries), EFPs, research catch, and the tribal fisheries. However, the old Section 11.2.2, paragraph 4 language specified that <u>any</u> catch by limited entry vessels would be deducted against a limited entry allocation (with certain exceptions when a fisheries closed) in that <u>any</u> catch by open access vessels would count against the open access allocation. This FMP language was in place prior to the implementation of ACLs which include "off the top" deductions for non-groundfish activity including incidental open access fisheries. When the pre-Amendment 21 FMP catch accounting language in Section 11.2.2, paragraph 4 was combined with the new ACL structure a vessel fishing in the incidental open access fishery would have catch deducted from the ACL as part of the set-aside for the incidental open access fishery and as well as deducted from allocation covering the open access fishery given the vessels specific catch.

Finally, the declaration program referenced in the Amendment 21 language and the associated data system is not necessarily the best available data to determine which fishery vessels are operating in for inseason catch accounting. The key piece of information for which the declaration system was to serve as the source, whether or not a particular landing is being made as part of the trawl IFQ program, is available through other elements of the fishery monitoring program (e.g. landing receipts). Therefore it

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[18] The division between the limited entry and open access allocations remains a key component of the license limitation program. For groundfish for which there is not a division between the limited entry and open access allocations and regulations the longline and pot limited entry endorsements become relatively meaningless, since longline and pot gear can be used both in the limited entry and open access fisheries. Limited entry/open access allocations are determined for most species during the biennial specifications process.

[19] Assuming that a limited entry/open access allocational split is maintained, the trawl/nontrawl split creates the need for separate accounting for limited entry trawl catch and limited entry fixed gear catch (previously aggregated accounted for as limited entry landings for all groundfish other than sablefish), as well as directed open access catch.

[20] Under the Pacific Coast groundfish program, prior to leaving port of vessel must have filed with the NMFS a declaration report stating the gear type they will be using. The gear declarations are specified such that they categorize trips by sector.

is being suggested that the references to declarations be eliminated from this paragraph so the best available information can to be used.

Management Issue

There is a catch accounting need to reinstate FMP language that specifies how catch will be accounted for between the trawl and non-trawl sectors and the open access and limited entry sectors. The language needs to be updated to address the change in allocation structure since the implementation of Amendments 20 and 21.

Management Options

No Action: Maintain the following language in section 11.2.2, paragraph 4 of the FMP:

> "Groundfish catch will be counted against the allocation to the fishery or sector into which the vessel has declared or is otherwise participating."

The Action Alternative, Preferred: The following language is proposed for section 11.2.2, paragraph 4, to reinstate the language specifying the accounting rules between limited entry and open access vessels; provide the rules for catch accounting between trawl and non-trawl sectors; and provide clarification to ensure that catch is not deducted twice from an ACL.

> Any groundfish catch by a vessel registered to an LE permit will be counted against the allocation for the limited entry gear(s) that the permit is endorsed for when the fishery for the limited entry gear is allowed, except when the vessel is fishing in a fishery for which the catch has already been accounted for in the preseason set-asides deducted from the ACLs. A vessel may not carry or deploy limited entry gear for which its permit is endorsed when the limited entry fishery for that gear is closed or otherwise prohibited. Once the limited entry fishery for the gear for which the permit is endorsed has closed, any groundfish landings by the vessel with open access gear will count toward the allocation covering the open access fishery. The catch of vessels fishing without LE permits will count toward the allocation covering the open access fishery regardless of what open access gear is used, except when the vessel is participating in a fishery for which the catch has already been accounted for in the preseason set-asides deducted from the ACLs.

Biological Impacts

The Action Alternative, which is preferred for 2013-2014, addresses catch accounting issues and affects the tracking of catch relative to sector allocations. The risk of exceeding an ACL, ABC or OFL would not result in a considerable difference relative to No Action. No other biological impacts were identified relative to the Action Alternative.

Socioeconomic Impacts

The Preferred Action Alternative benefits trawl and non-trawl fishermen by allowing for more accurate catch accounting while maintaining flexibility to move between gears and sectors. The Action Alternative further benefits non-trawl fishermen by eliminating duplicate catch accounting. When the pre-Amendment 21 FM catch accounting language in Section 11.2.2, paragraph 4 was combined with the new ACL structure a vessel fishing in the incidental open access fishery would have catch deducted from the ACL as part of the set-aside for the incidental open access fishery and as well as deducted from the allocation covering the open access fishery given the vessels specific catch.

C.6 Related Regulatory and FMP Language Clarifications

Complete Offloading (Regulatory Language Clarification)

Overview

As part of the trawl rationalization program regulations were adjusted for the trawl sector to clarify that once the transfer of fish begins all fish on board a vessel count toward a landing and that the offload must be completed prior to the start of a subsequent trip. A similar clarification is needed for other segments of the fishery for accurate catch accounting between sector allocations. It is proposed that as part of implementing this FMP amendment on catch accounting, regulatory language be adjusted to parallel the requirements for complete offloading which apply for the trawl sector.

Management Issue

For the purpose of catch accounting it is important that all fish harvested on a trip are clearly associated with the landings receipts and permit status. Action is needed to require that all fish from a particular trip be offloaded prior to the commencement of a subsequent trip.

Management Options

No Action Option: Require that all fish from an IFQ trip be offloaded prior to the commencement of a subsequent trip.

Action Alternative, Preferred: Require that all fish from any trip be offloaded prior to the commencement of a subsequent trip.

Comparison of the Management Options

<u>Biological Impacts</u>

The Preferred Action Alternative affects tracking of catch and catch limits. Requiring that all catch be offloaded is expected to improve catch accounting between sectors. The risk of exceeding an ACL, ABC or OFL would not result in considerable difference relative to No Action. No other biological impacts were identified relative to the Action Alternative.

<u>Socioeconomic Impacts</u>

For the purpose of catch accounting it is important that all fish harvested on a trip are clearly associated with the landings receipts and permit status. Because all catch from a trip is generally offloaded prior to leaving port on a new trip under the No Action Option, the Preferred Action Alternative is expected to result in no considerable change in impacts to the affected fishermen.

Clarification in how the Open Access Sector Regulations Apply to IFQ participants (FMP Language Clarification)

Overview

As part of the trawl rationalization program Section 11.2.5 paragraphs a and b of the FMP were expanded to specify the regulations which would apply when vessels with trawl endorsed limited entry permits use longline or fishpot gear with (paragraph a) or without (paragraph b) endorsements for those gears. Paragraph b states that when LE trawl vessels are using longline or fishpot gear without an endorsement for the gear being used, landings must be covered with trawl IFQ and that the vessel must comply with the provisions of the trawl IFQ program. A sentence at the end of the section states that under such circumstances open access regulations would not apply, i.e., even though a trawl vessel is using open access gear (using longline or fishpot gear without an LE permit) the open access sector regulations will not apply. This sentence needs to be modified to clarify that it is only the open access trip limits which will not apply, unless explicitly stated elsewhere (e.g. the catch accounting rules for limited entry trawl vessels using an open access gear are different than for an open access sector vessel using open access gear).

Management Issue

Clarifications of the FMP language are needed to specify that language in section 11.2.5 relative to the open access regulations that only the trip limit regulations for limited entry trawl vessels using longline or fish pot gear do not apply. Gear and other regulations having to do with the open access fishery may continue to apply, however, this adjustment will not prevent NMFS and the Council from providing exceptions to other open access regulations as necessary and appropriate in the future through a rulemaking.

Management Options

No Action Option: Maintain language at 11.2.2 of the FMP that reads…..”longline and fishpot gears used by IFQ vessels endorsements are termed OA”

Action Alternative, Preferred: Revise Gear Endorsement language at 11.2.5 of the FMP to read as follows:

6. Gear endorsements are required for LE-permitted vessels to use LE gear types (see Section 11.2.1, paragraph 1) to catch groundfish under the regulations governing the LE fishery.
    b. Exception for Longline and Fishpot Gear Usage for Vessels with a LE Permit not Endorsed for the Gear Being Used:
        . . .
        iii. As specified in the trawl rationalization program (Section 6.9.3.1 and Appendix E) vessels registered to a trawl-endorsed LE permit and using longline or fishpot gear without a LE endorsement for those gears must cover their landings with trawl IFQ and comply with the provisions of the trawl IFQ program. Open access sector ~~regulations~~ trip limits will not apply to vessels participating under the IFQ program.

Comparison of the Management Options

Biological Impacts

The Preferred Action Alternative is an FMP housekeeping measure that is not expected to result in any biological impacts.

Socioeconomic Impacts

The Preferred Action Alternative is an FMP housekeeping measure that is not expected to result in any socioeconomic impacts.

C.7 Widow Rockfish Within-Trawl Allocations

Overview

The harvestable surplus of widow rockfish is formally allocated as specified in the FMP allocations with 91 percent of the fishery HG allocated to trawl sectors after yield is set aside to accommodate Tribal fisheries, research activities, bycatch in non-groundfish fisheries, and total catch limits for exempted fishing permits (EFPs). Allocations of widow rockfish are also specified for the various trawl sectors under Amendment 21 rules. Amendment 21 specifies that 500 mt of widow rockfish or 10 percent of the trawl allocation of widow rockfish is allocated to the trawl whiting sectors once the stock is rebuilt. Of that amount, widow yield is allocated to the whiting sectors according to the pro-rata allocation of whiting (42 percent to shoreside whiting, 34 percent to catcher-processors, and 24 percent to motherships). Since the shoreside whiting and non-whiting sectors were combined into one sector managed in an IFQ system starting in 2011 when Amendment 20 was implemented, the amount allocated to the shoreside whiting sector is combined with the remaining trawl sector allocation after allocating to the at-sea sectors (i.e., catcher-processors and motherships) to determine the shoreside trawl allocation.

Management Issue

The Council is contemplating a change to the widow rockfish allocation to the trawl sectors specified under Amendment 21 to provide more widow to the shoreside sector to allow greater opportunity to target widow and yellowtail rockfish. The needs of the shoreside trawl sector would best be met by allocating as much of the trawl allocation of widow rockfish as possible since a healthy widow rockfish stock is a valuable target for that sector. The needs of the at-sea sectors would best be met by allocating enough widow rockfish to prevent impeding the ability of these sectors to target Pacific whiting. While widow rockfish are not a target species in the at-sea whiting fisheries, the amount of widow rockfish allocated to the at-sea sectors has the potential to limit their ability to attain whiting allocations. If the total catch of widow rockfish hits the allocation for an at-sea sector, the season ends for that sector even if they have not attained their allocation of whiting. The analysis of sector needs for widow therefore compares the recent historical catches and catch rates of widow with respect to whiting by the at-sea sectors to understand whether the widow allocation options meet the needs of the at-sea sectors.

Management Options

Option 1 is the No Action widow allocation option and would allocate 290 mt to the at-sea sectors. Widow allocation option 2 would allocate 147.9 mt of widow to the at-sea sectors (147.9 mt is the amount of widow allocated to at-sea sectors in 2012) to be allocated to catcher-processors and motherships using the same apportionment used to allocate Pacific whiting (i.e., 41.4 percent and 58.6 percent of the at-sea allocation to motherships and catcher-processors, respectively) (
Table C-15). Widow allocation options 3-5 would allocate 200, 250, and 300 mt of widow to the at-sea sectors, respectively to be allocated to catcher-processors and motherships using the same apportionment used to allocate Pacific whiting. Option 1, where the Amendment 21 sector allocation of widow rockfish does not change, is the Preferred Alternative.

Comparison of Management Options

Given the widow rockfish ACL alternatives analyzed for 2013-2014 and the finding that the widow rockfish stock is successfully rebuilt, the status quo Amendment 21 allocation to whiting sectors is 500 mt, of which 290 mt is allocated to the at-sea sectors (i.e., Option 1), which is close to the maximum allocation of 300 mt analyzed (Table C-15). The range of at-sea whiting sector allocation options of 147.9 mt to 300 mt results in a range of widow allocations to catcher-processors of 86.7-175.9 mt and to motherships of 61.2-124.1 mt (Table C-16). Recent bycatch of widow rockfish since 2005 has ranged from 1-73 mt in the catcher-processor sector and from 13-73 mt in the mothership sector (Table C-15). Table C-18 depicts the projected sector whiting catch for the at-sea sectors under each of the widow allocation options assuming the recent year average and maximum widow bycatch rates observed in the fishery. The two options with lowest widow allocations to the at-sea sectors (Options 2 and 3) have the potential of limiting access to whiting in the mothership sector assuming the average rates occur in the future. Both sectors, especially the catcher-processor sector, have concentrated their fishing efforts later in the year when bycatch rates are reduced. If this pattern continues, the sectors may be able to access substantially larger allocations of whiting with lower widow allocation.

In 2005, a widow total catch limit was first implemented for the whiting sectors. The 2005 limit of 200 mt of widow bycatch was shared by the three trawl sectors that targeted whiting (shoreside whiting, catcher-processors, and motherships). In the event the widow limit was reached before sectors attained their whiting quotas, the fishery was closed until such time an inseason action provided more widow yield to the bycatch limit if yield was available, or for the rest of the year if yield was not available. Therefore, there was a great incentive to avoid widow rockfish bycatch and any other species where there was a specified bycatch limit[21]. Prior to 2005, when the whiting fleets were not actively avoiding widow rockfish, the widow bycatch was much higher than the allocations considered for 2013-2014 (Table C-17). The mothership sector had annual widow catches in that period that were higher than any of the 2013-2014 allocations considered and the catcher-processor sector had catches higher than some of the considered 2013-2014 allocations. Table C-17 also shows the catch percentage of widow was much higher in the shoreside non-whiting sector prior to 2003 when the target widow/yellowtail rockfish midwinter trawl fishery was eliminated (there was a partial year of widow/yellowtail targeting in 2002). Resumption of this target midwinter fishery in 2013 is the reason the widow sector allocation was being reconsidered. Testimony from participants in the at-sea whiting fishery at the April 2012 Council meeting that a higher widow allocation is needed as an insurance policy to prevent early closure of their fishery convinced the Council to prefer the No Action Option 1 allocation scenario. The Council did not reallocate widow rockfish as part of their preferred alternative for 2013-2014 fisheries.

Biological Impacts

It is possible that a greater amount of the widow rockfish ACL will be attained if the shorebased sector receives a higher allocation and is able to successfully target widow rockfish within the overfished species allocation constraints.

Socioeconomic Impacts

The socioeconomic impacts that could result from the range of widow rockfish allocation options are discussed in Section 4.2.2.5. In sum, using the average widow bycatch rate, the shoreside whiting sector may not be limited by the widow rockfish allocation under the options and ACLs analyzed (Table 4-62). That is, the widow rockfish allocation does not appear to limit access to the target stock, whiting. Under all the widow ACL alternatives the mothership sector may not be limited by the widow rockfish allocations under options 2 and 3. Further, under the 600 mt ACL, the mothership sector may be limited by the No Action widow rockfish allocation. The catcher-processer sector may only be limited under the 600 mt ACL and the No Action allocation. Under the highest widow bycatch rate scenario, the shoreside sector may be limited under allocation options 1, 4, and 5 under the 600 mt ACL. For the mothership sector, every allocation option under the alternative ACLs may be limiting, except the No Action allocation option under the 1,500 mt and 2,500 mt ACLs. For the catcher-processor sector, every allocation option under the alternative ACLs, may be limiting, except under the option 5 allocation under all ACLs and the No Action allocation under the 1,500 and 2,500 mt ACLs. The estimated change in revenue for the shorebased IFQ sector as a result of the widow rockfish allocations and subsequent increased access to a targeted widow and yellowtail fishery is in Table 4-63. Assuming the average 2001 widow-yellowtail encounter (landing) rate and 2011 ex-vessel prices, combined landings of widow and yellowtail rockfish in a directed fishery may have an ex-vessel value between $1.2 million and $2.2 million under the 1,500 mt widow ACL alternative and between $2.7 million and

[21] The first bycatch limit was implemented for canary rockfish late in the 2004 season by emergency regulation. Currently, there are sector-specific bycatch limits specified for canary rockfish, darkblotched rockfish, POP, and widow rockfish.

$4.2 million under the 2,500 mt widow ACL alternative, depending on the assumed bycatch rate and interjector allocation.

Table C-15. Bycatch of widow rockfish by non-tribal whiting trawl sectors, 2005-2011.

Year	Sector								
	Shoreside a/			Catcher-processors			Motherships		
	Widow Catch (mt)	Whiting Catch (mt)	Widow Catch Rate (Widow/Whiting)	Widow Catch (mt)	Whiting Catch (mt)	Widow Catch Rate (Widow/Whiting)	Widow Catch (mt)	Whiting Catch (mt)	Widow Catch Rate (Widow/Whiting)
2011	123.84	90,988	0.001361010	24.41	71,679	0.000340584	12.85	50,051	0.000256646
2010	54.97	62,319	0.000882075	5.01	54,285	9.22907E-05	34.02	35,714	0.000952568
2009	108.64	40,801	0.002662680	0.96	34,620	2.77296E-05	24.90	24,091	0.001033581
2008	99.09	50,423	0.001965175	52.37	108,121	0.000484365	60.75	57,432	0.001057773
2007	88.97	73,280	0.001214110	72.77	73,263	0.000993271	72.99	47,809	0.001526700
2006	49.38	97,297	0.000507518	67.00	78,864	0.000849564	71.80	55,355	0.001297082
2005	77.15	97,381	0.000792249	43.14	78,890	0.000546837	35.50	48,571	0.000730889
05-11 avgas	86.01	73,213	0.001340688	37.95	71,389	0.000476377	44.69	45,575	0.000979320
05-11 max	123.84	97,381	0.002662680	72.77	108,121	0.000993271	72.99	57,432	0.001526700
05-11 min (year)	49.38	40,801	0.000507518 2006	0.96	34,620	0.000027730 2009	12.85	24,091	0.000256646 2011

a/ Beginning in 2011 the shoreside whiting and non-whiting sectors were combined into a single sector and managed with IFQs. For this table, the 2011 data were analyzed at the trip level to determine trips that targeted whiting vs. those that targeted other groundfish species. The 2011 catch data presented in the table are the sum of catches from all whiting target trips to make these data comparable with previous years.

Table C-16. Trawl sector allocation options, including No Action (Option 1), of widow rockfish in mt.

ACL Alt.	Yield Set-Aside	Tribal Set-Aside	Inc. OA Set-Aside	Research Set-Aside	EFP Set-Aside	Fishery HG a/	Trawl Allot.	Widow Allot. Option	SB IFQ Allot. b/	At-sea Trawl Allot.	MS Allot.	CP Allot.
Max. 2005-11 widow catch									124		73	73
600	86.6	60.0	3.3	5.3	18.0	513.4	467.2	Option 1 c/	177.2	290.0	120.0	170.0
								Option 2	319.3	147.9	**61.2**	86.7
								Option 3	267.2	200.0	82.8	117.2
								Option 4	217.2	250.0	103.4	146.6
								Option 5	167.2	300.0	124.1	175.9
1,500						1,413.4	1,286.2	Option 1 c/	996.2	290.0	120.0	170.0
								Option 2	1,138.3	147.9	**61.2**	86.7
								Option 3	1,086.2	200.0	82.8	117.2
								Option 4	1,036.2	250.0	103.4	146.6
								Option 5	986.2	300.0	124.1	175.9
2,500						2,413.4	2,196.2	Option 1 c/	1,906.2	290.0	120.0	170.0
								Option 2	2,048.3	147.9	**61.2**	86.7
								Option 3	1,996.2	200.0	82.8	117.2
								Option 4	1,946.2	250.0	103.4	146.6
								Option 5	1,896.2	300.0	124.1	175.9

a/ The ACL is reduced by 86.6 mt to accommodate groundfish mortality in the tribal fisheries (60 mt), non-groundfish fisheries (3.3 mt), research (5.3 mt), and EFPs (18 mt). The resulting value is the fishery HG.

b/ The shorebased IFQ sector includes vessels that target whiting and non-whiting.

c/ Option 1 is the preferred No Action option, which applies the FMP allocation assuming the stock is rebuilt.

Table C-17. Trawl sector catches and catch percentages of widow rockfish by year, 1995-2004.

Year	Widow Rockfish Catch by Sector												
	Shoreside Non-whiting			Shoreside Whiting				Catcher-Processors			Motherships		
	mt	% Total shoreside sectors catch	% Total trawl sectors catch	mt	% Total shoreside sectors catch	% Total whiting trawl sectors catch	% Total trawl sectors catch	mt	% Total whiting trawl sectors catch	% Total trawl sectors catch	mt	% Total whiting trawl sectors catch	% Total trawl sectors catch
1995	6,165.3	96.3%	93.6%	236.1	3.7%	56.4%	3.6%	87.0	20.8%	1.3%	95.3	22.8%	1.4%
1996	5,403.2	90.4%	87.0%	571.5	9.6%	70.7%	9.2%	119.9	14.8%	1.9%	117.3	14.5%	1.9%
1997	6,213.3	97.4%	94.6%	163.3	2.6%	45.6%	2.5%	72.6	20.3%	1.1%	122.0	34.1%	1.9%
1998	3,346.7	90.5%	83.9%	349.6	9.5%	54.3%	8.8%	120.9	18.8%	3.0%	173.7	27.0%	4.4%
1999	3,691.1	95.0%	91.2%	194.4	5.0%	54.5%	4.8%	104.1	29.2%	2.6%	58.1	16.3%	1.4%
2000	3,718.5	97.8%	92.7%	83.3	2.2%	28.3%	2.1%	69.8	23.7%	1.7%	141.2	48.0%	3.5%
2001	1,729.6	97.5%	89.1%	44.3	2.5%	20.9%	2.3%	139.7	66.0%	7.2%	27.7	13.1%	1.4%
2002	254.9	98.0%	64.5%	5.1	2.0%	3.6%	1.3%	114.8	81.8%	29.0%	20.4	14.6%	5.2%
2003	4.1	24.7%	14.2%	12.5	75.3%	50.5%	43.3%	11.6	46.7%	40.1%	0.7	2.8%	2.4%
2004	13.8	28.7%	20.4%	34.3	71.3%	63.6%	50.6%	8.2	15.2%	12.1%	11.4	21.2%	16.9%

Table C-18. Projected potential whiting catch at the average and maximum widow bycatch rates for whiting sectors during 2005-2011. Highlighted cells show projected potential whiting catch levels that are below the "Highest plus 50%" whiting harvest guideline, indicating a potential widow rockfish bycatch constraint under that scenario.

Widow ACL Alt.	Widow Allot. Option	Projected potential whiting catch (mt) at the average widow bycatch rate			Projected potential whiting catch (mt) at the highest widow bycatch rate		
		Shoreside	MS	CP	Shoreside	MS	CP
600	Option 1 (No Action)	180,936	122,534	356,860	116,063	78,601	171,152
	Option 2	326,037	62,492	181,999	209,140	40,086	87,287
	Option 3	272,836	84,506	246,110	175,014	54,208	118,036
	Option 4	221,780	105,633	307,638	142,264	67,759	147,545
	Option 5	170,725	126,759	369,166	109,513	81,311	177,053
1,500	Option 1 (No Action)	1,017,231	122,534	356,860	652,515	78,601	171,152
	Option 2	1,162,331	62,492	181,999	745,591	40,086	87,287
	Option 3	1,109,131	84,506	246,110	711,465	54,208	118,036
	Option 4	1,058,075	105,633	307,638	678,715	67,759	147,545
	Option 5	1,007,019	126,759	369,166	645,965	81,311	177,053
2,500	Option 1 (No Action)	1,946,447	122,534	356,860	1,248,571	78,601	171,152
	Option 2	2,091,548	62,492	181,999	1,341,648	40,086	87,287
	Option 3	2,038,348	84,506	246,110	1,307,522	54,208	118,036
	Option 4	1,987,292	105,633	307,638	1,274,772	67,759	147,545
	Option 5	1,936,236	126,759	369,166	1,242,021	81,311	177,053

*Highlighted cells show projected potential whiting catch levels that are below the "Highest plus 50%" whiting HG, indicating a potential widow rockfish bycatch constraint under that scenario.

C.8 Remove or Modify the Minimum Lingcod Length Limit for Commercial and Recreational Fisheries

Overview

Minimum lingcod length limits have been in place since the late 1990s and were implemented to minimize harvest of immature lingcod while maintaining the reproductive potential of the stock. Since the length of 50 percent maturity of female lingcod is about 25 inches (63.6 cm) {Hamel, 2009 #77}, length restrictions established near these lengths may allow fish to spawn at least once prior to harvest. Current commercial length limits vary north and south of 42° N. latitude, and are 22 inches and 24 inches, respectively. Recreational lingcod length limits vary by state and region. In Washington, the recreational lingcod length limit is 24 inches in Marine Area 4, which is consistent with the state managed fisheries in adjacent Puget Sound management areas. The limit is 22 inches in the rest of Washington, Oregon, and California.

Lingcod caught by trawl gears and discarded are assumed to have a 50 percent survival rate {Hamel, 2009 #77}. Lingcod caught with fixed gears and discarded are assumed to have a 7 percent discard mortality rate {PFMC, 2008 #7}.

Management Issue

In November 2011, the Council requested analysis for removing or reducing to 20 inches the lingcod size limits in the shorebased IFQ fishery because all catch in the IFQ fishery count against quota and lingcod less than 24 inches length are considered marketable. In June 2012, the Council recommended maintaining the minimum lingcod length limit in the shorebased IFQ fishery for the start of the biennium in response to concerns expressed by the Council's Enforcement Committee about differential length limits between sectors (Agenda Item D.5.b, Supplemental EC Report). The Council requested additional analysis for removing and reducing the minimum lingcod length limits for all sectors (commercial and recreational) to address the Enforcement Committee's concerns. Such adjustments could be implemented inseason, if desired.

Management Options

No Action, Preferred: The minimum lingcod length limit in the shorebased IFQ fishery and the limited entry and open access fixed gear fisheries (except pink shrimp) vary north and south of 42° N. latitude and are 22 and 24 inches, respectively. In Washington, the recreational lingcod length limit is 24 inches in Marine Area 4, which is consistent with the state managed fisheries in adjacent Puget Sound management areas. The limit is 22 inches in the rest of Washington, Oregon, and California.

Option 1: The minimum length limit for lingcod would be 18 inches for all commercial or recreational fisheries.

Option 2: The minimum length limit for lingcod would be 20 inches for all commercial or recreational fisheries.

Option 3: No minimum lingcod length limit for all commercial or recreational fisheries.

Comparison of Biological Impacts between the Options

Lingcod are a productive stock and estimated abundance is high coastwide (see Section 2.1.3.2). Projected biomass and depletion in the 2009 assessment are high and above target levels at higher catches than realized recently on the west coast (Table C-19).

Lingcod mortality from 2007-2010 has been well below the optimum yield (OY; Table C-19). The RCAs and other management strategies implemented to reduce mortality of overfished species have effectively reduced lingcod mortality. It is unlikely that the proposed lingcod ACL for 2013-2014 would be exceeded as a result of modifications to the minimum length limit, given the low levels of mortality historically.

Table C-19. Percent attainment of the OY from 2007-2010 for lingcod.

Year	Percent of OY
2007	11
2008	4
2009	11
2010	9

Gear selectivity curves for commercial fisheries from the 2009 lingcod stock assessment indicate that lingcod 18 inches and larger are vulnerable to commercial gears {Hamel, 2009 #77}. Therefore, if the minimum length limit were changed to 18 or 20 inches, some increased mortality of lingcod at these sizes would be anticipated. It is difficult to ascertain selectivity less than 18 inches, should the minimum length limit be removed. It is anticipated that at some point smaller fish would not be desired by the market.

Data from charter boats observed in Oregon and California from 2007-2011 were examined to inform recreational selectivity (there are no observations available from Washington). On average, approximately 70 percent of lingcod discarded on observed trips Oregon and California were between 18 and 24 inches; 30 percent were less than 18 inches. In Oregon, all lingcod greater than 22 inches (current minimum length limit) were retained on the observed charter trips; however, in California, on average 29 percent of lingcod greater than 22 inches were discarded even though they were legal to be retained.

Given the estimated natural mortality rate (M) of female lingcod (0.32) and male lingcod (0.18), estimated growth rates of female and male lingcod, and an assumed 50 percent trawl discard survival rate {Hamel, 2009 #77}, for every kg of 18 inch females discarded in the trawl fishery, about 0.8 kg of 22 inch females could be expected to survive a year later (about 0.65 kg and 1.3 years for males). For every 1 kg of 13.5 inch females in the trawl fishery is estimated to yield 1.1 kg of 18 inch females a year later and only about 0.9 kg of 22 inch females two years later (even less for males). For recreational and fixed gear fisheries with only a 7 percent discard mortality rate, for every kg of 18 inch females discarded would yield 1.5 kg of 22 inch females a year later (1.2 kg of 22 inch males in 1.3 years). Therefore it is unlikely that significant biological effects would occur as a result of removing the minimum size limit in the commercial or recreational fisheries.

Comparison of Socioeconomic Impacts between the Options

Removing the lingcod length limit (Option 3) would simplify Federal regulations and eliminate regulatory discards in all fisheries, compared to No Action. Reducing the limit to either 18 (Option 1) or 20 inches (Option 2) would maintain regulatory discards but would allow smaller fish to be retained compared to No Action. All three options would provide consistent Federal regulations across all sectors, compared to No Action.

To the extent that lingcod less than the current size limits are processed, increased revenue would be anticipated. Feedback from processors indicate that lingcod smaller than 24 inches are marketable; however lingcod less than 20 inches are likely not marketable, except in the live fish fishery. The processors will likely establish market limits of the size of lingcod they are willing to buy.

The socioeconomic impacts of removing or reducing the lingcod length limit in the recreational fisheries are not well understood. It is possible that removing or reducing the lingcod size would allow fishermen to attain recreational bag limits quicker, which would enhance the recreational experience and potentially reduce costs (e.g., less fuel spent to fulfill the bag limit). However, as demonstrated in the observer data from California, some anglers may continue to fish for larger lingcod, reducing any potential socioeconomic impact.

Relationship between Lingcod Length Limits and Overfished Species
The shorebased IFQ fishery is rationalized and individual accountability is anticipated to resolve any overfished species implications related to removing or reducing the minimum lingcod length limit. Should increased catches of overfished species occur and become problematic, adjustments to the trawl or non-trawl RCA could be made to reduce catches.

It is uncertain how removing or reducing the lingcod length limit could change effort in the nearshore commercial fisheries, especially the open access component. Projected catches of overfished species in the nearshore fishery are based on target species landing limits. If an increase in participation is realized such that the target species landings exceed those currently in the nearshore model, overfished species projections will increase. Inseason action to reduce trip limits could be taken if landings are tracking higher than projected. Adjustments to the non-trawl RCA could also be used to reduce overfished species interactions. In some areas, the shoreward area of the non-trawl RCA is already at 20 fathoms; therefore, complete area closures would be necessary in these areas depending on the magnitude.

For the non-nearshore fishery, seaward adjustments to the non-trawl RCA or reductions to the lingcod trip limits may be necessary if removing or reducing the lingcod length limit results in increased overfished species interactions.

To the extent that removing or reducing the lingcod size allows fishermen to attain their recreational bag limits quicker, catches of overfished species would be reduced (i.e., less time on the water, less interaction with overfished species). If anglers continue to fish for larger lingcod, no reductions to overfished species catches would be anticipated.

C.9 Shorebased IFQ Accumulation Limits

The term “accumulation limits” applies to the maximum number of quota shares (QS) an entity can control, and the maximum number of quota pounds (QP) that can be assigned to a vessel account in the shorebased IFQ fishery (defined in regulation at 50 CFR 660.111). These limits vary according to the management unit for each relevant stock or stock complex. Objectives for the accumulation limits include preventing the consolidation of large blocks of quota holdings by a small number of controlling entities, and encouraging the distribution of quota among communities. The QS limits restrict the amount an individual or entity may control through ownership or other means. The vessel limits cap the maximum amount of QP that may be assigned to any one vessel during a given year. The annual vessel QP limits are larger than the QS control limits in order to allow several QS holders to work together on a single vessel. Additionally, there are daily vessel limits that regulate the amount of unused QP for Pacific halibut and overfished species residing in a vessel account. Performance of the accumulation limits was evaluated based on the conduct of the fishery in 2011 and the ACLs and trawl allocations that are proposed for 2013-2014.

Management Issue

Based on ownership information gathered in June 2009, the 167 limited entry trawl permits that received initial QS allocations in December 2010 under the trawl rationalization program are thought to be owned or controlled by a total of 114 identified business entities. Accumulation limits include an aggregate limit for all non-whiting species. In order to determine each individual's aggregate non-whiting QS (or vessel's QP) holdings, each IFQ species is weighted based on the percent it contributed to the aggregate non-whiting trawl sector allocation in 2010. A constant weighting is used (rather than changing each year) so that individuals who may be at or near the QS limit are not pushed over that limit any time there is a change in the sector allocations for the underlying species. Applying the species-quota weighting factors in the FMP, two of the 114 entities may have received initial quota share allocations that exceeded the aggregate non-whiting species accumulation limit of 2.7 percent (initial allocations in excess of 2.7 percent were grandfathered in for the duration of the divesture period). If, rather than holding the weighting constant, species weighting factors are adjusted based on the 2013 and 2014 preferred ACLs (and shoreside trawl allocations) for quota share species, these same two entities plus one additional entity (i.e., a total of 3) would apparently be in control of quota share amounts that exceed the aggregate non-whiting species accumulation limit of 2.7 percent.

Quota shares for lingcod were originally allocated as a single, coastwide stock. Splitting the formerly coastwide quota for lingcod into portions restricted to use north and south of 40º10' N. latitude may introduce unintended constraints on some participants.

The proposed 2013 lingcod ACLs are stratified north and south of 40°10 N. latitude, resulting in trawl sector allocations of 1,226 mt north of 40º10' N. latitude and 494 mt south of 40º10' N. latitude. Applying the 3.8 percent vessel use limit to each stock individually means that participating vessels would be limited to 46.6 mt of lingcod north of 40º10' N. latitude and 18.8 mt south of 40º10' N. latitude. In 2011, one vessel recorded lingcod landings of more than 46.6 mt north of 40º10' N. latitude (max was 59 mt, 2nd most was 42 mt, 3rd most was 36 mt), and no vessels landed more than 18.8 mt of lingcod south of 40º10' N. latitude (max was 3.4 mt). No vessels landed IFQ lingcod both north and south of 40º10' N. latitude.

Combining the proposed 2013 lingcod trawl sector allocations north and south of 40º10' N. latitude and applying the 3.8% vessel use limit would translate into an aggregated vessel use limit of 65.4 mt of lingcod in 2013. If the Council wishes to provide vessels an opportunity to harvest the same amount of lingcod north of 40º10' N. latitude that would have been available had the coastwide lingcod quota not been a split (i.e., 65.4 mt), a vessel use limit of at least 5.3 percent would be required. Similarly a vessel use limit of at least 13.2 percent would be required to allow a single vessel to catch 65.4 mt of lingcod south of 40º10' N. latitude.

The lingcod quota share control limits may also need to be adjusted accordingly. The coastwide lingcod quota share control limit of 2.5 percent was originally set as 2/3 of the vessel use limit (i.e., 2/3 x 3.8% ≈ 2.5%). Applying the same logic, in order to be consistent with the new vessel use limits, the lingcod quota share control limits would need to be reset to at least 3.6 percent north of 40º10' N. latitude, and 8.8 percent south of 40º10' N. latitude.

Management Options

<u>No Action:</u>

For the 2013-2014 management cycles, the maximum amount of aggregate non-whiting QS an entity can control and QP a vessel can use in the shorebased IFQ fishery would be limited by accumulation limits defined in regulation at 50 CFR 660.111. Specifically, the aggregate non-whiting QS accumulation limit would be 2.7 percent, the coastwide lingcod vessel QP limit would be 3.8 percent, and the lingcod QS control limit would be 2.5 percent. The weightings from the 2010 fishery, currently fixed in regulation, would continue to be used to evaluate each entity's accumulation of aggregate non-whiting quota.

Option 1, Preferred:

Leave in place the aggregate non-whiting QS accumulation limit of 2.5 percent.

Adjust the shorebased IFQ vessel QP use limits for lingcod for 2013-2014 as follows:

North of 40°10' N. latitude: increase vessel QP use limit from 3.8 percent to 5.3 percent
South of 40°10' N. latitude: increase vessel QP use limit from 3.8 percent to 13.2 percent.

Option 2:

Adjust the shorebased IFQ QS control limits for lingcod for 2013-2014 to be in line with the adjusted QP use limits as follows:

North of 40°10' N. latitude: increase QS control limit from 2.5 percent to 3.6 percent
South of 40°10' N. latitude: increase QS control limit from 2.5 percent to 8.8 percent.

Biological Impacts

Any adjustments to accumulation limits, either QS or QP, would be intended to improve economic efficiency thereby enhancing the ability of the fishery to harvest the ACL. If the ACL is attained, the biological impacts described in Section 2.1 would be realized.

Socioeconomic Impacts

The three business entities that control QS in excess of the aggregate non-whiting QS accumulation limit of 2.7 percent will still be required to divest excess QS by the end of 2014.

Increasing the lingcod accumulation limits to accommodate the division of the coastwide stock into two management units would restore the Council's original intent and provide greater revenue opportunity for entities controlling or harvesting lingcod quota within either of the two, new lingcod management units.

Since most vessels tend to concentrate in a particular geographic area rather than fishing coastwide, applying the No Action lingcod vessel use limit (3.8 percent coastwide) to the two new lingcod management units (north of 40°10 N. latitude; and south of 40°10 N. latitude) may limit some participants' harvest or force them to acquire additional lingcod QP for one area or the other. Analysis shows there is one vessel that would not be able to replicate its 2011 lingcod harvest level if the No Action vessel use limits for lingcod are maintained. Also, vessels needing to acquire additional lingcod QP to cover their catch may find it more difficult to procure available quota due to the relatively smaller, area-specific quota supplies.

There are four entities that currently exceed the lingcod QS control limit (2.5 percent coastwide). Under current regulations these entities would be required to divest excess lingcod QS by the end of 2014. Under option 2, two entities would exceed the 3.6 percent lingcod QS control limit north of 40º10' N. latitude (the control limit would need to be at least 5.54 percent to keep all entities under the limit). No entities would exceed the 8.8 percent lingcod QS control limit south of 40º10' N. latitude (the maximum QS allocation to an entity was 5.54 percent).

C.10 Shorebased IFQ Surplus Carry-Over

The shorebased IFQ carry-over provision, implemented in regulation at (660.140(e)(5), subpart D), allows up to a 10 percent quota pounds (QP) surplus in a vessel account to be carried over from one year to the next and allows up to a 10 percent deficit in a vessel account for one year to be covered with QP from a subsequent year. QP surpluses may not be carried over for more than one year. If there is a decline in the annual catch limit (ACL) from one year to the next, the amount of QP carried over as a surplus will be reduced in proportion to the reduction in the ACL. The carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve optimum yield (OY) while preserving the conservation of stocks. The Council is committed to designing the management system for all fisheries to attain but not exceed the ACL.

Absent a QP surplus carry-over provision, the fleet will likely attempt to maximize harvest of QPs and revenue annually (i.e., fish every last pound for maximum economic benefit) since the QP would not be available in the following year. Attempting to harvest all QPs may increase the risk of fishing into deficit since it is a multispecies fishery and there is limited precision in the harvesting activities.

Management Issue

At the September 2011 Council meeting, the National Marine Fisheries Service (NMFS) issued a report questioning whether the surplus carry-over provision was consistent with the Magnuson-Stevens Fishery Conservation Act (MSA) and National Standard 1 Guidelines (Agenda Item G.1.a, Supplemental Attachment 7). The report requested additional analyses and referenced Section 303(a)(15) of the MSA:

> "establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability."

The Council voted unanimously that NMFS issue the surplus carry-over for 2012 but on a delayed basis. In addition to considering the carry-over provision for 2012, NMFS also requested further exploration of the carryover provision for 2013-2014. The following management option and analysis is intended to ensure that issuance of surplus carry-over in 2013-2014 is consistent with the MSA and National Standard 1 Guidelines.

Management Options

No Action: Surplus carry-over would be implemented as specified in the current regulations, including:

a) 100 percent of the QP for most species are issued at the start of the year (except Pacific halibut, Pacific whiting, or when the harvest specifications are delayed)
b) Surplus carry-over QP from the previous year issued in the spring of the following year (e.g., 2012 surplus QP issued in spring 2013), to the extent allowed by the conservation requirements of the MSA
c) Accountability measures (AM) to ensure ACLs are not exceeded include
    (1) Automatic adjustments to the carry-over percentages based on changes in the ACL (660.140 (e)(5)(i))
    (2) Surplus QP must be harvested in the year issued, i.e., it cannot be carried-over for more than one year
    (3) Changes to the carry-over percentages can be implemented by NMFS under MSA authority (305d) or by the Council during the biennial process (660.140 (e)(5))

(4) Inseason data tracking against allocations and ACLs: Near-real time for IFQ fisheries, 2 month lag for non-IFQ commercial (limited entry fixed gear and open access) and recreational
(5) Routine management measures (660.60(c)) to keep mortality within the ACL include inseason trawl and non-trawl RCA adjustments (including area closures), inseason changes to the list of IFQ species documented on the observer forms, trawl trip limit reductions for non-IFQ species, adjustments to non-trawl management measures (trip limits, bag limits, season dates, etc.)
(6) Automatic actions (660.60(d)): includes automatic closure of the Pacific whiting sectors when that sector's whiting or non-whiting allocations are reached or projected to be reached and the ability to implement Pacific whiting bycatch reduction areas (660.131(c)(4) subpart D)
(7) Other: emergency action, two meeting regulatory process (e.g., trailing actions), biennial action

Greater detail on management measures as they relate to surplus carry-over can be found in Attachment 1.

Option 1, Preferred: The proposed action seeks to clarify regulations with regard to the current AMs outlined above, in the event it is necessary to address MSA conservation requirements. Clarifying regulations is largely a housekeeping measure that has no practical impact on the surplus carry-over provision. The proposed action also seeks to implement changes to the eligible surplus carry-over percentages through routine inseason actions based on recommendations generated at a Council meeting. Under this option, the Council would review the eligible surplus carry-over amounts from the previous year, projected impacts for the current year, and available AMs to determine whether the issuing the eligible surplus carry-over QPs results in a conservation concern. The Council will recommend surplus carry-over issuance when there is a reasonable expectation that ACLs will not be exceeded in light of the Council's ability to control catch inseason. This approach is consistent with the Council's commitment to manage all fisheries in such a manner that the Council does not expect ACLs to be exceeded. If a conservation concern is identified, the Council would make recommendations to NMFS to reduce or eliminate the provision for the species in question for that year. The ability to modify the surplus carry-over percentages through routine inseason action is different from the No Action option where adjustments are made by NMFS under MSA authority or by the Council through biennially cycle. Lastly, the proposed option would revise the current list of automatic actions that may be implemented by NMFS to include closing the shorebased IFQ fisheries, in addition to the at-sea whiting fishery (see regulations at 660.60 (d)).

Projected Impacts Analysis for 2013-2014

In the absence of any inseason action there is a theoretical calculation (mathematical possibility) whereby every sector achieves their allocation and the trawl sector achieves its maximum shorebased allocation, which could result in OFL, ABC, and ACL overages. In order to explore the likelihood of this scenario, the best available and most recent information on fisheries was considered to generate updated projected impacts for 2013-2014 fisheries. The projected mortalities scenario provides a more realistic expectation of mortality compared to the theoretical scenario; however the projected impact scenario may still overestimate mortality since it assumes maximum shorebased carry-over and historical maximum impacts in other sectors (see discussion below). The following analyses explore the projected harvest mortalities for 2013 and 2014 to evaluate whether implementing the surplus carry-over is consistent with the MSA conservation requirements.

Pacific halibut and Pacific whiting were not included in the analysis, since they are not subject to the ACL requirements. The IPHC reviewed the carryover policy and determined that it does not create a biological problem for Pacific halibut.

Projected Harvest Mortalities for 2013-2014

a. Projected Mortalities based on the 2011 Experience

There is only one year of data available for fishery performance under the trawl rationalization program. Therefore, the data for that year provides the best quantitative estimate for performance in future years (2013-2014).[22] Thus, if in aggregate the sector is 10 percent under its allocation in 2011 (i.e., a surplus is carried over to 2012), the best quantitative estimate currently available is that the trawl sector will likely be 10 percent under its allocation next year (i.e., a surplus will be carried over in 2013). Hence, for these situations where the projection is for the fishery to be 10% under in 2013 and 2014, carry-over of a surplus should not create a biological concern (i.e. if the fishery is under more than 90 percent, carrying over 10 percent is not projected result in the fishery exceeding its allocation and hence a conservation problem will not result). Further, for species where there is a 10 percent carry-over, it is unlikely that the deficit provision would be invoked in 2012. That is, fishery conditions would need to change substantially to move from less than 90 percent attainment in 2011 to 110 percent attainment in 2012. While this provides the best quantitative estimate, other factors need to be considered to take into account the degree of risk associated with that quantitative estimate. Those factors are twofold, first the ability to respond to an overage with a management adjustment (addressed in Sections 2.4 and 4.1) and second any qualitative indicators that industry performance will vary from 2011.

Table C-20 details the percent attainment of IFQ species in 2011. Attainment for only three IFQ species (sablefish north, petrale sole, and sablefish south) was greater than 80 percent. The eligible surplus carry-over percentage for whiting, petrale, sablefish north, and sablefish south is low (3.2, 3.4, and 3.8, respectively). However, since historical OY/ACL attainment for those species is high there is some risk of exceeding the ACL as a result of the carry-over (Table C-23).

The non-whiting species for which attainment was greater than 90 percent (sablefish north, sablefish south and petrale sole) are believed to be the stocks which constrained the harvest in 2011. The industry has indicated its strong intent to attempt to increase the proportion of the available harvest it takes. However, doing this will require emphasizing reducing the ratio of these three species in the catch in order to increase the amount of other species taken. For those other species attainment was below 50 percent and it appears very unlikely that the industry will be able to find a way to increase their attainment to 90 percent or higher (the level at which the possibility that the carryover provision might create a conservation concern arises) in the next year or two. Therefore, the qualitative information that informs an assessment of the likely the direction of deviation from the 2011 attainment indicates that fishermen are likely to try to conserve their attainment of the high attainment (constraining species) in favor of increasing their harvest of the low attainment species (the species for which there is the most room for taking their harvest). A higher percent of attainment of the high attainment species could ensue if the fishermen become more adept at trading QP to fully attain their quotas, or don't believe they will be allowed to carryover surplus from one year to the next. These appear to be the primary factors that need to be taken into account in evaluating the risk associated with authorizing full implementation of the surplus carryover allowance.

[22] A shorebased IFQ model was developed for estimating landings and the associated socioeconomic impacts of the harvest specifications decisions for 2013-2014. However, given model short-comings (see Appendix A), 2011 attainment was used in the carry-over projected impacts analysis is more conservative. If the shorebased IFQ model outputs were used, projected impacts would be lower.

For 2013-2014, IFQ fishery data could be evaluated on December 15th, the date at which QP transfers cease, to better evaluate the number of species where the carry-over provision is likely. On December 15, one could calculate the total used and unused QP for the year, eligible for the carry-over provision. The QP remaining in the vessel accounts on this date would represent the maximum carry-over for 2013 or 2014. That is, fishing could still occur between December 15 and 31, reducing the potential carry-over.

Table C-20. 2011 IFQ Allocation Attainment.

Species	Allocation (mt)	Catch (mt)	Attainment
Sablefish North of 36° N.	2,546	2,397	94%
Petrale sole	871	811	93%
Sablefish South of 36° N.	531	458	86%
Shortspine thornyheads North of 34°27' N.	1,432	713	50%
Longspine thornyheads North of 34°27' N.	1,966	960	49%
Widow rockfish	343	138	40%
Pacific ocean perch North of 40°10' N.	119	46	38%
Darkblotched rockfish	251	91	36%
Dover sole	22,235	7,826	35%
Pacific halibut (IBQ) North of 40°10' N.	117	30	25%
Non-whiting total	77,282	18,631	24%
Yellowtail rockfish North of 40°10' N.	3,094	739	24%
Pacific cod	1,135	253	22%
Chilipepper rockfish South of 40°10' N.	1,475	311	21%
Arrowtooth flounder	12,431	2,484	20%
Minor slope rockfish North of 40°10' N.	830	144	17%
Shortspine thornyheads South of 34°27' N.	50	8	17%
Other flatfish	4,197	685	16%
Lingcod	1,863	285	15%
Canary rockfish	26	4	14%
Minor slope rockfish South of 40°10' N.	377	51	14%
Yelloweye rockfish	1	0	10%
Bocaccio rockfish South of 40°10' N.	60	5	9%
Minor shelf rockfish North of 40°10' N.	522	15	3%
Minor shelf rockfish South of 40°10' N.	86	2	2%
Splitnose rockfish South of 40°10' N.	1,381	28	2%
Starry flounder	668	12	2%
Cowcod South of 40°10' N.	2	0	1%
English sole	18,673	135	1%

b. Updated Projections

The best available and most recent information on fisheries' impacts was considered to generate updated projected mortality for 2013-2014 fisheries to evaluate the risk of exceeding OFLs, ABCs, and ACLs. The recommended set-aside values for 2013-2014 were set higher than projected mortalities, typically at the maximum historical level, to increase the likelihood that mortality will remain within the ACL.

However, for some sectors, the maximum historical mortality does not represent the current best estimate of mortality. Yields set aside to accommodate tribal fisheries and bycatch in the at-sea whiting fisheries were updated with the maximum mortality from 2007-2010. Further, projected mortality for the non-trawl sectors represent the maximum mortality from 2007-2010, except in instances where the maximum value was higher than the 2013 or 2014 non-trawl allocation. That is, the management measures for the non-trawl sector are designed to keep catch within the 2013 and 2014 non-trawl allocations; therefore, it is unlikely that catches would reach the historical maximum.

The purpose of this scenario was to examine the projected impact for most sectors alongside the maximum surplus QP carryover scenario. Therefore, the shorebased trawl allocation was not updated with projected impacts; the values represent the maximum 10 percent carry-over for all species (see Section 2b). The results of this analysis are used to evaluate the likelihood of total mortality reaching the maximum 2012 shorebased allocation. However, it is noted that given the experience in 2011, this is an unlikely scenario since carry-over did not reach 10 percent for any species.

Updated Projections - Results

Table C-21 and Table C-22 represent the projected impacts and maximum shorebased allocation for 2013 and 2014. In 2013, no OFLs are projected to be exceeded under this scenario. ABCs for English sole, petrale sole, and splitnose could be exceeded. If there is no inseason action, the 2014 OFL for petrale sole could be exceeded along with the ABCs for English, petrale sole and splitnose. It is unlikely that the situations for English sole and splitnose rockfish would be realized based on historical data (Table 4-12). Further, English sole co-occurs with canary and yelloweye. It would be challenging to access such large amounts of English sole without first being constrained by QP availability for these species. Additionally, market demand is low for English sole and splitnose rockfish. Petrale is a highly marketable target species where the OY has been greater than 80 percent in recent years. Therefore, there may be some risk of exceeding the OFL and ABC.

In 2013 and 2014, the sums for eight species could exceed the ACL: darkblotched, English sole, longspine thornyheads north, petrale sole, sablefish and south, shortspine thornyheads north, and splitnose.

Table C-23 compares the historical maximum mortality for all sectors from 2007-2010 relative to the OY, the maximum historical trawl mortality and the maximum shorebased 2013-2014 allocation, for species where the ACL could be exceeded under this scenario. First, historical attainment of the OY was reviewed to determine the likelihood that the sum total sector morality would be greater than the 2013 and 2014 ACLs. Historical OY attainment for English sole (3 to 11 percent), longspine north of 34°27' N. latitude (34 percent to 79 percent), and splitnose south of 40°10 N. latitude (30 to 44 percent) has been less than 80 percent. Co-occurring overfished species restrict access to English sole (co-occurs with yelloweye and canary) and minor slope rockfish north (co-occurs with darkblotched, POP, and petrale). There is low market demand for longspine thornyhead and splitnose rockfish; however, the species co-occur with valuable target species (e.g., slope rockfish, Dover sole, sablefish, and petrale). Therefore, it seems highly unlikely that such large increases in mortality would be realized for all sectors.

Historical OY attainment for the following species has been greater than 80 percent: darkblotched (77 to 106 percent), petrale (78 to 94 percent), sablefish north of 36° N. latitude (94 to 95 percent), sablefish south (57 to 83 percent) and shortspine thornyheads north of 34°27' N. latitude (80 to 97 percent). Data from 2011 fisheries indicate that the maximum shorebased carry-over scenario for sablefish (north and south) and petrale is unlikely, since percent attainment in 2011 was 94 percent in the north and 86 percent in the south (Table C-20). There may be a risk of exceeding the ACL, assuming no inseason adjustment to management measures, for darkblotched and shortspine thornyhead north.

Biological Impacts

Impacts to a stock as a result of exceeding a harvest specification as a result of the carry-over provision depend on the biological characteristics of the species as well as the magnitude and frequency of the overage. The magnitude and frequency of the overages can be mitigated by the AMs mentioned above and in Attachment 1. If mortality averages to no higher what was expected (i.e., if the total amount of QP taken across several years is not greater than the total amount issues for those years) then the stock assessment forecasts will likely be unaffected. In April 2012, the SSC noted that relatively modest interannual departures from annual ACLs were not cause for concern from a biological perspective (Agenda Item I.3.b, Supplemental SSC Report, April 2012). The SSC stated that ensuring that OFLs are not exceeded is an adequate additional constraint to ensure that the annual departures from ACL do not have biological impacts. The SSC also believes that once the trawl rationalization system stabilizes, rollovers to the following year may act to balance rollovers from the previous year. The biological impacts associated with exceeding an OFL, ABC, or an ACL are further discussed in Chapter 4.1.

Socioeconomic Impacts

The surplus carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve OY while preserving the conservation of stocks. Absent a QP surplus carry-over provision, the fleet will likely attempt to maximize harvest of QPs and revenue annually (i.e., fish every last pound for maximum economic benefit) since the QP would not be available in the following year. Attempting to harvest all QPs may increase the risk of fishing into deficit, which results in a negative socioeconomic impact, since it is a multispecies fishery and there is limited precision in the harvesting activities.

Considered but Rejected for More Detailed Analysis

The following options were considered but rejected for more detailed analysis; option 1 was the only measure analyzed and considered in greater detail. Generally, these measures were rejected because they increased regulatory complexity and/or were not consistent with the Council's objectives for the surplus carry-over provision. However, additional consideration of these and other options may occur as part of a long term approach to the surplus carryover program.

Option 2 Enhanced AM Criteria Based on Moving Multi-year Average Approach

Surplus carry-over would be implemented as currently specified in regulation along with the enhanced accountability measures included in option 1. The need to invoke enhanced AMs (i.e., reductions or suspension of the eligible surplus carry-over) would be evaluated by calculating the average trawl mortality plus all other mortality compared to the average ACL over a four-year moving average period (two biennia). The evaluation of the moving average mortality to the average ACL would be conducted annually and the enhanced AMs would be considered in the event the average trawl mortality plus all other mortality for a given year results in an ACL overage more than once in four years. This option was consistent with the Council's objectives for the surplus carry-over program but was rejected since it required more detailed analysis than what could be accomplished in the timeframe for implementing the 2013-2014 harvest specifications and management measures.

Option 3 Enhanced AM, Modifications in the Following Year

Surplus carry-over would be implemented as currently specified in regulation along with the enhanced accountability measures included in option 1. Enhanced AMs (i.e., reductions or suspension of the eligible surplus carry-over) would be invoked in the following year instead of the current year. For example, eligible surplus carry-over from 2012 would be identified in 2013. Should a conservation concern arise, modifications to the eligible surplus carry-over would not occur until 2014. Under this option, there would be a 9 month notice that carry-over would not be issued for the following year, which would provide for better business planning.

Option 4 Holdback Approach

Under option 4, the trawl allocation would be reduced by 10 percent, reducing the start of the year QP. Part or all of the 10 percent holdback QP would be issued to vessel accounts for surplus carry-over in March/April after the previous year vessel accounts have been reconciled. After that, any remaining amounts of the 10 percent holdback QP would be issued to QS accounts according to percentages on QS permits.

Option 5 Buffer/Reserve Approach

Under option 5 an overall groundfish fishery ACT (all sectors) for all IFQ species at 10% below the ACL. The fishery HG and resulting trawl allocation would be calculated from this overall fishery ACT. The resulting affect is that the trawl allocation is reduced by 10 percent, affecting start of the year QP. The non-trawl fishery allocation would also be 10 percent less. The 10 percent holdback QP would be issued in March/April after the previous year accounts have been reconciled. Non-trawl allocation could also be increased after the evaluation in the previous step is completed.

Option 6 Suspend Surplus Carry-Over Pounds, Amend Deficit Provision

This option would suspend the issuance of surplus carry-over pounds but amend the deficit provisions such that deficit penalties would not be invoked until the deficit is greater than 10 percent. That is, overages in excess of 10 percent would need to be covered and could be covered by QP from the current year QP from the following year (current deficit provision). Under this alternative, QP are not issued, therefore the surplus pounds are not tradable.

Option 7 No Surplus Carry-Over Provision

This option would suspend the surplus carry-over provision, while maintaining the deficit carry-over provision.

Table C-21. 2013 Projected Impacts for Set-Asides and Non-Trawl Allocations Along with the Maximum 10 percent Shorebased Allocation.

Species category	Management area	2013 OFL (mt)	2013 ABC (mt)	2013 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Arrowtooth flounder	Coastwide	7,391	6,157	6,157.0	4,536.97	74%	74%	61%
BOCACCIO ROCKFISH	South of 40°10' N.	884	845	320.0	147.30	46%	17%	17%
CANARY ROCKFISH	Coastwide	752	719	116.0	96.86	84%	13%	13%
Chilipepper rockfish	South of 40°10' N.	1,768	1,690	1,690.0	1,458.46	86%	86%	82%
COWCOD	South of 40°10' N.	11	9	3.0	2.62	87%	30%	23%
DARKBLOTCHED ROCKFISH	Coastwide	541	517	317.0	343.83	108%	66%	64%
Dover sole	Coastwide	92,955	88,865	25,000.0	24,747.46	99%	28%	27%
English sole	Coastwide	7,129	6,815	6,815.0	7,088.01	104%	104%	99%
Lingcod	North of 42° N.	3,334	3,036	3,036.0	1,672.24	55%	55%	50%
Lingcod	South of 42° N.	1,334	1,111	1,111.0	723.35	65%	65%	54%
Longspine thornyheads	Coastwide	3,391	2,825				80%	66%
Longspine thornyheads	North of 34°27' N.			2,009.0	2,072.79	103%		
Longspine thornyheads	South of 34°27' N.			356.0	172.0	2%		
Minor shelf rockfish	North of 40°10' N.	2,183	1,920	968.0	652.22	67%	34%	30%
Minor shelf rockfish	South of 40°10' N.	1,910	1,617	714.0	380.18	53%	24%	20%
Minor slope rockfish	North of 40°10' N.	1,518	1,381	1,160.0	1,047.12	90%	76%	69%
Minor slope rockfish	South of 40°10' N.	681	618	618.0	529.39	86%	86%	78%
Other flatfish	Coastwide	10,060	6,982	4,884.0	4,843.53	99%	69%	48%
Pacific cod	Coastwide	3,200	2,221	1,600.0	1,494.08	93%	67%	47%
PACIFIC OCEAN PERCH	Coastwide	844	807	150.0	150.53	100%	19%	18%
PETRALE SOLE	Coastwide	2,711	2,592	2,592.0	2,660.71	103%	103%	98%
Sablefish	Coastwide	6,621	6,045				93%	91%
Sablefish	North of 36° N.			4,012.0	4,145.00	103%		
Sablefish	South of 36° N.			1,439.0	1,495.99	104%		

Species category	Management area	2013 OFL (mt)	2013 ABC (mt)	2013 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Shortspine thornyheads	Coastwide	2,333	2,230				86%	82%
Shortspine thornyheads	North of 34°27' N.			1,540.0	1,653.76	107%		
Shortspine thornyheads	South of 34°27' N.			397.0	268.89	68%		
Splitnose rockfish	South of 40°10' N.	1,684	1,610	1,610.0	1,675.69	104%	104%	100%
Starry flounder	Coastwide	1,825	1,520	1,520.0	828.94	55%	55%	45%
WIDOW ROCKFISH	Coastwide	4,841	4,598	1,500.0	1,403.02	94%	31%	29%
YELLOWEYE ROCKFISH	Coastwide	51	43	18.0	16.22	90%	38%	32%
Yellowtail rockfish	North of 40°10' N.	4,579	4,378	4,378.0	4,020.23	92%	92%	88%

Table C-22. 2014 Projected Impacts for Set-Asides and Non-Trawl Allocations Along with the Maximum 10 percent Shorebased Allocation.

Species category	Management area	2014 OFL (mt)	2014 ABC (mt)	2014 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Arrowtooth flounder	Coastwide	6,912	5,758	5,758	4,047.79	70%	70%	59%
BOCACCIO ROCKFISH	South of 40°10' N.	881	842	337	152.29	45%	18%	17%
CANARY ROCKFISH	Coastwide	741	709	119	86.74	73%	12%	12%
Chilipepper rockfish	South of 40°10' N.	1,722	1,647	1,647	1,408.56	86%	86%	82%
COWCOD	South of 40°10' N.	12	9	3	2.63	88%	29%	23%
DARKBLOTCHED ROCKFISH	Coastwide	553	529	330	358.13	109%	68%	65%
Dover sole	Coastwide	77,774	74,352	25,000	24,750.12	99%	33%	32%
English sole	Coastwide	5,906	5,646	5,646	5,859.49	104%	104%	99%
Lingcod	North of 42° N.	3,162	2,878	2,878	1,601.88	56%	56%	51%
Lingcod	South of 42° N.	1,276	1,063	1,063	651.29	61%	61%	51%
Longspine thornyheads	Coastwide	3,304	2,752				80%	61%

Species category	Management area	2014 OFL (mt)	2014 ABC (mt)	2014 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Longspine thornyheads	North of 34°27' N.			1,958	2,019.32	103%		
Longspine thornyheads	South of 34°27' N.			347	179.00	52%		
Minor shelf rockfish	North of 40°10' N.	2,195	1,932	968	656.23	68%	34%	30%
Minor shelf rockfish	South of 40°10' N.	1,913	1,620	714	379.75	53%	23%	20%
Minor slope rockfish	North of 40°10' N.	1,553	1,414	1,160	1,106.51	95%	78%	71%
Minor slope rockfish	South of 40°10' N.	685	622	622	532.18	86%	86%	78%
Other flatfish	Coastwide	10,060	6,982	4,884	4,849.47	99%	69%	48%
Pacific cod	Coastwide	3,200	2,221	1,600	1,493.21	93%	67%	47%
PACIFIC OCEAN PERCH	North of 40°10' N.	838	801	153	153.26	100%	19%	18%
PETRALE SOLE	Coastwide	2,774	2,652	2,652	2,843.92	107%	107%	103%
Sablefish	Coastwide	7,158	6,535				93%	85%
Sablefish	North of 36° N.			4,349	4,447.00	102%		
Sablefish	South of 36° N.			1,560	1,625.27	104%		
Shortspine thornyheads	Coastwide	2,310	2,210				86%	83%
Shortspine thornyheads	North of 34°27' N.			1,525	1,640.24	108%		
Shortspine thornyheads	South of 34°27' N.			393	268.89	68%		
Splitnose rockfish	South of 40°10' N.	1,747	1,670	1,670	1,744.47	104%	104%	100%
Starry flounder	Coastwide	1,834	1,528	1,528	841.87	55%	55%	46%
WIDOW ROCKFISH	Coastwide	4435	4,212	1,500	1,469.21	98%	35%	33%
YELLOWEYE ROCKFISH	Coastwide	51	43	18	16.26	90%	38%	32%
Yellowtail rockfish	North of 40°10' N.	4,584	4,382	4,382	3,876.24	88%	88%	85%

Table C-23. Historical Attainment of the OY, Compared to the Historical Maximum Trawl Mortality from 2007-2010 and the 2012 Shorebased Allocation with the Theoretical Maximum 10 percent Surplus Carry Over.

Species	Year	Total Mortality for All Sectors (mt)	OY (mt)	% Attainment	Historical Max Trawl Mortality 07-10 (mt)	2013/2014 ACL (mt)	Theoretical 2013/2014 SB Allocation plus 10% (mt)
Darkblotched	2007	285	290	98%	294	317/330	344/358
	2008	253	330	77%			
	2009	301	285	106%			
	2010	332	330 a/	101%			
English Sole	2007	914	6,237	11%	839	6,815/5,646	7,088/5,859
	2008	436	6,237	7%			
	2009	501	14,326	3%			
	2010	311	9,745	3%			
Longspine N. of 34°27' N. lat.	2007	928	2,696	34%	2,106	2,009/1,958	2,073/2,019
	2008	1,445	2,220	65%			
	2009	1,582	2,231	71%			
	2010	1,719	2,175	79%			
Petrale	2007	2,340	2,499	94%	2,286	2,592/2,652	2,661/2,844
	2008	2,260	2,499	90%			
	2009	1,978	2,433	81%			
	2010	936	1,200	78%			
Sablefish- N. of 36° N. lat. b/	2009	6,625	7,052	94%	3,171	4,012/4,349	4,145/4,447
	2010	6,167	6,471	95%			
Sablefish- S. of 36° N. lat. b/	2009	776	1,371	57%	19.6	1,439/1,560	1,496/1,625
	2010	1,039	1,258	83%			
Shortspine N. of 34°27' N. lat.	2007	1,557	1,608	97%	1,557	1,540/1,525	1,654/1,640
	2008	1,313	1,634	80%			
	2009	1,557	1,608	97%			
	2010	1,308	1,591	82%			
Splitnose South	2007	143	461	31%	1,593	1,610/1,670	1,676/1,744
	2008	177	461	38%			
	2009	203	461	44%			
	2010	140	461	30%			

a/ There was an HG of 288 mt in response to the court order.

b/ Sablefish data were only reported coastwide in the 2007 and 2008 Total Mortality Reports; therefore, the evaluation was limited to using 2009 and 2010 data

Attachment 1: Harvest Specifications and Management Measures

This section provides greater detail on the shorebased carry-over projected impacts analysis for 2013-2014.

Section 2.1 details the harvest specifications framework that establishes the OFL, ABC, and ACLs. Management measures are outlined in Section 2.1 to 2.3; further information on management measures as they relate to the carry-over provision is presented here. The MSA and National Standard 1 guidelines require accountability measures (AMs) to ensure that overfishing does not occur. Further, the National Standard 1 guidelines state "AMs are management controls to prevent ACLs, including sector-ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur." The first set of AMs used in the groundfish Fishery Management Plan (FMP) to prevent ACLs from being exceeded are deductions from the ACLs or annual catch targets (ACTs) to account for fishing-related groundfish mortality resulting from Pacific Coast treaty Indian tribal harvest, scientific research, non-groundfish fisheries (i.e., incidental open access), and, as necessary, exempted fishing permits (EFPs). For the 2013-2014 cycle, the Council recommended set-aside values in regulation based on various methodologies (see Attachment 1 for more detail). Most often, set-asides values were set higher than the projected impacts to increase the likelihood that total catches of all sectors would stay within the ACL and ultimately the OFL.

Allocations provide a harvest target or limit (overfished species), which increase the likelihood that catch does not exceed the ACL and OFL. Allocations between the trawl and non-trawl sectors are specified in the groundfish FMP and regulations. The trawl sector is composed of shorebased trawl and at-sea fisheries for Pacific whiting. The non-trawl sector is composed of recreational and commercial fixed gear fisheries, both limited entry and open access. Allocations can be long-term and formal, as in the case of Amendment 21 species (most IFQ species). Some allocations are set only for the biennial management period (e.g., bocaccio, canary, cowcod, and yelloweye).

National Standard 1 Guidelines state "…whenever possible, inseason AMs should include inseason monitoring and management measures to prevent catch from exceeding ACLs". Current regulations and proposed regulations for 2013-14 contain a series of management measures designed to keep catch within the ACL. Examples include set-asides, allocations, rockfish conservation areas (RCAs), trip limits for non-IFQ species and fisheries, bag limits, season dates, etc. Further, the west coast groundfish fishery relies on active inseason monitoring and adjustments to commercial and recreational management measures. In concert, these AMs work within a sector and among sectors, to prevent overfishing and keep catch within the ACL.

In the recreational fisheries, it is the combination of inseason monitoring, season dates, depth restrictions, and bag limits that ensure mortality stays within the recreational share of the non-trawl allocation, and ultimately the ACL and OFL. Preseason, groundfish bag limits are set at a level to spread socioeconomic benefits among more harvesters, generate greater charter vessel revenues and community benefits, and achieve OY while meeting conservation objectives. If the number of anglers participating in the fishery or the number of anglers achieving the bag limit increases beyond the preseason estimates, adjustments can be made through routine inseason action.

Trip limits and RCAs are the primary AMs in the commercial fixed gear fisheries. Preseason, trip limits are set to maximize economic efficiency, attain allocations, and achieve OY while meeting conservation objectives. That is, based on historical fleet performance, trip limits are set with the understanding that not every vessel will achieve the trip limit. If the number of vessels participating in the fishery or the number of vessels achieving the trip limit increases beyond the preseason estimates, adjustments to the trip limits can be accomplished through routine inseason action.

In the rationalized trawl fishery, the allocations and QP issuance, near real time inseason tracking, 100 percent monitoring (both at-sea and shoreside), and RCAs are the primary AMs that the Council expects to use to ensure catches will remain within the trawl allocation and ultimately the ACL and OFL (as is discussed in the Amendment 20 EIS). Other accountability measures are available, such as inseason adjustments to RCAs, between season adjustments, biennial adjustments, and closures. The purpose of the carry-over provision, when invoked, is based on a similar philosophy as the trip limit scenario. That is, based on historical performance of the fishery (i.e., overfished species interactions, market limits, etc.) not every vessel will attain 100 percent of their QP allocation, therefore the surplus can be carried over to the following year to allow full harvest of the sector allocation and OY to the benefit of consumers, fishermen, the community and nation. However, if all vessels carry over QP for a certain species and harvest those species in the following year, in addition to that following year's allocations, and if the following year catches in other sectors are above projections by the maximum amount, routine inseason management may need to occur to prevent a conservation concern.

In summary, not one of the AMs in isolation is sufficient to regulate the fishery impacts; however, all of the set-asides, recreational AMs, and commercial AMs in combination with inseason tracking and adjustments to management measures, result in an effective management system which is expected to keep catch within ACLs, ABCs, and OFLs. Further, no sector is held completely without management response to overages in other sectors. Finally, ACLs and OFLS are biased low by the stock assessment assumptions such that the ACL is harvested each year, i.e. there is an additional buffer between the OFLs adopted by the Council and the OFLs which would be set if assessments were updated with actual mortality instead of the ACL (Agenda Item G.5.b, Supplemental SSC Report, September 2011).

Inseason adjustments to existing management measures are informed by the robust tracking systems in place for both commercial and recreational fisheries. Adjustments can occur five times a year after Council meetings or by automatic action initiated by NMFS (e.g., closure of the at-sea whiting sectors and the bycatch reduction areas[23]). The trawl allocation is monitored by NMFS staff and the Council's Groundfish Management Team (GMT) in near real time with electronic fish ticket reporting (i.e., landings) on close to a 24-hour lag and reconciliation with observer data (i.e., discard) within a two week timeframe (except for Pacific halibut). The GMT utilizes data and reports from the Pacific Fisheries Information Network (PacFIN) to track limited entry and open access fixed gear commercial landings of stocks and stock complexes managed under ACLs or harvest guidelines. PacFIN reports are updated with most recent landings information every two weeks. Further, the GMT utilizes bycatch rates obtained by the West Coast Groundfish Observer Program, which are produced on an annual basis for the previous year. The GMT tracks total mortality inseason by combining the PacFIN landings reports with the bycatch rates to project the discard fraction of the total catch. In addition to the state reporting systems, the GMT utilizes data from the Recreational Fisheries Information Network (RecFIN) to track recreational impacts, which are on a two month lag.

If total catch is projected to exceed an ACL, routine inseason management measures can be implemented for the trawl and/or non-trawl sectors. For example, adjustments to the trawl RCA can be made to slow or stop catches in the trawl sector. Trip limit adjustments, non-trawl RCA adjustments, changes to recreational seasons, and modification of depth restrictions for recreational fisheries can be made to slow or stop catches in the non-trawl sectors. Further, if inseason tracking indicates a conservation concern, NMFS has the authority to take action in any and/or all sectors to protect the stock or complex, if needed (75FR78344, see Comment 38). In addition to routine inseason measures to reduce catch in the trawl and non-trawl sectors, NMFS retains the authority to close any or all sectors to respond to a conservation concern.

[23] See 660.131(c)(4) Subpart D

Inseason actions are not the full extent of the AMs available to manage the fishery. The FMP, as amended under Amendment 23, requires "if ACLs are exceeded more often than one in four years, then AMs may need to be implemented. AMs, such as catch monitoring and inseason adjustments to fisheries, need to improve or additional AMs may need to be implemented." Should an ACL be exceeded, there are many avenues - including emergency action, trailing actions, or actions taken every two years through the biennial process – to implement AMs to ensure the ACL is not exceeded in future years. Additionally, the percentage of QPs eligible for the carry-over and deficit provisions can be modified (increased or decreased) during the biennial management process.

Table C-24 demonstrates the record of using AMs to keep mortality within the OY for the west coast groundfish species subject to the carry-over provision. There have only been four overages over the four year period. The canary (2007) and darkblotched (2009, 2010) overages occurred due to poor impact model performance. Specifically, projections from the limited entry non-whiting trawl model, which was used historically to generate trip limits and estimate overfished species catches, failed to estimate catches with relative precision. The trawl model is no longer used to inform management measures and predict catches in the trawl fishery; instead the rationalized fishery AMs are anticipated to keep catch within the trawl allocation and ACLs. The Pacific ocean perch overage in 2007 occurred as a result of an unusually large catch event in the shorebased Pacific whiting fishery. For the 2011-2012 cycle, the Council recommended an ACT, a value set below the ACL, in order to improve the likelihood that catch will remain with the ACL. The sablefish overage in 2008 occurred as a result of a data processing error in PacFIN that has since been corrected (Agenda Item G.4.b, Supplemental GMT Report, November 2009).

Table C-24. West Coast Groundfish Accountability: Check marks indicate years in which total mortality remained within the OY, circles indicate years with overages.

Species	2007	2008	2009	2010
Arrowtooth flounder	✓	✓	✓	✓
BOCACCIO ROCKFISH	✓	✓	✓	✓
CANARY ROCKFISH	O	✓	✓	✓
Chilipepper rockfish	✓	✓	✓	✓
COWCOD	✓	✓	✓	✓
DARKBLOTCHED ROCKFISH	✓	✓	O	O
Dover sole	✓	✓	✓	✓
English sole	✓	✓	✓	✓
Lingcod N.	✓	✓	✓	✓
Lingcod S.	✓	✓	✓	✓
Longspine thornyheads N.	✓	✓	✓	✓
Minor shelf rockfish N.	✓	✓	✓	✓
Minor shelf rockfish S.	✓	✓	✓	✓
Minor slope rockfish N.	✓	✓	✓	✓
Minor slope rockfish S.	✓	✓	✓	✓
Other flatfish	✓	✓	✓	✓
Pacific cod	✓	✓	✓	✓
PACIFIC OCEAN PERCH N.	O	✓	✓	✓
PETRALE SOLE	✓	✓	✓	✓
Sablefish Coastwide	✓	O	✓	✓
Shortspine thornyheads N.	✓	✓	✓	✓
Shortspine thornyheads S.	✓	✓	✓	✓
Splitnose rockfish	✓	✓	✓	✓
Starry flounder	✓	✓	✓	✓
WIDOW ROCKFISH	✓	✓	✓	✓
YELLOWEYE ROCKFISH	✓	✓	✓	✓
Yellowtail rockfish	✓	✓	✓	✓

Attachment 2 Details of the Analysis

Background

Data from the 2007 to 2010 Total Mortality Reports, published by the West Coast Groundfish Observer Program, were used to generate projected impacts for set-asides and the non-trawl sector. While Total Mortality Reports go back to 2004, we elected to use reports from 2007-2010 because the data were more consistently reported and reliable. Two scenarios were analyzed to determine the best projection based on historical impacts by sector: 1) the maximum of either the average mortality from 2007-2010 or the 2010 mortality and 2) the maximum mortality from 2007-2010. The second approach was thought to represent the maximum impacts that might be possible. There were very few differences in the results (discussed below) and therefore to be conservative we chose to present the maximum values as our best projected impacts.

Projections

Deductions from the ACLs or ACTs are necessary to account for fishing-related groundfish mortality from Pacific Coast treaty Indian tribal harvest, scientific research catches, bycatch in non-groundfish fisheries, bycatch in at-sea whiting fisheries (off trawl allocation), and, recommended EFP activities. For Amendment 21 species and species with biennial allocations (e.g., bocaccio, canary, cowcod, and yelloweye), these values are referred to as set-asides and are used to calculate the fishery harvest guideline, which is the amount available for trawl and non-trawl allocations. Set-asides for sablefish north of 36° N. latitude, include yield deductions for research activities, recreational fisheries, and EFP activities. The tribal fishery is accommodated by an allocation. The incidental open access fishery impacts are deducted from the open access share. During the development of the biennial specifications, the set-asides for all species were recommended based on various methodologies, but were typically set higher than the projected impacts to increase the likelihood that fishing-related mortalities would stay within specified ACLs and OFLs.

The yield set-asides necessary to accommodate upcoming tribal fisheries in 2013-2014 are, in most cases, greater than the maximum catches in 2007-2010. There is no new available information demonstrating increased tribal fishery participation and higher harvests compared to historical maximums. Therefore, the set-asides were replaced with the projected impacts in the analysis, using the maximum tribal catches reported in 2007-2010 Total Mortality Reports[24]. There is a formal tribal allocation of sablefish north of 36° N. latitude and the fishery is managed to stay within the allocation (as opposed to a set-aside or harvest guideline). The allocation was not updated to projected impacts because it is assumed, given the increasing value of sablefish, the tribal allocation will be attained.

During the 2013-2014 cycle, the Council adopted the maximum mortality in recent years to estimate groundfish bycatch in the non-groundfish fisheries (also called incidental open access fisheries) and research. It is believed that the thorough evaluation and estimation in 2013-2014, though conservative, represents reasonable projected impacts for 2013-2014 and therefore no values were updated. EFP values represent the values established in the 2013-14 process based on expected applications. Therefore the EFP values were not updated.

A similarly conservative method of adopting set-asides for the at-sea whiting sectors was used for 2013-2014. Total Mortality Reports from 2007-2010 were used to generate a projected impact for the sector, based on the maximum.

The 2013-2014 EIS analysis reports projected impacts for the non-trawl sector, typically landings, for modeled species only. That is, not all IFQ species subject to the carry-over provision are modeled and projected for the non-trawl fishery and thus projected impacts may be higher than those reported. Therefore, this complimentary analysis was conducted to provide our best estimate of projected impacts for 2013-2014 non-trawl fisheries. The maximum mortality from 2007-2010 in the non-trawl sectors (sum of nearshore, non-nearshore, and recreational) was used to project impacts for 2013-2014, with a few exceptions (darkblotched rockfish, sablefish south of 36° N. latitude, and yelloweye rockfish). In these instances, the historical non-trawl catch was higher than the 2013-2014 allocation. Since the non-trawl sector will be actively managed to stay at or within the allocation, the 2013-2014 non-trawl allocation was used.

[24] Note the Total Mortality Report references “Tribal Landings”. Tribal fisheries require maximized retention therefore landings represent total catch.

C.11 Recreational Shelf Rockfish Retention in the Cowcod Conservation Area

Overview

Some recreational fishing is currently permitted within the Cowcod Conservation Area (CCA). Shelf rockfish, including bocaccio, are encountered but are required to be discarded resulting in "bycatch" (total amount of fish that are caught and discarded, regardless of mortality). To reduce bycatch by recreational fisheries operating in the CCAs, a modification to the retention allowance for shelf rockfish in the CCA is being considered. The loss of angler trips directly resulting from the CCA implementation, combined with the inability to retain shelf rockfish while fishing inside the CCA, has resulted in lost economic opportunities to southern California anglers. The impacts to anglers combined with the low risk of impacts to overfished species represents new information on fisheries interactions on which to support changes to CCA regulations.

Background

In 2001, the CCAs were implemented as part of the cowcod rebuilding strategy. As specified in the Groundfish Fishery Management Plan, as new information becomes available on cowcod behavior and fisheries interactions with cowcod, the boundaries or related regulations concerning the current CCAs may change.

The recreational targeting of groundfish has been prohibited within the CCAs since 2001, with some exceptions. In waters less than 20 fm in depth, recreational anglers are permitted to take and retain nearshore rockfish, cabezon, California scorpionfish, lingcod, greenlings of the genus *Hexagrammos*, and several state-managed species when the season is open to recreational groundfish fishing within the CCA. An additional exception exists for vessels targeting "other flatfish", which may be taken year round in any depth inside the CCA. The commercial groundfish fishery is also allowed to retain the above mentioned species in addition to shelf and slope rockfish, some species of sharks, skates, and flatfish in depths of 20 fm or less. Various recreational state fisheries for sea bass, California halibut, barracuda, bonito, marlin, tunas, and sharks also occur within the CCAs, but are not subject to depth restrictions.

The retention of shelf rockfish, including bocaccio and cowcod, is currently prohibited anywhere within the CCAs in the recreational fishery. Prohibited retention of shelf rockfish was implemented as a rebuilding measure for bocaccio and cowcod. The California Fish and Game Commission believed that prohibiting shelf rockfish retention in the recreational fishery would discourage fishing for rockfish in deeper waters (outside legal depths) where adult bocaccio and cowcod are found.

Recreational anglers have reported that prohibited retention of shelf rockfish results in unnecessary bycatch while fishing for target species. Regulatory complexity has been identified as a concern because the CCAs are the only place where shelf rockfish retention is prohibited but nearshore rockfish and other certain groundfish species (described previously) may be retained.

Summary of Options

Option 1: No Action – maintain prohibition on shelf rockfish retention in all depths of the CCA.

Option 2, Preferred: Allow shelf rockfish retention from 0-20 fm – Allow retention of shelf rockfish excluding bronzespotted, canary, cowcod and yelloweye rockfish, from 0-20 fm in the CCAs when the season is open to fishing for other groundfish species to reduce bycatch in the recreational fishery (the Council preferred option).

Option 3: Align recreational regulations inside and outside the CCA - Align species retention and depth restriction regulations inside and outside the CCA when the season is open to fishing for groundfish species to reduce bycatch in the recreational fishery. Retention of bronzespotted, canary, cowcod, and yelloweye rockfish will be prohibited.

Option 4: Prohibition on all groundfish **-** Prohibit the retention of all federal groundfish anywhere within the CCAs to reduce bycatch in the recreational fishery.

Data

The California Recreational Fisheries Survey (CRFS) is used to estimate total marine recreational finfish catch and effort in California[25]. It is a coordinated sampling survey designed to gather catch and effort data from anglers in all modes of marine recreational finfish fishing. In CRFS, the state of California is divided into six geographic areas or districts where district boundaries coincide with county boundaries. For the purposes of this analysis, the Southern Management Area (SMA), which includes the CCA, is comprised of the South and Channel Districts. Raw sample data collected in these two districts are combined before data are expanded for the entire SMA. Raw sample data can be differentiated into smaller areas, but expanded data cannot. In other words, due to the design of this program it is not possible to determine the proportion of total catches originating from a particular area (e.g., CCA) once data are expanded.

The CRFS sample data[26] from 2005 through 2010 were used to analyze rockfish catch within the CCA. The CRFS sample data contains encounters of nearshore and shelf rockfish species which is stratified by depth. Depth and location information used in the analysis are assumed to be reasonably accurate since the majority are global positioning system (GPS) coordinates taken by trained CRFS samplers on Commercial Passenger Fishing Vessels (CPFVs). These data were then used to 1) evaluate current fishing activity in depths of 20 fm or less, 2) evaluate mortality of shelf rockfish, and 3) evaluate the mortality of overfished species as a result of allowing retention of shelf rockfish in the CCA.

Comparison of Options

Option 1: No Action

Under Option 1, retention of shelf rockfish in the recreational fishery will continue to be prohibited in all depths of the CCA. Retention of shelf rockfish will still be permissible within the depths and seasons open to recreational groundfish fishing in all open areas outside the CCA. Retention of shelf rockfish in the commercial fishery is currently permissible within the depths and seasons open to commercial groundfish fishing both inside and outside the CCA. Retention of bronzespotted, canary, cowcod, and yelloweye will be prohibited.

<u>Fishing Activity in CCAs under Option 1</u>

Fishing activity in the entire CCA includes recreational targeting of groundfish and non-groundfish species. Fishing activities in depths of 20 fm or less within the CCA include groundfish and non-groundfish target strategies, although the number of anglers directly targeting bottomfish is small (26 percent between 2005 and 2010) when compared to the proportion of anglers targeting other species. Although the "bottomfish" effort category includes rockfish, it also includes other desired species such as lingcod and California halibut.

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[25] A full review of CRFS Methods is available at http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=36136&inline=true
[26] Sample data included both onboard observations and dockside sampling

Fishing activities in depths greater than 20 fm are mainly comprised of recreational targeting of non-groundfish species (e.g., tuna, yellowtail, and white seabass) that occur at various depths depending on the target. Many of these fisheries are open year round and occur in all depths. These non-groundfish fisheries incidentally encounter rockfish while in pursuit of their target species, but only retention of nearshore rockfish (and other groundfish species as described previously) is allowed in depths of 20 fm or less during the open season.

Under existing regulation, discarding of rockfishes does occur in pursuit of non-groundfish fishing and would continue under Option 1. Table C-25 shows the recreational groundfish and non-groundfish fisheries permitted to occur in the CCAs in 2012 along with corresponding management measures.

Table C-25. Recreational Fisheries in the CCAs and Corresponding Management Measures in 2012.

Groundfish	
Rockfish*, cabezon, greenling complex (RCG Complex)	March 1 through December 31 from 0-20 fm
Lingcod	March 1 through December 31 from 0-20 fm
California scorpionfish	Year round 0-20 fm
"Other flatfish" **	Year round, any depth, 20-fish bag limit for all species of finfish, of which there may be no more than 10 fish of any one species. Pacific sanddab are not subject to a daily bag limit.
Non-Groundfish	
California sheephead	March 1 through December 31 from 0-20 fm
Ocean whitefish	March 1 through December 31 from 0-20 fm
Various bass	Year round, any depth
Grunion	June 1 through March 31, all depths
White seabass	Year round, all depths
California halibut	Year round, all depths
Barracuda	Year round, all depths
Bonito	Year round, all depths
Yellowtail	Year round, all depths
Marlin	Year round, all depths
Various sharks	Year round, all depths
Non-FMP flatfish	Year round, all depths

** includes minor nearshore rockfish*
*** "Other flatfish" are defined at 50 CFR §660.11, subpart C, and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.*

Recreational Groundfish Catch in CCAs under Option 1

From 2005 through 2010, a total of 884 nearshore and shelf rockfish encounters (kept/retained or released) was reported in all depths in the CCA for all recreational fishing activities (groundfish and non-groundfish trips) based on CRFS sample data. These data are based on interviews with 323 anglers, which included 35 observed CPFV fishing trips. Approximately 60 percent (526 fish) of those rockfish encounters occurred in depths less than 20 fm; the remaining 40 percent (358 fish) occurred in deeper depths. Of the encounters in depths less than 20 fm, 276 encounters (52 percent) were shelf rockfish, and 250 encounters (48 percent) were nearshore rockfish (Table C-26). Vermilion and bocaccio rockfish were the most frequently encountered shelf species. No cowcod (juvenile or adult) were reported to have been encountered by anglers during interviews or sampled by CRFS samplers.

Data in Table C-26 represent sampled encounters, not total encounters, from inside the CCA. As described previously, estimates of total mortality for all shelf rockfish are only available for the entire SMA due to CRFS program expansions. Data from inside the CCA are included in that expansion, but the proportion of total mortality from only inside the CCA cannot be differentiated. Under the current regulations estimates of total mortality for shelf rockfish in the SMA are expected to be similar to previous years.

Table C-26. Encounters of Nearshore and Shelf Rockfish (Numbers of Fish) in depths of 20 fm or less in the Cowcod Conservation Area from 2005 through 2010 (source: CRFS Sample Data).

Species	Total from Sample Data	
NEARSHORE ROCKFISH		
Copper rockfish	149	
Blue rockfish	20	
Gopher rockfish	20	
Olive rockfish	17	
Treefish	17	
Kelp rockfish	15	
Other nearshore rockfish	12	
SHELF ROCKFISH		
Vermilion rockfish	173	
Bocaccio	72	
Starry rockfish	13	
Rosy rockfish	11	
Other shelf rockfish (non-overfished)	**7**	
		% total
Nearshore rockfish total	250	48%
Shelf rockfish total	276	52%
Total	526	100%

Bocaccio are encountered inside the CCA, but cannot be retained under Option 1. They can be legally retained outside the CCA as long as anglers abide by current bag limits, season and depth restrictions. Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, some increase in the encounter rate (and discard rate) would be expected within the CCA under Option 1.

Retention of cowcod is prohibited statewide in the recreational fishery. Zero cowcod have been encountered in depths of 20 fm or less inside the CCA and encounters are not expected to increase under Option 1 as cowcod slowly rebuilds.

Data Uncertainty under Option 1

Under Option 1, the accuracy of species identifications by anglers has been identified as a potential source of uncertainty. Although canary, vermilion and yelloweye rockfish can be challenging to distinguish in areas of northern California, misidentification by anglers is less prevalent in southern California because canary and yelloweye rockfish are not commonly found in that area. In southern

California, misidentification of overfished species is not as prevalent because the two overfished species found in that area, bocaccio and cowcod, are both distinct and easily identifiable.

Allowing retention of some species (e.g., nearshore rockfish) under Option 1 likely decreases uncertainty associated with accurate identifications by anglers because identifications can be verified by a trained CRFS sampler. As stated previously, the overfished species in southern California (bocaccio and cowcod) are both distinct and easily identifiable, thus uncertainty associated with correct identification by anglers is likely reduced. Conversely, the uncertainty associated with shelf rockfish would be higher because they cannot be retained and species identifications cannot be verified by CFRS samplers.

Biological Impacts under Option 1

Projected Mortality

Minor Shelf Rockfish South of 40°10' N. latitude

Under the Council's preferred alternative, the minor shelf rockfish ACL in 2013 would be 1,190 mt. The rockfish species with the largest contributions to the complex are as follows: yellowtail (55.7 percent), vermilion (14.1 percent), greenstriped (12.0 percent), and remaining rockfish (18.2 percent).

Total mortality from both the recreational and commercial fisheries has been far below the ACL from 2006 through 2010 (Table C-27). Between 2006 and 2010, total recreational shelf rockfish mortality south of 40°10' N. latitude ranged from 171 mt to 308 mt. In the entire SMA (including the CCA), they ranged from 72 mt to 122 mt (Table C-28).

Table C-27. Estimated total fishing mortality (mt) shelf rockfish south of 40°10' N. latitude from all sectors compared to the annual catch limit (ACL), from 2006 through 2010 (source: West Coast Groundfish Observer Program).

Year	Total Mortality (mt)	ACL (mt)	% ACL
2006	334	714	46.8%
2007	365	714	51.1%
2008	212	714	29.7%
2009	273	714	38.2%
2010	251	714	35.1%

Table C-28. Estimated total mortality (mt) of shelf rockfish in the recreational fishery by area, south of 40°10' N. latitude from 2006 through 2010 (source: RecFIN data).

Year	40°10' - 34°27' N lat	south of 34°27' N lat	Total
2006	203	72	275
2007	186	122	308
2008	80	91	171
2009	159	87	246
2010	110	101	211

Bocaccio
Seventy-two bocaccio were encountered by CRFS samplers in depths of 20 fm or less in the CCA from 2005 to 2010 (Table C-26)[27]. For the entire area south of 40°10' N. latitude, the projected recreational mortality of bocaccio in 2012 under Option 1 is 55.4 mt (PFMC and NMFS, 2011).

Projected recreational mortality of overfished species are estimated using CDFG's RecFISH model. The model incorporates historic fishery data throughout the SMA to inform future mortality and includes data prior to implementation of the CCA when the fishery was less regulated. The model currently assumes all rockfish are taken in depths of 60 fm or less throughout the entire SMA when projecting mortality; mortality inside the CCA is not modeled separately from those in other areas. In other words, the model already assumes the recreational fishery operates to depths of 60 fm inside the CCA, rather than only 20 fm; so projected mortality is overestimated by the model. Actual mortality of bocaccio under Option 1 would likely be lower than the projected mortality of 55.4 mt.

Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, some increased encounters (and discards) would be expected within the CCA in depths of 20 fm or less, although the amount cannot be quantified. In its report under Agenda Item E.4.b (November 2011), the Groundfish Management Team concluded that any increase in bocaccio mortality in 2013, as a result of the 2010 year class, is not expected to exceed the 2011 California recreational HG (131 mt). If the 2010 year class is not as strong as projected, mortality under Option 1 would likely be similar to previous years.

Cowcod
Zero cowcod were encountered by CRFS samplers on any trips from 2005 to 2010 in depths of 20 fm or less in the CCA under current regulations. Under Option 1 impacts in depths of 20 fm or less are expected to be the same – zero.

One cowcod was observed on a non-groundfish trip deeper than 20 fm in the CCA between 2005 and 2010. This cowcod was encountered by an angler targeting yellowtail (*Seriola dorsalis*). The reported depth of capture was approximately 58 fm (350 ft); the cowcod was released alive. The presence of only one cowcod in six years (outside the allowable depths) suggests that the encounter rate in depths greater than 20 fm is very low under Option 1.

The preferred ACL for cowcod in 2013-14 is 3 mt, of which 1.0 mt is allocated to the non-trawl fishery which includes both the commercial and recreational sectors. Similar to bocaccio, the RecFISH model also incorporates a "buffer" in its projections for cowcod mortality due to the fact that the model assumes the depth restriction inside the CCA is the same as outside. Projected mortality of cowcod for the entire California recreational fishery under Option 1 is 0.2 mt.

<u>Stock Status</u>

Minor Shelf Rockfish South of 40°10' N. latitude
The minor shelf rockfish complex includes many rockfish species with differing biological characteristics, life histories and habitat preferences. These species are included in this complex because they all inhabit areas on the continental shelf. The southern minor shelf rockfish complex is composed of the following species: bronzespotted rockfish (*Sebastes 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.*

[27] In the entire SMA, 18,737 bocaccio were encountered by CRFS samplers from 2005 to 2010 at depths of 60 fm or less. Bocaccio encounters in 20 fm or less in the CCA represent 0.4 percent of total encounters in the SMA.

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*).

With the exception of greenstriped and greenspotted rockfish, none of the minor shelf rockfish species in this complex have been assessed. Under Option 1, no changes to individual stock status or complex status are expected.

Bocaccio

Declared overfished in 1999, bocaccio is one of the larger rockfish species in southern California. Pelagic young-of-year bocaccio typically recruit to shallow habitats and sub-adult bocaccio are more common in shallower water than adults and are commonly found around piers and other shore structures. Adult bocaccio are typically found in a broad range of habitats and depths, and can develop large mid-water aggregations; high densities tend to be more associated with more complex substrates. As with many other shelf species of rockfish, there is a clear trend towards larger fish at greater depths. Adults are highly sedentary and exhibit some ontogenetic movement to greater depths which is common for most shelf species. (Field et al, 2009)

Results of the current assessment indicate that bocaccio are rebuilding quickly. Under Option 1, no changes to stock status or rebuilding progress are expected.

Cowcod

Cowcod were declared overfished in 1999. They are primarily encountered in depths greater than 50 fm (Butler et. al., 1999). Though cowcod do occur from 20 fm to 267 fm (Love et. al., 2003), submersible surveys at the northern end of the Southern California Bight, indicate that juvenile cowcod were most common from 49 fm to 82 fm and adults were most common at depths of 66 fm to 115 fm (Butler et al., 1999). These trends in the depth distribution are repeated in the proportion of catch by depth from the trawl fishery in the Southern California Bight where cowcod were predominantly encountered in depths deeper than 65 fm (Butler et al., 1999). Recent submersible surveys indicate that juvenile cowcod occur over a wide range of habitat types, at depths between 28 fm and 180 fm and typically avoid soft sediment substrate, favoring hard substrate such as cobble and boulder fields or rock ridges (Love and Yoklavich, 2008). Juvenile cowcod are found in depths greater than 30 fm, and are vulnerable to recreational fishing gear (Love and Yoklavich, 2008; Dick et al., 2007).

Results of the 2009 data report indicate that cowcod are rebuilding, albeit slowly. Under Option 1, no changes to stock status or rebuilding progress are expected.

Socioeconomic Impacts under Option 1

Under Option 1, public comment submitted to National Marine Fisheries Service on the 2011-12 FEIS indicate that over 140 vessels from various ports in the SMA have been affected by the prohibition on shelf rockfish retention. Those communities include the following: Dana Point, Long Beach, Marina Del Rey, Mission Bay, Newport Beach, Oceanside, San Diego, San Pedro, Santa Barbara, Santa Monica, Santa Paula, and Temecula.

Those same public comments also spoke to the loss of trips and loss of revenue as a result of the CCA implementation and prohibition on shelf rockfish retention. Under Option 1, some loss to industry would be expected as a result of CCA implementation and prohibition on shelf rockfish retention, but that amount cannot be quantified at this time. The prohibition of shelf rockfish retention would likely result in increased operating costs to the industry. Trip durations would be increased because it takes longer for individuals to reach their bag limits as a result of discarding shelf rockfish. More time would be spent on the water, resulting in higher fuel costs and the overall number of trips could be reduced, resulting in lost income.

Fiscal Impacts under Option 1

Under Option 1, fiscal impacts to the state of California are high due to differing regulations inside and outside the CCA. Fiscal impacts include public outreach and education, enforcement, and regulation maintenance as a result of this regulatory complexity.

Option 2, Preferred: Allow retention of shelf rockfish in the recreational fishery, excluding bronzespotted, canary, cowcod and yelloweye rockfish, from 0-20 fm in the CCAs, when the season is open.

Under Option 2, the preferred option for 2012, retention of shelf rockfish in the recreational fishery will be permissible inside depths of 20 fm or less inside the CCA when the season for groundfish is open. Bocaccio, an overfished and desirable recreational species could be retained under this option[28]; retention of bronzespotted, canary, cowcod, and yelloweye bronzespotted rockfish will remain prohibited. No changes to commercial retention regulations are proposed and retention of all rockfish (except prohibited species) in the commercial fishery will be permissible within the depths and seasons open to groundfish fishing both inside and outside the CCA.

Change in Fishing Activity in CCAs Compared to Option 1

Groundfish fishing activity under Option 2 is expected to be similar to Option 1. It is highly unlikely that an overall increase in fishing effort in the entire SMA would result compared to Option 1 due to the remoteness of fishing locations (40 to 100 miles from port). As indicated by public testimony (see 2011-2012 FEIS), some increase could be realized but it is not clear whether it would be new effort or an effort shift from other areas outside the CCA. Non-groundfish fisheries target non-groundfish stocks; therefore no changes in non-groundfish trips are expected as a result of the groundfish regulation changes, compared to Option 1.

Change in Recreational Groundfish Catch in CCAs Compared to Option 1

If fishing effort and encounters with shelf rockfish, including bocaccio and cowcod, are similar to the catch under Option 1, allowing retention in this area will reduce the overall bycatch of shelf rockfish. The bycatch reduction would occur because fish previously discarded would be retained. However, it is assumed that not all shelf rockfish would be retained.

Data Uncertainty Compared to Option 1

Under Option 2, uncertainty associated with angler identifications of shelf rockfish are expected to decrease compared to Option 1. Instead of having to discard shelf rockfish species, anglers could retain them and identification could be verified by CRFS samplers. No changes to uncertainty associated with identifications to nearshore or overfished species are expected compared to Option 1.

Biological Impacts Compared to Option 1

[28] Anglers would still have to abide by current regulations, including sub-bag limit, size limit, and season restrictions.

Projected Impacts

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 2, the overall mortality of shelf rockfish could increase compared to Option 1 even though bycatch is reduced, whereas total mortality of nearshore rockfish, cabezon or greenling could be reduced because anglers may prefer to fill their 10 fish RCG bag limit with larger shelf rockfish species. This could result in high grading where smaller desirable fish are temporarily retained and discarded for the more prized catch (size or species).

Despite the increase in total mortality under Option 2, the risk of exceeding the recreational HG let alone the entire minor shelf rockfish ACL[29], is low. A doubling of total mortality from the entire SMA (both inside and outside the CCA), would still not likely result in the ACL being exceeded for the minor shelf rockfish complex (Table C-29). This event is not likely to occur because it would assume that the entire 10 fish RCG bag limit is filled solely by shelf rockfish and that angler effort both inside and outside the CCA increases. Changes of this magnitude based simply on allowing shelf rockfish retention inside 20 fm or less in the CCA are not realistic.

Table C-29. Estimated total fishing mortality of shelf rockfish south of 40°10' N. latitude assuming a doubling of recreational mortality in the Southern Management Area (south of 34°27' N. latitude) compared to the annual catch limit (ACL). (source: WCGOP and RecFIN)

Year	Recreational (mt)		Commercial (mt)	Total Mortality (mt)	ACL (mt)	% ACL
	40°10' - 34°27'	south of 34°27'				
2006	203	144	59	406	714	56.7%
2007	186	244	57	487	714	68.2%
2008	80	182	41	303	714	42.4%
2009	159	174	27	360	714	50.4%
2010	110	202	40	352	714	49.3%

Bocaccio

Under Option 2, some increase to bocaccio mortality would be expected as a result of allowing shelf rockfish retention inside 20 fm or less in the CCA, but the overall projected mortality will not change compared to Option 1. As discussed under Option 1, mortality attributed to inside the CCA are an overestimate because the model assumes the depth restrictions and retention requirements inside the CCA are the same as outside. Therefore, allowing retention of shelf rockfish inside the CCA may more closely align actual mortality with projected mortality.

Bocaccio mortality as a result of the incoming 2010 year class are expected to be the same as Option 1. If the year class is as strong as projected, any increase in mortality as a result of the year class and/or allowing shelf rockfish retention could still be accommodated without exceeding the recreational HG, let alone the entire ACL.

Cowcod

Under Option 2, no changes to projected mortality of cowcod are expected to occur compared to Option 1. Projected mortality of cowcod for the entire California recreational fishery under this option are 0.2 mt.

[29] In September 2011, the PFMC limited the scope of harvest specifications for 2013-14 in order to more closely reflect those in place for 2012. Therefore, it is likely that the 2013-14 shelf rockfish ACL will be the same as in 2011-12.

Stock Status

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 2, no changes to individual stock status or complex status are expected compared to Option 1.

Bocaccio

Under Option 2, no changes to stock status or rebuilding progress are expected compared to Option 1.

Cowcod

Under Option 2, no changes to stock status or rebuilding progress are expected compared to Option 1.

Social-Economic Impacts compared to Option 1

Under Option 1, public comment submitted to National Marine Fisheries Service on the 2011-12 FEIS indicate that over 140 vessels from various ports in the SMA have been affected by the prohibition on shelf rockfish retention. Those communities include the following: Dana Point, Long Beach, Marina Del Rey, Mission Bay, Newport Beach, Oceanside, San Diego, San Pedro, Santa Barbara, Santa Monica, Santa Paula, and Temecula.

Those same public comments spoke to the loss of trips and loss of revenue as a result of the CCA implementation and prohibition on shelf rockfish retention. Under Option 2, some industry representatives indicate that profits of $25,000 to $50,000 (10 to 15 percent increase in revenue) could be expected by allowing shelf rockfish retention. Estimates of increased revenue (assuming 140 vessels) range from $3.5 million to $7 million.

Allowing retention of shelf rockfish could also reduce operating costs compared to Option 1. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Fiscal Impacts Compared to Option 1

Under Option 2, fiscal impacts to the state of California are expected to be less than Option 1. Public outreach and education, enforcement, and regulation maintenance will still be necessary, but outreach and education costs will be less due to the reduction in regulatory complexity.

Option 3: Align species retention and depth restriction regulations inside and outside the CCA when the season is open to fishing for groundfish species to reduce bycatch in the recreational fishery.

Under Option 3, there will be no difference in regulations inside and outside the CCA. Retention of all federal groundfish (including shelf and slope rockfish) and state-managed species in the recreational fishery will be permissible within legal depths when the season for groundfish is open. Bocaccio, an overfished and desirable recreational species could be retained under this option[30]; retention of bronzespotted, canary, cowcod and yelloweye rockfish will remain prohibited. No changes to commercial retention regulations are proposed and retention of all rockfish (excluding prohibited species) in the

[30] Anglers would still have to abide by current regulations, including sub-bag limit, size limit, and season restrictions.

commercial fishery will be permissible within the depths and seasons open to groundfish fishing both inside and outside the CCA.

Way points approximating the 60 fm depth contour inside the CCA do not currently exist in federal regulations and would need to be defined if this alternative is implemented in regulation.

Change in Fishing Activity in CCAs Compared to Option 1

Fishing activity under Option 3 is expected increase compared to Option 1. As indicated by public testimony (see 2011-2012 FEIS), some increase could be realized but it is not clear whether it is new effort or an effort shift from other areas outside the CCA. No changes in fishing effort for non-groundfish trips are expected compared to Option 1.

Change in Recreational Groundfish Catch in CCAs Compared to Option 1

Groundfish catch is expected to increase relative to Option 1 as a result of allowing retention of all groundfish species. Allowing retention of these species is expected to reduce bycatch of all groundfish species because fish previously discarded would be retained.

Data Uncertainty Compared to Option 1

Under Option 3, uncertainty associated with angler identifications of all federal groundfish species are expected to decrease compared to Option 1. Instead of having to discard all federal groundfish, anglers would be able to bring them to shore where identification can be verified by CRFS samplers. No changes to uncertainty associated with identifications to nearshore or overfished species are expected compared to Option 1.

Biological Impacts Compared to Option 1

Projected Mortality

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 3, the overall mortality of shelf rockfish could increase compared to Option 1 even though bycatch is reduced, whereas total mortality of nearshore rockfish, cabezon or greenling could be reduced because fishermen may prefer to fill their 10 fish RCG bag limit with larger shelf rockfish species. This could result in high grading where smaller desirable fish are temporarily retained and discarded for the more prized catch (size or species). Despite the increase in total mortality under Option 3, the risk of exceeding the recreational HG let alone the entire minor shelf rockfish ACL is low.

Other Federal Groundfish Species

Under Option 3, the overall mortality of other federal groundfish species is expected to increase compared to Option 1 because fish previously discarded would be retained. It is unknown whether a HG or ACL would be exceeded as a result of allowing retention.

Bocaccio

Under Option 3, some increase to bocaccio mortality would be expected as a result of allowing retention of all groundfish inside 60 fm or less in the CCA, but the overall projected mortality is not expected to change compared to Option 1. Any increase in mortality as a result of the 2010 year class could still be accommodated without exceeding the recreational harvest guideline, let alone the entire ACL.

Cowcod

Under Option 3, projected mortality of cowcod could be expected to be the same or higher than Option 1. Aligning the retention and depth restrictions inside and outside the CCA (as proposed under this alternative) could increase the likelihood of encounters with cowcod because they have higher encounter rates in deeper depths.

Any increase in mortality, if it does occur, would not cause the non-trawl allocation, let alone the entire ACL to be exceeded because a sufficient buffer exists between the projected mortality and the non-trawl allocation.

Stock Status

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 3, no changes to individual stock status or complex status are expected compared to Option 1.

Other Federal Groundfish Species

Other federal groundfish species consists of stocks with differing biological characteristics, life histories and habitat preferences. The following species or complexes would be included within the general grouping of other federal groundfish:

- Slope rockfish: aurora rockfish (*Sebastes 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*).
- Skates: big skate (*Raja binoculata*), California skate (*R.. inornata*), and longnose skate (*R. rhina*)
- Sharks: leopard shark (*Triakis semifasciata*), soupfin shark (*Galeorhinus zyopterus*), spiny dogfish (*Squalus sucklei*),
- Flatfish: Dover sole (*Microstomus pacificus*), English sole (*Parophrys vetulus*), petrale sole (*Eopsetta jordani*), arrowtooth flounder (*Atheresthes stomias*), and starry flounder (*Platichthys stellatus*)
- Other Flatfish: 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*).
- Other: finescale codling (*Antimora microlepis*), Pacific rattail (*Coryphaenoides acrolepis*), ratfish
- (*Hydrolagus colliei*), Pacific cod (*Gadus macrocephalus*), Pacific whiting (*Merluccius productus*), sablefish (*Anoplopoma fimbria*), and thornyheads (*Sebastolobus alascanus, S. altivelis*)

Although some of these stocks have been formally assessed, most have not; therefore it is unknown whether there would be any changes to individual stock status or complex status compared to Option 1.

Bocaccio

Under Option 3**,** no changes to stock status or rebuilding progress are expected compared to Option 1. Even if bocaccio mortality increases as a result of this alternative, rebuilding progress is not expected to be jeopardized because bocaccio is rebuilding quickly.

Cowcod

Under Option 3**,** some changes to stock status and/or rebuilding progress could be expected compared to Option 1. Increasing the depth restriction to 60 fm would allow access to potential cowcod habitat and be contrary to the intent of the CCA.

Social-Economic Impacts Compared to Option 1

Under Option 1, impacts to over 140 vessels in southern California resulting in foregone revenue of 3.5 million to 7 million dollars could be expected, whereas under Option 3 those losses would not be expected. Allowing retention of shelf rockfish could also reduce operating costs compared to Option 1. Individuals could reach their bag limits faster and with less discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Fiscal Impacts Compared to Option 1

Under Option 3, fiscal impacts related to the state of California are expected to be equal to or less than Option 1. Although there could be some reduction due to the decrease in regulatory complexity, there could be a subsequent increase due to new workload associated with implementing new RCA lines and educating the public about regulatory changes.

Option 4: Prohibition of All Groundfish in the CCA

Under Option 4, retention of all federal groundfish in the recreational fishery will be prohibited inside the CCA. No changes are proposed to retention of state-managed non-groundfish species (e.g., ocean whitefish, California sheephead) or to commercial fishery regulations. Retention of all rockfish (excluding prohibited species) in the commercial fishery will be permissible within the depths and seasons open to groundfish fishing both inside and outside the CCA.

Change in Fishing Activity in CCAs Compared to Option 1

Under Option 4, no change in fishing activity is expected compared to Option 1. CPFVs mainly travel to the CCA to specifically target non-groundfish species and those trips are still expected to occur even if all federal groundfish retention is prohibited.

Change in Recreational Groundfish Catch Compared to Option 1

Although recreational groundfish catch inside the CCA is expected to be less under Option 4, due to the prohibition on retention, it is not clear how groundfish catch will be affected in the entire SMA. Effort on nearshore rockfish, cabezon, and greenling, which previously occurred inside the CCA, could be directed outside. Fishing could continue inside the CCA for state-managed species. There may not be a change in overall catch compared to Option 1, just the location where that catch occurred.

Data Uncertainty Compared to Option 1

Under Option 4, uncertainty in species identification by anglers is likely to increase for all groundfish species because anglers targeting non-groundfish species may not pay close attention to or be able to identify what was discarded.

Biological Impacts Compared to Option 1

<u>Projected Mortality</u>

<u>Minor Shelf Rockfish South of 40°10' N. latitude</u>

Under Option 4, some reduction in total mortality for groundfish species would be expected compared to Option 1 because retained catch would be converted into discarded catch; conversely, discarding would increase compared to Option 1.

Bocaccio

Under Option 4, no changes to projected mortality are expected compared to Option 1 because retention of bocaccio would be prohibited under both options.

Cowcod

Under Option 4, no changes to projected mortality are expected compared to Option 1 because retention of cowcod would be prohibited under both options.

Stock Status

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 4, no changes to individual stock status or complex status are expected compared to Option 1.

Bocaccio

Under Option 4, no changes to stock status or rebuilding progress are expected compared to Option 1.

Cowcod

Under Option 4, no changes to stock status or rebuilding progress are expected compared to Option 1.

Socioeconomic Impacts under Option 1

Under Option 4, socioeconomic impacts are expected to be worse than Option 1.

C.12 Remove the California Recreational Bocaccio Size and Filet Limit

Overview

The recreational bocaccio fishery has been managed to a harvest guideline (HG) since the early 2000s, which is 131 mt in 2012; the presumptive harvest guidelines are expected to increase to 168 mt (2013) and 174 mt (2014; Table C-30). Bocaccio are the only rockfish subject to a recreational size limit, which is a 10 inch minimum size limit to protect recruiting juvenile fish (Table C-31). The majority of the bocaccio catch comes from the southern part of the state (south of Point Conception - 34°27' N. latitude) where recreational anglers are allowed to access the shelf 10 months of the year to depths of 60 fm (360 feet).

The 10 inch minimum size limit and 5 inch filet limit was initially implemented in 2000 to protect juveniles from pier and jetty anglers during years of heavy recruitment. At that time, managers believed that bocaccio below that size, would have a high survival rate when caught in shallow water. However, the minimum size limit has been relatively ineffective in protecting juvenile fish even following good recruitment years (e.g., 2003, 2005 and 2009). Recent data suggest that there have been very few encounters of small bocaccio, and even fewer discards, suggesting that the size limit has been ineffective in reducing mortality by protecting juvenile fish.

Table C-30. 2012 Harvest specifications for bocaccio south of 40°10' N. latitude in metric tons, implemented in regulation.

Species	OFL	ABC	ACL	HG
Bocaccio	732	700	263	131

Table C-31. Recreational statewide management measures for bocaccio in California in 2012.

Bag Limit –2 fish w/in the 10 fish RCG complex bag limit
Size limit – 10 inch minimum size
Seasons and Depth Restrictions—Same as those for other rockfish and lingcod by Management Area

Management Issue:

Due to the need to protect overfished rockfish species, which resulted in limited access to deeper water, California's recreational fishery has been unable to attain their bocaccio HG in recent years (Table C-32).

Bocaccio has shown steady progress toward rebuilding under the current rebuilding plan. Application of the constant harvest rate in the current rebuilding plan corresponds with an ACL for 2013-2014 that is larger than the ACL in recent years. The Council proposes to remove the minimum 10 inch size limit and 5 inch filet limit for bocaccio and the additional projected mortality can be accommodated within the higher 2013-2014 ACLs and HGs.

Table C-32. West Coast Groundfish total mortality estimates of bocaccio south of 40°10' N. latitude (in metric tons) for the California recreational fishery compared to the harvest guideline from 2006-2010

Year	Total Mortality	HG	% of HG
2006	42.0	43.0	98%
2007	53.6	66.3	81%
2008	35.0	66.3	53%
2009	46.4	66.3	70%
2010	57.2	66.3	86%

Management Options

Option 1- No Action: Maintain the 10 inch minimum size limit and 5 inch filet limit

Under Option 1, the 10 inch minimum size limit and 5 inch filet limit would remain in place for all recreational anglers statewide and anglers would be forced to discard small fish. Regulatory complexity would continue and the regulation would continue to be ineffective in reducing mortality by protecting juvenile bocaccio.

Biological Impacts under Option 1

Projected Mortality

Table C-33 summarizes projected mortality of overfished species under Option 1 assuming a 10 inch minimum size limit. The projected mortality of bocaccio under Option 1 is 50.7 mt, or approximately 39 percent of the HG. Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, under Option 1 some increased encounter rate (and discarding) would be expected, although the amount cannot be quantified. In its report under Agenda Item E.4.b (November 2011), the Groundfish Management Team concluded that any increase in bocaccio catches in 2013, as a result of the 2010 year class, is not expected to exceed the 2011 California recreational harvest guideline (131 mt). If the 2010 year class is not as strong as projected, mortality under No Action would likely be similar to previous years.

Table C-33. Projected mortality of overfished species under Alternative 1

Species	Projected Mortality (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

<u>Stock Status</u>

Declared overfished in 1999, bocaccio are one of the larger rockfish in southern California. Pelagic bocaccio young-of-year typically recruit to shallow habitats and sub-adult bocaccio are more common in shallower water than adults and are commonly found around piers and other shore structures. Adult bocaccio are typically found in a broad range of habitats and depths, and can develop large mid-water aggregations; high densities tend to be more associated with more complex substrates. As with many other shelf species of rockfish, there is a clear trend towards larger fish at greater depths. Adults are highly sedentary and exhibit some ontogenetic movement to greater depths which is common for most shelf species (Field et al, 2009).

Results of the current assessment indicate that bocaccio is rebuilding quickly. Under Option 1, no changes to stock status or rebuilding progress are expected.

<u>Socioeconomic Impacts</u>

Currently, bocaccio is the only rockfish species in the recreational sector that has a minimum size limit. Since there are numerous recreational regulations to remember, having an additional size limit adds to the regulatory complexity. Removing the bocaccio size limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Option 2, Preferred: Remove the 10 inch minimum size limit and the corresponding 5 inch filet limit

The Council is proposing to remove the minimum size limit of 10 inches and 5 inch filet limit. Recreational anglers would be allowed to retain all bocaccio regardless of size under this alternative, while abiding by current depth and season restrictions. This action would reduce regulatory complexity and the overall mortality of bocaccio is expected to be minimal. No additional mortality of other overfished species is expected.

<u>Methodology:</u>

Length data from the California Recreational Fisheries Survey (CRFS) from 2005 to 2010 was used to analyze the projected mortality of bocaccio as a result of removing the recreational size limit; both raw sample and estimate data were used. Total lengths from 13,975 bocaccio (retained and released) were measured; fish less than 10 inches comprised 19 percent (57 fish) of all discards and 0.5 percent (73) of retained fish (Table C-34). The length frequency distribution of the released bocaccio from 2005 to 2010 is shown in Figure C-6.

The increase in mortality as a result of this analysis was calculated by determining the percentage of fish less than 10 inches (by weight) of all discarded fish. That percentage was applied to the total estimated weight of B2 fish, to determine an overall percent increase in the total catch estimate (A+B1+B2 fish)[31] that would be expected by removing the minimum size limit. For a full description of the methodology refer to Appendix A.

Table C-34. Summary of bocaccio length data (in numbers of fish) from 2005 to 2010 (source: CFRS data)

	Discarded	Retained	Total
All lengths	298	13,677	13,975
Less than 10 in.	57	73	130
% 10 inch	19%	0.5%	0.9%

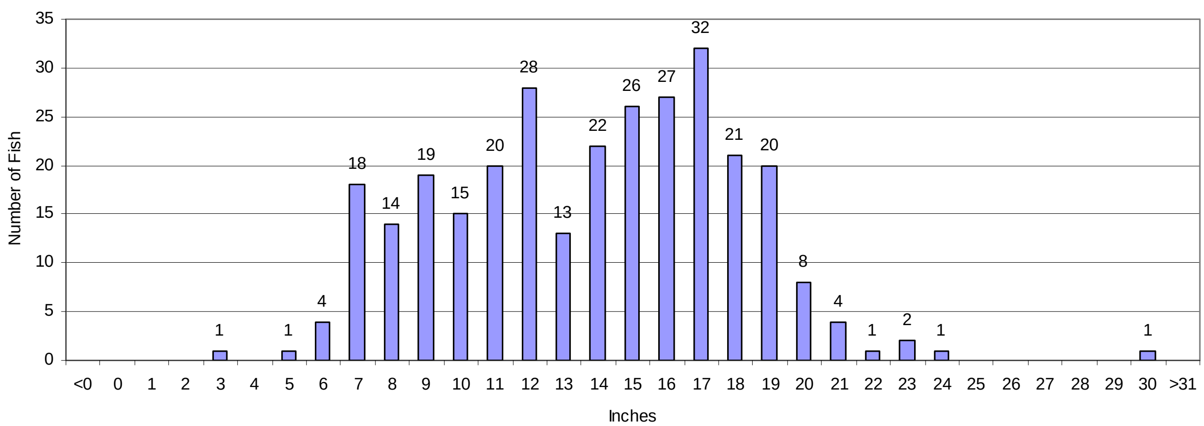

Figure C-6. Length frequency distribution of released bocaccio from 2005 to 2010

<u>Biological Impacts under Option 2</u>

<u>Projected Impacts</u>

Under Option 2, removing the size limit is only expected to increase total bocaccio mortality by 0.36 percent (0.2 mt) compared to Option 1. The total projected mortality, under this alternative, is 50.9 mt. No additional mortality to any overfished groundfish species is expected with this Option.

The Council is also proposing two additional changes to management measures in the recreational fishery related to bocaccio – increasing the sub-bag limit and allowing retention of shelf rockfish (including bocaccio) inside the Cowcod Conservation Area. The cumulative mortality of all of these proposed changes are not expected to exceed the harvest guideline or ACL.

[31] A fish include sampled dead fish, B1 fish includes both fillets and fish thrown back, and B2 fish includes mainly live fish in excess of bag limits or undersized fish

Table C-35. California recreational projected mortality of bocaccio for 2013-2014, including changes as a result of the proposed action.

	Option 1:	Option 2:
Projected Impacts (mt)	50.7	50.9
Percent of Option 1 HG	39%	39%

<u>Stock Status</u>
It is unlikely that there would be any changes to the stock status of bocaccio under Option 2 since mortality is projected to be within the ACL. Under Option 2, no changes to stock status or rebuilding progress are expected.

Socioeconomic Impacts of Option 2

Currently, bocaccio is the only rockfish species in the recreational sector that has a minimum size for retention. Removing the size restriction for bocaccio would reduce regulatory complexity on a recreational fishery that already has many regulations.

C.13 Sablefish Trip Limits

Overview

The following section discusses catch projection and trip limit analyses for the four fixed gear, daily trip limit (DTL) fisheries, including both limited entry (LE) and open access (OA), north and south of 36° N. lat. for 2011. Hereafter, they will be referred to as follows: LE North, LE South, OA North, and OA South. Proposed trip limits for 2013 and 2014 in the fixed gear sablefish DTL fisheries were produced through iteration using GMT catch projection models (models described briefly below, and in detail in the 2011-2012 SPEX EIS).

Management Issue

Proposed trip limit reductions or increases are considered to bring projected catch to within new management targets, resulting from changes to the sablefish ACLs for the areas north and south of 36° N. lat. Landings projections were approximately 91 percent of the landings target, in order to produce trip limits which are likely to result in full attainment of harvest guidelines, while providing sufficient catch buffer, appropriate for the uncertainty in accuracy of estimated landings data, and normal uncertainty associated with statistical model projections. This strategy was supported by the Council in establishing sablefish DTL trip limits for 2012, in the November, 2011 Council meeting.

Management Options

For 2013, in the LE North fishery, proposed trip limits for 2013 were reduced to approximately 85 percent of No Action levels; for the OA North fishery, proposed trip limits were reduced to 68 percent of No Action. In the area south of 36° N. lat., harvest guidelines were higher than No Action (due to a slightly higher sablefish ACL for 2013 and 2014 in this area). For LE South, proposed trip limits were 104 percent of no action; for OA South, 108 percent. Trip limits for 2014 were slightly higher than for 2013 (2 to 5 percent higher) across all four sablefish DTL fisheries, due to higher ACLs in 2014.

Comparison of the Management Options

Analytical Description

The purposes of this analysis are to compare predicted landings between the No Action Alternative management measures and the action alternatives (i.e., Alternatives 1-8), under their resultant regional allocations, and fishery harvest guidelines, for the four fixed gear, sablefish daily trip limit (DTL) fisheries, including limited entry (LE) and open access (OA), both north and south of 36° N. lat.

The ACLs, regional allocations, and fishery landing targets (LTs) only vary between the No Action Alternative and the remaining alternatives, within each year. Levels of these three harvest control points vary only between years (2013-2014), and between No Action and all other alternatives. Within this analysis, "harvest guidelines" is defined as numerical management harvest objectives which are not quotas. These are either cited in regulation or calculated from other higher level numerical management objectives appearing in regulation. These harvest guidelines were reduced to account for discard mortality, the method and rationale for which is described below, to produce "landings targets", which were used in projection modeling to predict landings, and determine necessary trip limits.

Model Description

The catch projection models used in this analysis are linear regression models that relate trip limits to monthly or bimonthly landings, separately for each fishery. Detailed descriptions of the models can be found in Appendix A. of the 2011-2012 harvest specifications EIS.

Limited entry models were specified as described in the 2011-2012 EIS. Minor differences in model specification were made in the open access models for 2013-2014. Sablefish ex-vessel revenue and fuel prices were removed as predictor variables in the open access north and south models. Although these variables present a meaningful picture in retrospect, when their historical values are known, they do not provide valuable information for making projections of future catch, since fuel prices and sablefish prices in the future are not known, are subject to substantial variability, and either assumptions or projections must be made about these would-be predictor variables themselves. Error in assumptions regarding future values of these variables introduces bias and substantially affects accuracy of projections; using them inflates apparent accuracy and precision, producing unrealistically high multiple-R^2 values and low standard errors for the regressions. Trip limits, on the other hand, are known (are set by the Council process), and their use for projecting catch into the future presents a realistic picture of uncertainty. Data from years 2004-2006, when there was extremely small variation in trip limits, and provided little information content for the model, were removed from the OA South model, and resulted in increased model fit.

Model Input Data

Landings and catch data were acquired from PacFIN using the query "slct_ves_sabl_arid_DTL_no_EFP.sql". As described in the GMT inseason statements from the April, June, September, and November 2011 Council meetings, data from this query were found this year to have two substantial problems, both of which were corrected before use in the analysis for these harvest specifications. First, historical landings of sablefish with fixed gear, in the LE North, DTL fishery were substantially underestimated from 2004 through 2011, as the software in the PacFIN database which estimates division of fixed gear sablefish landings between the sablefish primary fishery and DTL fisheries was malfunctioning. The software has since been modified to make the most accurate division of catch between the two fisheries which is currently possible, and the GMT and Council are working on a long-range solution that would provide direct catch accounting, which would replace the currently necessary computational estimation procedure. Second, gear-switching provisions under IFQ lead to misattribution of IFQ landings of sablefish using fixed gear, to the various sablefish DTL fisheries. This has also been corrected, and screening procedures have been put in place both in PacFIN and with the states to flag and remove IFQ fish tickets from the "slct_ves_sabl_arid_DTL_no_EFP.sql" query for the sablefish DTL projection models.

Accounting for Discards and Discard Mortality

Landings targets which appear in this section have been reduced from harvest guidelines that would appear in regulation, where applicable, in order to account for discard mortality. The harvest guideline (a specified numerical harvest objective that is not a quota) was multiplied by 15.9% (discard rate estimate), and by 20% (discard mortality rate estimate), and then that product (estimated dead discarded sablefish) was subtracted from the harvest guideline, resulting in a "landings target", which projected landings should be beneath, in order to keep total catch within the harvest guideline. The estimated discard rate used by GMT was taken from the 2010 West Coast Groundfish Observer Program (WCGOP) Total Mortality Report. In the 2009-10 management cycle, the discard rate estimate was the same, and was derived from data in the 2007 WCGOP Total Mortality Report, which was the most recent available data at that time. That discard mortality rate estimate was taken from information in Davis (2001, LTtp://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2001.tb00495.x/abstract), Schirripa and Colbert (2005, LTtp://www.pcouncil.org/wp-content/uploads/Sable05_complete.pdf), and Schirripa (2007, LTtp://www.pcouncil.org/wp-content/uploads/Sable07v3_0.pdf). Schirripa (2005) used experimental data and sea surface temperature to predict varying release mortality by gear. The GMT considered that Davis (2001) demonstrated high sensitivity to temperature and deck time, along with high variability of predicted discard mortality in Schirripa (2005) informed by sea surface temperature data, and adopted an estimate of 20%. This value was also adopted by Taylor 2011 in the current sablefish stock assessment.

Results - No Action Alternative

Under No Action, the following Rockfish Conservation Area boundaries for use of fixed gear, from 2012 regulations, would remain in place for 2013 and 2014 (Table C-36).

Table C-36. Rockfish Conservation Area (RCA) boundaries for fixed gear, under the No Action Alternative.

Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
North of 46° 16'	shore - 100 fm					
45° 03' 83" - 46° 16'	30 - 100 fm					
43° - 45° 03' 83"	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)					
42° - 43°	20 - 100 fm					
40° 10' - 42°	20 fm depth contour - 100 fm					
34° 27' - 40° 10'	30 fm - 150 fm line					
South of 34° 27' (w/islands)	60 m - 150 fm line					

Projected Landings (No Action)

Projected landings under the No Action Alternative are presented in Table C-37 under the limits in Table C-38. The GMT and the Council considered, while constructing and adopting them, respectively, the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings) along with the normal uncertainty associated with projection models, the No Action trip limit structures for 2012 for each fishery presented here. The No Action Alternative resulted in projected attainments in the range of 91% to 93%, aiming to enable harvest of a high proportion of the HG, yet accommodating previously described uncertainty.

Table C-37 Model-projected landings compared to the landing target under the No Action Alternative, for the fixed-gear, sablefish, DTL fisheries. Landings targets and projected landings are in metric tons (mt) of landed catch.

Fishery	Area	Projection (mt)	Landing Target (mt)	% of LT
LE N.	North of 36° N. lat.	242	265	91%
OA N.	North of 36° N. lat.	381	419	91%
LE S.	South of 36° N. lat.	353	380	93%
OA S.	South of 36° N. lat.	284	309	92%

These trip limits can be adjusted inseason as needed to influence higher or lower catch as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure (which was appreciated by the GAP, in their statement, in the November 2011 Council meeting), and to avoid starting the year with highly variable trip limits, such as resulted from the "rolling over" of 2010 trip limits into 2011, due to unforeseeable delays in implementation.

Table C-38. Trip limits for sablefish DTL fisheries under No Action.

<table>
<tr><th>Area</th><th>Fishery</th><th>Jan-Feb</th><th>Mar-Apr</th><th>May-Jun</th><th>July-Aug</th><th>Sept-Oct</th><th>Nov-Dec</th></tr>
<tr><td rowspan="2">North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)</td><td>LE N.</td><td colspan="6">1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.</td></tr>
<tr><td>OA N.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 900 lb., not to exceed 1,800 lb. per 2 mo.</td></tr>
<tr><td rowspan="2">South of 36° N. lat.</td><td>LE S.</td><td colspan="6">1,800 lb. per week</td></tr>
<tr><td>OA S.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 1,350 lb., not to exceed 2,700 lb. per 2 mo.</td></tr>
</table>

Action Alternatives for 2013

Projected landings under the action alternatives are presented in Table C-39 under the trip limits Table C-40. As with the No Action Alternative, we considered the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The action alternative limits result in projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the action alternatives (i.e., alternatives other than No Action), within each year.

Table C-39. 2013 Model-projected landings under the action alternatives for the limited entry and open access fixed-gear sablefish DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt) of landed catch.

Fishery	Area	Alternatives Projection (mt)	Landing (mt)	% of LT
LE N.	North of 36° N. lat.	179	197	91%
OA N.	North of 36° N. lat.	266	291	91%
LE S.	South of 36° N. lat.	405	446	91%
OA S.	South of 36° N. lat.	330	362	91%

Projected landings under the action alternatives were lower than No Action for the LE North and OA North fisheries (74 percent and 70 percent of No Action, respectively), and higher than No Action for the LE South and OA South (115 percent and 116 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table C-40 and Figure C-7.

Table C-40. 2013 Model-projected landings under the action alternatives compared to No Action for the fixed-gear sablefish DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	Alternatives Projection (mt)	No Action Projection (mt)	% of No action
LE N.	North of 36° N. lat.	179	242	74%
OA N.	North of 36° N. lat.	266	381	70%
LE S.	South of 36° N. lat.	405	353	115%
OA S.	South of 36° N. lat.	330	284	116%

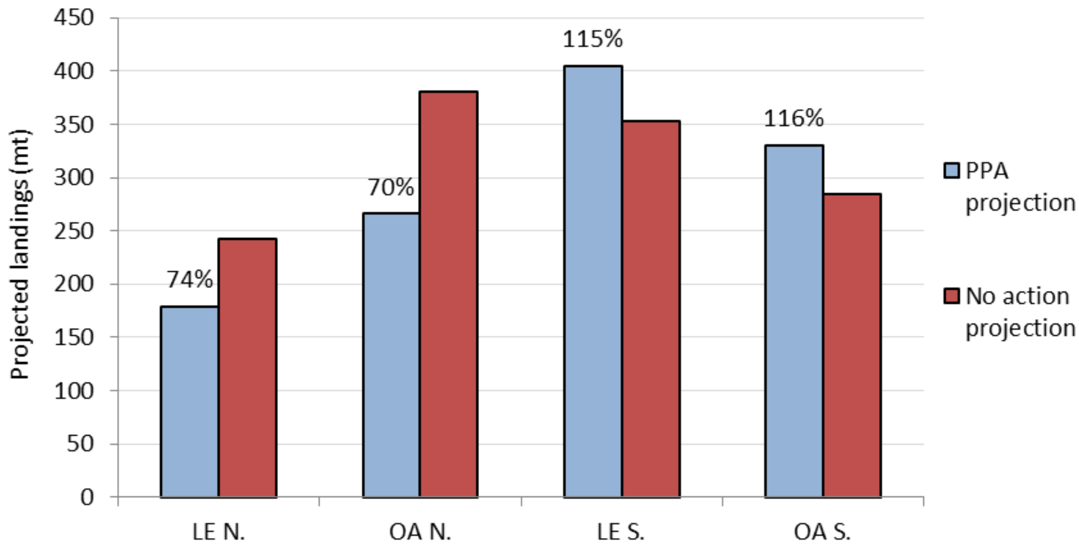

Figure C-7. Projected landings for 2013 under the preferred and No Action alternatives, for the four fixed gear, sablefish, DTL fisheries. Column labels show the projection for the preferred alternative as a percentage of No Action.

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table C-40), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 800 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 290 pounds per week and 580 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 80 pounds per week was possible in the LE South fishery, while an increase of 110 pounds per week and 220 pounds per bimonthly period was possible in the OA South fishery.

Table C-41. 2013 Proposed trip limits for 2013 in sablefish DTL fisheries under the preferred alternative, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,880 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.					

Action Alternatives for 2014

Projected landings under the actions alternatives for 2014 are presented in Table C-42. As with the No Action Alternative, we considered uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The action alternatives for 2014 results in projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2014 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the action alternatives, within each year.

Table C-42. Model-projected landings under the Action Alternatives in the fixed-gear sablefish DTL fisheries for 2014. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	Projection (mt)	Landing Targets (mt)	% of LT
LE N.	North of 36° N. lat.	194	214	91%
OA N.	North of 36° N. lat.	290	319	91%
LE S.	South of 36° N. lat.	441	483	91%
OA S.	South of 36° N. lat.	359	393	91%

Projected landings under action alternatives were lower than No Action for the LE North and OA North fisheries (80 percent and 76 percent of No Action, respectively), and higher than No Action for the LE South and OA South (125 percent and 126 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table C-43 and Figure C-8.

Table C-43. Model-projected landings under the action alternatives compared to No Action in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	Alternatives Projection (mt)	No action projection (mt)	% of No act.
LE N.	North of 36° N. lat.	194	242	80%
OA N.	North of 36° N. lat.	290	381	76%
LE S.	South of 36° N. lat.	441	353	125%
OA S.	South of 36° N. lat.	359	284	126%

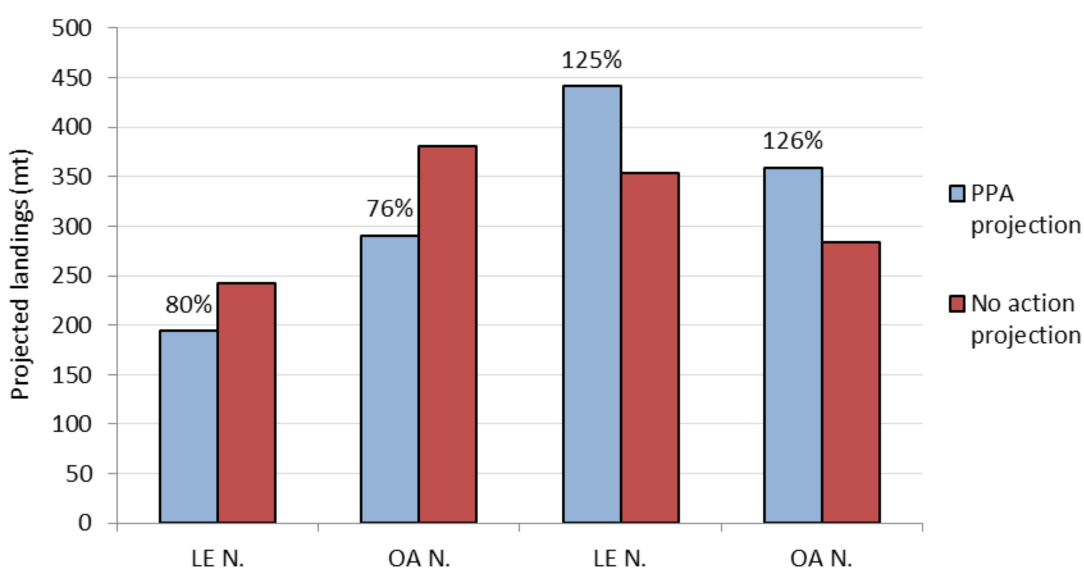

Figure C-8. Projected landings for 2014 under the Action Alternatives and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show the projection under the preferred alternative as a percentage of No Action.

Table C-44. Proposed trip limits for 2014, in sablefish DTL fisheries under the action alternatives, other than No Action.

<table>
<tr><th>Area</th><th>Fishery</th><th>Jan-Feb</th><th>Mar-Apr</th><th>May-Jun</th><th>July-Aug</th><th>Sept-Oct</th><th>Nov-Dec</th></tr>
<tr><td rowspan="2">North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)</td><td>LE N</td><td colspan="6">1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.</td></tr>
<tr><td>OA N</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.</td></tr>
<tr><td rowspan="2">South of 36° N. lat.</td><td>LE S</td><td colspan="6">1,930 lb. per week</td></tr>
<tr><td>OA S</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.</td></tr>
</table>

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table C-43), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 600 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 225 pounds per week and 450 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 130 pounds per week was possible in the LE South fishery, while an increase of 175 pounds per week and 350 pounds per bimonthly period was possible in the OA South fishery.

Biological and Socioeconomic Impacts of Inseason Adjustments

As noted previously, these trip limits under any alternative would be adjusted inseason as needed to influence higher or lower catch as 2013 or 2014 progresses; the aim of such adjustments is to attain the annual harvest guideline. No substantial biological or socioeconomic effects are expected from routine inseason adjustments during a year-round fishery, since the goal is ultimately to either enable or restrict the fishery to take a predetermined amount of sablefish in a given one year period. If catch were to progress too quickly, faster than trip limit adjustments could curb it, this could result in a fishery closure near the end of the year, to limit catch to within the harvest guideline. However, a year-round fishery is a primary management goal for all the fixed gear, sablefish DTL fisheries; closures can disrupt the incomes of participants, and flow of revenue from participants through communities. Even in the event of a closure of one fishery, fishers can often participate in another DTL fishery which remains open. One example is that if the LE North fishery were closed, some of those former participants may decide to fish in the OA North fishery. Another example would be if a fisher's home port was close to the 36° N. lat. boundary, they may wish to participate in a sablefish DTL fishery on the other side of the boundary, or in another fishery for a different species, such as winter Dungeness crab, etc.

Since ex-vessel prices for fixed gear caught sablefish tend to be highest in the fall of each year (September and October), and participation and catch are also highest during this season for most of the four DTL fisheries, trip limit changes during this time are expected to have a larger effect on attainment and revenue than trip limit changes during other months. Sablefish spawn in the late fall through winter, at depths greater than 150 fm. Changes in catch, seaward of the current fixed-gear RCA during this season, therefore, could affect recruitment, if it changed the catch rate for gravid females, for example.

Results from future sablefish stock assessments would indicate if seasonal changes in trip limits resulted in greater harvest of the spawning females and whether recruitment was affected. Such information could be considered in the seasonal design of future trip limits.

C.14 Regulatory fix: threshold for switch from sablefish primary fishery to DTL fishery

Overview

The Groundfish Management Team (GMT) reviewed Council guidance under Agenda Item G.7, in the November Council meeting: Inseason Adjustments Part II, and provided the following considerations relative to the limited entry fixed gear (LEFG) sablefish fishery north of 36° N. lat.

As per Council discussion, the GMT is addressing the subject of finding a remedy to the unforeseen complications to the LEFG sablefish primary fishery north of 36° N. lat., resulting from elimination of the daily trip limit in the sablefish DTL fishery in the same area. It recently came to the attention of NMFS, enforcement, the GMT, and the Council that elimination of the daily trip limit, at the request of the GAP, and following analysis by the GMT in 2009, caused the unintended consequences of impacting the amount of sablefish that primary fishery participants are allowed land, as they conclude fishing on their tier limits.

Some clarifications are in order on this somewhat complex regulatory topic. While the daily trip limit was in effect, it served a second regulatory purpose, in addition to the obvious one of a daily limit for the DTL fishery; it also served as the poundage threshold, which determines when the fixed gear, sablefish landings of a sablefish primary fishery participant begin being counted as DTL landings, and become subject to those trip limits.

Specifically, if after a delivery, a primary fishery participants remaining tier amount (sum of tier endorsements on the participant's vessel, minus all pounds fished on those endorsements) was less than the daily trip limit amount, all subsequent fixed gear sablefish deliveries by the vessel would be attributed to the DTL fishery. Additionally, any remaining tier amount after this time would be forfeited. The daily limit, when it was in place, was either 300 or 500 pounds. In this case, in the absence of a daily trip limit, "an amount that is smaller than the DTL amount" is interpreted for enforcement purposes to mean an amount that is smaller than the weekly limit, which is currently 1,300 pounds, under the No Action Alternative. This is a substantial complication for the primary fishery participants, and means that they must make their final landing within 1,300 pounds, rather than 300 or 500 lbs.

For example, if 2,200 pounds were remaining on one's tier limit, the fisher could land 1,000 pounds in one trip, and be required to forfeit the remaining 1,200 pounds of the tier limit. Subsequently, that vessel's participation in the primary fishery would conclude for the season. Any subsequent landings of sablefish with fixed gear by that vessel would be subject to the DTL fishery regulations. Once a vessel that is eligible to participate in the sablefish primary fishery makes the switch into the DTL fishery, it cannot return to the primary fishery, according to Federal regulations at 50 CFR 660.232(a)(2).

That regulation states:

> *"A vessel that is eligible to fish in the sablefish primary season may fish in the DTL fishery for sablefish once that vessels' primary season sablefish limit(s) have been taken, or after the close of the primary season, whichever occurs earlier.* ***Any subsequent sablefish landings by that vessel will be subject to the restrictions and limits of the***

> ***limited entry DTL fishery for sablefish for the remainder of the fishing year***. [emphasis added]."

It also states:

> *"No vessel may land sablefish against both its primary season cumulative sablefish limits and against the DTL fishery limits within the same 24 hour period of 0001 hours local time to 2400 hours local time. If a vessel has taken all of its tier limit except for* ***an amount that is smaller than the DTL amount****, that vessel's subsequent sablefish landings are automatically subject to DTL limits* [emphasis added]."

In this case, in the absence of a daily trip limit, "an amount that is smaller than the DTL amount" is interpreted to mean the weekly limit currently in place. If the fisher were unaware of the enforcement of the weekly-limit threshold, or didn't plan carefully for it, they could unintentionally forfeit close to the full weight weekly limit. At current sablefish ex-vessel prices, this would represent substantial lost revenue by the participant.

Management Issue

The elimination of the daily trip limit in the LEFG sablefish DTL fishery, north of 36° N. latitude., at the request of the Groundfish Advisory Subpanel (GAP) and analysis of the GMT in 2009, caused the unintended consequences of impacting the amount of sablefish that LEFG primary fishery participants north of 36° N. latitude are allowed to land as they conclude fishing on their tier limits.

Management Options

No Action: (Regulations at 660.232.a.3.)

> *"If a vessel has taken all of its tier limit except for* ***an amount that is smaller than the DTL amount****, that vessel's subsequent sablefish landings are automatically subject to DTL limits* [emphasis added]."

Proposed Action: The proposal is to add the following language to regulation, immediately following the excerpt from the No Action Alternative.

> *"In the absence of a daily limit, 300 pounds would serve as a proxy for the daily limit ("the DTL amount"), only acting as the threshold to facilitate the transition of a vessel from participation in the sablefish primary fishery, to the sablefish DTL fishery."*

We propose that 300 pounds should be this amount, as it was the most common daily trip limit in this fishery over the past seven years, and would give maximum access of a fisher to their tier pounds. Out of the 80 months between January 2003, through August of 2009, in which a daily trip limit was in place for the LE North sablefish DTL fishery, in 68 of those months a daily limit of 300 pounds was in place, and during the other 12 months, a limit of 500 pounds was in place. The 500 pound limit was put in place to enable higher harvest of DTL sablefish, rather than to limit access to tier limit (primary fishery) poundage.

Alternatively, the threshold for transitioning from the sablefish primary fishery to the DTL fishery could be permanently set to 300 pounds, regardless of what the daily limit in the DTL fishery north of 36° N. lat. might be, whether or not a daily limit was in place.

Comparison of Management Options

To review, in the 660.232.a.3 (above), the "DTL amount" refers to the daily trip limit which is currently in regulation. It is also used to establish the threshold for a sablefish primary tier fisher transitioning from the primary to DTL fishery, upon exhausting his/her tier pounds. When no daily limit is specified in regulation, enforcement officials must implement the weekly limit for the transition instead, which is much larger, and this often leads to the unintentional forfeiture of fish, as described above. Since the daily trip limit was eliminated in this fishery, the proportion of the primary share that went unharvested has been larger than when there was a daily trip limit in place. In 2009 through 2011, an average of 6.7 percent of the primary landed share has been left unharvested, compared with 4.7 percent during the five previous years (2004 through 2008).

Biological Impacts

It is possible that a greater amount of the sablefish ACL will be attained under the proposed action since fewer fish with be left in the tier fishery. The biological impacts associated with harvest at the ACL level are discussed in Section 4.1.

Socioeconomic Impacts

If the No Action Alternative were left in place, it is probable that the amount of unharvested sablefish in the primary tier fishery would remain higher than when there was a daily trip limit in this fishery. It is the intent of the regulations that the primary landed share be harvested, which provides a greater economic benefit compared to No Action. The action alternative would allow fishermen to harvest a greater amount of sablefish and associated revenue in the tier fishery before switching into the DTL fishery.

C.15 Blackgill Rockfish South of 40°10 N. Latitude Management Measures

Overview

For 2011-12 groundfish fisheries, blackgill rockfish have been managed as part of the overall southern slope rockfish complex and its harvest specifications have contributed to the complex as a whole (Table C-45). Although blackgill rockfish south of 40°10 N. latitude was assessed previously, species-specific harvest specifications were never defined in federal regulation. That is, it was never given its own overfishing limit (OFL), acceptable biological catch (ABC), or annual catch limit (ACL). Targeting of blackgill rockfish occurs in all commercial fisheries south of 40°10' N. latitude Blackgill rockfish management measures are detailed in Table C-46.

Table C-45. 2012 Harvest Specifications for Minor Slope Rockfish Complex south of 40°10' N. latitude in Metric Tons, Implemented in Regulation.

Species	OFL	ABC	ACL
Minor Slope Rockfish South	903	832	626

Table C-46. Blackgill Rockfish Management Measures for the 2012 Groundfish Fisheries, south of 40°10' N. latitude.

Fishery	
Commercial	No sorting requirement for all commercial landings
--Limited Entry Trawl	Managed under slope rockfish IFQ
--Limited Entry Fixed Gear	Bi-monthly limit management under slope rockfish complex. Current limits south of 40°10' N. latitude are: Periods 1-6: "*40,000 lb/2 months slope rockfish & darkblotched rockfish*" Bi-monthly limits can be adjusted through routine inseason action.
--Open Access	Bi-monthly limit management under slope rockfish complex. Current bi-monthly limits by area are: <u>40°10' N. latitude to 38° N. latitude</u>: Periods 1-6: "*slope rockfish & darkblotched rockfish - Per trip, no more than 25% of weight of the sablefish landed*" <u>South of 38° N. latitude</u>: Periods 1-6: "*10,000 lb/2 months slope rockfish & darkblotched rockfish*" Bi-monthly limits can be adjusted through routine inseason action.

<u>Management Issue</u>

An assessment was performed for blackgill rockfish for use in the 2013-2014 management cycle. Although the 2011 blackgill rockfish assessment indicated that historical catches have been higher than the proposed OFL and ABC contributions to the complex for 2013-2014, they never exceeded the historical contribution to the complex.

Total catch data (landings plus discard) by sector from the West Coast Groundfish Observer Program Total Mortality Reports in recent years (2006-2010) can be found in Table C-47.

Table C-47. West Coast Groundfish Total Mortality Estimates in Metric Tons by Sector for Blackgill Rockfish from 2006-2010.

Year	Trawl	Non-Trawl	Other	Total Mortality
2006	65.7	57.0	0.4	123.1
2007	28.6	19.0	3.2	50.8
2008	35.6	21.3	14.8	71.7
2009	48.0	84.6	3.4	136.0
2010	61.4	84.6	6.3	152.3

The Council's preferred OFL and ABC blackgill contribution to the complex is in Table C-48. Given that blackgill stock is below 40 percent depletion, a 40-10 adjustment was applied to its contribution to the complex.

Table C-48. Preferred Component OFLs and ABCs for Blackgill Rockfish south of 40º10' N. latitude in Metric Tons.

Year	OFL	ABC
2013	131	119
2014	134	122

The estimated mortality provided by WCGOP for blackgill rockfish from 2006-2010 would have exceeded the blackgill component OFLs in 2009 and 2010 (Table C-47, compared to Table C-48).

Management Options

The options before the Council at the September and November 2011 Council meetings were whether to 1) continue status quo management of blackgill rockfish within the minor slope rockfish complex, 2) continue managing blackgill rockfish within the minor slope rockfish complex south and implement a harvest guideline, or 3) remove blackgill rockfish from the minor slope rockfish south complex and manage it with stock specific harvest specifications.

Option 1, No Action – Manage Blackgill Rockfish within the Minor Slope Rockfish Complex (south of 40°10' N. latitude)

Under Option 1, blackgill rockfish would continue to contribute to the harvest specifications for the minor slope rockfish south complex; no Federal sorting requirement would be implemented. The blackgill rockfish contribution would be based on the results from the 2011 stock assessment. The management measures outlined in Table C-46 would remain in place and some could be modified inseason through routine management measures to slow landings if necessary.

Although there is no Federal requirement to sort blackgill rockfish to individual species under Option 1, existing regulations in California require the species, not the complex, be reported on fishtickets (Fish & Game Code sections 8043 and 8045). From 2005-2011, an average of 13 percent of the fish tickets reported data at the complex level, instead of the species level. In recent years (2009-2011), the average has declined to 9 percent. However, the slope rockfish category is the most commonly used. Blackgill rockfish are easy to identify and are more valuable compared to other slope rockfish; therefore individual sorting of blackgill rockfish is expected to continue under Option 1.

Under Option 1, the following management measures would be available by fleet to control catches of blackgill rockfish within the minor slope rockfish complex, if necessary.

<u>Limited Entry IFQ</u>

The total catch of blackgill rockfish taken in the IFQ fishery will count against the slope rockfish south of 40°10' N. latitude IFQ. One measure available to the IFQ fishery to reduce the catch of blackgill rockfish would be an adjustment to the seaward boundary of the RCA (trawl and non-trawl RCAs are currently at 150 fm). Because blackgill rockfish are most abundant from 160 to 270 fm, it is probable that to effectively reduce blackgill rockfish mortality, the RCA would have to be moved to depths that would effectively eliminate all slope rockfish opportunities, which would adversely affect the IFQ fishery. Voluntary avoidance by the fleet has proven successful in the whiting fishery and could be requested for slope rockfish to reduce blackgill rockfish encounters.

<u>Non-Trawl</u>

In the limited entry (LE) and open access (OA) fisheries, blackgill rockfish is included within the aggregate slope rockfish bi-monthly limits. Under current regulations, the slope rockfish bi-monthly limits outlined in Table C-46 could be taken entirely of blackgill. The only measures available to these fisheries to slow blackgill rockfish catches under Option 1 is to adjust the seaward boundary of the RCA (similar to the IFQ fishery), voluntary avoidance, or reductions in bi-monthly limits. Any reductions to bi-monthly limits would be applied to the aggregate slope rockfish limit and would likely be severe (because it would apply to the entire slope complex, not just blackgill rockfish) and would limit access to other healthy slope rockfish species. A two meeting process could be undertaken during 2013-2014 to establish a HG, sorting requirement, and species-specific trip limits, if needed.

Biological Impacts

Projected Impacts

Although projected catches for blackgill rockfish could exceed the blackgill rockfish contribution to the minor slope rockfish complex under Option 1, the overall slope rockfish complex harvest specification would not be exceeded. Action could be taken within the biennium, if necessary, to reduce mortality of blackgill rockfish. For example, a regulatory process could be undertaken to establish a HG, sorting requirement, and species-specific trip limits, if needed.

Stock Status

Under Option 1, the status of blackgill rockfish stock is expected to maintain its upward trajectory as indicated by the 2011 assessment (Field and Pearson, 2011). The increase in biomass is most likely due in part to implementation of the Cowcod Conservation Areas (CCA) in 2001 which removed fishing pressure and provided protection to a large fraction of the blackgill rockfish habitat.

Socioeconomic Impacts

Under Option 1, any inseason action taken to reduce catches (e.g., RCA modifications, reductions in bi-monthly limits) would likely be severe and could effectively eliminate target opportunities in other valuable fisheries such as sablefish. Voluntary avoidance would have the fewest impacts on the fleet because known blackgill rockfish hotspots could be avoided, according to industry input. Although this could reduce or eliminate a directed fishery for blackgill rockfish, it still could allow for small amounts of blackgill rockfish to be taken incidentally while prosecuting other valuable fisheries, such as sablefish.

Option 2, Preferred: Manage Blackgill Rockfish within the Minor Slope Rockfish Complex south of 40°10' N. latitude, Establish a Harvest Guideline and a Sorting Requirement.

Under Option 2, blackgill rockfish would continue to contribute to the harvest specifications for the minor slope rockfish south complex south of 40°10' N. latitude and a blackgill rockfish harvest guideline would be established based on the results from the 2011 stock assessment.

Harvest Guideline

Under Option 2, harvest guidelines of 106 mt and 110 mt would be established for 2013 and 2014 respectively. Based on the FMP, the harvest guideline would be further divided 63% trawl (67 mt) and 37% non-trawl (39 mt)[32]. Although establishment of a harvest guideline does not mean that action has to be taken based upon projected attainment, it does allow for more flexibility in creating management measures to limit catch.

Sorting Requirement

Under Option 2, implementing a sorting requirement is not expected to change current fleet practices compared to Option 1. Further, existing regulations in California require the species, not the complex, be reported on fishtickets (Fish & Game Code sections 8043 and 8045). From 2005-2011, an average of 13 percent of the fish tickets reported data at the complex level, instead of the species level. In recent years (2009-2011), the average has declined to 9 percent. However, the slope rockfish category is the most commonly used. Increased enforcement may be necessary to ensure accurate sorting for use in management.

The following management measures would be available to the IFQ and non-trawl fleets to be used in season in the landings are tracking high.

[32] Since increasing the harvest guideline to 110 mt (in 2014) will not result in any appreciable change in bi-monthly limits, the 2013 values were assumed for all calculations.

Limited Entry IFQ

Under a HG, landings and discards in the IFQ fishery would continue to count against slope rockfish QP[33]. Because a sorting requirement would be implemented, it is possible blackgill rockfish landings could be verified by catch monitors and port biologists. Discards at sea would be recorded by the observer at the species level, as currently done. If mortality appears to be tracking higher than the HG[34], the Council could reduce blackgill rockfish catches by moving the seaward boundary of the RCA, which could adversely affect IFQ fishermen as described above under Option 1, or request voluntary avoidance by the fleet.

Non-Trawl

Under Option 2, modifications to bi-monthly limits were investigated to keep blackgill rockfish removals within the yearly non-trawl allocation. No changes are proposed for the overall slope rockfish bi-monthly limits. Per Council guidance at the November 2011 meeting, the non-trawl blackgill rockfish allocation was divided 60% LE (23.4 mt) and 40% OA (15.6 mt)[35] to facilitate modeling bi-monthly limits. As removals in the LE and OA fisheries would have exceeded the 2013-2014 harvest targets given past fishery behavior (Figure 1), reductions in bi-monthly limits may provide an effective tool for controlling catches.

Blackgill rockfish landings as recorded in PacFIN from 2005-2010 for LE and OA fixed gear fleets were used to analyze catch limits by fleet and period. Bi-monthly limits for the LE fishery maintained the No Action area designation (south of 40º10' N. latitude); whereas bi-monthly limits for the OA fishery were modified from the No Action area designations (40º10' N. latitude to 38º N. latitude; south of 38º N. latitude) to a single area (south of 40º10' N. latitude). For analytical and managerial ease, bi-monthly limits are assumed the same in each bi-monthly period. Two modeling approaches (using 90% and 100% attainment of the non-trawl allocation) were used to analyze bi-monthly limits. The years 2008 to 2010 were ultimately chosen as the basis for modeling the trip limits in this analysis because they are the most representative of current and future activities. The southern sablefish ACL was larger in most recent years therefore future effort would be more similar to2008-2010 (I.e., more boats fishing for sablefish would take the time to set gear for blackgill). Both sablefish and blackgill tend to be caught in the same trips, though not necessarily the same set. For a full description of bi-monthly limit methodology refer to Appendix A.

Limited Entry Bi-Monthly Limit Options

Table C-49 summarizes a range of bi-monthly limits for blackgill rockfish in the LE fishery under varying assumptions of catch attainment. The bi-monthly limit options range from 1,200 lb/2 months (Option A) to 1,375 lb/2 months (Option B). The percentage of vessels affected per bi-monthly period by each of the options are provided in Figure C-10, which is generally less than 15% for all options over all periods.

Under Option 2, the LE bi-monthly limits would need to be restructured to accommodate the new sub-limit for blackgill. Currently the bi-monthly limit is "*40,000 lb/2 months of slope rockfish and darkblotched rockfish*". The bi-monthly limit could be restructured as "*40,000 lb/2 months of slope rockfish and darkblotched rockfish, of which no more than XX lb can be blackgill rockfish*".

[33] Species specific IFQ can only be issued based on an ACL, not a harvest guideline.
[34] Per federal regulations, attainment of a HG does not require action or closure of a fishery.
[35] Percentages were based on average participation from 2005 to 2010.

Table C-49. Range of sub-limits for blackgill rockfish in the limited entry non-trawl fishery. Bi-monthly limits are modeled for the area south of 40º10' N. latitude and may include rounding to facilitate management.

Option	Period limit	Calculation Assumptions
Option A	1,200 lb/2 mo	Assumes 90% attainment of LE portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.
Option B	1,375 lb/2 mo	Assumes 100% attainment of LE portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.

Open Access Bi-Monthly Limit Options

Unlike the LE fishery, OA fishery bi-monthly limits are divided at 38º N. latitude and structured differently in both areas. Since the original rationale documenting the need for the area divisions and the differences in period limit structuring is no longer available, the areas were combined for this analysis.

Table C-50 summarizes a range of OA bi-monthly limits under varying assumptions catch attainment. The bi-monthly limit options range from 410 lb/2 months (Option A) to 480 lb/2 months (Option B). The OA fishery has traditionally been more unpredictable than the LE fishery, making it difficult to accurately predict catch and fleet behavior.

Under this Option, the bi-monthly limits would need to be restructured to accommodate the new sub-limit for blackgill rockfish. For the area south of 40º 10' N. latitude, a new bi-monthly limit could be implemented as "*10,000 lb/2 months of slope rockfish and darkblotched rockfish, of which no more than XX lb can be blackgill rockfish*".

Overall, the percentages of open access vessels per bi-monthly period affected by each of these options are provided in Figure C-11

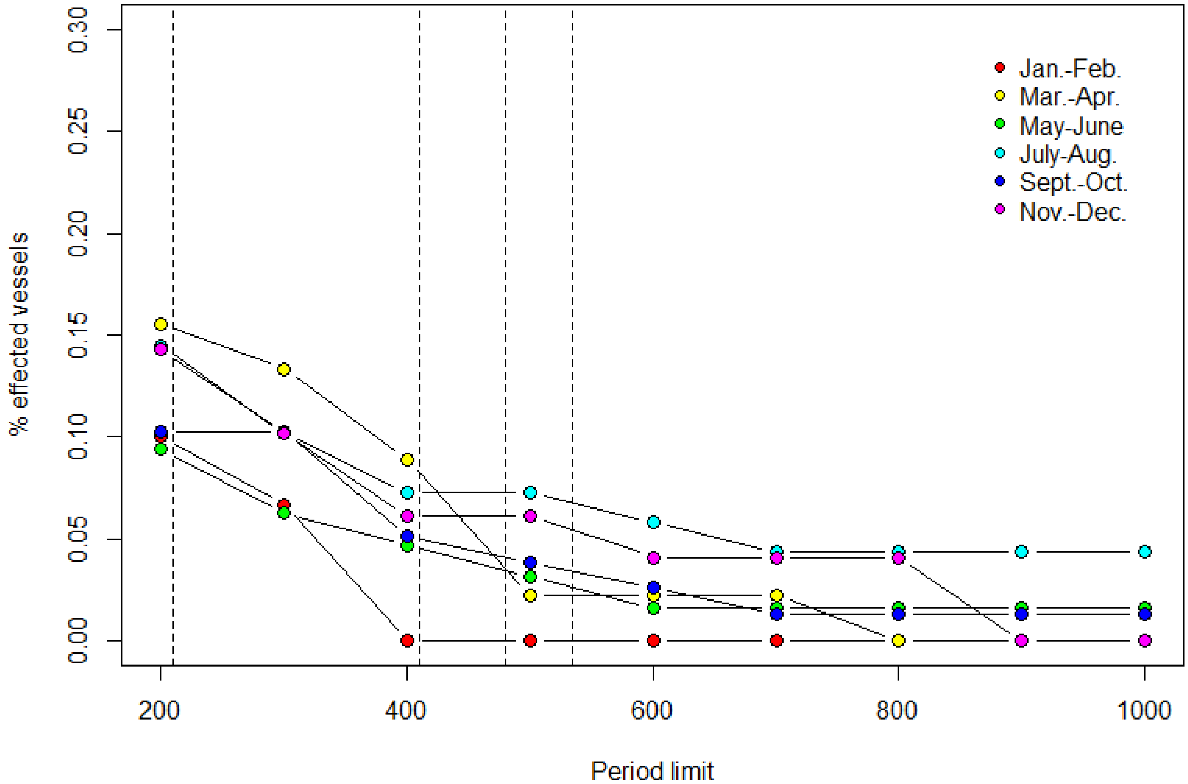

Figure C-11, which is generally 5 to 15% for most options.

Table C-50. Range of sub-limits for blackgill rockfish in the open access non-trawl fishery, assuming one area (south of 40°10' N. latitude). Values may be rounded for ease of management.

	Bi-monthly Limit	Description
Option A	410 lb/2 mo	Assumes 90% attainment of OA portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.
Option B	480 lb/2 mo	Assumes 100% attainment of OA portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.

Comparison of the Management Options

Biological Impacts

Projected Impacts

Under Option 2, projected catches for blackgill rockfish would be expected to stay within the harvest guideline.

Stock Status

Under Option 2, a positive change to the stock status of blackgill rockfish could be expected compared to Option 1, but the extent is unknown. Blackgill are a long-lived, resilient species so small changes to total mortality over a short time period would not be expected to have any detectible impact on stock status.

Socioeconomic Impacts

Under Option 2, the fleet is expected to be negatively impacted due to the decrease in landings. This impact is expected to be mainly experienced by the non-trawl fisheries that target blackgill rockfish.

Although the percentage of LE and OA vessels affected per bi-monthly period is generally less than 15% for all options, the loss in vessel revenue will not be equal among those vessels. Some of these vessels directly targeted blackgill rockfish and had landings far above the proposed bi-monthly limits. Their losses will be much greater than a vessel that only had landings at or slightly above the new proposed bi-monthly limits. Since the LE fleet targeting blackgill primarily operates out of southern California, disproportionate losses in blackgill rockfish revenues will affect that fleet and local communities in that area.

Since the majority of the fleet is already sorting blackgill rockfish to species due to its higher value compared to other slope rockfish species, daily operations are not expected to change as a result of a sorting requirement.

Option 3: Remove Blackgill Rockfish from the Minor Slope Rockfish Complex and Apply Species Specific Harvest Specifications (i.e., ACL)

Blackgill rockfish would be removed from the minor slope rockfish south complex and its contribution to the harvest specifications for the minor slope rockfish south complex would be removed (thus lowering the minor slope rockfish complex harvest specifications). Blackgill rockfish would be managed under its own ACL, which would be based on the results from the 2011 stock assessment, and a sorting requirement would be implemented.

Sorting Requirement

Under Option 3, implementing a sorting requirement is not expected to greatly change current fleet practices compared to Options 1 or 2. Similar to Option 2 a sorting requirement could have an impact on state and federal programs because all blackgill would have to be tracked and monitored. Some increase in time and money may be expected relative to increase the accuracy of identification. Increased enforcement may be necessary to enforce the new sorting requirements.

Limited Entry IFQ

Under an ACL, QS/QP would be established for the IFQ fishery and all landings and discards would be counted against the newly formed blackgill rockfish QP. The default proxy to distribute blackgill QS would be based on that used for slope rockfish unless the Council chose to re-evaluate a different methodology. Depending on the amount of blackgill available to the trawl fishery, it is possible that blackgill QP could be as constraining, if not more, than many overfished species and limit access to many healthy target stocks.

In November 2011, the Council rejected moving forward with the detailed analysis to remove blackgill from the slope rockfish south complex, establish species-specific harvest specifications, and establish IFQ as the primary catch control until the comprehensive analysis of stock complexes is completed and the historical estimates of mortality are finalized. Methodologies to estimate the species-specific historical mortality estimates by sector need to be finalized, reviewed, and accepted by the Council and its advisory bodies. This step is necessary to inform the component OFL and ABC estimates, evaluate the existing allocation structure, and inform any potential modifications to the allocations between the trawl and non-trawl sectors as well as within the trawl sector (i.e., allocations between shorebased IFQ, mothership, and catcher-processors).

Current regulations provide a formula for issuing QS in the shorebased IFQ fishery in the event species are removed from an IFQ management unit. For example, if a person holds one percent of a species group (e.g., slope rockfish north) before the subdivision, that person will hold one percent of the QS for each IFQ species resulting from the subdivision (e.g., blackgill). However, now that species-specific estimates of landings are available, additional options for initial issuance may need to be considered. For example, it is anticipated that individual catch history of the component species (e.g., blackgill) are different than the aggregate slope rockfish north landings used in the initial issuance of slope rockfish QS.

Non-Trawl

Under Option 3, an ACL effectively functions the same as a harvest guideline (see Option 2) except projected attainment of an ACL does require management action. Reductions in bi-monthly limits would also be an effective tool for controlling catches, but unlike Option 2, establishment of an ACL would allow for species specific limits to be implemented. Therefore, no sub-limits within the slope rockfish limits would need to be applied. Any of the options presented under Option 2 in Table C-49 or Table C-50 could be implemented as a blackgill specific limit.

Comparison of the Management Options

Biological Impacts

Projected Impacts

Under Option 3, projected catches are expected to be lower than Option 1 and the same as Option 2.

Stock Status

Under Option 3, no changes to stock status are expected compared to Option 2. Some positive change to the stock status could be expected compared to Option 1, but the extent is unknown.

Impacts to Industry

Impacts to industry under Option 3 are expected to be the same as under Option 2. The fleet is expected to be negatively impacted compared to Option 1.

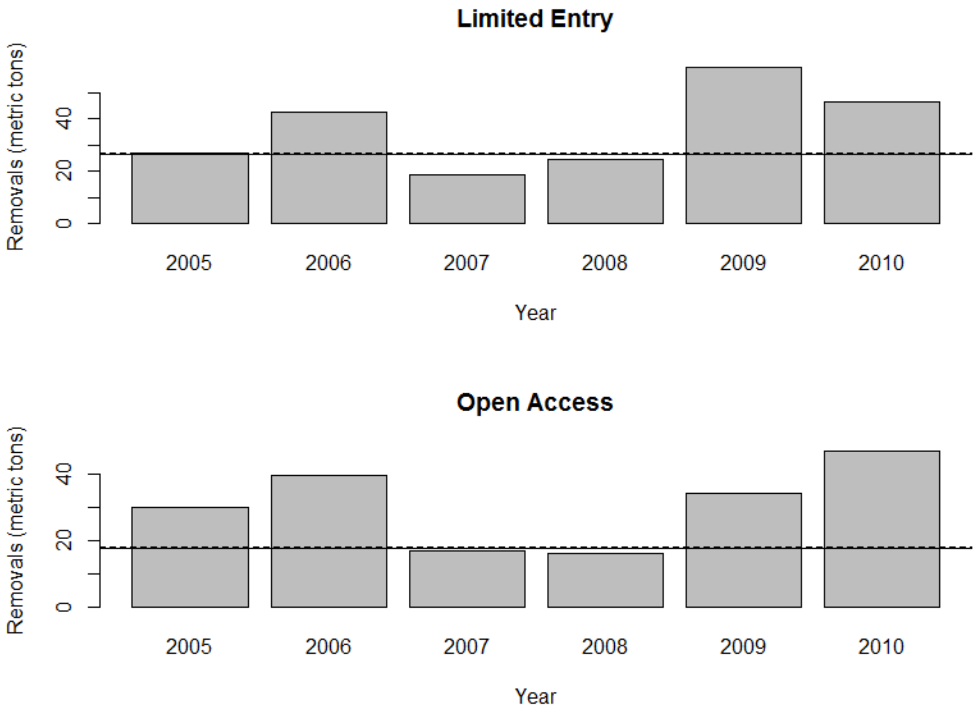

Figure C-9. Removals of blackgill rockfish in the limited entry (top panel) and open access (bottom panel) fisheries south of 40°10' N. latitude. Solid horizontal lines are the 2013 harvest guidelines; Broken horizontal lines are the 2014 harvest guidelines.

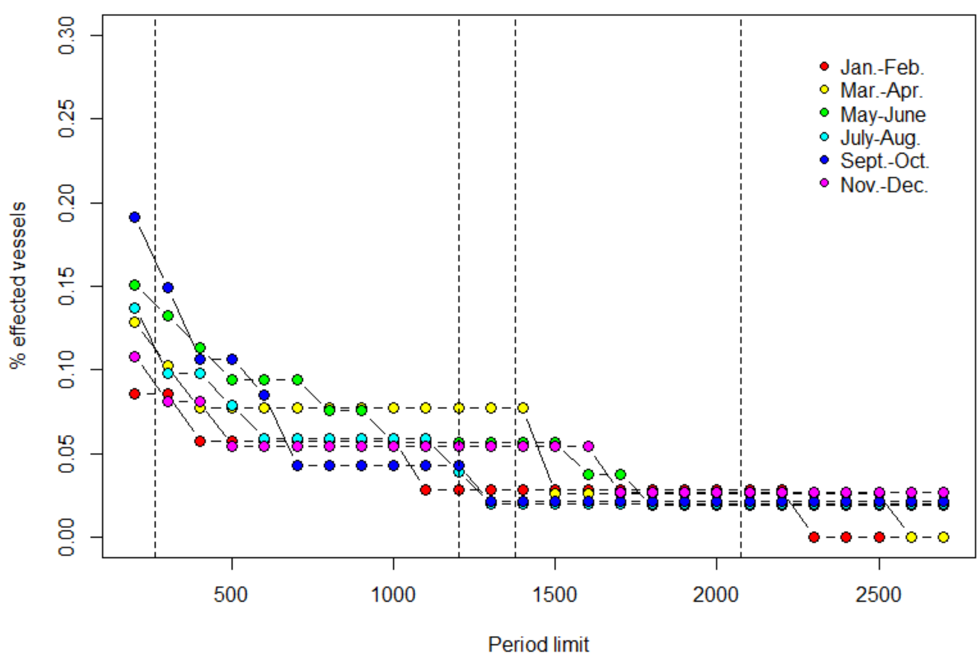

Figure C-10. Percentage of vessels per bi-monthly period (summarized from 2005-2010) that would need to reduce catch to comply with each of the proposed bi-monthly limit options for the limited entry fishery.

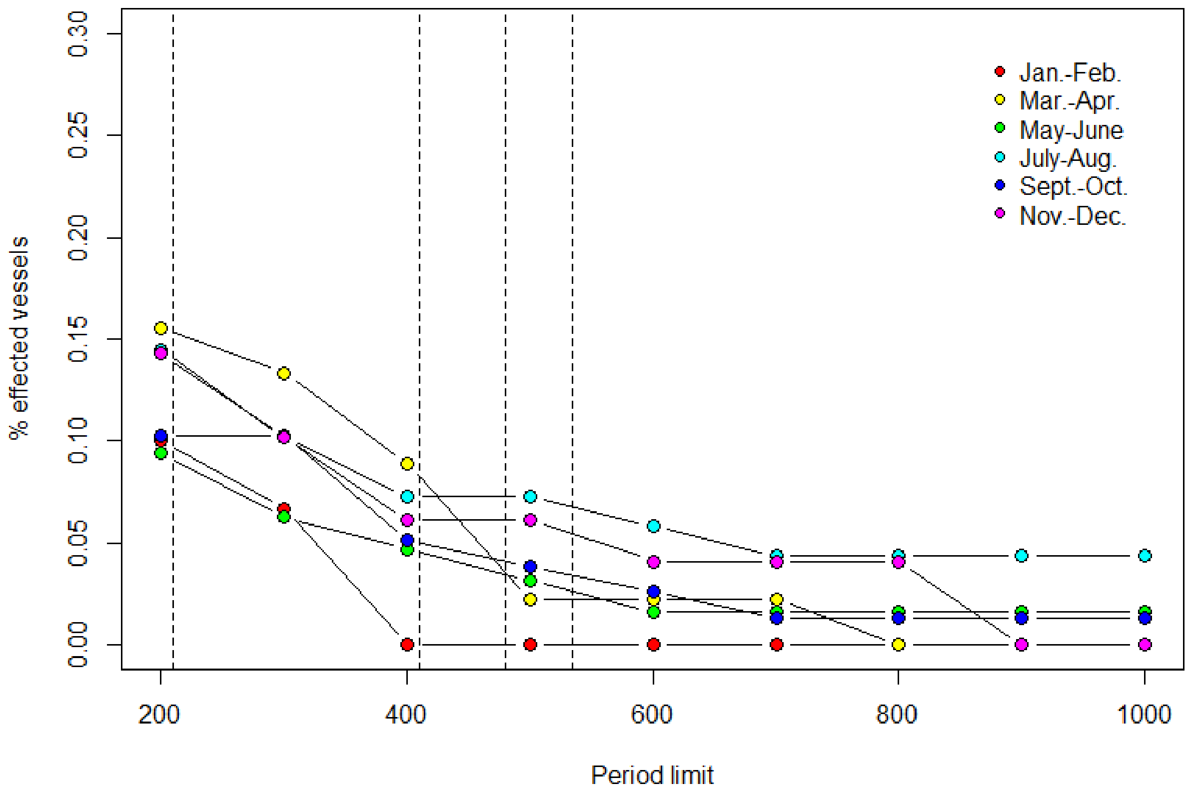

Figure C-11. Percentage of vessels per bi-monthly period (summarized from 2005-2010) that would need to reduce catch to comply with each of the proposed bi-monthly limit options for the open access fishery south of 38º N. latitude.

C.16 Longnose Skate Management Measures

Overview

Historically, longnose skate (*Raja rhina*) were not commercially important and were mostly caught as bycatch in trawl fisheries. Discards were estimated at 93% prior to 1995, and 53% thereafter (Gertseva and Schirripa 2008). The commercial importance and retention of this species appears to be increasing, however. Longnose skate landings have increased from 313 mt in 2002 (Gertseva and Schirripa 2008) to 977 mt in 2010 (Bellman et al. (2011). This 2010 level represents the 4th largest landing for longnose skate since 1950.

Herein we provide an analysis to examine the efficacy of potential management measures that could be used to restrain the catch of longnose skate by west coast commercial fisheries, if needed. Alternative trip limits and RCAs are provided. Other potential measures are also discussed.

Prior to March, 2012, catch accounting (e.g., Bellman et al., 2011) assumed that 100% of the discarded longnose skate died. Recently, however, the Council adopted the SSC recommendation that WCGOP reports should apply discard mortality rates shown in stock assessments (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012. The SSC noted that although the discard mortality assumptions used in the assessments are based on very limited information, they represent the best information available. Stock assessments (e.g., Gertseva and Schirripa 2008) assumed 50% discard mortality for longnose skate for all gear types. It should be noted that the new 50% discard-mortality rate assumption is applied only as we look forward (i.e., when evaluating options toward the end of this report). In most cases prior to that section, 100% discard mortality is shown because that was the historical perception.

2009-2010 Total Mortality of Longnose Skate

The West Coast Groundfish Observer Program (WCGOP) reported total fishing mortalities for longnose skate of 1,455 and 1,387 mt during 2009 and 2010, respectively (Bellman et al., 2010 and 2011), while assuming that all discarded longnose skate died. Under the 100% discard-mortality rate assumption, it was thought that mortality exceeded the optimum yield (OY) during both years (Table C-51; Bellman et al., 2010 and 2011). These total mortality estimates did not exceed the Annual Biological Catch (ABC; Table C-51), however. Under a 50% discard mortality assumption, only 83% and 88% of the OYs would have been attained during 2009 and 2010 (see Agenda Item E4b, Supplemental GMT Report 3, November 2011).

Table C-51. West coast groundfish total mortality estimates (mt) for longnose skate from 2009-2010 assuming 100% mortality (Bellman et al., 2010 and 2011) and 50% mortality (Agenda Item F.2.b, Revised Supplemental SSC Report, March 2012) for discarded longnose skate.

Year	Estimated mortality (mt) assuming 100% discard mortality	Estimated mortality (mt) Assuming 50% discard mortality	Optimum yield (OY) (mt)	Estimated mortality (% of OY) assuming 100% discard mortality	Allowable Biological Catch (ABC)
2009	1455.1	1,120.3	1,349	108%	3,428
2010	1,386.5	1,181.8	1,349	103%	3,269

2011-2012 Harvest Specifications

Longnose skate were considered "trawl dominant" catch under Amendment 21, therefore trawl and non-trawl allocations were set at 95 percent and 5 percent, respectively, for 2011-2012 fisheries. No within trawl allocation was necessary since longnose skate is not managed with Individual Fishing Quotas (IFQs) or allocations for the at-sea whiting sectors.

Longnose skate was removed from the "Other Fish" complex in 2009, and sorting became a requirement beginning March 6, 2009. The 2011-2012 harvest specifications for this species resulted in an annual catch limit (ACL) of 1,349 mt for 2011 and 2012 (Table C-52).

Table C-52. 2011-2012 harvest specifications for longnose skate in metric tons, implemented in regulation. OFL = overfishing limit; ABC = annual biological catch; ACL = annual catch limit.

Year	OFL	ABC	ACL
2011	3,128	2,990	1,349
2012	3,006	2,873	1,349

Historically, there has been little effort to restrict longnose skate catches because markets and landings were generally limited (with the exception of some high landings during the 1990s when Asian markets developed; Gertseva and Schirripa 2008). Subsequently, most longnose skate were caught incidentally while pursuing other species. Management measures to reduce "targeting" and restrict catches have therefore been unnecessary.

2011 - 2012 Management Measures (= No Action):

Management measures used to control catches and improve monitoring of longnose skate for the 2011-12 fisheries are summarized in Table C-53. The sorting requirement, first implemented in 2009, provides for better monitoring relative to previous years when longnose skate were reported within the "Other Fish" complex. Rockfish conservation areas (RCAs; Table C-54 and Table C-55) in regulation may inadvertently provide some catch-controls for longnose skate, because the depth distribution of this species extends from near shore to 600 fm (Keller et al. 2008). Hence, RCAs may prevent the capture of longnose skate throughout the middle of their depth distribution along the entire west coast for non-whiting groundfish fisheries. Trip limits are currently listed as "unlimited" but can be adjusted through inseason action.

Table C-53. Management measures affecting longnose skate catch and monitoring for the 2011-2012 (= No Action) groundfish fisheries.

Fishery	Management Measure
Commercial	
--All Commercial landings	Sorting required for all commercial landings
--Limited Entry Trawl	Non-IFQ species, trip limit management. Unlimited trip limits coast-wide that can be adjusted through routine inseason action. RCAs may inadvertently reduce catch.
--Limited Entry Fixed Gear	Trip limit management. Unlimited trip limits coast-wide that can be adjusted through routine inseason action. RCAs may inadvertently reduce catch.
--Open Access Fixed Gear	Trip limit management. Unlimited coast-wide trip limits that can be adjusted through routine inseason action. RCAs may inadvertently reduce catch.
Recreational	
--Washington	Included as part of the 12 fish groundfish bag limit (landed fish) implemented in federal regulation.
--Oregon	Included as part of the 10 fish marine bag limit (landed fish) implemented in federal regulation. Oregon state regulations limit retention to 7 fish marine bag limit.
--California	Included as part of a 20 fish finfish bag limit (landed fish) implemented in federal regulation. California state regulations limit retention of longnose skate species to no more than 10 within the 20 fish fin fish bag limit.

Table C-54. Limited entry non-whiting trawl RCAs for 2010-2012 (= No Action. Depth is in fathoms (fm)

Limited Entry Non-Whiting Trawl

Year	Area (N. latitude)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	North of 48°10'	0 - [m]200		0 - 200		0 - 150				0 - 200		0 - [m]200	
	48°10' - 45°46'	75 - [m]200		75 - 150		75 - 150		100 - 150		75 – 150			
	45°46' - 40°10'			75 - 200				100 - 200		75 - 200		75 - [m]200	
	40°10' - 34°27'	100 – 150											
	South 34°27' (mainland)												
	South 34°27' (islands)	0 – 150											
2011	North of 48°10'	0 - [m]200		0 - 200		0 – 150				0 - 200		0 - [m]200	
	48°10' - 45°46'	75 - [m]200		75 - 200		75 - 150		100 - 150		75 - 150			
	45°46' - 40°10'					75 - 200		100 - 200		75 - 200		75 - [m]200	
	40°10' - 34°27'	100 – 150											
	South 34°27' (mainland)												
	South 34°27' (islands)	0 – 150											
2010	North of 48°10'	0 - [m]200		0 - 200		0 – 150				0 - 200		0 - [m]200	0 - 250
	48°10' - 45°46'	75 - [m]200		75 - 200		75 - 150		100 - 150		75 - 200		75 - [m]200	75 - 250
	45°46' - 40°10'					75 - 200		100 - 200					
	40°10' - 34°27'	100 – 150											
	South 34°27' (mainland)												
	South 34°27' (islands)	0 – 150											

Table C-55. Non-trawl rockfish conservation areas (RCAs) for limited entry and open access fixed gear (2010-2012; = No Action). Depth is in fathoms.

Limited Entry and Open Access Fixed Gear

Year	Area (N. lat.)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83												
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											
2011	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83	30 - 125 (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											
2010	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83	30 - 125 (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											

Management Issue

2013-2014 Harvest Specifications and Historical Total Mortality Estimates

The 2012–2014 harvest specifications are shown in Table C-56.

Table C-56. 2012 overfishing limits (OFLs), annual biological catch (ABCs), and annual catch limits (ACLs) along with the final preferred 2013-2014 OFLs and ABCs for longnose skate in metric tons.

Year	OFL	ABC	ACL
2012	3,006	2,873	1,349
2013	2,902	2,774	[a]TBA
2014	2,816	2,692	[a]TBA

[a] Although the preferred ACL for 2013 and 2014 is 2,000 mt, both 1,349 and 2,000 mt ACLs will be analyzed in the 2013-14 EIS.

The 2009 and 2010 estimated total fishing mortality for longnose skate (1,455 and 1,387 mt, respectively; Bellman et al. 2010, 2011), which was calculated assuming 100% discard mortality rates, would not exceed the final preferred 2013-14 OFLs or ABCs, nor would these have exceeded the preferred ACL of 2,000 mt (Table C-56). This reported longnose skate mortality during 2009-2010 (Bellman et al. 2010, 2011) would, however, exceed the lowest ACL alternative being analyzed within the 2013-14 EIS (i.e., 1,349 mt). However, as pointed out above, the SSC recently recommended that the WCGOP reports only 50% of the discarded longnose skate as dead (all gears; Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). The result of this new assumed discard-mortality rate would be lower total mortality estimates for longnose skate during 2009 and 2010 than was previously assumed (Table C-51). Nonetheless, even under the 50% discard-morality assumption, recent catches approach the 1,349 mt level. Therefore, some modifications to existing management measures or new management measures may need to be developed to keep total catch within the ACL if the lowest alternative is selected.

Total catch and discard of longnose skate by sector

Longnose skate catch and discard by sector can be found in Figure C-12 (for 2010) and Table C-57 (2009-2010). Most longnose skate were taken by the limited entry non-whiting trawl fishery (87% - 91%), whereas 7% to 12% were taken by the non-nearshore fixed gear fishery (Figure C-12; Table C-57). Small amounts were taken by other sectors (Table C-57).

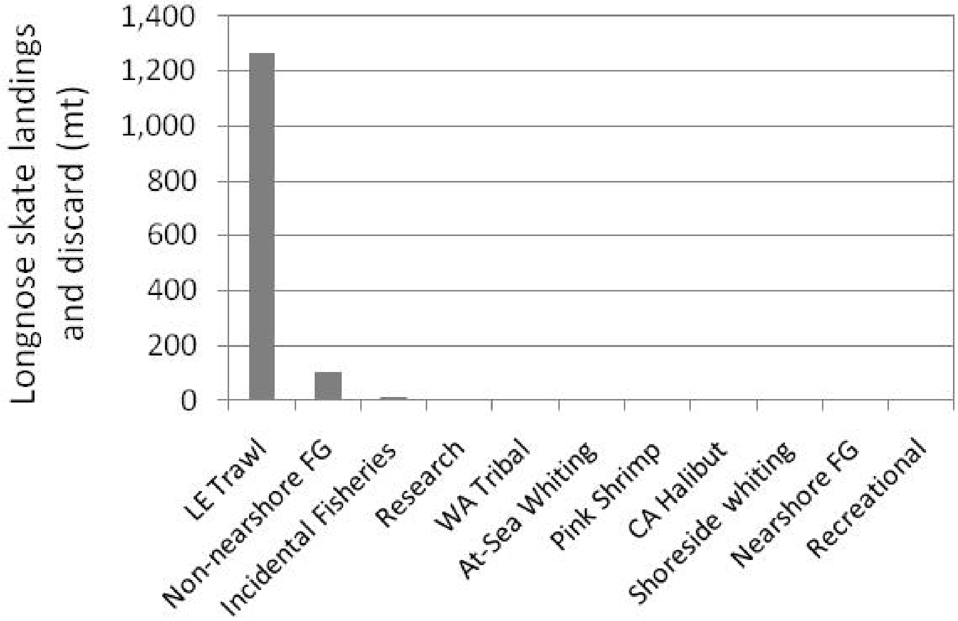

Figure C-12. Total landings and discard of longnose skate (mt) by sector during 2010. Data acquired from Bellman et al. (2011).

Table C-57. West Coast Groundfish Total Mortality Estimates, by Sector in Metric Tons, for longnose skate from 2009-2010. Estimates assume 100% mortality for discarded longnose skate. Data acquired from Bellman et al. (2010 and 2011).

	Shoreside commercial fisheries								Total recreational fishing mortality					
YEAR	LE bottom trawl	CA halibut	Pink shrimp	Non-nearshore fixed-gear	Nearshore fixed-gear	Shoreside hake mid-water trawl	WA tribal landings	All at-sea hake fisheries	WA	OR	CA	Research	Remaining incidental OA fisheries landings	Estimated total fishing mortality
2009	1,275.4	--	2.1	173.3	0.0	0.1	--	0.2	--	--	--	2.8	1.3	1455.1
2010	1,266	0.1	0.4	103.2	0.0	0.1	1.3	0.6	--	0.0	--	1.7	13.0	1,386.5

Distribution of longnose skate along the U.S. west coast

Approximately 80% of longnose skate commercial catch (landings + discards) occur north of 40°10' N. latitude (Figure C-13; Bellman et al. 2011). This roughly coincides with the pattern of longnose skate catch per unit effort (CPUE) estimates shown by the 2005 west coast groundfish trawl survey (Keller et al. 2008), which shows highest densities north of 40°30' N. latitude (Table C-58). Longnose skate CPUE was ranked #10 relative to all other species caught by the 2005 survey over all INPFC areas and depth strata combined.

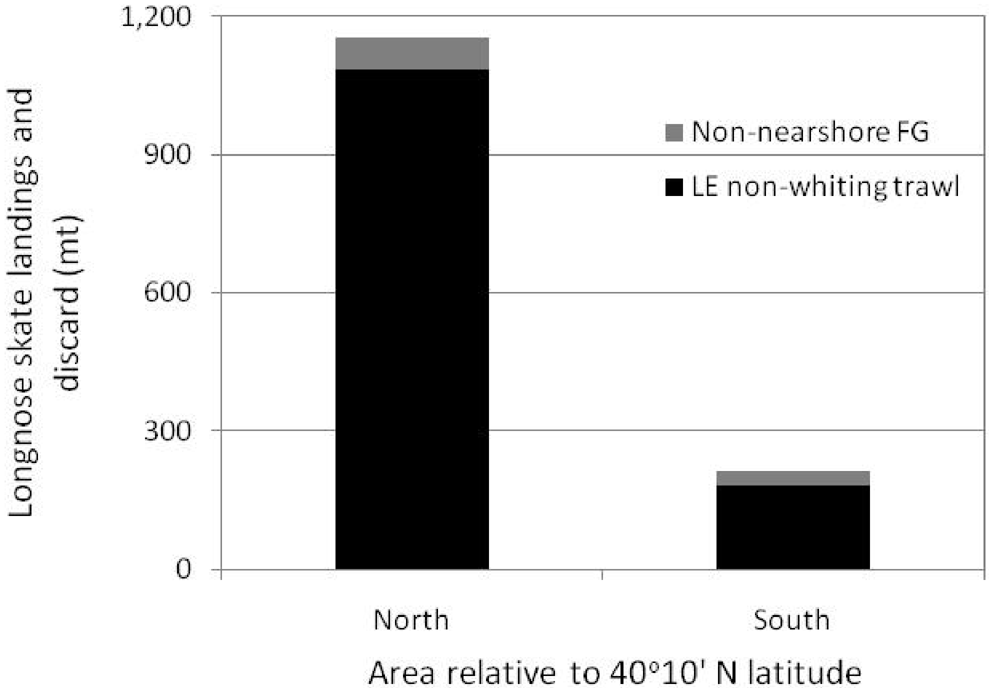

Figure C-13. Longnose skate landings and discard off the U.S. west coast during 2010 for non-nearshore fixed gear (FG) and limited entry (LE) non-whiting trawl fisheries north and south of 40°10' N. latitude. Data acquired from Bellman et al. (2011).

Table C-58. Mean catch per unit effort (CPUE; kg/ha) for longnose skate caught during the 2005 west coast trawl survey by International North Pacific Commission (INPFC) area. Data acquired from Keller et al. (2008).

INPFC Area	Southern boundary	CPUE (kg/ha)
U.S.-Vancouver	47^{o}30’ N. latitude	8.83
Columbia	43^{o}00’ N. latitude	4.88
Eureka	40^{o}30’ N. latitude	5.52
Monterey	36^{o}00’ N. latitude	4.51
Conception	Southern boundary of EEZ	1.89

The depth distribution for longnose skate caught by the 2005 west coast trawl survey is shown in Table C-59 (Keller et al. 2008). Overall, highest densities were found between 100-301 fm (9.20 kg/ha) and lowest seaward of 301 fm (0.78 kg/ha). Densities were also high shoreward of 100 fm (4.85 kg).

Table C-59. Mean CPUE (kg/ha) of longnose skate by depth strata in all INPFC areas combined during the 2005 West coast groundfish trawl survey. Data acquired from Keller et al. (2008).

Depth (m)	Depth (fm)	CPUE (kg/ha)
55 – 183	30 – 100	4.85
184 – 549	100 - 301	9.20
550 – 1,280	302 - 702	0.78

Trends in annual landings, discard and price per pound

Gertseva and Schirripa (2008) showed that the assumed discard rate for longnose skate prior to 1995 was 93%, but decreased to 53% after 1995 when Asian markets developed. Discarding of all skate species has continued to decrease in recent years, from approximately 50% in 2006 and 2007 to 28% in 2010 (Figure C-14). Consequently, landings of longnose skate have showed a constant increase over the past decade, from 313 mt in 2002 (Gertseva and Schirripa 2008) to 977 mt in 2010 (Bellman et al. 2011). This 2010 landed amount of longnose skate represents the 4th largest landing for this species 1950 (see Gertseva and Schirripa 2008).

Longnose skate discard was much different between non-whiting trawl and non-trawl fisheries during 2009 – 2010. The average discard by sector for those years was 32% for trawl, but 87% for non-trawl. The relatively low discard rate shown in Figure C-14 is because longnose skate is primarily encountered by trawl Table C-57.

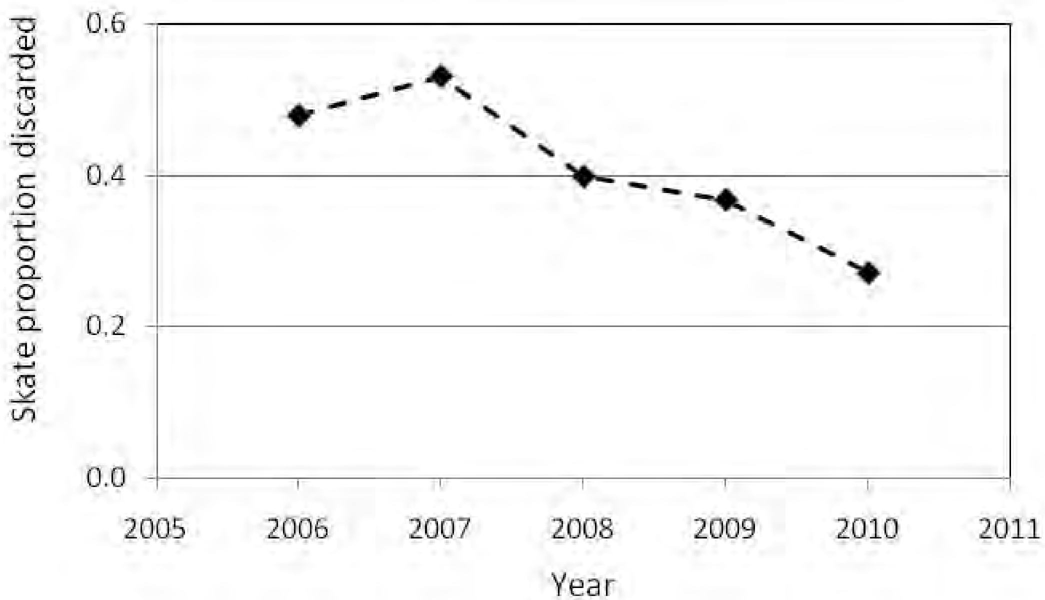

Figure C-14. Proportion of skate (longnose skate + "other skate") discarded by the limited entry non-whiting trawl and non-nearshore fixed gear fisheries. All skate were combined because longnose skate were not sorted until 2009. Data were acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

The ex-vessel prices paid for longnose skate has increased during recent years, especially for the limited entry non-whiting trawl fishery. The average price per pound for longnose skate delivered by non-whiting trawl vessels increased from $0.19 in 2009 to $0.32 during 2011 (Figure C-15). The coast-wide average price per pound for longnose skate has remained somewhat constant and lower for fixed gear vessels, increasing from $0.26 per pound in 2009 to $0.28 per pound in 2011.

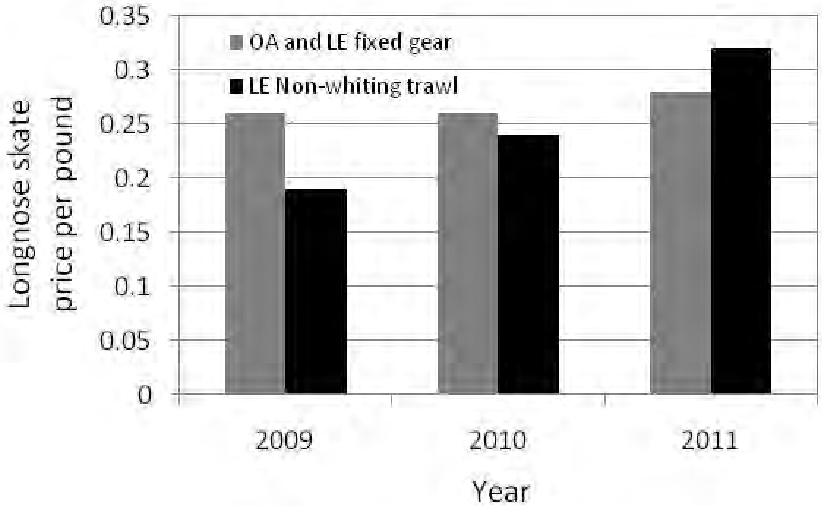

Figure C-15. Longnose skate price per pound for limited entry (LE) and open access (OA) fixed gear (gray) and limited entry non-whiting trawl (black) by year. Data acquired from PacFIN.

Only "unspecified skate" is shown in the PacFIN data base prior to 2009. To put the current average price per pound of longnose skate ($0.28 - $0.32) into historical perspective, the price per pound for "unspecified skate" is shown for the limited entry trawl fishery from 1994 – 2011 (Figure C-16). The price per pound fluctuated between $0.13 and $0.18 from 1994-2006, then abruptly increased in 2007 to $0.24. The highest price per pound for "unspecified skate" was recorded in 2011 ($0.35), during the first year of the Individual Fishing Quota (IFQ) fishery.

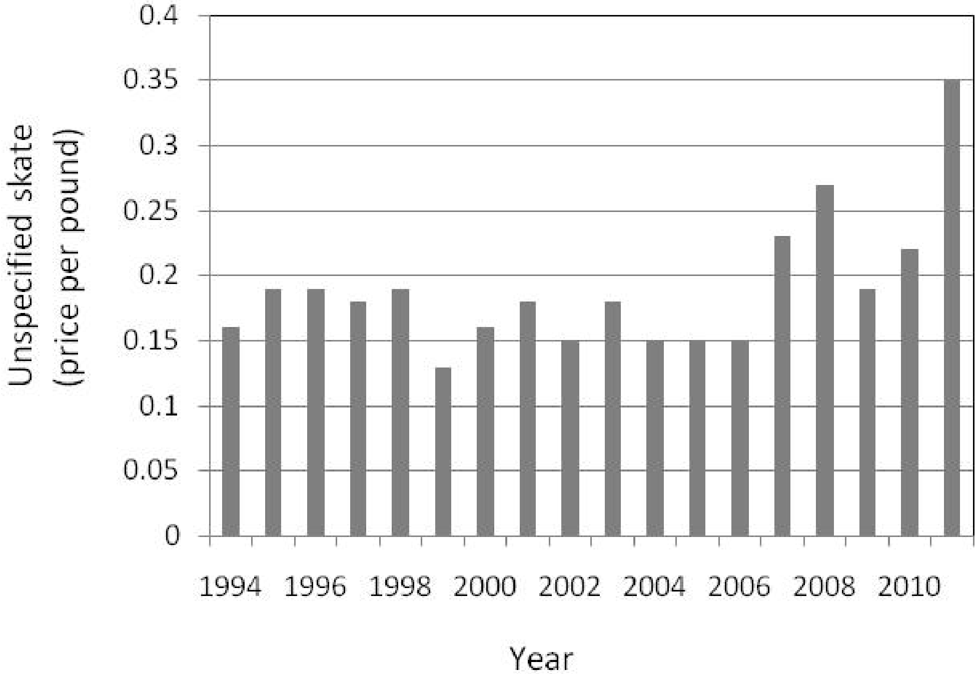

Figure C-16. "Unspecified skate" price per pound for limited entry non-whiting trawl fisheries by year. Data acquired from PacFIN.

Landings by area and port

Approximately 2/3 of the limited entry non-whiting trawl landings of longnose skate occurred in the Columbia INPFC area from 2009-2011, reaching 3.4 million pounds over the 3-year period (Figure C-17a; PacFIN data). Substantial landings were also shown for Eureka (1.0 million pounds), Vancouver (0.6 million pounds), and Monterey (0.3 million pounds) INPFC areas. Port groups receiving most longnose skate landings from limited entry non-whiting trawlers were Columbia River Oregon, Coos Bay, Newport, and Eureka area port groups (1.8, 1.1, 1.1, and 0.6 million pounds, respectively; Figure C-18a). Each of the other port groups received less than 0.2 million pounds of longnose skate during 2009-2011.

Landings of longnose skate by fixed gear fisheries (Figure C-17b) were much lower than shown for the trawl fisheries (Figure C-17a) over the 2009-2011 period, ranging from highs of 56,000 and 41,000 pounds for the Columbia and Eureka INPFC areas to lows of 11,000 pounds for the Monterey and Conception INPFC areas during 2009-2011 (Figure C-17b). Landings of longnose skate in the Vancouver INPFC area were 21,000 pounds over this same period. Most longnose skate landings by limited entry and open access fixed gear fisheries occurred in the Coos Bay, Brookings, and Northern Puget Sound port groups during 2009-2011 (47,000, 33,000, and 16,000 pounds, respectively; Figure C-18b).

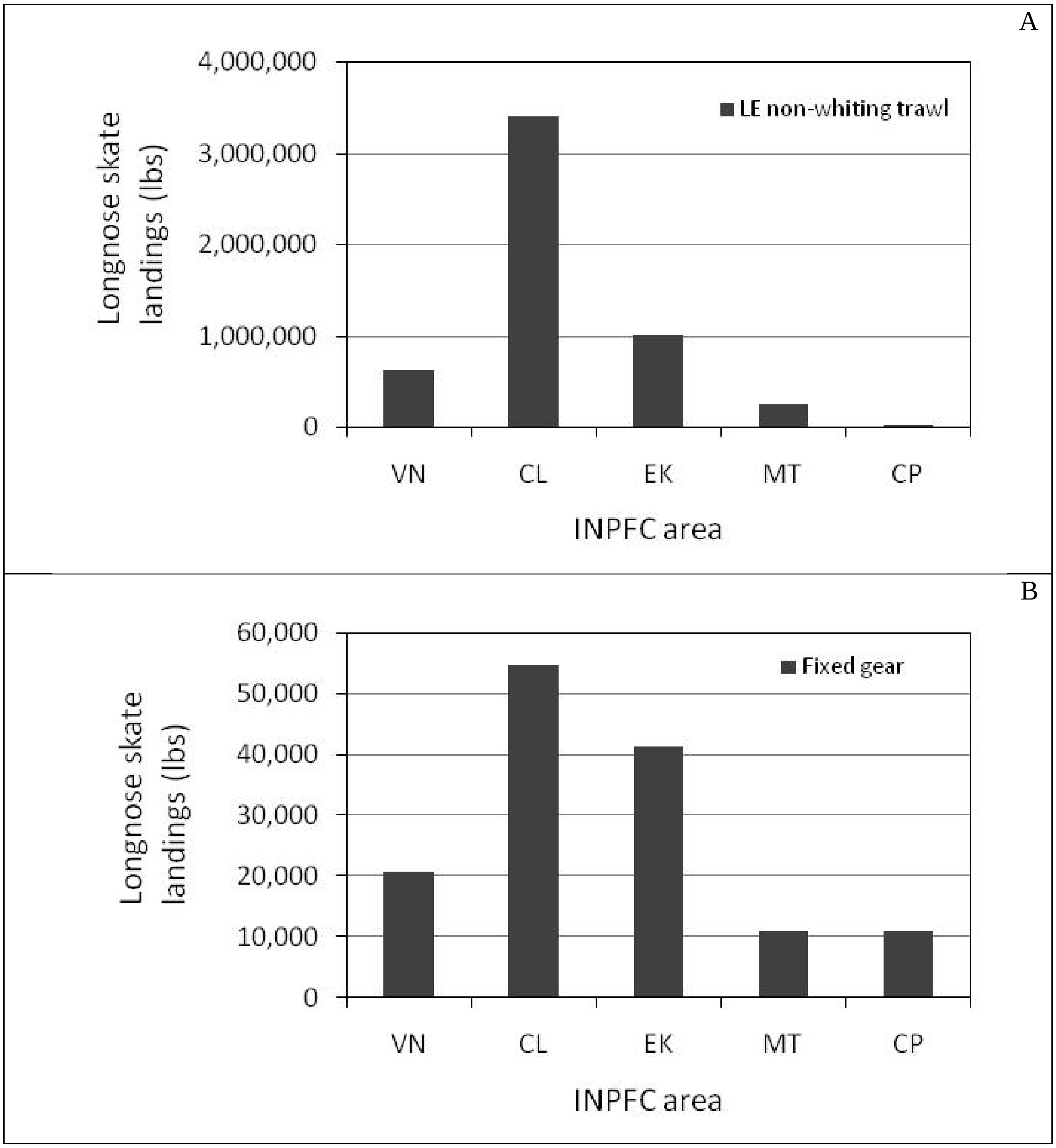

Figure C-17. Longnose skate landings (lbs.) by International North Pacific Fishery Commission (INPFC) area during 2009-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear fisheries.

Note: Data were acquired from PacFIN. INPFC areas are: VN = Vancouver, CL = Columbia, EK = Eureka, MT = Monterey, and CP = Conception.

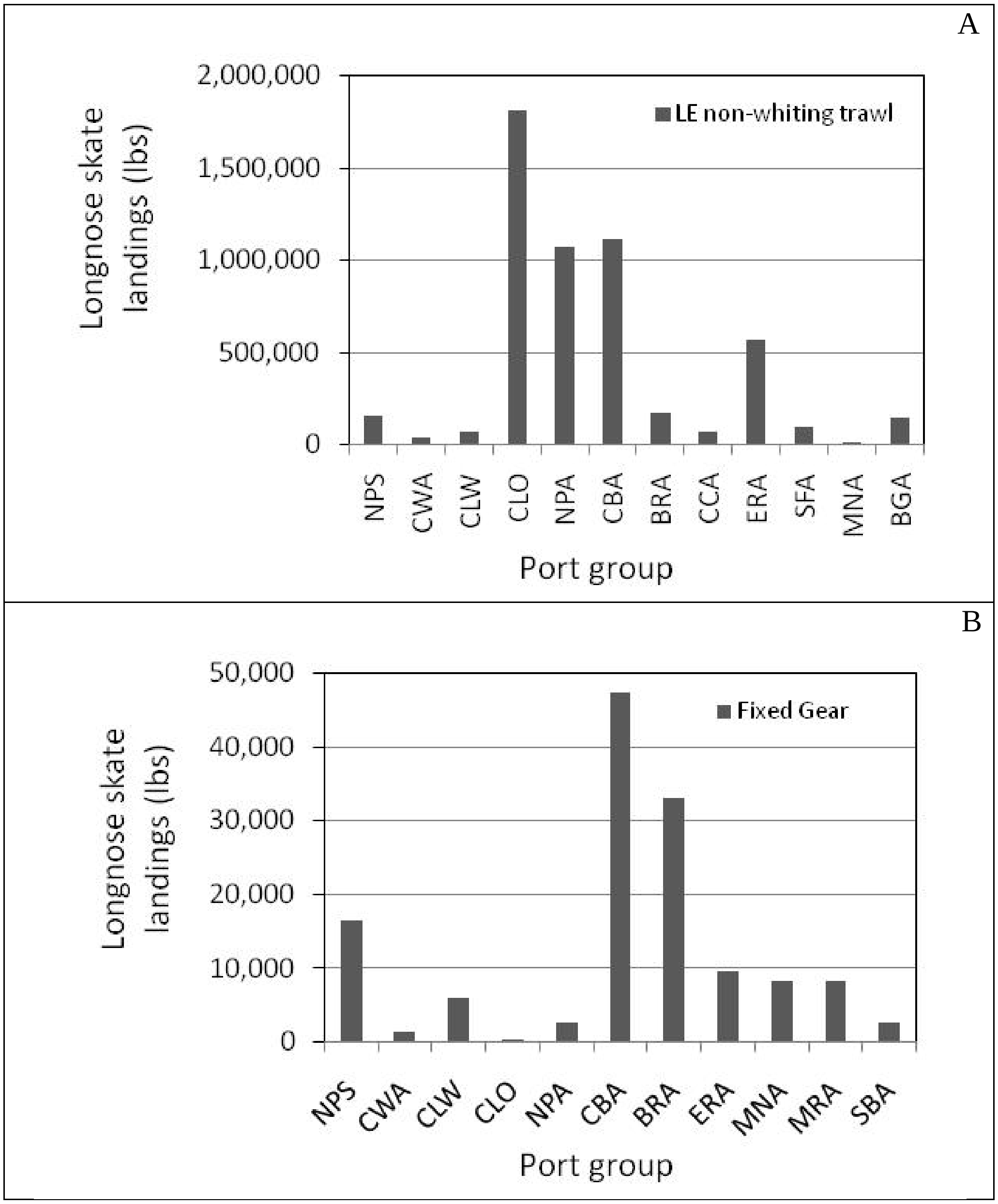

Figure C-18. Longnose skate landings (lbs.) by port group during 2009-2011 for (A) limited entry non-whiting trawl and (B) open access and limited entry fixed gear.

Note: Data were acquired from PacFIN. Port group areas are: BGA = Fort Bragg; BRA = Brookings; CBA = Coos Bay; CCA = Crescent City; CLO = Columbia River Oregon Ports; CLW = Columbia River Washington Ports; CWA = Coastal Washington; ERA = Eureka; MNA = Monterey; MRA = Morro Bay Area; NPA = Newport; NPS = North Puget Sound; SBA = Santa Barbara; SFA = San Francisco. Port group areas with less than three vessels making landings were omitted for confidentiality.

Basis for and Development of Potential New Management Measures

Longnose skate may require more restrictive management measures to keep fishing mortality below their respective ACLs (see Table C-56; also see Agenda Item E.9.b, GMT Report 2, November 2011). Although longnose skate have been intermittently retained and sold in the past, demand and markets may be increasing. Landings have increased recently to nearly all time high levels (see above) and ex-vessel price for skates have reached highest levels ever recorded (Figure C-16). This suggests that the increasing trend in landings observed since 2004 may continue. Whether an increase in total mortality will accompany potential increases in landings is uncertain. If this species is only incidentally caught while pursuing other species (see Gertseva and Schirripa 2008), then an increase in landings may reflect higher retention, and not increased targeting or the development of a targeted fishery. On the other hand, the increase in price could lead to more frequent or prolonged fishing in areas with relatively high concentrations of longnose skate, relative to that observed in the recent past.

The GMT previously suggested that longnose skate may be managed using time-area tools, such as trip limits and depth restrictions (Agenda Item E.9.b, GMT Report 2, November 2011). This section describes the development and basis for new (or additional) management measures (besides No Action). Data from WCGOP and PacFIN data were used to develop and evaluate these potential measures and options. Other potential management measures are also discussed.

Trip Limits

Trip limits may effectively reduce total mortality if trip limits (a) discourage targeting, (b) encourage fishermen to move out of or avoid areas with high longnose skate catch rates because of the burden required to sort and discard large volumes that cannot be landed, and (c) result in trip limit induced discards (instead of landings) if the mortality of discarded skate is low. It is clear that reducing targeting, or the potential for targeting, may reduce total mortality. It is also clear that fishing in areas with lower incidental catch rates may reduce total mortality. However, if trip limits result in discards (rather than landings) without affecting fishers behavior (e.g., fishing location), and if the discard mortality is 100%, then trip limits may simply convert landed mortality into discard mortality at a 1:1 conversion. In this case, total mortality would be unaffected by trip limits. Although the WCGOP had previously assumed 100% discard mortality for longnose skate (e.g., Bellman et al., 2011), catch monitoring will now assume a 50% discard mortality rate for the species, as recommended by the SSC (Agenda Item F.2.b, REVISED Supplemental SSC Report, march 2012) and shown by (Gertseva and Schirripa 2008). Under the 50%-discard mortality assumption, trip limits may be effective for reducing total mortality even if catches are incidental and fishermen behavior does not change (e.g., they do not move from areas with high longnose skate catch rates and continue targeting other species while discarding skate in excess of trip limits).

Are Longnose Skate Targeted? It has been assumed that longnose skate are not the primary target for trawl or fixed gear fisheries. Instead, it has been assumed that this species is caught incidentally while targeting other species. The following is an examination of longnose skate catches to provide insight on whether longnose skate targeting occurs. We caution that this analysis uses historical data and thus may not accurately predict the future, especially since the price for skate has been increasing and is now at an all-time high (Figure C-16). The behavior of fishermen now (and in the future) may be different than what had occurred in the past.

Catch per haul or set: West coast groundfish observer data show that maximum catches of longnose skate per set or haul were less than 6,000 lbs. for trawl and less than 1,300 lbs. for fixed gear during 2009 and 2010 (Figure C-19). Most hauls where longnose skate were present in the catch produced less than 500 lbs. (trawl) and less than 200 lbs. (fixed gear), with very few larger hauls. These catch rates suggest that longnose skate are most commonly encountered at relatively low volumes, but are occasional caught at somewhat high volumes by both gear types.

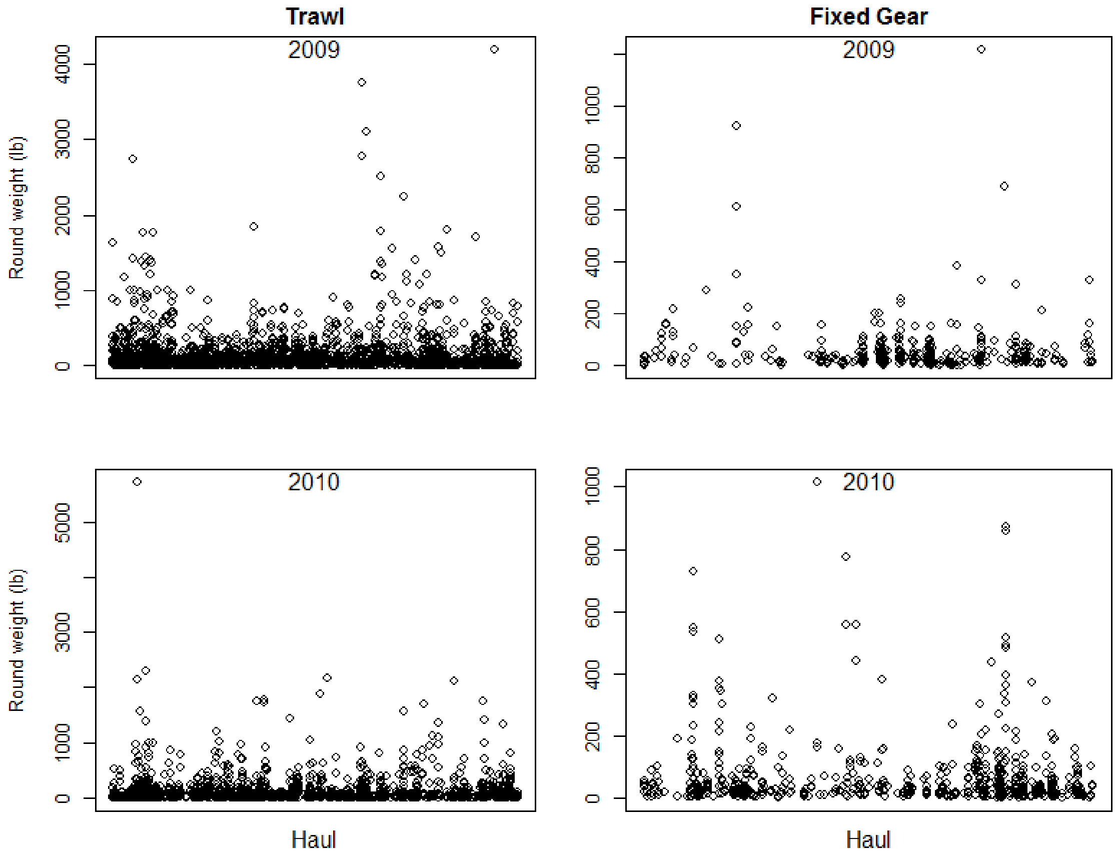

Figure C-19. Longnose skate catch (lbs.) by haul or set by limited entry non-whiting trawl (Trawl) and limited entry and open access fixed gear (Fixed Gear) during 2009 and 2010. Only positive tows were included. Data were acquired from the WCGOP.

Discard and retention weight per trip: Prior to 2008, most WCGOP observed limited entry non-whiting trawl trips showed higher maximum catches when discarding longnose skate than when retaining the species (Figure C-20). During this period, maximum longnose skate catch per trip was less than approximately 500 pounds when retained (except for 2002), while at the same time, maximum longnose skate catches for trips that discarded the species typically ranged from 2,000 pounds to nearly 10,000 pounds. This is supported by the 75th percentile for trips discarding and retaining longnose skate prior to 2008 – 75th percentiles were typically higher for trips that discarded longnose skate than for those that retained the species on for trawl vessels. One would expect the opposite if targeting occurred, or if fishers that discarded the catch (e.g., due to no market) chose to avoid or leave areas with high longnose skate concentrations.

Discard behavior changed for the limited entry non-whiting trawl sector during the 2008-2010 period, when larger hauls of longnose skate began to be retained. The range of longnose skate weight became more similar between retained and discarded trips beginning 2008, and the 75th percentile for trawl trips retaining longnose skate far exceeded those that discarded the species throughout trips. We suggest that this is a result of the increasing price per pound (and market) that began to develop for trawlers in 2007 for longnose skate (see Figure C-15 and Figure C-16).

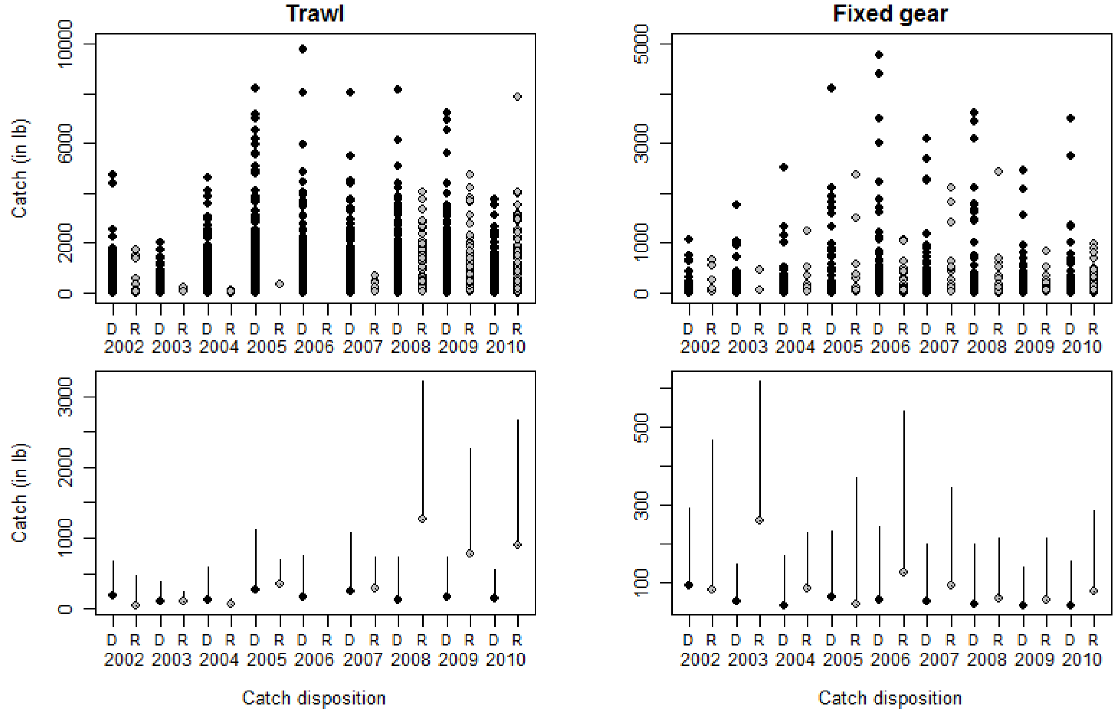

Figure C-20. Longnose skate catches by trips (top row) and median (point) and 75% quartile (upper end of vertical bars) catch values (bottom row) in observed trips that discarded (D; black points) or retained (R; gray points) longnose skate for years 2002-2010 for two gear types (columns).

Although we show trawlers retaining more longnose skate during 2008-2010 than during previous years (Figure C-20), we suggest that these data do not support the argument that fishermen began targeting "schools" of the species, but rather fishermen more frequently selected trawling sites with known concentrations of longnose skate along with other groundfish species. In these cases, they simply began retaining incidentally caught longnose skate more frequently. These results also suggest, however, that although the incidental catch and discard of longnose skate is typically low (e.g., low 75th percentile bars), many fishers that discard longnose skate remain in areas with relatively high skate catch rates (i.e., they do not avoid or leave these areas). If these fishermen opted to move from areas with high skate encounters, the range of discarded weights would be less than the range of retained weights.

The pattern of trips retaining longnose skate is different for the fixed gear sector than for the trawl sector. Differences in catch weight of longnose skate are slight between fixed-gear trips retaining and those trips discarding the species (Figure C-20). The median and 75th percentile of longnose skate catch per trip is much more similar between retained and discarded trips, although in general the 75th percentile is slightly higher for trips retaining longnose skate. Price per pound has not increased as dramatically for the fixed gear sectors as shown for the trawl sector (Table C-54). These data suggest that trip size is not a good predictor of longnose skate retention, suggesting that fixed gear fishers are not targeting longnose skate and are not moving out of areas with large concentrations of longnose skate even while discarding the catch.

Landing size of longnose skate relative to other groundfish: Another way to evaluate whether longnose skate are targeted is to compare the landed weight of longnose skate to the landed weight of all groundfish species by trip (Figure C-21). For those cases where longnose skate were landed, there was typically little relationship between longnose skate landings and total groundfish landings, except perhaps at the smallest landing levels. Longnose skate landings for the limited entry non-whiting trawl fishery were typically less than 6,000 pounds per trip (99% of the landings), whereas total groundfish landings for those trips typically exceeded 20,000 pounds, and reached 130,000 pounds (Figure C-21a). Landings for limited entry and open access fixed gear trips followed a similar trend but on a smaller scale (Figure C-21b). Most landings were less than 500 pounds for open access fixed gear (95% of the landings) and less than 1,000 pounds for limited entry fixed gear (93% of the landings). These landings were typically dominated by groundfish species other than longnose skate (Figure C-21b). Note that even for cases where landings of longnose skate were relatively large for fixed-gear trips (e.g., > 1,000 pounds per trip), longnose skate typically represented less than approximately 1/3 of the total groundfish landings per trip. These results, coupled with the results shown in Figure C-20, demonstrate that longnose skate are typically caught incidentally and landed with other groundfish species. Fishermen may opt, however, to remain in areas or select areas known for relatively high longnose skate concentrations, as demonstrated in Figure C-20 for trawl since 2008.

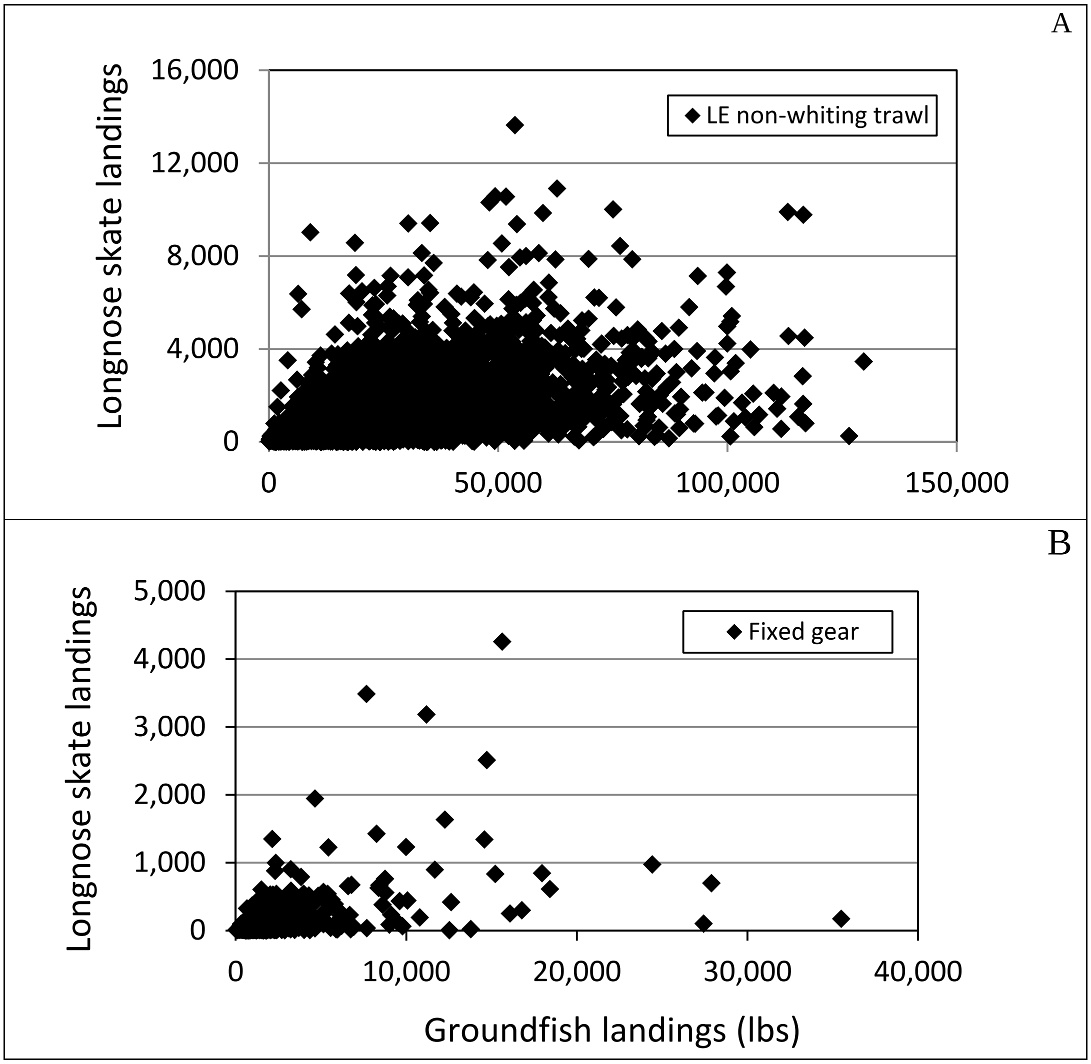

Figure C-21. Landing weight (pounds) of longnose skate and of all groundfish by trip during 2009-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear. Data were acquired from PacFIN.

Bimonthly Landings and Basis for the Selection of Alternative Trip Limits: Bimonthly landings of longnose skate over nearly a 3-year period (2009 – October 2011) by limited entry non-whiting trawl vessels are shown in Figure C-22. Cumulative bimonthly landings of longnose skate ranged from only a few pounds to nearly 40,000 pounds per vessel per bimonthly period. The pattern of bimonthly landings is somewhat linear until approximately 10,000-12,000 pounds, where vessels began landing increasingly more longnose skate relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited entry non-whiting trawlers (50th percentile) were less than 3,810 pounds whereas the 75th percentile of bimonthly landings resulted in 7,261 pounds. The 90th percentile was 11,971 pounds. Three alternative bimonthly trip limits (=Options) for the limited entry non-whiting trawl fishery were identified based on approximate 50, 75, and 90 percentiles: 4,000, 7,000, and 12,000 pounds per bimonthly period.

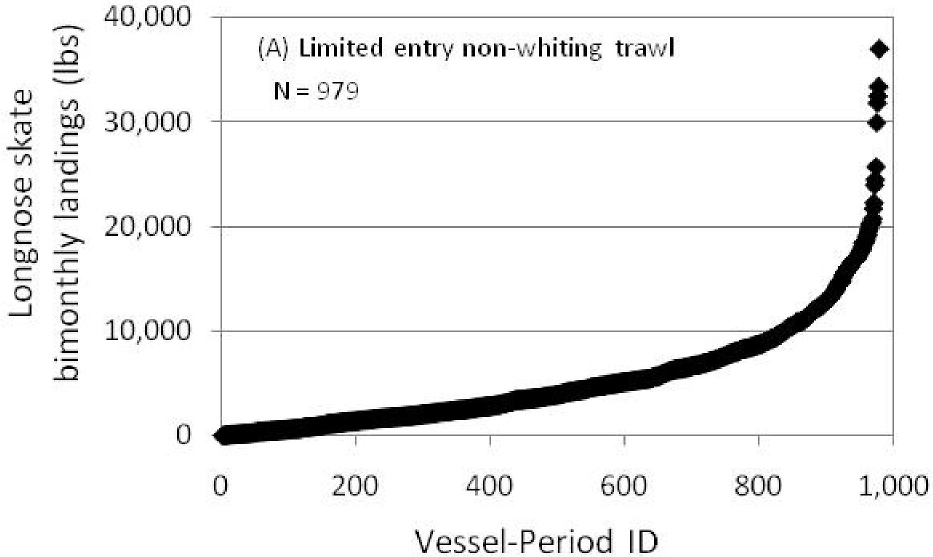

Figure C-22. Bimonthly landings (lbs.) of longnose skate by vessel and period for 2009 – October 2011 (sorted by bimonthly-landing size) for limited entry non-whiting trawl. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without longnose skate were excluded.

Bimonthly landings of longnose skate over nearly a 3-year period (2009 – October 2011) by fixed gear fisheries (limited entry and open access) are shown in Figure C-23. Nearly all cumulative bimonthly landings were less than 1,000 pounds for the open access fishery, whereas bimonthly landings for the limited entry fixed gear fishery reached nearly 6,000 pounds in some instances. The pattern of bimonthly landings for limited entry fixed gear fisheries (primarily non-nearshore fishery) is somewhat linear until approximately 500 pounds, when vessels began landing increasingly more longnose skate relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited fixed gear vessels (50^{th} percentile) were less than 187 pounds, whereas the 75^{th} percentile of bimonthly landings resulted in 482 pounds. The 90^{th} percentile was 1,040 pounds. We therefore identified three alternative bimonthly trip limits for the open access and limited entry fixed gear sectors based on these approximate 50, 75, and 90 percentiles: 200, 500, and 1,000 pounds per bimonthly period.

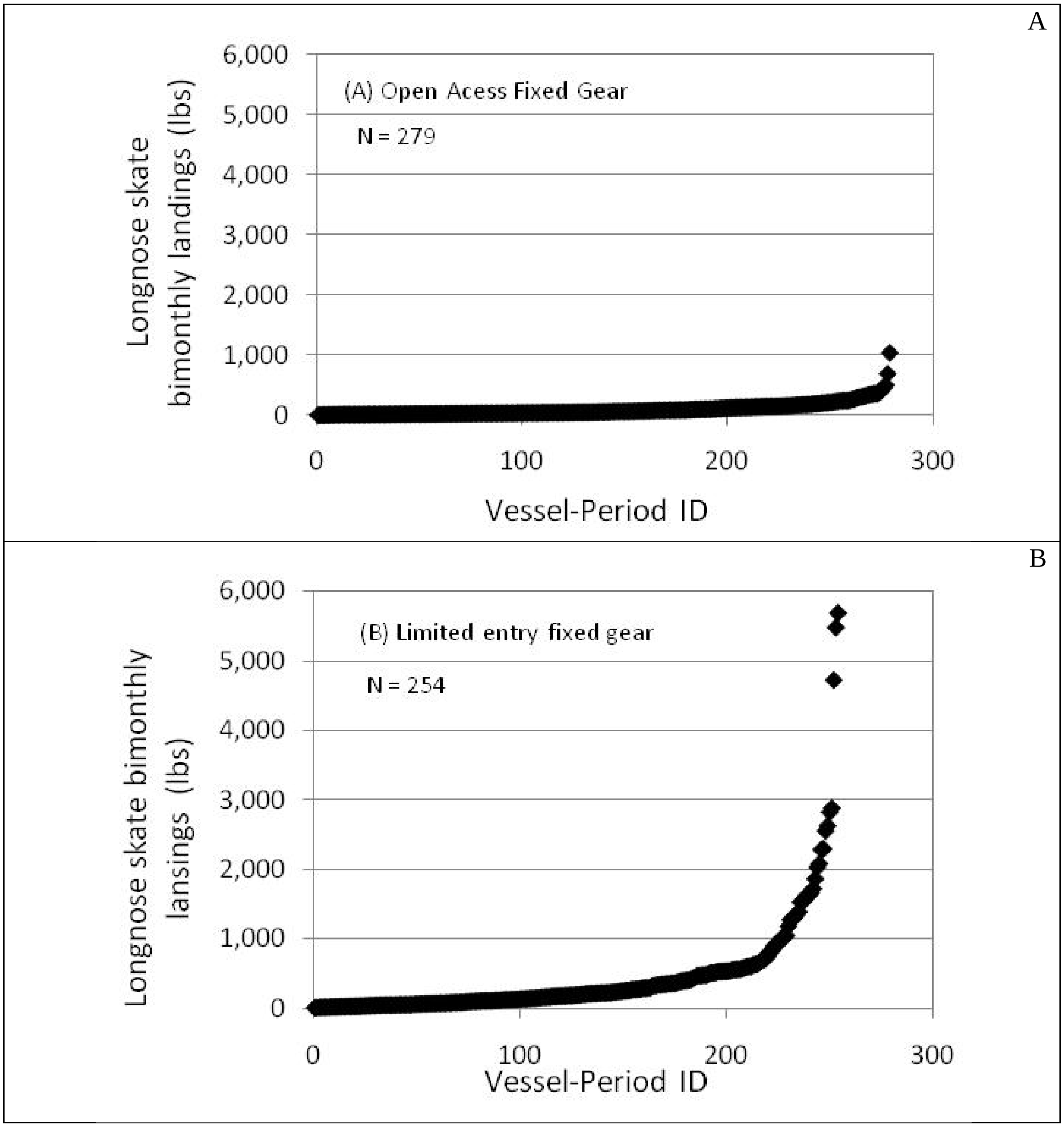

Figure C-23. Bimonthly landings (lbs.) of longnose skate by vessel and period for 2009 – October 2011 (sorted by bimonthly-landing size) for (A) Open access fixed gear, and (B) limited entry fixed gear. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without longnose skate were excluded.

Can trip limits reduce longnose skate mortality? It is uncertain how any reduction in landings may alter total mortality of longnose skate, because catch size is not a good predictor of retention. If the trip limit resulted in reduced targeting (or moving from areas with high concentrations of longnose skate), then some reduction in total mortality may occur. This analysis suggests that most longnose skate are incidentally caught while targeting other species, and are landed along with other groundfish species (Figure C-21). This is especially true for the limited entry trawl fishery, which contributes approximately 90% of the longnose skate catch coastwide (Table C-57). It is unlikely, therefore, that trip limits will have a large effect on encounter rates as long as conditions remain similar to the recent past (e.g., catch size has not been a good predictor of retention). It was pointed out, however, that the price (Figure C-15) and landings for longnose skate have recently increased, so trip limits may prevent the potential of increased targeting in the future. We acknowledge the potential for increased targeting (or reluctance to move from areas with high longnose skate catch) if prices and markets continue to develop.

A reduction in total mortality may occur if some proportion of discarded longnose skate survives, even if fishing behavior does not change (i.e., fishermen do not change their fishing location and strategy once reaching the trip limit). Although during previous years, catch accounting assumed discard mortality of 100% for longnose skate (e.g., Bellman et al. 2011), it is likely that some of the discarded skate survive. Gertseva and Schirripa (2008) suggested 50% discard mortality for longnose skate, and Enever et al. (2009) recently demonstrated short term mortality of 45% for skates caught and discarded by demersal trawlers. Effective March 2012, the assumed discard mortality rate for longnose skate is 50% (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012); hence, trip limits will likely reduce mortality even if fishermen behavior does not change.

Commercial catch rates by depth and identification of potential alternatives for depth-based management

West coast groundfish survey data showed highest densities of longnose skate to 300 fm, after which densities dropped precipitously (Table C-59). Limited entry non-whiting trawl and limited entry and open access fixed gear sets or hauls showed a similar pattern but perhaps more of an expanded pattern (Table C-60 and
Table C-61). Depending on the area, longnose skate catch and CPUEs during 2002-2010 were generally high until 250-350 fathoms, after which catches and CPUEs drop.

Interpretations of Table C-60 and
Table C-61 should be made with caution. These represent catches of longnose skates only during observed hauls, therefore, sample sizes are small and may not be representative of the fleet. These hauls also represent fishers targeting other groundfish specie while catching longnose skate incidentally (see above). Fishing patterns could change if prices continue to increase for this species. Finally, low catches at some depth strata are reflective of RCA restrictions rather than longnose skate density. For example, observed catches of longnose skate by trawl during 2002-2010 generally decline between 100-200 fm (Table C-60), where RCAs have commonly been implemented (Table C-54). Low observed catches of longnose skate due to RCAs are also apparent for fixed gear at depths less than 100 fm (north of $40^{o}10'$ N. latitude) and depths less than 150 fm (south of $40^{o}10'$ N. latitude). This demonstrates that the current RCA structure already prevents the capture of longnose skate across depth ranges where there densities are high (see Table C-59).

Table C-60. Observed catch of longnose skate (mt) north of 45°46' N. latitude by depth (fm) for fixed gear and trawl sets (or hauls) for 2002-2010.

	Fixed Gear				Trawl			
Area 1	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
North of 48°10'	0-100	0	0.0%	0.00	0-100	17,485	26.9%	6.14
	100-150	2,906	15.7%	7.50	100-150	33,967	52.3%	14.02
	150-200	3,635	19.7%	6.49	150-200	12,637	19.4%	29.28
	200-250	3,706	20.1%	5.37	200-250	86	0.1%	2.23
	250-300	4,948	26.8%	4.68	250-300	496	0.8%	3.01
	300-350	2,413	13.1%	3.63	300+	322	0.5%	2.64
	350+	872	4.7%	5.56				
	Total	18,481				64,993		

Area 2	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
48°10' to 45°46'	0-50	0	0	0.00	0-50	11,673	0	17.90
	50-100	112	0.1%	14.89	50-100	274,683	44.7%	10.59
	100-150	36,992	27.7%	9.18	100-150	51,708	8.4%	13.54
	150-200	47,247	35.4%	8.44	150-200	17,476	2.8%	10.89
	200-250	31,182	23.4%	7.95	200-250	94,579	15.4%	11.54
	250-300	12,632	9.5%	5.60	250-300	99,454	16.2%	10.66
	300-350	4,008	3.0%	5.63	300-350	49,768	8.1%	5.90
	350-400	676	0.5%	6.15	350-400	12,481	2.0%	3.57
	400+	490	0.4%	3.56	400-450	2,795	0.5%	3.92
					450-500	217	0.0%	2.36
					500+	126	0.0%	2.85
	Total	133,340			Total	614,961		

Table C-61. Observed catch of longnose skate (mt) south of 45°46' N. latitude by depth (fm) for fixed gear and trawl sets for 2002-2010.

	Fixed Gear				Trawl			
Area 3	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
45°46 to 40°10	0-150	15,832	0	12.29	0-100	112,267	0	9.79
	150-200	35,620	38.7%	8.13	100-150	47,314	7.3%	10.28
	200-250	28,431	30.9%	9.98	150-200	5,417	0.8%	8.70
	250-300	10,466	11.4%	11.19	200-250	182,844	28.1%	11.95
	300+	1,766	1.9%	5.40	250-300	202,704	31.2%	10.00
					300-350	83,093	12.8%	5.64
					350-400	11,342	1.7%	3.33
					400-450	4,080	0.6%	3.93
					450-500	114	0.0%	1.57
					500-550	146	0.0%	3.28
					550-600	270	0.0%	2.06
					600	91	0.0%	2.36
	Total	92,115			Total	649,683		
Area 4	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
South of 40°10'	0-100	18	0.0%	1.15	0-50	2,107	0.4%	2.30
	100-150	0	0.0%	0.00	50-100	86,473	15.7%	8.34
	0-200	264	0.5%	8.38	100-150	85,675	15.5%	18.58
	200-250	5,630	11.0%	7.36	150-200	23,807	4.3%	12.97
	250-300	10,881	21.3%	8.17	200-250	105,945	19.2%	20.54
	300-350	26,730	52.3%	4.50	250-300	112,195	20.4%	19.55
	350-400	6,079	11.9%	2.62	300-350	106,087	19.2%	17.42
	400-450	654	1.3%	1.17	350-400	19,930	3.6%	5.62
	450-500	471	0.9%	2.06	400-450	5,447	1.0%	3.85
	500-550	268	0.5%	1.44	450-500	1,777	0.3%	2.70
	550-600	63	0.1%	1.56	500-550	1,391	0.3%	3.15
	600+	63	0.1%	1.04	550+	441	0.1%	3.14
	Total	51,122				551,276		

Depth restrictions in addition to current No Action RCAs (see Table C-54 and Table C-55) may reduce the catch (or catch rates) of longnose skate relative to status quo. For trawl, 15-30% of the longnose skate catch occurs between 200 and 250 fm south of 48°10' N. latitude, where CPUEs were among the highest (Table C-54 and Table C-55). Extending the seaward RCA from 200 to 250 fm may therefore reduce longnose skate catch. Actions could also be taken shoreward of the RCA to reduce catches (or catch rates) of longnose skate; 44% of the observed longnose skate caught between 40°10' and 45°46' was at 50-100 fm during 2002-2010, where CPUEs were also relatively high (Table C-60). The shoreward trawl

RCA was typically 75 fm in this area (Table C-54), which suggests that moving the trawl RCA from 75 to 50 fm may reduce catch (or catch rates) of longnose skate.

Adjusting RCAs to prevent catches by fixed gear fisheries would provide less of a savings than adjustments made to trawl fisheries, because fixed gear catches represent only approximately 10% of the longnose skate catch (Table C-57). Nonetheless, additional depth restrictions may reduce catch of longnose skate by fixed gear sectors. Approximately 16–28% of the longnose skate catch occurs between 100 and 150 fm north of 45°46' N. latitude (Table C-60). Implementing a 150 fm RCA coastwide may therefore reduce catches of longnose skate for these sectors.

There is great uncertainty regarding the level of savings that may occur by extending the trawl RCAs seaward to 250 fm (i.e., whether total mortality would be reduced). Longnose skate are incidentally caught while fishers target other species (e.g., Dover sole, sablefish, thornyheads; Figure C-21). Moving the RCA deeper to 250 fm would require fishers to target the other groundfish species at more restrictive depths and potentially less productive grounds, while continuing to catch longnose skate incidentally. Longnose skate are still abundant seaward of 250 fm (Table C-59), and commercial logbook data (Figure C-24) and observer data (Table C-60 and
Table C-61) demonstrate that longnose skate are commonly caught outside of 250 fm. Because catch rates for target species may decrease if the most productive fishing grounds are closed, fishing effort (number of hauls or sets) may increase in order to attain the quota pounds of target species (under the IFQ fishery) or tier limits (for the limited entry sablefish fishery). This increased fishing effort could ultimately eliminate any potential savings of longnose skate by moving the RCA to 250 fm; these potential catches are difficult to predict.

A 300 fm seaward depth restriction for trawl would clearly reduce catches of longnose skate. Although some commercial catches continue to occur beyond 300 fm (Table C-60 and
Table C-61), longnose skate densities drop to exceptionally low levels beyond this depth contour (Table C-59).

Two depth restriction options are analyzed herein: (a) move the shoreward trawl RCA from 75 fm to 50 fm between 45°46' and 48°10' N. latitude and (b) move the seaward trawl RCA from 200 (or 150 fm) to 300 fm. The potential benefits to the longnose skate resource of moving the seaward RCA to depths shallower than 300 fm (e.g., 250 fm) is uncertain and cannot be predicted.

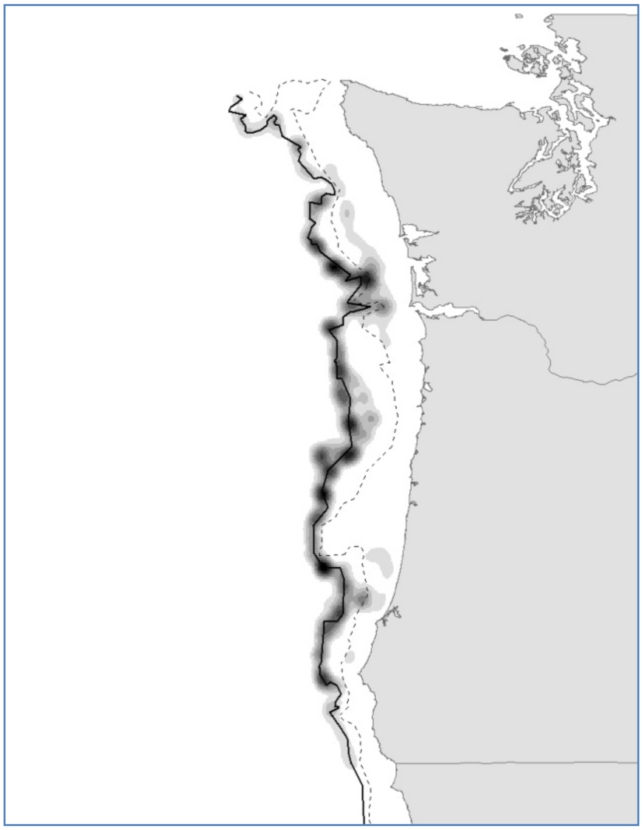

Figure C-24. Distribution of limited entry non-whiting trawl tows (shaded areas) where longnose skate were retained and recorded in logbooks during 2010.

Note: Darker shading represents higher number of tows with longnose skate. Dashed line = 75 fm line; Solid line = 250 fm line. RCA lines were included for reference only. Data was acquired from the PacFIN data base. Only hauls where a hail weight was recorded are included.

Comparison of Management Options

No Action

No Action, management measures are shown for longnose skate in Table C-53, Table C-54, and Table C-55. Trip limits would remain unlimited, and RCAs shown for 2012 in Table C-54 and Table C-55 would remain in place. These measures could be modified inseason through routine management measures to slow landings if necessary.

Under No Action, longnose skate would continue to be sorted and reported to species on state landing reports and federal fish tickets. Historical discard rates would be used inseason for catch projections and the basis for trip limit adjustments. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard rates provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

Biological Impacts: Under No Action, one can assume that total catch and discards of longnose skate would be similar to recent historical levels. Assuming 50% discard mortality, total fishing mortality during 2009 and 2010 (1,120 and 1,182 mt, respectively; Table C-51) would be less than the 2013 preferred ACL (2,000 mt) and the 2013 No Action ACL (1,349 mt) analyzed in the DEIS (Table C-56). Hence, mortality under No Action may not be substantial, assuming catch and discard in 2013 and 2014 are similar to those observed during 2009-2010.

Socioeconomic impacts:

Affected Fisheries: The primary fisheries affected by status quo trip limits and RCAs are limited entry non-whiting trawl, limited entry non-nearshore fixed gear, and open access non-nearshore fixed gear. Approximately 90% of the recent historical catch (landings + discard) has been made by the limited entry non-whiting trawl fishery, and approximately 10% has been made by non-nearshore fixed gear sectors; other sectors are less affected (Table C-54). This is a limited entry non-whiting trawl dominant fishery.

Even though historical catch and discard levels suggest no biological impact under No Action (see above), the potential of exceeding sector-specific allocations or HGs must be evaluated. If allocations or HGs are projected to be exceeded, then sector-specific trip limits or other management measures may be needed (see options below). The 2013 and 2014, the Council recommended HGs for shoreside trawl are 1,739 mt (for PREFERRED ACL) and 1,154 mt (for No Action ACL; Table C-62). Total mortality for this sector, using an assumed discard mortality rate of 50%, ranged from 1,025 – 1,106 mt, which is less than the HG. The estimated total mortality for non-trawl fisheries (65 – 91 mt assuming 50% discard mortality) under No Action is less than the preferred non-trawl HG (193.8 mt), but higher than the No Action allocation (61 mt). Hence, additional management measures would be needed to reduce total mortality for non-trawl fisheries if the No Action ACL for longnose skate is selected (see Options below).

Table C-62. 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) under two ACLs analyzed within the DEIS. Expected range of total mortality by sector is shown for comparison (minimum and maximum). Expected mortality was calculated using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear.

Option	ACL	Shoreside trawl HG	No Action shoreside trawl total mortality (50% discard mortality)	Non-trawl HG	No Action non-trawl total mortality (50% discard mortality)
Preferred	2,000	1,739	1,025 – 1,106	193.8	65 - 91
No Action	1,346	1,154		61	

Distribution of Fishery Effort: Approximately 84% of longnose skate catch (landings + discard) occurs north of 40°10’ N. latitude (Figure C-13); most longnose skate landings occur in the Columbia INPFC area (Figure C-17). Approximately 64% of longnose skate landings by the limited entry non-whiting trawl fishery were made within the Columbia INPFC area (Figure C-17). These trawl landings also occurred to a lesser extent in other INPFC areas (e.g. 12% and 19% in Vancouver and Eureka areas, respectively). Limited entry and open access fixed gear landings of longnose skate were primarily in Columbia (39%), Eureka (30%), and Vancouver (15%) INPFC areas (Figure C-17).

Importance to port groups/communities: Longnose skate are typically delivered as part of mixed groundfish complex (primarily caught seaward of the current RCA), and represent a small percentage of total groundfish landings. Primary trawl deliveries (2009-2011) were made to Oregon ports (Columbia River, Newport, and Coos Bay area ports; 34%, 20%, and 20.8%, respectively), and to a lesser extent to Eureka area ports (10.6%) (Table C-55; Figure C-18). Longnose skate caught by fixed gear were primarily landed at Coos Bay (34%), Brookings (24%), and North Puget Sound (12%) area ports during 2009-2011 (Table C-64; Figure C-17).

Ex-vessel value of the landings by port group are shown in Table C-63. Landings from January 2009 – October 2011 = 2.83 years) were averaged as annual landings (i.e., by dividing the total landed weight by 2.83). Landings were then converted to value by multiplying by the average sector-specific landed weight (pounds) by the 2011 average price per pound shown in Figure C-15. The average revenue, calculated using this method, was $602,744 for limited entry non-nearshore trawl and $13,748 for limited entry and open access fixed gear (Table C-55). Top three average annual revenues by gear/sector ranged from $120,899 (Newport area ports) to $205,080 (Columbia River Oregon area ports) for trawl and $1,625 (Northern Puget Sound area ports) to $4,690 (Coos Bay area ports) for fixed gear (Table C-63).

Table C-63. Revenue and percent contribution of longnose skate landings by port group area.

Gear/sector	Port-area group	2009-2011 Weight landed (lbs.)	Percent by area	Annual weight landed (Average; lbs.)	2011 Average price per pound ($)	Average annual revenue ($)
LE Trawl	CLO	1,813,678	34.0%	640,876	0.32	$205,080
	NPA	1,068,757	20.0%	377,653	0.32	$120,849
	CBA	1,110,461	20.8%	392,389	0.32	$125,564
	ERA	565,813	10.6%	199,934	0.32	$63,979
	Remaining	771,805	14.5%	272,723	0.32	$87,271
	TOTAL	5,330,514	100.0%	1,883,574	0.32	$602,744
Fixed gear	NPS	16429	0.12	5,805	0.28	$1,625
	CBA	47407	0.34	16,752	0.28	$4,690
	BRA	33108	0.24	11,699	0.28	$3,276
	Remaining	42012	0.30	14,845	0.28	$4,157
	TOTAL	138,956	1.00	49,101	0.28	$13,748

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; Fixed Gear = limited entry and open access groundfish fixed gear. Port group areas are: CBA = Coos Bay; CLO – Columbia River Oregon; ERA = Eureka; NPA = Newport; NPS = North Puget Sound; BRA = Brookings. Other port groups were combined into “Remaining”. The number of remaining port groups were 12 for LE trawl and 10 for fixed gear.

Options 1 – 5 (general)

Under all of the following management options, longnose skate would continue to be sorted and reported to species on state landing reports and federal fish tickets. Inseason catch accounting and basis for trip limit and/or RCA adjustments will be made using: (a) historical discard rates with near real-time bycatch updates from the WCGOP observer program for the IFQ fishery to improve precision as the year proceeds and/or (b) historical discard amounts (average annual discard beginning 2009) added to landings data provided by PacFIN. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard amounts provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

<u>Option 1 – High Trip Limit</u>: Reduce the longnose skate bimonthly trip limit from unlimited to (a) 12,000 pounds/2 months for limited entry non-whiting trawl and (b) 1,000 pounds/2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 1 (high-trip limit) relative to No Action are shown in Table C-64 for longnose skate (trawl and fixed gear). In this case, trip limits were 12,000 pounds/2 months for limited entry non-whiting trawl and 1,000 pounds/2 months for fixed gear sectors. These trip limits represent the 90th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery. Small adjustments were made to PacFIN data downloaded for this table to allow for direct comparison with Table C-63. Longnose skate weights shown here were increased by factors of 3.19% (trawl) and 0.58% (fixed gear). PacFIN queries were made at different times for this analysis and the analysis shown in Table C-63 resulting in the small differences that were standardized (scaled) using the factors shown above.

Table C-64. Option 1 "high" trip limits for longnose skate and potential landings and lost revenue relative to No Action. Trip limits were selected based on the 90th percentile of landings over the period 2009 – October 2011 (see Figure C-22 and Figure C-23).

Gear/sector & Option	Bi-monthly trip limit (lbs.)	2009-2011 bimonthly trip limits exceeded (%)	2009-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 1 average annual landings (lbs.)	Option 1 average amount discarded or avoided due to trip limits (lbs.)	Option 1 average annual revenue lost ($)
No Action							
OA FG	Unl.	0%	0%	9,382			
LE FG	Unl.	0%	0%	39,721			
LE Trawl	Unl.	0%	0%	1,883,511			
TOTAL				1,932,614			
Option 1							
OA FG	1,000	0.4%	0.2%		9,366	16	$5
LE FG	1,000	11.0%	28.3%		28,500	11,221	$3,142
LE Trawl	12,000	9.9%	9.0%		1,713,884	169,627	$54,280
TOTAL					1,751,750	182,854	$57,427

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings (see above). Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 182,854 pounds (83 mt), or 9.5% for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings combined (Table C-64). If fishers' behavior remained unchanged, and assuming discard mortality were 50%, then total mortality may be reduced by 91,427 pounds (42 mt) for trawl and fixed gear combined relative to No Action. Total mortality would be reduced even more (to a maximum of 83 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of longnose skate (i.e., so that no additional discarding were caused by trip limits).

Under Option 1, the total fishing mortality (all sectors) would be 42 – 83 mt lower than shown under No Action; estimated total mortality for all fisheries shown in Table C-51 would therefore be reduced to a range of 1,037 - 1,140 mt, which is less than both preferred and No Action ACLs analyzed herein (2,000 and 1,349 mt, respectively).

Socioeconomic Impacts: Approximately 10% of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings may be affected by Option 1 trip limits (Table C-64; Figure C-22 and Figure C-23). Open access fisheries would largely be unaffected relative to No Action (Table C-64). Reducing trip limits from unlimited to 12,000 pounds bimonthly for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 9% (= 169,627 pounds or 78 mt) relative to No Action. Reducing trip limits from unlimited to 1,000 pounds bimonthly for fixed gear sectors could reduce landed pounds by 28.3% for the limited entry fixed gear sector (11,221 pounds or 5 mt reduction relative to No Action) and 0.2% for the open access fixed gear sector (16 pounds or 0.007 mt reduction relative to No Action).

The estimated value of longnose skate revenue forgone under Option 1 relative to No Action is $57,427 ($3,147 for fixed gear and $54,280 for trawl). Oregon port groups would be most impacted by longnose skate trip limits (Table C-63).

The only sector that may require trip limits to keep its mortality below its HG is the non-trawl fishery if the No Action ACL (61 mt) is selected (Table C-65) Trip limits described under Option 1 may not keep the total mortality by this sector (expected range = 60 – 89 mt) below its No Action allocation. Trip limits may not be required for non-trawl if the preferred HG is adopted and may not be required for shoreside trawl under either alternative (preferred or No Action).

Table C-65. Expected range of total mortality by sector under Option 1, along with 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) for comparison.

Option	ACL	Shoreside trawl HG	Option 1 shoreside trawl total mortality (50% discard mortality)	Non-trawl HG	Option 1 non-trawl total mortality (50% discard mortality)
Preferred	2,000	1,739	947 – 1,067	193.8	60 - 89
No Action	1,346	1,154		61	

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear (see Table C-51). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with a 50% discard mortality rate) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 2 – Moderate Trip Limits: Reduce the longnose skate bimonthly trip limit from unlimited to (a) 7,000 pounds/2 months for limited entry non-whiting trawl and (b) 500 pounds/2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 2 (moderate-trip limit) relative to No Action are shown in Table C-66 for longnose skate (trawl and fixed gear). In this case, trip limits were 7,000 pounds/2 months for limited entry non-whiting trawl and 500 pounds/2 months for fixed gear sectors. These trip limits represent the 75th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery. Small adjustments were made to PacFIN data downloaded for this table to allow for direct comparison with Table C-63. Longnose skate weights shown here were increased by factors of 3.19% (trawl) and 0.58% (fixed gear). PacFIN queries were made at different times for this analysis and the analysis shown in Table C-63 resulting in the small differences that were that were standardized (scaled) using the factors shown above.

Table C-66. Option 2 "moderate" trip limits for longnose skate and potential landings and lost revenue relative to No Action. Trip limits were selected based on the 75th percentile of landings over the period 2009 – October 2011 (see Figure C-22Figure C-23).

Gear/sector & Option	Bi-monthly trip limit (lbs.)	2009-2011 bimonthly trip limits exceeded (%)	2009-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 2 average annual landings (lbs.)	Option 2 average amount discarded or avoided due to trip limits (lbs.)	Option 2 average annual revenue lost ($)
No Action							
OA FG	Unl.	0%	0%	9,382			
LE FG	Unl.	0%	0%	39.721			
LE Trawl	Unl.	0%	0%	1,883,511			
TOTAL				1,932,614			
Option 2							
OA FG	500	1.1%	2.8%		9,117	265	$74
LE FG	500	24.8%	40.8%		23,524	16,197	$4,535
LE Trawl	7,000	26.3%	24.8%		1,415,825	467,686	$149,670
TOTAL					1,448,466	484,148	$154,279

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings (see above). Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce longnose skate landings by 484,148 pounds (219 mt), or 25% for limited entry non-whiting trawl and groundfish fixed gear fisheries landings combined (Table C-66). If fishers' behavior remained unchanged, and assuming discard mortality were 50%, then total mortality may be reduced by 242,074 pounds (110 mt) relative to No Action. Total mortality would be reduced even more (to a maximum of 219 mt) if this trip limit caused fishermen to reduce targeting or fishing in areas with high concentrations of longnose skate (i.e., so that no additional discarding were caused by trip limits).

Under Option 2, the total fishing mortality (all sectors) would be 110 – 220 mt lower than shown under No Action; estimated total mortality for all fisheries shown in Table C-51 would be reduced to range of 901 – 1,072 mt, which is less than both preferred and No Action ACLs analyzed herein (2,000 and 1,349 mt, respectively).

Socioeconomic Impacts: Approximately 25% of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings may be affected by Option 2 trip limits (Table C-66; Figure C-22 and Figure C-23). Only approximately 1% of the open access bimonthly landings (number) may be affected by this trip-limit option relative No Action (Table C-66). Reducing trip limits from unlimited to 7,000 pounds bimonthly for the limited entry non-whiting trawl sector would reduce landed pounds for that sector by 24.8% (= 467,686 pounds or 212 mt) relative to No Action. Reducing trip limits from unlimited to 500 pounds bimonthly for fixed gear sectors would reduce landed pounds by 40.8% for the limited entry fixed gear sector (= 16,197 pounds or 7 mt relative to status quo) and 2.8% for the open access fixed gear sector (265 pounds or 0.1 mt relative to No Action).

The estimated value of longnose skate revenue forgone under Option 2 relative to No Action is $154,279 ($4,609 for fixed gear and $149,670 for trawl). Oregon port groups would be most impacted by longnose skate trip limits (Table C-63).

The only sector that may require trip limits to keep its mortality below its HG is the non-trawl fishery if the No Action ACL (61 mt) is selected (Table C-67) Trip limits described under Option 2 may not keep the total mortality by this sector (expected range = 58 – 88 mt) below its No Action allocation. Trip limits may not be required for non-trawl if the preferred HG is adopted and may not be required for shoreside trawl under either alternative (preferred or No Action).

Table C-67. Expected range of total mortality by sector under Option 2, along with 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) for comparison.

Option	ACL	Shoreside trawl HG	Option 2 shoreside trawl total mortality (50% discard mortality)	Non-trawl HG	Option 2 non-trawl total mortality (50% discard mortality)
Preferred	2,000	1,739	813 - 961	193.8	58 - 88
No Action	1,346	1,154		61	

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear (see Table C-51). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with a 50% discard mortality rate) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 2 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

<u>Option 3 – Low Trip Limits</u>: Reduce the longnose skate bimonthly trip limit from unlimited to (a) 4,000 pounds/2 months for limited entry non-whiting trawl and (b) 200 pounds/2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 3 (low-trip limit) relative to No Action are shown in Table C-68 for longnose skate (trawl and fixed gear). In this case, trip limits were 4,000 pounds/2 months for limited entry non-whiting trawl and 200 pounds/2 months for fixed gear sectors. These trip limits represent the 50th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery. Small adjustments were made to PacFIN data downloaded for this table to allow for direct comparison with Table C-63. Longnose skate weights shown here were increased by factors of 3.19% (trawl) and 0.58% (fixed gear). PacFIN queries were made at different times for this analysis and the analysis shown in Table C-63 resulting in the small differences that were that were standardized (scaled) using the factors shown above.

Table C-68. Option 3 "low" trip limits for longnose skate and potential landings and revenue relative to No Action. Trip limits were selected based on the 50th percentile of landings over the period 2009 – October 2011 (see Figure C-22Figure C-23).

Gear/sector & Option	Bi-monthly trip limit (lbs.)	2009-2011 bimonthly trip limits exceeded (%)	2009-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 3 average annual landings (lbs.)	Option 3 average amount discarded or avoided due to trip limits (lbs.)	Option 3 average annual revenue lost ($)
No Action							
OA FG	Unl.	0%	0%	9,382			
LE FG	Unl.	0%	0%	39,721			
LE Trawl	Unl.	0%	0%	1,883,511			
TOTAL				1,932,614			
Option 3							
OA FG	200	12.2%	16.2%		7,862	1,520	$426
LE FG	200	48.4%	68.0%		12,730	26,991	$7,558
LE Trawl	4,000	48.3%	45.6%		1,024,422	859,089	$274,909
TOTAL					1,045,014	887,520	$282,893

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings (see above). Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 887,520 pounds (402 mt), or 46% for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries combined (Table C-68). If fishers' behavior remained unchanged, and assuming discard mortality were 50%, then total mortality may be reduced by 443,760 pounds (201 mt) relative to No Action. Total mortality would be reduced even more (to a maximum of 402 mt) if this trip limit caused fishermen to reduce targeting or fishing in areas with high concentrations of longnose skate (i.e., so that no additional discarding were caused by trip limits).

Under Option 3, the total fishing mortality (all sectors) would be 201 – 402 mt lower than shown under No Action; estimated total mortality for all fisheries shown in Table C-51 would be reduced to a range of 718 – 981 mt, which is less than both preferred and No Action ACLs analyzed herein (2,000 and 1,349 mt, respectively).

Socioeconomic Impacts: Approximately 50% of the limited entry fixed gear and limited entry non-whiting trawl fleet may be affected by Option 3 trip limits, whereas 12% of the open access bimonthly landings (number) may be affected by this trip-limit option relative to No Action (Table C-68; Figure C-22 and Figure C-23). Reducing trip limits from unlimited to 4,000 pounds bimonthly for the limited entry non-whiting trawl sector would reduce landed pounds for that sector by 45.6% (= 859,089 pounds or 390 mt) relative to No Action. Reducing trip limits from unlimited to 200 pounds bimonthly for fixed gear sectors would reduce landed pounds by 68% for the limited entry fixed gear sector (= 26,991 pounds or 12 mt relative to No Action) and 16.2% for the open access fixed gear (= 1,520 pounds or 0.7 mt relative to No Action).

The estimated value of longnose skate revenue forgone under this Option 3 relative to No Action is $282,893 ($7,984 for fixed gear and $274,909 for trawl). Oregon port groups would be most impacted by longnose skate trip limits (Table C-63).

The only sector that may require trip limits to keep its mortality below its HG is the non-trawl fishery if the No Action ACL (61 mt) is selected (Table C-69) Trip limits described under Option 3 may not keep the total mortality by this sector (expected range = 52 – 85 mt) below its No Action allocation. Trip limits may not be required for non-trawl if the preferred HG is adopted and may not be required for shoreside trawl under either alternative (preferred or No Action).

Table C-69. Expected range of total mortality by sector under Option 3, along with 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) for comparison.

Option	ACL	Shoreside trawl HG	Option 3 shoreside trawl total mortality (50% discard mortality)	Non-trawl HG	Option 3 non-trawl total mortality (50% discard mortality)
Preferred	2,000	1,739	635 - 991	193.8	52 - 85
No Action	1,346	1,154		61	

Expected mortality was initially calculated by using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear (see Table C-51). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with a 50% discard mortality rate) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 3 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

<u>Option 4 – Extend Seaward Trawl RCA Deeper:</u> Extend trawl seaward RCA to 300 fm coastwide.

Biological Impact: Extending the trawl RCA from 150 or 200 fm to 300 fm coastwide may decrease encounters with longnose skate substantially. Approximately 15.9% of the longnose skate observed catch (coastwide) was made seaward of 300 fm by observed trawl trips where CPUEs were relatively low (Table C-60 and
Table C-61). The density of longnose skate was also shown to drop to low levels seaward of 300 fm (Table C-59).

The actual savings in total catch of longnose skate under this management measure cannot estimated from the data obtained WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource. However, it is expected that longnose skate mortality under Option 4 will be substantially less than under No Action.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. Maximum revenues are shown in Table C-64; the direct loss would be something less than ~$600,000, and would likely be in the low $100,000's. Most of this loss would be incurred by the Oregon trawl fleet. The loss in longnose skate landings revenue may be lower than anticipated, however, because landings may be more of a function of market than encounters for this species (see above), at least in the recent past.

Any direct revenue loss due to a reduction in longnose skate landings may be inconsequential relative to other associated economic and safety impacts of a seaward RCA change. This measure would (a) force fishers off some of their most productive fishing grounds and on to less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) require fishers to travel greater distances and spend more time on the water to catch targeted species at levels similar to status quo, and (d) concentrate fishers into a smaller fishing area, resulting in likelihood of increased gear impacts. These impacts will either reduce landings of target species (e.g., sablefish, Dover sole, thornyheads), or increase time and expense (e.g., fuel, number of trips, and days at sea) to maintain status quo landings of target species. The additional time at sea, running distance, and potential gear conflicts also may result in increased accidents at sea. The impact to communities under alternative 4, based on these criteria, would be severe and substantial relative to No Action and relative to Options 1 – 3.

<u>Option 5 – Extend Shoreward Trawl RCA Shallower</u>: Extend shoreward trawl RCAs from 75-100 fm to 50 fm between 45°46’ and 48°10’ N. latitude.

Biological Impact: Extending the shoreward trawl RCA from 75-100 fm to 50 fm between 45°46’ and 48°10’ N. latitude may decrease encounters with longnose skate (Table C-60). The actual savings in total catch of longnose skate under this management measure cannot be estimated from the data obtained WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource. Although uncertain, the reduction in dogfish mortality may be great relative to No Action, but less than Option 4.

Impacts to communities: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. Most revenue loss would be incurred by the Oregon trawl fleet. The loss in longnose skate landings revenue may be lower than anticipated, however, because landings may be more of a function of market than encounters for this species (see above), at least in the recent past.

Any ex-vessel revenue loss caused by reduced landings of longnose skate (due to RCAs) may be small relative to other economic and safety impacts associated with moving the shoreward trawl RCA to 50 fm. This measure would (a) force fishers off some of their most productive fishing grounds in the nearshore area and onto less productive areas within the nearshore, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) concentrate fishers into a smaller area, resulting in likelihood of increased gear conflicts, (d) reduce or eliminate the catch of flatfish species that are primarily found between 50 and 100 fm, and (e) create gear conflicts and potential competition with nearshore fixed gear fisheries. The impact to communities under Option 5, based on these, would be severe relative to the No Action option and Options 1 – 3.

Other Potential Management Measures and Considerations

Other management measures or considerations are available to reduce fishing mortality for longnose skate. The alternatives provided above may reduce longnose skate catch, but may result in a high cost to communities and fishers (especially RCA changes). The following considerations may reduce mortality of longnose skate with lower associated impacts to communities than those described in alternatives 1-5.

- Gear modifications may reduce fishing mortality of longnose skate. For example, flexible grates and escape panels (e.g., halibut excluders) have been shown to effectively allow escapement of skate at fishing depth while retaining most target species that enter the net. These types of potential management measures could be further explored and considered as a regulatory or a voluntary measure if it is anticipated that longnose skate catch might exceed the ACL under status quo management measures.

- Voluntary avoidance of areas with highest longnose skate catch rates may be considered to keep longnose skate catch below the ACL.

Summary of Management Options and Comparison of Impacts

A summary of management measures and associated impacts are provided in Table C-70. Note that under No Action, total mortality of longnose skate may be lower than the preferred and No Action ACLs (i.e., less than 2,000 and 1,349 mt, respectively). Management measure options were analyzed, however, in the event inseason tracking and monitoring predicts higher fishing mortality than anticipated. Prices and retention have increased over the past few years, so that situation may occur.

Under the preferred ACL for longnose skate (2,000 mt), the total mortality by sector will likely be below each sector HG. Under the No Action ACL, however, the non-trawl allocation may be exceeded during 2013 and 2014.

Trip limit options (Options 1 – 3) would be effective for reducing No Action fishing mortality for the non-whiting trawl fishery, if necessary. This fishery retained approximately 68% of the longnose skate encountered during 2009 and 2010 (i.e., discarded 32%), so trip limits may cause increased discard (of which 50% may survive) or change fishermen's behavior (fishermen may choose to avoid areas with high concentrations of longnose skate). Hence, this measure could be used to substantially reduce total mortality relative to No Action. Options 1-3 would have moderate to substantial impacts to communities – severity of impacts to communities increase as option number increases. Option 3 would have most substantial impacts to communities and would affect approximately 50% of the non-whiting trawl fishermen and reduce landings by approximately $250,000.

Trip limits for fixed gear fisheries (Options 1 – 3), on the other hand, may not substantially reduce longnose skate mortality relative to No Action. Few longnose skate encountered by this fishery are landed (13% landed; 87% discarded), so trip limits will likely not change fishermen behavior relative to No Action. Conversely, Options 1 – 3 will have no substantial impacts on this fishery since most are already discarded and the annual revenue lost due to the trip limits range from only $3,142 for Option 1 to $7,984 for Option 3.

Moving the seaward RCA deeper (Option 4) or the shoreward RCA shallower (Option 5) may reduce mortality relative to No Action, however, additional data is required to estimate the extent of that reduction. Regardless, expanding the RCAs to reduce mortality will have the most substantial impacts on communities relative to No Action and relative to Options 1 – 3 (trip limits).

Voluntary avoidance or use of excluder devices may be most effective at reducing mortality while having the least impact on communities.

Table C-70. Comparison and summary of management options.

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
No Action	Trip Limit: Status quo RCA: Status quo	Preferred ACL = 2,000 mt No Action ACL = 1,349 mt Expected total mortality (all fisheries and set asides) = 1,120 to 1,182 mt Caution is advised if price, targeting, and retention increase.	**<u>Shoreside Trawl Allocation</u>:** Expected total mortality = 1,025 – 1,106 mt - Preferred Allocation (1,739 mt) - No Action Allocation (1,154 mt) **<u>Non-trawl Allocation</u>** Expected total mortality = 65 – 91 mt - Preferred Allocation (194 mt) - ***No Action ACL (61 mt)*** - ***Expected Mortality Exceeds Allocation*** **<u>Revenue:</u>** Average annual ex-vessel value was $602,744 (trawl) and $13,748 (LE and OA fixed gear). **<u>Fisheries Most Affected</u>**: Limited entry bottom trawl (historically caught 90%) and non-nearshore fixed gear (LE and OA historically caught 10%). **<u>Discard and mortality rates</u>:** Recent discard rates are approximately 32% for non-whiting trawl and 87% for fixed gear. Assumed discard mortality is 50% for non-whiting trawl and fixed gear. **<u>Areas Most Affected</u>**: Most encounters (catch and discard) and landings occur north of 40°10’ N. latitude and in the Columbia INPFC area. Oregon ports receive

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			most landings; North Puget sound and Eureka area ports are also but to a lesser extent.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 1	Trawl trip limit = 12,000 lbs. / 2 months Non-trawl trip limit = 1,000 lbs. / 2 months	Option 1 trip limits reduces total mortality (all sectors and set asides) by 42 – 83 mt relative to No Action Expected total mortality (all fisheries and set asides) = 1,037 – 1,140 mt Preferred ACL = 2,000 mt No Action ACL = 1,349 mt	**<u>Shoreside Trawl HG</u>:** Expected Total Mortality = 947 – 1,067 mt - Preferred HG (1,739 mt) - No Action Allocation (1,154 mt) **<u>Non-trawl HG</u>** Expected Total mortality = 60 – 89 mt - Preferred HG (194 mt) - ***No Action Allocation (61 mt)*** - ***Expected Mortality Exceeds allocation*** **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $54,280 (trawl) and $3,142 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 169,627 pounds or 77 mt (trawl) and 11,237 pounds or 5.1 mt (LE and OA fixed gear) relative to No Action.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 2	Trawl trip limit = 7,000 lbs. / 2 months Non-trawl trip limit = 500 lbs. / 2 months	Option 2 trip limits reduces total mortality (all sectors and set asides) by 110 - 220 mt relative to No Action	**<u>Shoreside Trawl HG</u>:** Expected Total Mortality = 813 – 961 mt - Preferred HG (1,739 mt) - No Action Allocation (1,154 mt)

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
		Expected total mortality (all fisheries and set asides) = 901 – 1,072 mt Preferred ACL = 2,000 mt No Action ACL = 1,349 mt	**<u>Non-trawl HG</u>** Expected Total mortality = 58 – 88 mt - Preferred HG (194 mt) - ***No Action Allocation (61 mt)*** - ***Expected Mortality May Exceed Allocation*** **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $149,670 (trawl) and $4,609 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 467,686 pounds or 212 mt (trawl) and 16,462 pounds or 7.5 mt (LE and OA fixed gear) relative to No Action.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 3	Trawl trip limit = 4,000 lbs. / 2 months Non-trawl trip limit = 200 lbs. / 2 months	Option 3 trip limits reduces total mortality (all sectors and set asides) by 201 - 402 mt relative to No Action Expected total mortality (all fisheries and set asides) = 718 - 981 mt Preferred ACL = 2,000 mt No Action ACL = 1,349 mt	**<u>Shoreside Trawl HG</u>:** Expected Total Mortality = 635 – 991 mt - Preferred HG (1,739 mt) - No Action Allocation (1,154 mt) **<u>Non-trawl HG</u>** Expected Total mortality = 52 – 85 mt - Preferred HG (194 mt) - ***No Action Allocation (61 mt)***

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			- ***Expected Mortality May Exceed Allocation*** **Revenue:** Average annual ex-vessel value was reduced by $274,909 (trawl) and $7,984 (LE and OA fixed gear) relative to No Action. **Landings:** Average annual landings reduced by 859,089 pounds or 390 mt (trawl) and 28,511 pounds or 12.9 mt (LE and OA fixed gear) relative to No Action.
Option 4	Extend the trawl RCA from 150 or 200 fm to 300 fm coastwide	*Mortality greatly reduced from No Action, but the level of decrease is uncertain.*	**Shoreside Trawl:** *The socioeconomic impact of Option 4 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 3.* **Non-trawl:** *No Substantial Impact*
Option 5	Extend shoreward trawl RCAs to 50 fm between 45°46' and 48°10' N. latitude	*Mortality greatly reduced from No Action, but the level of decrease is uncertain.*	**Shoreside Trawl:** *The socioeconomic impact of Option 5 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 3.* **Non-trawl:** *No Substantial Impact*

C.17 Spiny Dogfish Management Measures

Overview

Spiny dogfish was assessed for the first time off the off the U.S. west coast in 2011 (Gertseva and Taylor 2011). This species is currently not considered overfished; the spawning output at the beginning of 2011 was estimated to be 29,337 thousands of fish, which represents 63 percent of the unfished spawning output level (Gertseva and Taylor 2011).

Since 2002, average discard rates have been 85 percent and 52 percent for trawl and hook-and-line fisheries, respectively (Gertseva and Taylor 2011). More than 90 percent of the recent landed catch has been in Washington. A small portion of the catch is taken by recreational fisheries.

Herein we provide an analysis to examine the efficacy of potential management measures that could be used to restrain the catch of spiny dogfish shark by west coast commercial fisheries, if needed. Alternative trip limits and RCAs are provided for fixed gear and limited entry non-whiting trawl fisheries. Considerations of set asides or allocations are shown for the at-sea whiting sector. Other potential measures are also discussed.

Prior to March, 2012, catch accounting (e.g., Bellman et al., 2011) assumed that 100 percent of the discarded dogfish shark died. Recently, however, the Council adopted the SSC recommendation that WCGOP reports should apply discard mortality rates shown in stock assessments (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). The SSC noted that although the discard mortality assumptions used in the assessments are based on very limited information, they represent the best information available. Stock assessments (e.g., Gertseva et al. 2011) assumed 50 percent dogfish shark discard mortality for fixed gear (i.e., hook and line and pots), but retained the 100 percent discard mortality assumption for all trawls. It should be noted that the new 50 percent discard-mortality rate assumption is applied to non-trawl sectors herein only as we look forward (i.e., when evaluating management options toward the end of this report). In most cases prior to that section, 100 percent discard mortality is shown for all sectors because that was the historical perception.

2006-2010 Total Mortality of Spiny Dogfish Shark and "Other Fish"

Spiny dogfish shark is managed within the "Other Fish" complex but is sorted by regulation. Therefore, fishing mortality of dogfish and the "Other Fish" complex are described in this section.

The West Coast Groundfish Observer Program (WCGOP) reported total fishing mortalities for dogfish shark (Table C-71) that ranged from a low of 1,215 mt (2010) to a high of 2,497 mt (2008) while assuming that all discarded dogfish died from all gear types. The trend is similar for the "Other Fish" category, which includes spiny dogfish shark (Table C-71). Note that beginning 2009, longnose skate were removed from the "other fish" category. Had longnose skate been included in this category during all years, then the adjusted "other fish" mortality would have been 3,969 mt in 3,617 mt in 2009 and 2010, respectively.

There was no optimum yield (OY) or allowable biological catch (ABC) for dogfish shark during this period; these harvest specifications were provided only for the "other fish" complex. The total mortality of "other fish" did not exceed the ABC or OY during any of the years shown in Table C-71, even under the assumption of 100 percent discard mortality for dogfish shark among all gear types.

Note that beginning March, 2012, catch accounting will assume new discard rates for dogfish shark relative to assumptions made prior to 2012. From that date forward, WCGOP will report 100 percent discard mortality for dogfish for all gear types except fixed gear (i.e., longline and pot gear), for which 50 percent mortality will be assumed. Estimated total mortality using these new assumed discard mortality rates are included in (Table C-56) for comparative purposes.

Table C-71. West coast groundfish total mortality estimates (mt) for dogfish shark and "Other Fish" complex from 2006-2010.

Year	Estimated dogfish mortality (mt) assuming 100% discard mortality	Estimated dogfish mortality (mt) assuming 50% discard mortality for fixed gear	[a] "Other Fish" mortality (mt), assuming 100% discard mortality for dogfish	"Other Fish" ABC (mt)	"Other Fish" Optimum yield (OY) (mt)
2006	1,407	1,222	3,452	14,600	7,300
2007	1,504	1,346	4,516	14,600	7,300
2008	2,497	2,393	5,339	14,600	7,300
2009	1,207	1,032	[b]2,514	11,200	5,600
2010	1,215	1,093	[c]2,231	11,200	5,600

Notes: Total mortality estimates prior to 2012 assume 100% mortality for discarded dogfish shark among all gear types. Data acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011). For comparison and future projections, dogfish shark mortality estimates were provided assuming 50% discard mortality for fixed gear and 100% mortality for all other gears, as specified under Agenda Item F.2.b, Revised Supplemental SSC Report, March 2012.

[a]Other fish category consisted of cabezon (north of 42° N. latitude), kelp greenling, spiny dogfish shark, other sharks, **longnose skate**, big skate, unspecified skate, ratfish, morids, and grenadiers until 2009. Longnose skate was removed from the "other fish" category beginning 2009.

[b]**Longnose skate** was removed from the other fish complex in 2009. Longnose skate total mortality in 2009 was 1,455.1 mt (Bellman et al., 2010). Had longnose skate not been removed, the "Other Fish" total mortality for 2009 would have been 3,969 mt.

[c]**Longnose skate** was removed from the other fish complex in 2009. Longnose skate total mortality in 2010 was 1,386.5 mt (Bellman et al., 2011). Had longnose skate not been removed, the "Other Fish" total mortality for 2010 would have been 3,617 mt.

2011-2012 Harvest Specifications

For 2011-12 groundfish fisheries, spiny dogfish harvest specifications were analyzed and continued to be implemented in regulation with the "Other Fish" complex (Table C-72). Note that longnose skate was removed from the "Other Fish" complex beginning 2009, so the harvest specifications shown in Table C-72 for "Other Fish" were substantially lower than pre-2009 levels (see Table C-71).

Table C-72. 2011-2012 harvest specifications for ""Other Fish" in metric tons, implemented in regulation. OFL = overfishing limit; ABC = annual biological catch; ACL = annual catch limit.

Year	Species	OFL (mt)	ABC (mt)	ACL (mt)
2012	Other fish	11,150	7,742	5,575
2011	Other fish	11,150	7,742	5,575

2011 – 2012 Management Measures (= No Action)

Spiny dogfish are caught by trawl, commercial fixed gear, and recreational fisheries. Management measures that may control catches of dogfish shark for these fisheries in 2011-12 are summarized in Table C-73. All commercial landings of spiny dogfish are sorted. Rockfish conservation areas (RCAs; Table C-74 and Table C-75) in regulation may inadvertently provide some catch-controls for dogfish shark, because the depth distribution of this species extends from near shore to 470 fm (Keller et al., 2007a, 2007b, 2008). Hence, RCAs prevent the capture of some dogfish shark throughout a portion of their depth distribution along the entire West Coast. Trip limits range from 60,000 lb./month (limited entry trawl) to 100,000-200,000 lbs./2 months (limited entry and open access fixed gear).

Table C-73. Management measures affecting dogfish shark catch and monitoring for the 2011-2012 (= No Action) groundfish fisheries.

Fishery	**Management Measure**
Commercial	
--All Commercial landings	Sorting required for all commercial landings
--Limited Entry Trawl	Non-IFQ species. Trip limit management. Coastwide limits are: Periods 1-6: 60,000 lb./month. Trip Limits can be adjusted through routine inseason action. Current RCA structure may inadvertently reduce catch.
--Limited Entry Fixed Gear	Trip limit management. Coastwide limits are: Periods 1-2: 200,000 lb./2 months Period 3: 150,000 lb./2 months Periods 4-6: 100,000 lb./2 months Trip limits can be adjusted through routine inseason action. Current RCA structure may inadvertently reduce catch.
--Open Access Fixed Gear	Trip limit management. Coastwide limits are: Periods 1-2: 200,000 lb./2 months Period 3: 150,000 lb./2 months Periods 4-6: 100,000 lb./2 months Trip limits can be adjusted through routine inseason action. Current RCA structure may inadvertently reduce catch.
Recreational	
--Washington	Included as part of the 12 fish groundfish bag limit (landed fish) implemented in federal regulation.
--Oregon	Included as part of the 10 fish marine bag limit (landed fish) implemented in federal regulation. Oregon state regulations limit retention to 7 fish marine bag limit.
--California	Included as part of a 20 fish finfish bag limit (landed fish) implemented in federal regulation.

Table C-74. Limited entry non-whiting trawl RCAs for 2010-2012 (= No Action). Depth is in fathoms (fm).

Limited Entry Non-Whiting Trawl

<table>
<tr><th>Year</th><th>Area (N. latitude)</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td rowspan="6">2012</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 - 150</td><td colspan="2">0 - 200</td><td colspan="2">0 - [m]200</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2">75 - 150</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="4">75 – 150</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="4">75 - 200</td><td colspan="2">100 - 200</td><td colspan="2">75 - 200</td><td colspan="2">75 - [m]200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
<tr><td rowspan="6">2011</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 – 150</td><td colspan="2">0 - 200</td><td colspan="2">0 - [m]200</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2" rowspan="2">75 - 200</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="4">75 - 150</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="2">75 - 200</td><td colspan="2">100 - 200</td><td colspan="2">75 - 200</td><td colspan="2">75 - [m]200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
<tr><td rowspan="6">2010</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 – 150</td><td colspan="2">0 - 200</td><td>0 - [m]200</td><td>0 - 250</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2" rowspan="2">75 - 200</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="2" rowspan="2">75 - 200</td><td rowspan="2">75 - [m]200</td><td rowspan="2">75 - 250</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="2">75 - 200</td><td colspan="2">100 - 200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
</table>

Table C-75. Non-trawl rockfish conservation areas (RCAs) for limited entry and open access fixed gear (2010 – 2012; = No Action). Depth is in fathoms.

Limited Entry and Open Access Fixed Gear

Year	Area (N. lat.)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83												
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											
2011	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83	30 - 125 (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											
2010	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83	30 - 125 (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											

Management Issue 2013-2014 Harvest Specifications

Final preferred overfishing limits (OFLs) and allowable biological catch (ABCs were adopted for the Other Fish complex at the March 2012 Council meeting. The values for these specifications (Table C-76) are calculated as the sum of the known contributions of component stocks. The dogfish component of the Other Fish complex OFL and ABC is provided for reference.

Table C-76. Final preferred 2013-2014 OFLs and ABCs for the Other Fish Complex and the spiny dogfish shark component that contributed to the Other Fish complex specifications.

Year	Species or Complex	OFL (mt)	ABC (mt)	Preferred - ACL (mt)
2013	Other Fish	6,832	4,717	4,717
	Dogfish component	2,980	2,044	NA
2014	Other Fish	6,802	4,697	4,697
	Dogfish component	2,950	2,024	NA

2013-2014 Harvest Specifications Relative to Historical Total Mortality Estimates

The 2009 - 2010 estimated total fishing mortality for the Other Fish complex (Table C-71; 2,231 and 2,514 mt, respectively), which was calculated assuming 100 percent discard mortality rates for all species and gears, would not have exceeded the final preferred 2013-14 OFLs or ABCs, nor would these have exceeded the preferred Other Fish complex ACLs of 4,717 and 4,697 mt (Table C-76). Comparisons were not made for previous years because longnose skate was included in the Other Fish complex prior to 2009.

The 2013 and 2014 component ABC for spiny dogfish shark (2,044 and 2,024 mt, respectively; Table C-76) would have been exceeded by the 2008 dogfish total mortality (2,597 mt assuming 100 percent discard mortality for all gears; Table C-71) by 27 percent and 28 percent, respectively. These component ABCs also would be exceeded by the 2008 dogfish total mortality using 50 percent discard survival for fixed gear (= 2,393 mt; Table C-71). The remaining total fishing mortality for spiny dogfish (i.e., for the years 2006, 2007, 2009, and 2010; Table C-71) are far below the 2013 and 2014 component ABC for this species (Table C-76). Note that reconstructed historical catch records indicated that the dogfish ABCs shown in Table C-76 also would have been exceeded by catches in 2002, 2004, and 2005 (Gertseva and Taylor 2011), assuming 100 percent discard mortality for all gears.

This demonstrates that some modifications to existing management measures or new management measures may be needed to keep total fishing mortality of spiny dogfish shark within its component ABC.

Total catch and discard of dogfish shark by sector

Dogfish shark catch and discard by sector can be found in Figure C-25 (for 2010) and **Error! Reference source not found.**. During 2010, most dogfish were taken by the limited entry non-whiting trawl fishery (43%). Other sectors that caught substantial amounts of dogfish shark in 2010 were at-sea whiting (23%), non-nearshore fixed gear (21%) and shoreside whiting (10%). Small amounts were taken by other sectors (Figure C-25).

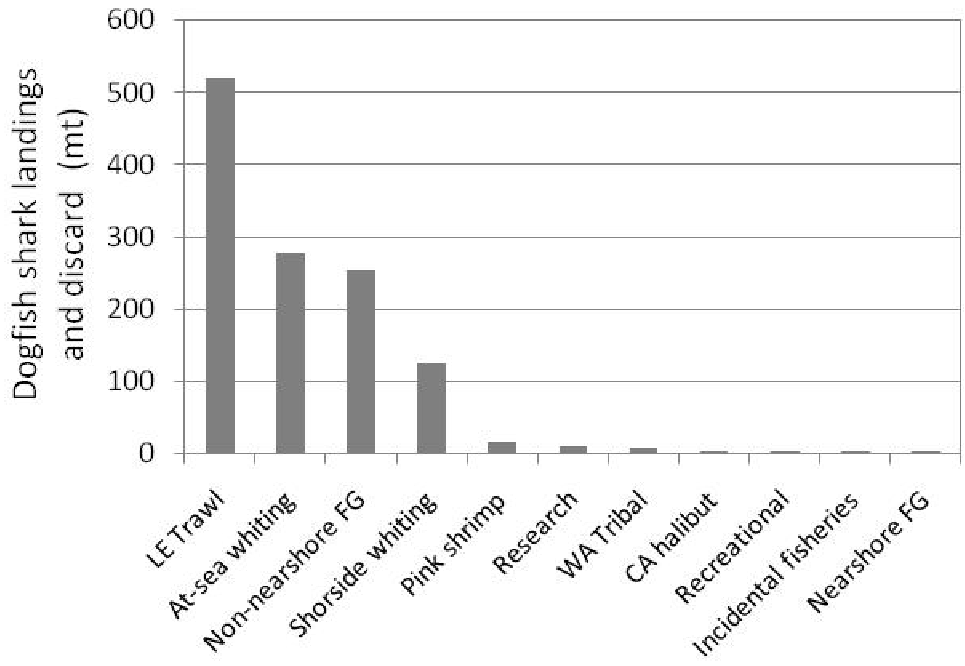

Figure C-25. Total landings and discard of spiny dogfish shark (mt) by sector during 2010. Data acquired from Bellman et al. (2011).

Sector-specific catches and total mortality of dogfish shark has been extremely variable over recent years (**Error! Reference source not found.**). One large difference among years is apparent for the non-nearshore fixed gear fishery, where total mortality during 2006 and 2007 (509 and 563 mt, respectively) was noticeably higher than during 2008-2010 (total mortality ranged from 216 to 332 mt). This reduction in total mortality was due, in part, to the loss of a spiny dogfish processor in northern Washington after the 2007 season. The reduction in processing capability also is responsible for a reduction in dogfish targeting after the 2007 season (see below).

Most sectors showed noticeably higher catches in 2008 relative to other years shown in **Error! Reference source not found.**. For example, total mortality of spiny dogfish for the non-tribal at-sea whiting sectors during 2008 was 673 mt, which was 2x – 11x higher than during the other years. This annual variability in catches should be considered if spiny dogfish set asides or formal allocations become adopted.

Table C-77. West coast groundfish total mortality estimates, by sector in metric tons, for dogfish shark from 2006-2010. Estimates assume 100 percent mortality for discarded dogfish shark. Data acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

	Shoreside commercial fisheries								Total recreational fishing mortality					
YEAR	LE bottom Trawl	CA halibut	Pink Shrimp	Non-nearshore fixed-gear	Nearshore fixed-gear	Shoreside hake mid-water trawl	WA tribal landings	All at-sea hake fisheries	WA	OR	CA	Research	Remaining incidental OA fisheries landings	Estimated total fishing mortality
2006	666.0	--	--	563.0[a]	--	33.2	77.0	59.0	0.0	0.0	3.9	5.8	1.3	1,407.0
2007	652.0	3.0	1.0	509.0	0.0	51.0	113.0	155.0	0.0	0.0	5.0	13.0	1.0	1,504.0
2008	1,023.0	3.0	4.0	332.0	1.0	59.0	303.0	673.0	--	0.0	3.0	14.0	82.0	2,497.0
2009	665.5	3.2	0.4	216.2	0.0	16.0	125.4	163.4	--	0.1	4.9	10.9	1.0	1,206.9
2010	520.1	2.9	16.4	254.1	0.1	124.6	6.9	277.7	--	0.1	1.6	10.2	0.4	1,215.1

[a]Reported as “estimated non-trawl”, which included non-nearshore fixed gear, nearshore fixed gear, and minor landings made with troll

It is important to point out that for the two fisheries that have characteristically targeted and sold dogfish shark in the past (e.g., non-whiting trawl and hook-and-line fisheries), that most of the total mortality is represented by discard mortality, rather than landed fish (Figure C-25). Landings by the non-whiting trawl fishery have been consistently low during 2006-2010, ranging from 43 – 85 mt. Landings for the non-nearshore fishery show a dramatic reduction from 191 mt in 2006 to 10 mt in 2010.

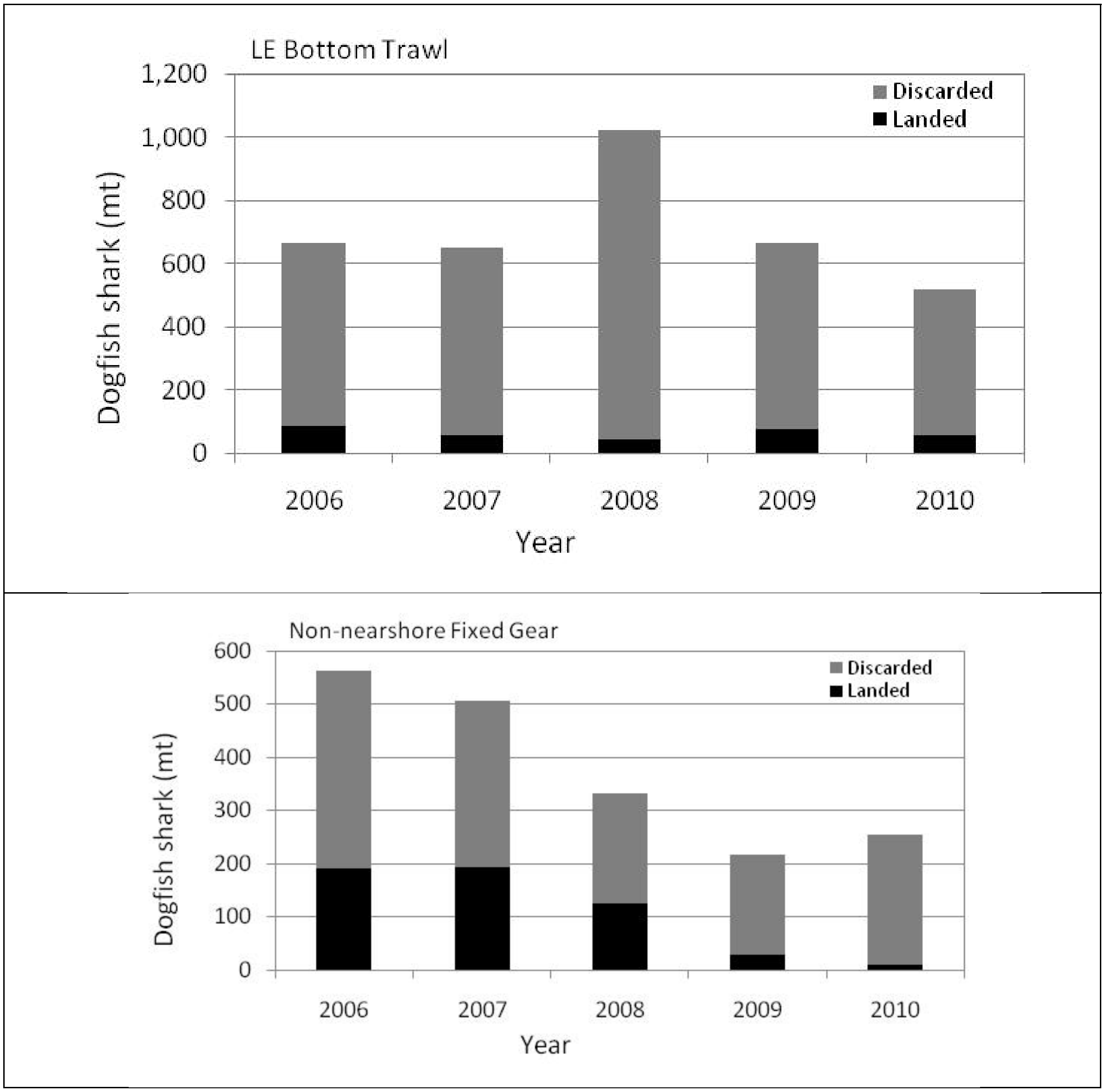

Figure C-26. Discarded and landed dogfish shark (mt) during 2006-2010 for the limited entry non-whiting trawl fishery(top) and the non-nearshore fixed gear fishery (bottom). Data acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

Distribution of dogfish shark along the U.S. West Coast

Approximately 92 percent of dogfish shark total mortality by the non-nearshore fixed gear fisheries and the limited entry non-whiting trawl fishery (landings + discards) occur north of 40°10' N. latitude (Figure C-27; Bellman et al. 2011).

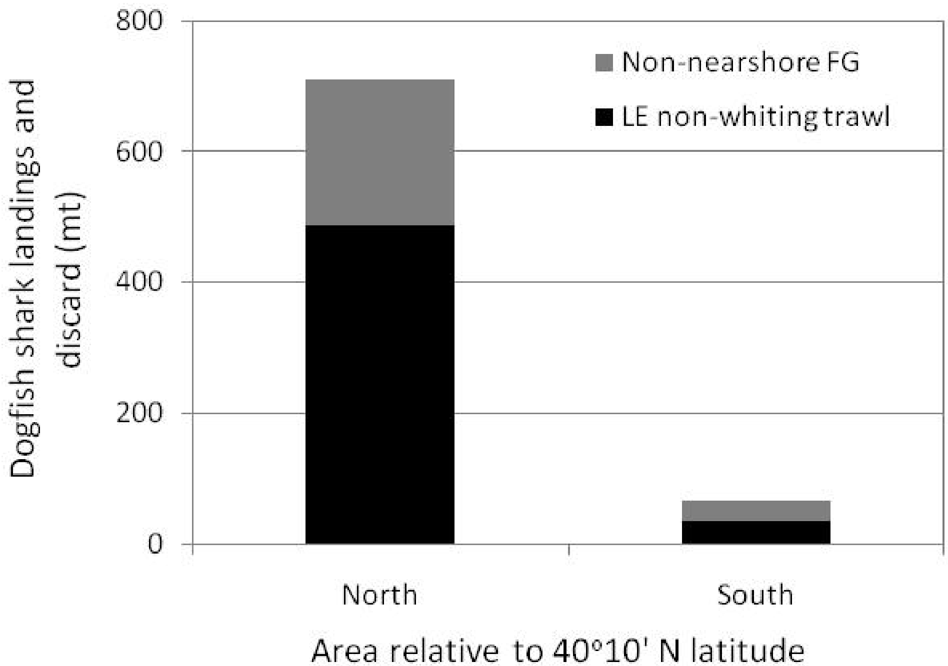

Figure C-27. Dogfish shark landings and discard off the U.S. west coast during 2010 by fishery north and south of 40°10' N. latitude. Data acquired from Bellman et al. (2011).

The latitudinal distribution is provided in more detail by the 2005 west coast groundfish trawl survey (Table C-78; Keller et al. 2008), which shows highest dogfish shark concentrations north of 47°30' N. latitude in the U.S.-Vancouver INPFC area. Dogfish was estimated to be the most abundant of all species caught by the trawl survey within this northern area. The density of dogfish shark is considerably lower in Columbia and Eureka INPFC areas, but relatively high in the Monterey INPFC area, where it ranked #10 relative to all other species caught by the 2005 trawl survey (Table C-78). This bimodal trend of density was also displayed by the 2003 and 2004 trawl surveys (Keller et al. 2007a,b).

Table C-78. Mean catch per unit effort (CPUE; kg/ha) for dogfish shark caught during the 2005 west coast trawl survey by INPFC area. Data acquired from Keller et al. (2008).

INPFC Area	Southern boundary	CPUE (kg/ha)
U.S.-Vancouver	47°30' N. latitude	43.6
Columbia	43°00' N. latitude	< 0.5
Eureka	40°30' N. latitude	2.6
Monterey	36°00' N. latitude	10.1
Conception	Southern boundary of EEZ	< 0.5

The high density of spiny dogfish shark in northern Washington is also demonstrated by the International Pacific Halibut Commission (IPHC) hook-and-line surveys (Figure C-28). Catch rates of dogfish shark were consistently highest north of 46° N. latitude from 1995-2010.

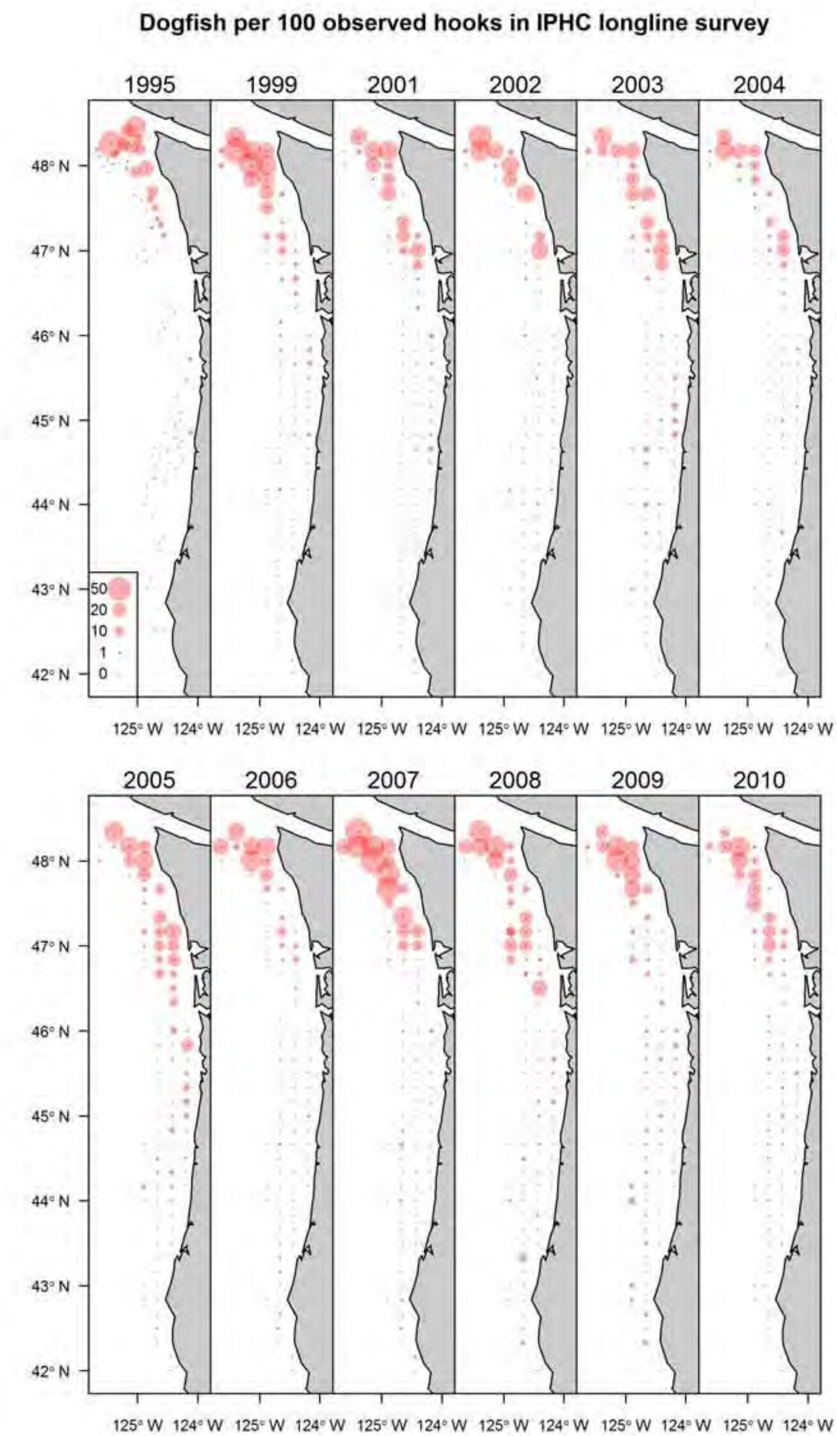

Figure C-28. Spatial distribution of spiny of spiny dogfish catches within the International Pacific Halibut Commission (IPHC) hook and line survey (expressed as the number of dogfish per 100 observed hooks). This figure was acquired from Gertseva and Taylor (2011).

Although dogfish shark were caught by trawl surveys from 20 to 470 fm (Keller et al., 2007a, 2007b, 2008), highest densities were found at the shallowest depths (shoreward of 100 fm) across all INPFC areas (Table C-79; 13.86 kg/ha). Densities declined to 4.7 kg/ha at moderate depths, and were lowest seaward of 301 fm (< 0.16 kg/ha) for all INPFC areas combined. Within the U.S.-Vancouver INPFC area, where densities were highest (Table C-79; Figure C-27), CPUEs were 126.9 kg/ha, 10.9 kg/ha, and < 0.1 kg/ha at the shallowest, moderate, and deepest depth strata (Table C-79).

Table C-79. Mean CPUE (kg/ha) of dogfish shark by depth strata in all INPFC areas combined and within the U.S.-Vancouver INPFC area during the 2005 West coast groundfish trawl survey. Data acquired from Keller et al. (2008).

INPFC Area	Depth (m)	Depth (fm)	CPUE (kg/ha)
All combined	55 – 183	30 – 100	13.9
	184 – 549	100 - 301	4.7
	550 – 1,280	302 - 702	< 0.2
U.S.-Vancouver	55 – 183	30 – 100	126.9
	184 – 549	100 - 301	10.9
	550 – 1,280	302 - 702	< 0.1

Trends in annual landings, discard and price per pound

Gertseva and Taylor (2011) provided a comprehensive catch history for dogfish shark. They showed highest catches in the 1940s, driven by the high demand for Vitamin A. During this period, catches (landings + discards) averaged 6,281 mt per year and peaked at 16,876 mt. The demand for dogfish livers (and therefore West Coast dogfish) waned in the 1950s when synthetic vitamins were developed, but increased again in the 1970s due to increased sales to Europe for fish and chips. Dogfish shark landings averaged approximately 450 mt until recent years (Gertseva and Taylor 2011). That demand for west coast dogfish shark decreased, and the subsequent loss of a processor in northern Washington after the 2007 season resulted in noticeably less landings (Figure C-26) and an increase in at-sea discarding for this species (Figure C-29).

Dogfish discard rates have averaged 90 percent for limited entry non-whiting trawl fisheries since 2006, (range 87% - 91%; Figure C-29). Discard rates were lower for the non-nearshore fixed gear fishery from 2006 – 2008 (62% – 66%) but increased to levels more similar to the recent trawl-discard rates in 2009 (86%) and 2010 (96%). These increased discard rates for the non-nearshore fixed gear fishery roughly coincides with the closing of the processor in northern Washington in 2007. Gertseva and Taylor (2011) showed much lower discarding for dogfish shark by limited entry non-whiting trawl and for hook-and-line fisheries during the 1990s and early 2000s when demand was higher (see above); discard rates during this period when targeting was likely prevalent may have been a as low as 25 percent (trawl) and 14 percent (hook-and line) during some years.

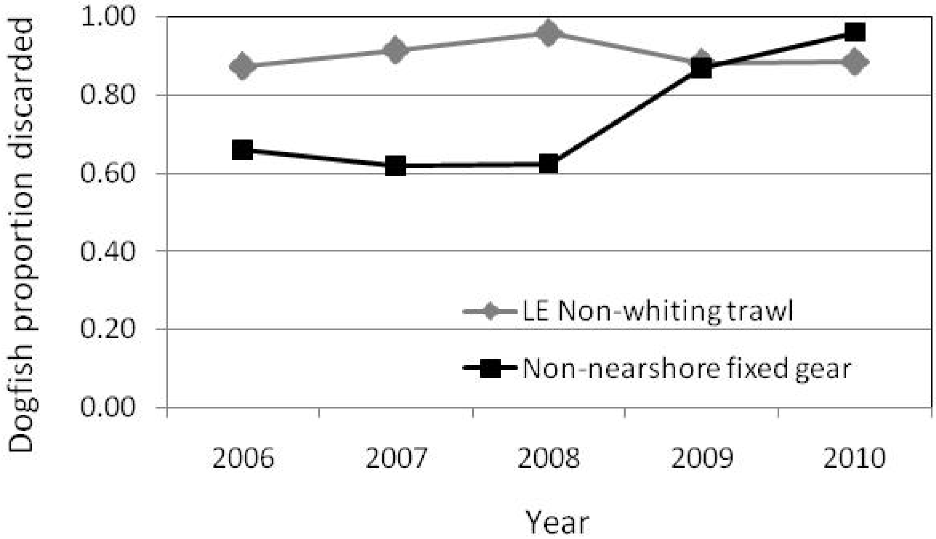

Figure C-29. Proportion of dogfish shark discarded by the limited entry non-whiting trawl and non-nearshore fixed gear fisheries. Data were acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

The ex-vessel prices paid for dogfish shark in recent years has fluctuated between $0.17 and $0.25 per pound for open access and limited entry fixed gear fisheries, and has shown a general decline from $0.37 to $0.28 per pound for trawl since 2008 (Figure C-30). Recent prices may reflect special niche markets, because landings have become small (Figure C-29) relative to earlier years (see Gertseva and Taylor 2011).

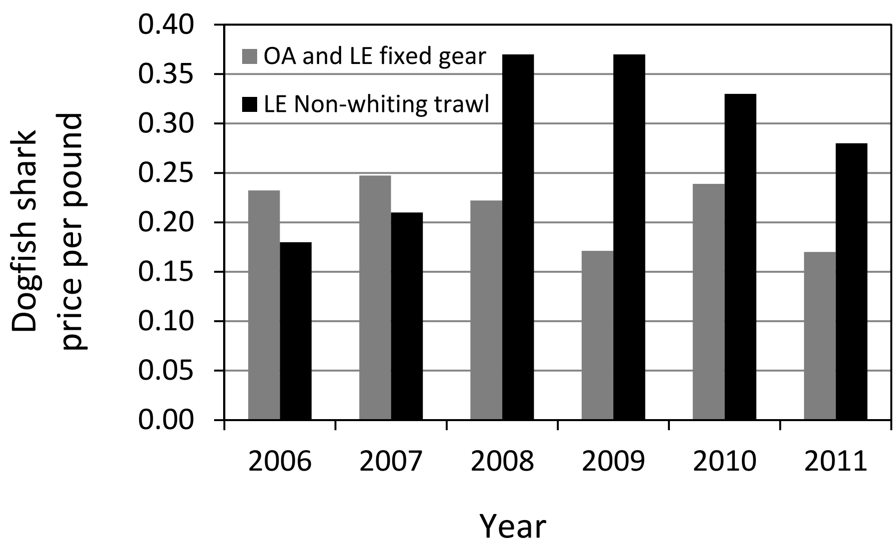

Figure C-30. Dogfish shark price per pound for limited entry (LE) and open access (OA) fixed gear (gray) and limited entry non-whiting trawl (black) by year. Data acquired from PacFIN.

Landings by area and port

Approximately 83 percent of the limited entry non-whiting trawl landings of dogfish shark occurred in the Vancouver and Columbia INPFC areas from 2006-2011, reaching 863,000 pounds over the 5-year period (Figure C-31a; PacFIN data). Noticeable landings were also made in the Monterey INPFC area during this period (140,000 lbs.). Almost no trawl landings of dogfish shark were recorded in the other INPFC areas (Figure C-31a). Port groups receiving most dogfish shark landings from limited entry non-whiting trawlers during 2006-2011 were North Puget Sound (280,000 lbs.), Columbia River Oregon (439,000 lbs.), Monterey (91,000), and Fort Bragg (49,000 lbs.; Figure C-32a. Each of the other port groups received less than 3,000 lbs. of dogfish during 2006-2011.

Landings of dogfish shark by fixed gear fisheries (Figure C-31b) were larger than shown for the trawl fisheries (Figure C-31a) over the 2006-2011 period, and were primarily concentrated in the Vancouver INPFC area (1,334,000 lbs.). Dogfish shark landings in the other INPFC areas over the 5-year period were low and ranged from 335 lbs. to 35,000 lbs. Most dogfish shark landings by limited entry and open access fixed gear fisheries occurred in the North Puget Sound port group (1,252,000 lbs.; Figure C-32b). Small dogfish landings were also recorded for Central Washington area (86,000 lbs.) and Brookings (35,512) area port groups during 2006-2011.

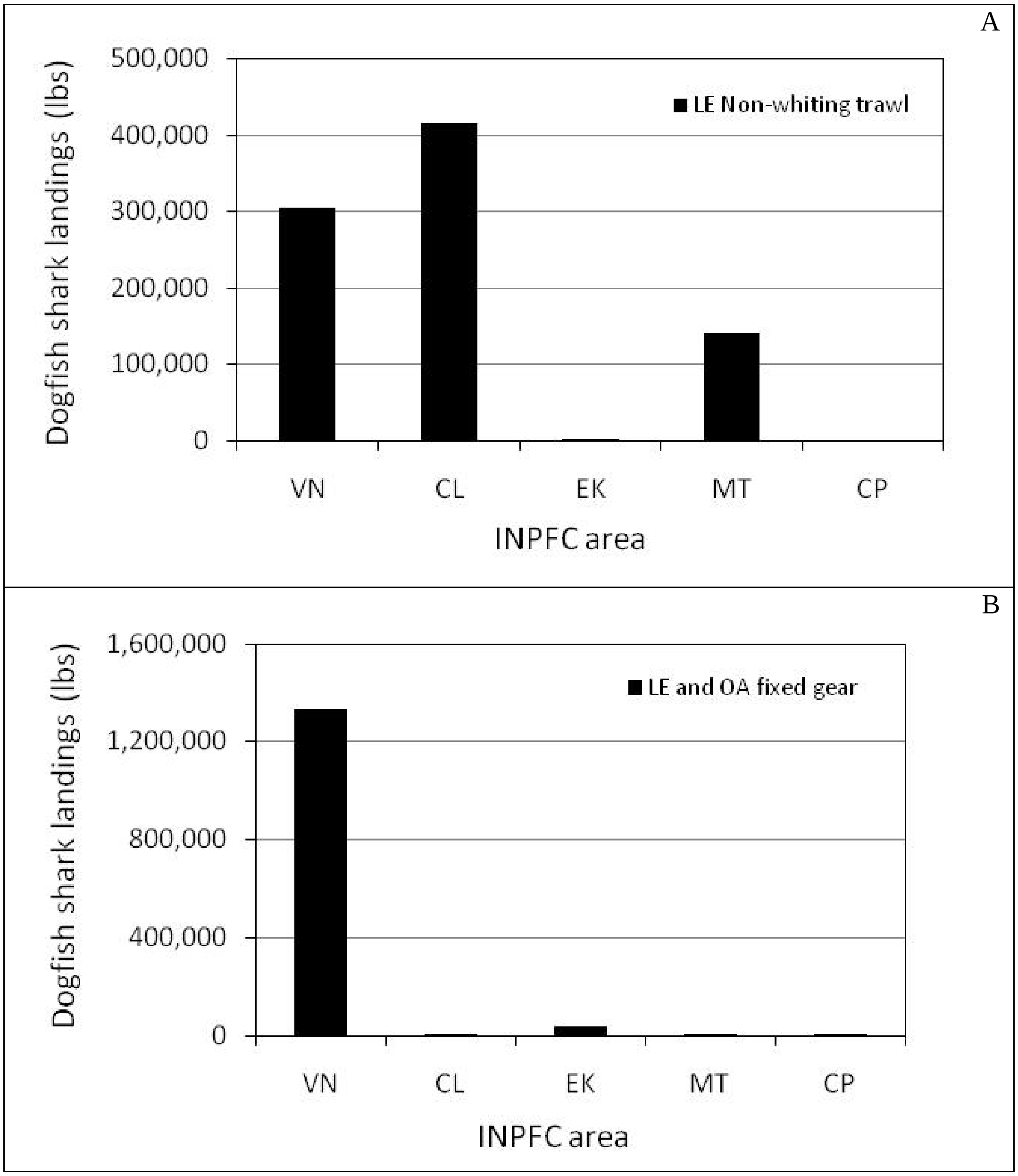

Figure C-31. Dogfish shark landings (lbs.) by International North Pacific Fishery Commission (INPFC) area during 2006-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear fisheries.

Note: Data were acquired from PacFIN. INPFC areas are: VN = Vancouver, CL = Columbia, EK = Eureka, MT = Monterey, and CP = Conception.

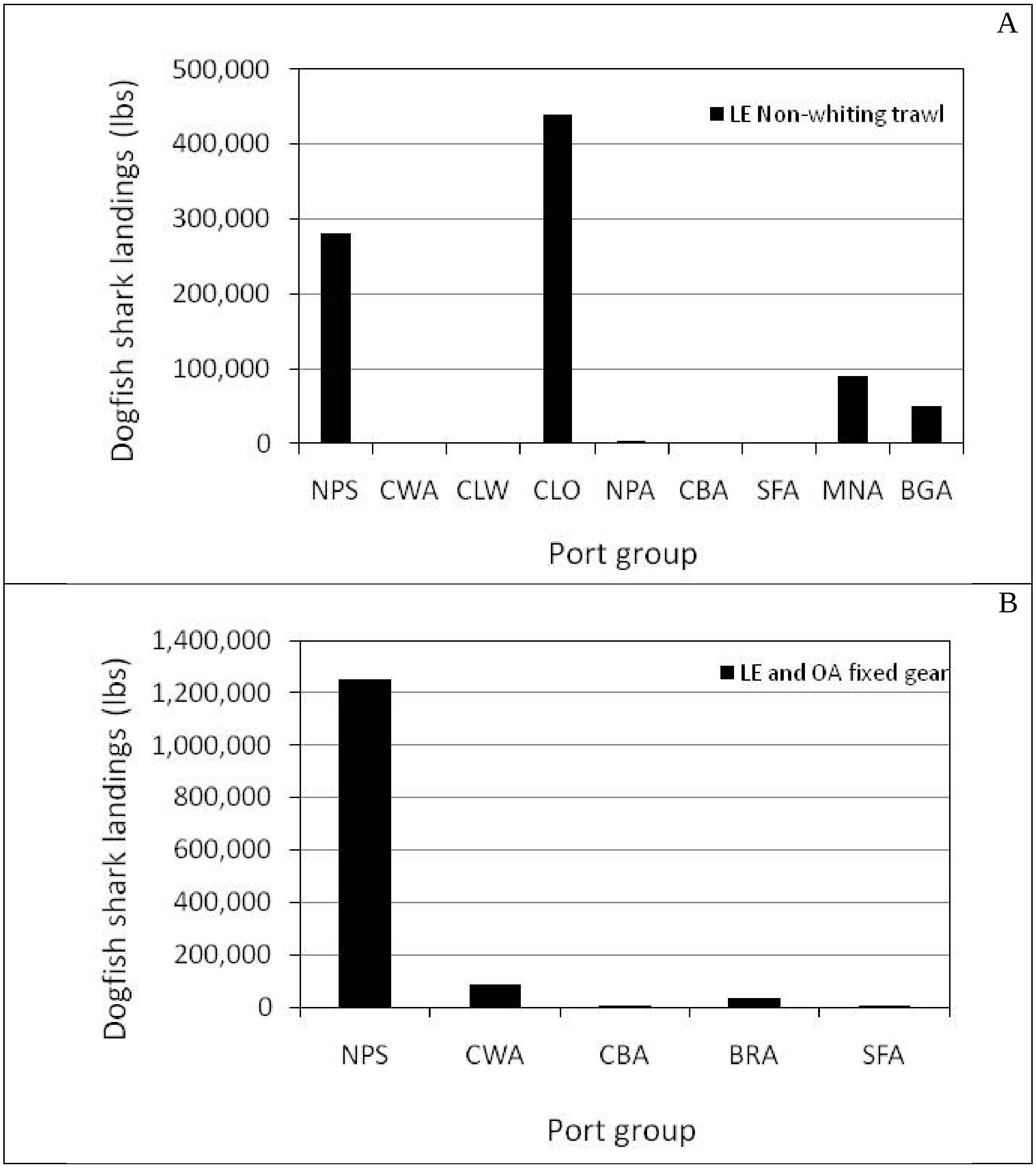

Figure C-32. Dogfish shark landings (lbs.) by port group during 2006-2011 for (A) limited entry non-whiting trawl and (B) open access and limited entry fixed gear.

Note: Data were acquired from PacFIN. Port group areas are: BGA = Fort Bragg; BRA = Brookings; CBA = Coos Bay; CLO = Columbia River Oregon Ports; CLW = Columbia River Washington Ports; CWA = Coastal Washington; MNA = Monterey; NPA = Newport; NPS = North Puget Sound; SFA = San Francisco. Port group areas with less than three vessels making landings were omitted for confidentiality.

Basis for and Development of Potential New Management Measures

Management measures already in effect are likely holding the total mortality of dogfish shark lower than would otherwise be observed in their absence. For example, the current RCA structure north of 46°16' (0 – 100 fm for fixed gear; Table C-75) and north of 48°10' (0 – 150 or

0-200 fm trawl; Table C-74) prevents fishing by these sectors in areas showing the highest concentrations of dogfish shark along the U.S. west coast (Figure C-28; Table C-78 and Table C-79). Regardless, dogfish shark may require even more restrictive management measures to keep fishing mortality below their 2013-2014 ABC contributions (see Table C-76 and Table C-77; also see Agenda Item E.9.b, GMT Report 2, November 2011). Although landings have been low during recent years (Figure C-29), recent WCGOP total mortality reports suggest that discard and landings of dogfish shark (Table C-77) would exceed the 2013-2014 ABC for the ABC-contribution for dogfish shark (Table C-76). The Other Fish complex ABCs would not be exceeded by recent historical catches.

The markets for dogfish shark have declined in recent years (Gertseva and Taylor 2011), resulting in decreased landings (Figure C-29) and increased discard rates (Figure C-29). Targeting has probably also decreased due to the decreased market for dogfish shark. If markets improve to levels seen in the late 90s and early 2000s (see Gertseva and Taylor 2011), then it is possible that total mortality may increase to even higher levels.

Highest 2010 total mortalities for dogfish shark are shown for limited entry non-whiting trawl, at-sea whiting, non-nearshore fixed gear, and shoreside-whiting trawl fisheries (Figure C-25; **Error! Reference source not found.**). Catch (landings + discards) of dogfish shark in the at-sea whiting (277.7 mt) and shoreside whiting (124.6 mt) fisheries is incidental while targeting whiting and represents only 0.3 percent and 0.2 percent of the whiting catch, respectively (Bellman et al., 2011). "Trip" limits, even if feasible for these whiting fisheries, would therefore be ineffective for reducing the total mortality of dogfish shark. Trip limits are not feasible for whiting fisheries because (a) the at-sea sector processes their catch prior to landings and (b) the shoreside-whiting sector must immediately immerse their catch at low temperatures in the fish hold to prevent tissue degradation. Thus, most of the discussions and analyses that follow will primarily focus on limited entry non-whiting trawl and limited entry and open access fixed gear fisheries. These fisheries have demonstrated dogfish targeting in the past (see below). If markets develop to recent historic levels, then increased targeting may occur. Depth-area restrictions and other potential management measures may be considered for whiting sectors but are not included within this analysis.

The GMT previously suggested that dogfish shark may be managed using time-area tools, such as trip limits, area closures, and depth restrictions (Agenda Item E.9.b, GMT Report 2, November 2011). This section describes the development and basis for new (or additional) management measures beside (besides No Action). Data from WCGOP and PacFIN were used to develop and evaluate these potential measures and options. Other potential management measures are also discussed.

Trip Limits

Trip limits may effectively reduce total mortality if trip limits (a) discourage targeting, (b) encourage fishermen to move out of or avoid areas with high dogfish shark catch rates and (c) result in trip limit induced discards (instead of landings) if the mortality of discarded dogfish shark is low. It is clear that reducing targeting may reduce total mortality. It is also clear that fishing in areas with lower incidental catch rates may reduce total mortality. However, if trip limits result in discards (rather than landings) without affecting fishers behavior (e.g., selection of fishing location), and if the discard mortality is 100 percent, then trip limits may simply convert landed mortality into discard mortality at a 1:1 conversion. In this case, total mortality would be unaffected by trip limits. Although the WCGOP had previously assumed 100 percent discard mortality for dogfish shark (e.g., Bellman et al., 2011), catch monitoring will now assume 100 percent discard mortality for trawl fisheries and 50 percent discard mortality for fixed gear fisheries as described by (Gertseva and Taylor 2011) and recommended by the SSC (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). Under these new discard mortality assumptions, trip limits may be effective for reducing total mortality even if catches are incidental and fishermen behavior does not change because of trip limits (e.g., they do not move from or avoid areas with high dogfish shark catch rates and continue targeting other species while discarding dogfish in excess of trip limits).

Are dogfish shark targeted? It is well known that dogfish shark may form very large and dense schools (see Gertseva and Taylor 2011), and may be targeted if markets exist. It is also common knowledge that large schools may be inadvertently encountered while targeting other groundfish species. The following is an examination of dogfish shark catches to provide insight on the potential level of targeting compared to catch that is largely incidental. We caution that this analysis uses historical data and thus may not accurately predict the future, especially if markets and RCAs change.

Catch per haul or set: West coast groundfish observer data show that most hauls where dogfish shark were present in the catch produced less than 500 pounds (trawl) and 250 lbs. (fixed gear) during 2009 and 2010 (Figure C-33). However, hauls frequently exceeded 1,000 lbs. of dogfish shark per haul for both trawl and fixed gear, and reached nearly 12,000 lbs. for both gear types. These data suggest that dogfish shark are most commonly encountered at relatively low volumes, but are occasionally caught in high volumes by both gear types.

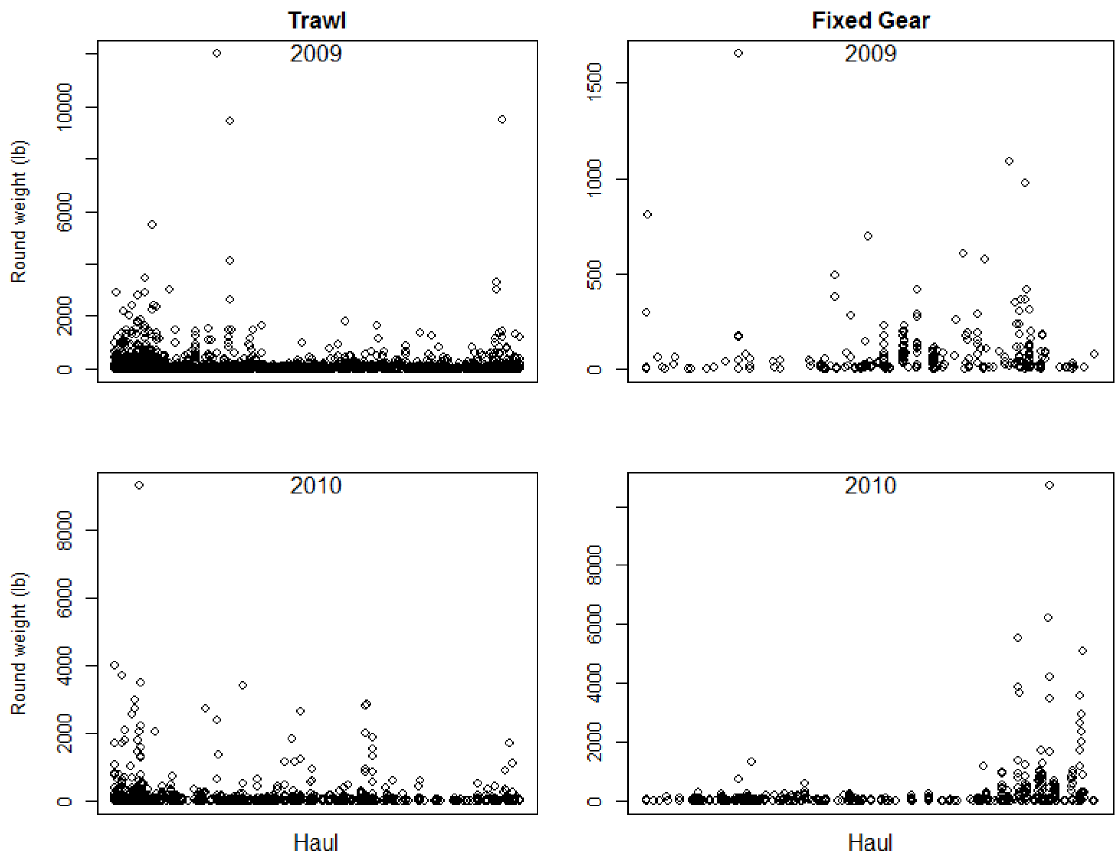

Figure C-33. Dogfish shark catch (lbs.) by haul or set by limited entry non-whiting trawl (Trawl) and limited entry and open access fixed gear (Fixed Gear) during 2009 and 2010. Only positive tows were included. Data were acquired from the WCGOP.

Discard and retention weight per trip: The maximum weight of retained dogfish shark per trip rarely exceeded the maximum weight of those discarded (Figure C-34). Dogfish shark were frequently discarded at levels between 10,000 and 40,000 pounds per trip for both trawl and fixed gear. More than 50,000 pounds of dogfish shark were incidentally caught and discarded on some trips.

The 75th and 50th percentiles (weight) for discarded dogfish per trip are consistently low (i.e., less than 100 – 300 lbs.), meaning that most trips encounter low concentrations of dogfish, and larger catches were relatively rare. The 75th and 50th percentiles (weight) for trips that retained dogfish shark were, in some cases, substantially higher than for trips that discarded dogfish shark during the same years, especially for trawl. These data, although inconsistent across years, suggest that when fishers intend to retain dogfish shark, they may select areas where high catch rates are likely and known.

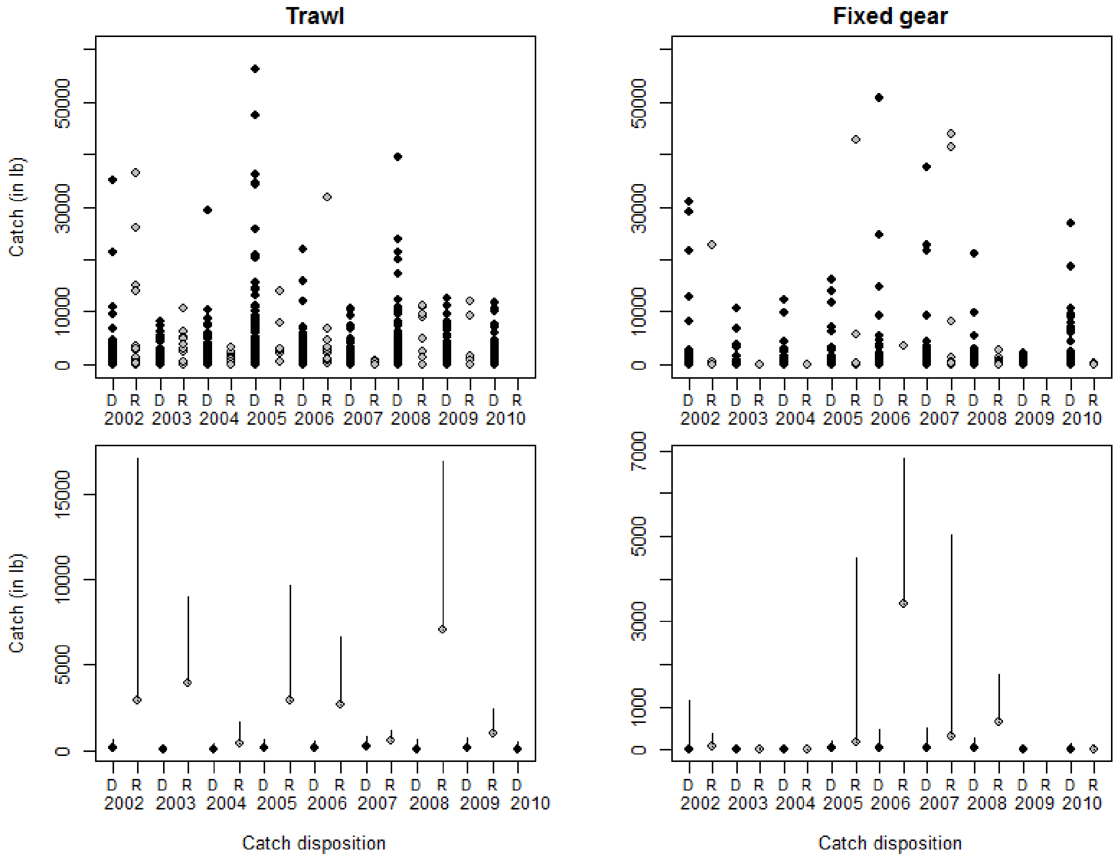

Figure C-34. Spiny dogfish catches by trips (top row) and median (point) and 75% quartile (upper end of vertical bars) catch values (bottom row) in observed trips that discarded (D; black points) or retained (R; gray points) dogfish shark for years 2002-2010 for two gear types (columns).

Although dogfish may be targeted, resulting in large catches, large unintentional catches of dogfish shark also occur. The level of discard shown in Figure C-34 would likely be avoided if possible. Setting longline gear in areas with high concentrations of dogfish shark, while targeting other species, results in bait loss due to dogfish taking the bait or the capture of dogfish shark on baited hooks before the gear reaches the bottom (or soon after). Towing a trawl through schools or high concentrations of dogfish shark would also be unintentional if retention was not planned for many reasons, including (a) the girth, rough skin, and spines of dogfish shark make them extremely susceptible to gilling (i.e., becoming wedged within 4.5” trawl meshes), and may become tightly stuck in almost every mesh of the codend, and (b) dogfish shark are difficult to clear from a deck because of their sandpaper-like skin. Shark are difficult to remove from the deck with a shovel, and therefore must be tossed overboard one at a time when discarding. The incidental capture by trawl and subsequent discard of large amounts shown in Figure C-34 would result in hours of down time due to picking gilled fish from the meshes and clearing the deck.

Figure C-34 indicates that maximum trip size may not be a good indicator of dogfish shark retention, because this species is sometimes encountered in very high volumes when retention is not planned. Some targeting may occur, however, as is suggested by the difference between retained and discarded median percentiles (weights) during certain years.

Landing size of dogfish shark relative to other groundfish: Another way to evaluate the level of targeting for dogfish shark is to compare the landed weight of dogfish to the landed weight of all groundfish species by trip (Figure C-35). For limited entry non-whiting trawl (Figure C-35a), most landings of spiny dogfish shark were less than 300 lbs./trip and represented a small percentage of total groundfish landed by those trips. Even for cases where dogfish landings reached 5,000 lbs. per trip, the proportion of the total groundfish landed was often less than 25 percent, because groundfish landings reached more than 100,000 lbs./trip. In these cases, dogfish were most likely incidentally caught while targeting a suite of groundfish species, but were retained and sold. There were cases for trawl; however, where dogfish shark landings exceeded 20,000 lbs./trip (reaching 50,000 lbs./trip) and where the percent contribution of dogfish shark exceeded 50 percent of the total groundfish landings (Figure C-35). Approximately 5 percent of the trawl landings consisted of more than 50 percent dogfish shark. These infrequent cases may be representative of trips directed at dogfish shark (i.e., targeting).

The relationship between dogfish landings and total groundfish landings for fixed gear fisheries suggests numerous directed dogfish trips during the 2006-2011 period (Figure C-35b). Dogfish shark landings during these trips reached 45,000 pounds; numerous landings (7%) exceeded 10,000 lbs. of dogfish shark. Indeed, groundfish landings that exceeded 10,000 pounds by these fisheries typically consisted almost entirely dogfish shark (Figure C-35b). Approximately 10 percent of the landings consisted of more than 80 percent dogfish shark.

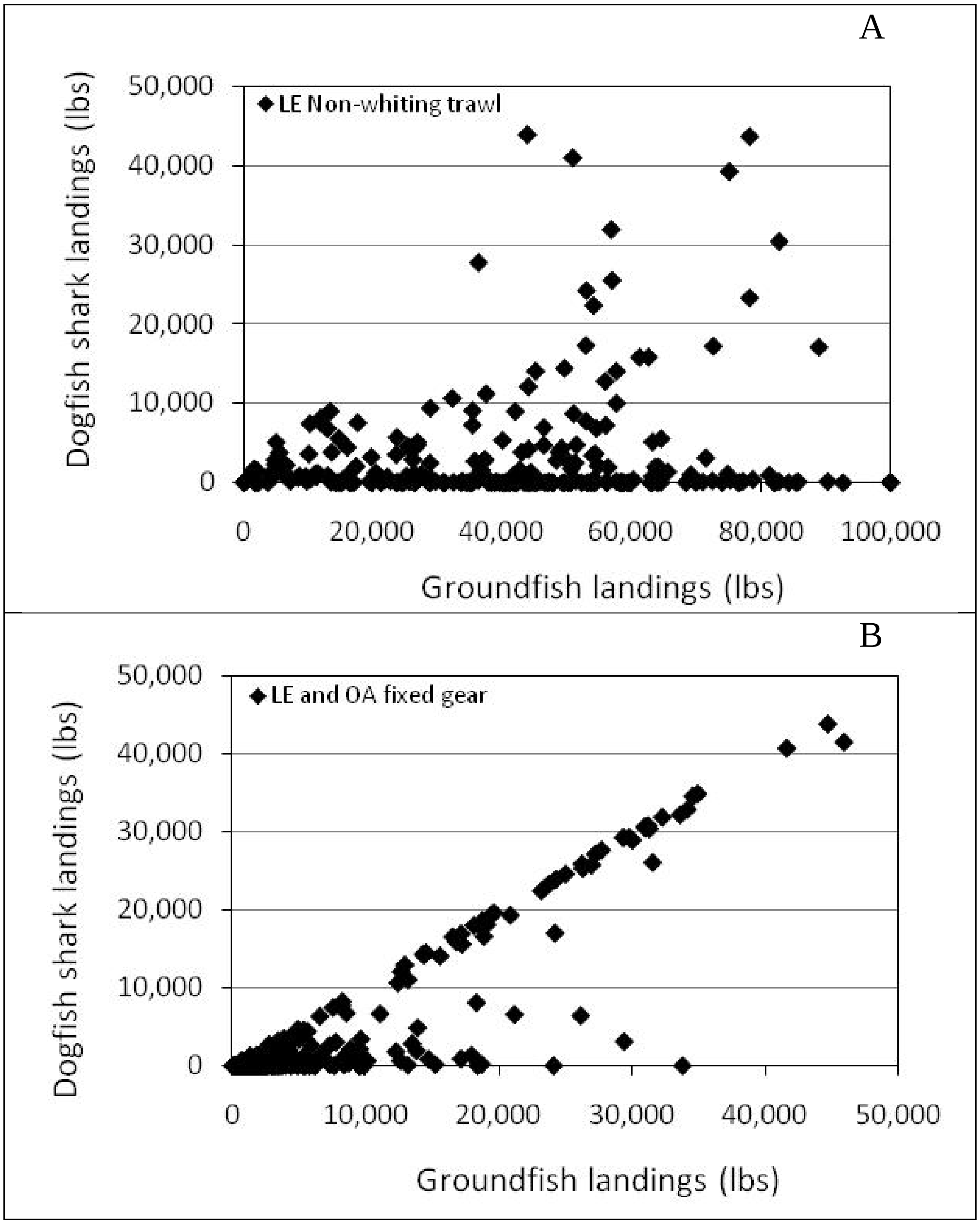

Figure C-35. Relationship between landed weight (pounds) of dogfish shark and the landed weight of all groundfish by trip during 2006-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear.

Note: The x-axis for the limited entry non-whiting trawl was truncated at 100,000 lbs. for illustrative purposes, which caused the exclusion of fifteen groundfish landings (all exceeding 100,000 lbs.) and fifteen associated dogfish landings (ranging from 7 – 955 lbs.). Data were acquired from PacFIN.

Bimonthly Landings and Basis for the Selection of Alternative Trip Limits: Bimonthly landings of dogfish shark over nearly a 6-year period (2006 – October 2011) by limited entry non-whiting trawl vessels are shown in Figure C-36. Cumulative bimonthly landings of dogfish shark for limited entry non-whiting trawl ranged from only a few pounds to nearly 72,000 pounds per vessel per bimonthly period. The pattern of bimonthly landings is somewhat linear until approximately 5,000 – 7,000 pounds, where vessels began landing increasingly more dogfish shark relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited entry non-whiting trawlers (50th percentile) were less than 588 pounds whereas the 75th percentile of bimonthly landings resulted in 4,752 pounds. The 90th percentile was 20,547 pounds. Three bimonthly trip limit options for the limited entry non-whiting trawl fishery were identified based on approximate 50, 75, and 90 percentiles: 600, 5,000, and 20,000 pounds per bimonthly period.

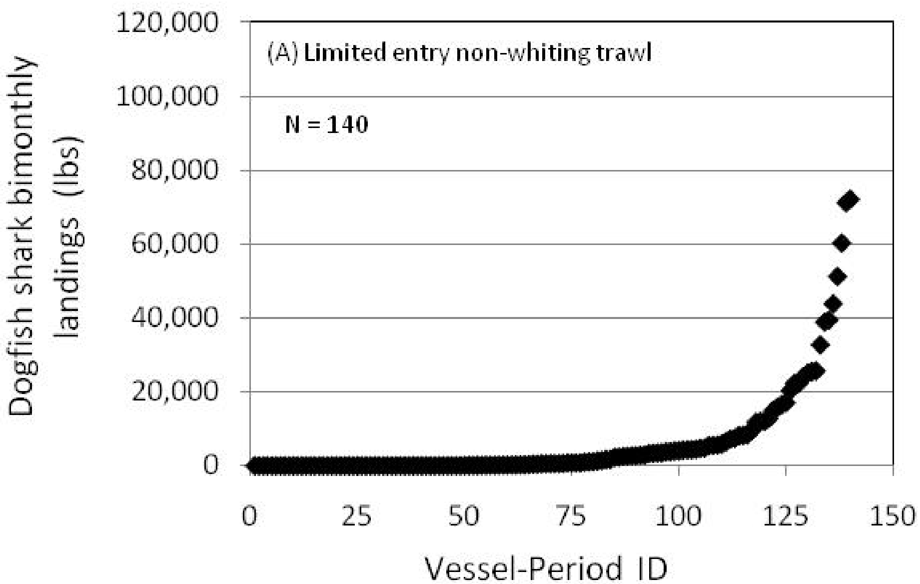

Figure C-36. Bimonthly landings (lbs.) of dogfish shark by vessel and period for 2006 – October 2011 (sorted by bimonthly-landing size) for limited entry non-whiting trawl. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without dogfish shark were excluded.

Cumulative bimonthly landings of dogfish shark over nearly a 6-year period (2006 – October 2011) by limited entry and open access fixed gear fisheries are shown in Figure C-37. Most (85%) cumulative bimonthly landings were less than 1,000 pounds for the open access fishery, whereas 5 percent of the bimonthly landings ranged from 5,000 to 74,000 pounds. The 50th percentile for open access fixed gear was 50 lbs.

Cumulative bimonthly landings for the limited entry fixed gear fishery reached nearly 115,000 pounds; seven bimonthly cumulative landings (3%) exceeded 60,000 pounds. The pattern of bimonthly landings for limited entry fixed gear fisheries (primarily non-nearshore fishery) is somewhat linear until approximately 5,000 pounds, when vessels began landing increasingly more dogfish relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited fixed gear vessels (50th percentile) were less than 314 pounds, whereas the 75th percentile of bimonthly landings resulted in 2,245 pounds. The 90th percentile was 17,657 pounds. We therefore identified three bimonthly trip limit options for the open access and limited entry fixed gear sectors based on these approximate 50, 75, and 90 percentiles: 300, 2,500, and 18,000 pounds per bimonthly period.

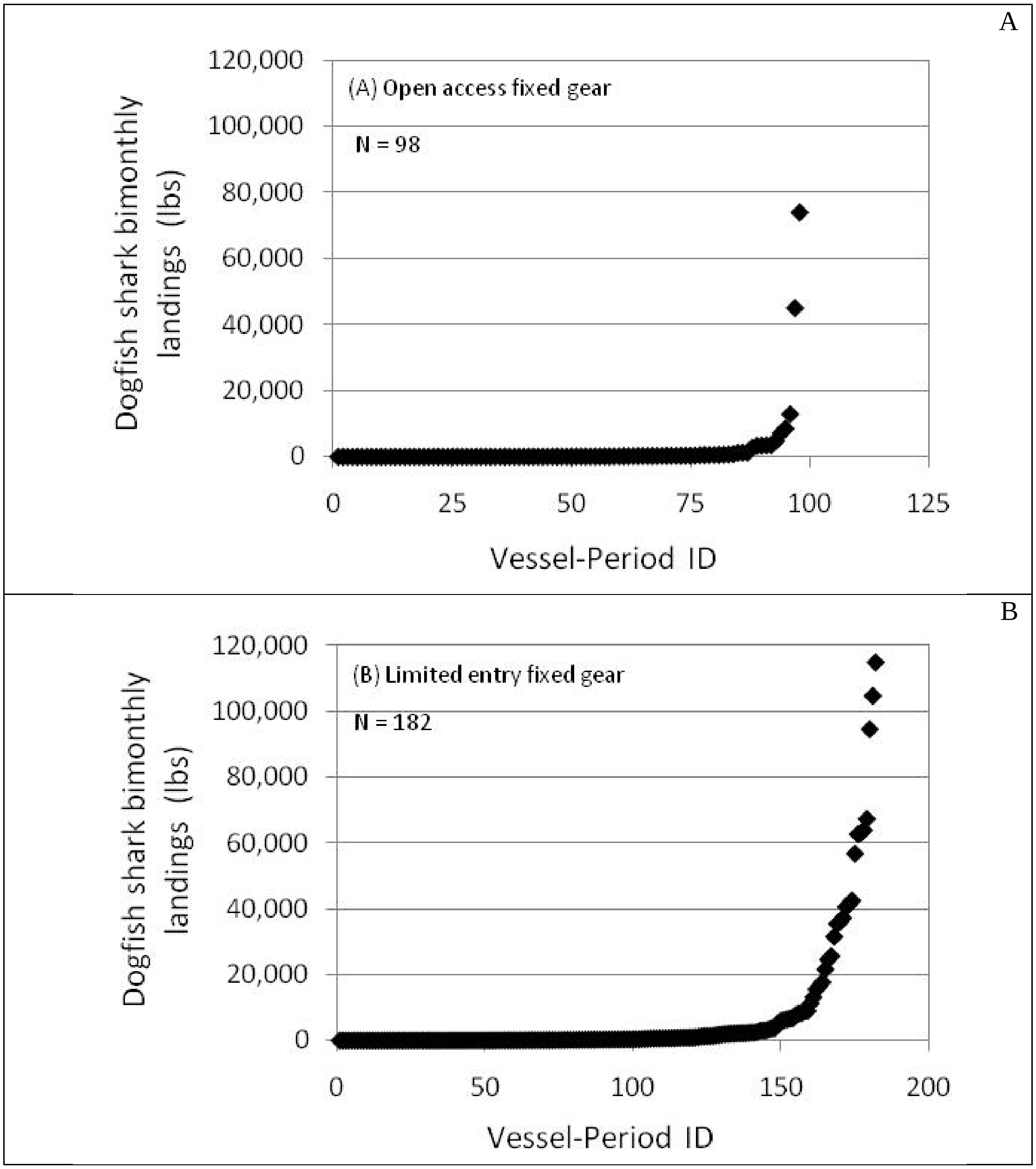

Figure C-37. Bimonthly landings (lbs.) of dogfish shark by vessel and period for 2006 – October 2011 (sorted by bimonthly-landing size) for (A) Open access fixed gear, and (B) limited entry fixed gear. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without dogfish shark were excluded.

Can trip limits reduce dogfish shark mortality? It is uncertain how any reduction in landings may alter total mortality of dogfish shark, because catch size is not a good predictor of retention (Figure C-34). Even though some targeting occurs when markets are available (Figure C-35), targeting has likely decreased, discarding has increased (Figure C-29), and landings have decreased since 2008 (Figure C-26). If trip limits result in reduced targeting (or moving from areas with high concentrations of dogfish), then some reduction in total mortality may occur. In addition, if mortality of dogfish shark is something less than 100 percent, then total mortality may be reduced under trip limit management even if trip limits cause discards.

It is clear that current dogfish trip limits (60,000 lbs./month for trawl and 100,000-200,000 lb./2 months for fixed gear; Table C-73) would have had almost no impact on landings over the past 6 years (Figure C-36 and Figure C-37). Two fixed gear landings may have been impacted by the 100,000 lb./2 month limit for that fishery, and no trawl landings would have been affected by the trawl limit. Nonetheless, historical catch data demonstrates that dogfish shark can be targeted and caught with few other groundfish species at high volumes (Figure C-35). Appropriate trip limits may therefore prevent the potential for large-volume targeting, especially for fixed gear fisheries. On the other hand, large amounts of dogfish shark are incidentally caught and discarded (Figure C-34). Therefore, even under trip limits, incidental catch may remain high. In these cases, trip limits may have little effect on most potential encounters and may simply convert landings to discards. It is important to be aware that, at present, most dogfish encountered are discarded even in the absence of effective trip limits.

A reduction in total mortality may occur if some proportion of discarded dogfish shark survives, even if fishing behavior does not change (i.e., fishermen do not change their fishing location and strategy once reaching the trip limit). Although during previous years, catch accounting assumed discard mortality of 100 percent for dogfish shark (e.g., Bellman et al. 2011), it is likely that some of the fixed-gear caught dogfish survive the discard process. It is unlikely, however, that trawl-caught and discarded dogfish survive, especially when caught in large amounts. Gertseva and Taylor (2011) assumed 50 percent discard mortality for dogfish shark in the fixed gear fisheries, and 100 percent mortality for dogfish discarded by trawl fisheries. Effective March 2012, the assumed discard mortality rate for dogfish shark is equal to that assumed by Gertseva and Taylor (2011; Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). Hence, trip limits applied to fixed gear fisheries (i.e., non-nearshore fixed gear) will likely reduce mortality even if fishermen behavior does not change.

Commercial catch rates by depth and identification of potential alternatives for depth-area based management

West coast groundfish trawl survey data showed highest densities of dogfish shark north of 47°30’ N. latitude (Vancouver INPFC Area; Table C-78) at depths less than 100 fm. This survey showed that dogfish shark were also present but less abundant between 100-300 fm, and almost nonexistent at depths > 300 fm. High catch rates have also been shown by IPHC hook and line surveys north of 46° N. latitude (Figure C-28). We provide additional information in Table C-80 and Table C-81 from the WCGOP to further elucidate potential depth-area management measures that may reduce dogfish total mortality. Table C-80 and Table C-81 suggest that dogfish shark catch rates (CPUE) may be high at much deeper depths than 300 fm, and in some cases, to at least 400 fm. The commercial catch data from WCGOP (Table C-80 and Table C-81) support remaining conclusions drawn from other data sources (e.g., trawl survey and the IPHC hook-and-line survey) - largest catches and CPUEs were generally north of 45°46’ N. latitude (Table C-79).

Interpretations of Table C-80 and Table C-81 should be made with caution. These represent dogfish shark catches only during observed hauls, therefore, sample sizes are small and may not be representative of the fleet. In addition, RCA structures (current and past) affected catches and may affect interpretations. For example, low catches at some depth strata are reflective of RCA impacts rather than dogfish shark density. This can be seen for trawl where catch may appear bi-modal and low at moderate depths (e.g., 100-200 fm; Table C-80) where RCAs have typically been in regulation throughout much of the 2002-2010 period (see Table C-74). Low catches of dogfish shark due to RCAs are also apparent for fixed gear at depths less than 100 fm (north of 40°10' N. latitude) and depths less than 150 fm (south of 40°10' N. latitude). This demonstrates that the current RCA structure already prevents the capture of dogfish shark over many areas and depths where densities are high. Depths with the least restrictive 2012 RCAs are displayed by gray cells in Table C-80 and Table C-81.

Table C-80. Observed catch (lbs.) of dogfish shark by depth north of 45°46' N. latitude by depth (fm) for fixed gear and trawl sets (or hauls) for 2002-2010.

	Fixed gear				Trawl			
Area 1	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
North of 48°10'	0-100	0	0.0	0.00	0-100	279,868	53.6	40.32
	100-150	46,066	25.1	60.49	100-150	191,974	36.8	50.80
	150-200	28,240	15.4	49.19	150-200	49,013	9.4	118.03
	200-250	22,257	12.1	31.42	200-250	220	0.0	3.23
	250-300	32,376	17.6	46.77	250-300	709	0.1	4.45
	300-350	18,070	9.8	55.57	300-350	12	0.0	0.95
	350+	36,557	19.9	113.30	350+	5	0.0	0.77
	Total	183,566				521,800		

Area 2	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
48°10' - 45°46'	0-50	0	0.0	0.00	0-50	14,692	1.0	6.13
	50-100	6,358	0.9	343.66	50-100	678,475	45.4	20.72
	100-150	264,741	38.5	44.43	100-150	239,244	16.0	43.41
	150-200	200,465	29.2	31.26	150-200	62,063	4.2	33.91
	200-250	110,152	16.0	30.16	200-250	311,495	20.8	28.76
	250-300	67,221	9.8	42.41	250-300	122,284	8.2	14.90
	300-350	6,928	1.0	12.91	300-350	55,518	3.7	9.65
	350-400	4,836	0.7	49.90	350-400	10,319	0.7	5.57
	400+	26,735	3.9	81.95	400-450	621	0.0	1.54
					450-500	178	0.0	1.67
					500+	188	0.0	1.73
	Total	687,436				1,495,075		

Note: CPUE (lbs./hour) and % of total catch by area are also provided. Some depth bins were collapsed due to confidentiality concerns. Gray shading represents the most liberal 2012 RCA throughout the year for trawl (shoreward and seaward) and fixed gear (seaward). Data were acquired from WCGOP.

Table C-81. Observed catch (lbs.) of dogfish shark by depth south of 45°46' N. latitude by depth (fm) for fixed gear and trawl sets (or hauls) for 2002-2010.

	Fixed gear				Trawl			
Area 3	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
45°46 - 40°10	0-150	19,035	20.9	9.59	0-100	46,327	9.2	4.68
	150-200	44,160	48.6	7.29	100-150	41,547	8.2	8.66
	200-250	23,028	25.3	5.26	150-200	25,418	5.0	22.39
	250-300	3,985	4.4	4.27	200-250	295,398	58.5	19.18
	300+	661	0.7	1.92	250-300	76,364	15.1	6.97
					300-350	18,155	3.6	3.64
					350-400	944	0.2	1.27
					400-450	350	0.1	1.10
					450-500	158	0.0	1.14
					500-550	88	0.0	1.06
					550-500	32	0.0	0.83
					600+	26	0.0	1.27
	Total	90,870				504,807		

Area 4	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
South of 40°10'	0-100	963	7.3	2.26	0-50	15,356	4.0	2.45
	100-150	0	0.0	0.00	50-100	49,910	13.0	5.37
	150-200	382	2.9	6.12	100-150	133,889	34.8	38.67
	200-250	6,132	46.7	7.89	150-200	40,335	10.5	20.78
	250-300	2,456	18.7	3.43	200-250	118,243	30.8	34.07
	300-350	1,441	11.0	1.13	250-300	22,564	5.9	8.55
	350-400	1,255	9.6	2.93	300-350	3,396	0.9	3.25
	400-450	126	1.0	1.05	350-400	459	0.1	1.33
	450-500	102	0.8	1.59	400+	88	0.0	0.59
	500-550	72	0.5	0.52				
	550-600	52	0.4	1.09				
	600+	142	1.1	0.79				
	Total	13,123				384,239		

Note: CPUE (lbs./hour) and % of total catch by area are also provided. Some depth bins were collapsed due to confidentiality concerns. Gray shading represents the most liberal 2012 RCA throughout the year for trawl (shoreward and seaward) and fixed gear (seaward). Data were acquired from WCGOP.

Depth restrictions in addition to current No Action RCAs (see Table C-74 and Table C-75) may reduce the catch (or catch rates) of dogfish shark relative to No Action. For trawl, 21-59 percent of the observed dogfish shark catch occurred between 200 and 250 fm south of 48°10' N. latitude (Table C-80 and Table C-81) during 2002-2010. These depths also exhibited relatively high CPUEs (20-34 lbs./hour). Extending the seaward trawl RCA from 150/200 fm to 250 fm would likely reduce dogfish shark encounters. Actions could also be taken shoreward of the RCA to reduce catches (or catch rates) of dogfish shark; 45 percent of the dogfish shark caught between 45°46' and 48°10' N. latitude was at 50-100 fm during 2002-2010 (Table C-80); CPUE in this area was (21 lbs./hour) and ranked third among currently open depth strata. The shoreward trawl RCA was typically 75 fm in this area (Table C-74), which suggests that moving the trawl RCA from 75 to 50 fm may reduce catch (or catch rates) of dogfish shark considerably.

As shown for trawl, depth-area restrictions may also result in reduced encounters of dogfish shark by fixed gear sectors. Fixed gear RCAs have typically extended to 100 fm north of 40°10 N. latitude since 2002 (Table C-75). Extending the seaward RCA from 100 fm to 150 fm north of 45°46' N. latitude may result in substantial reductions of dogfish shark encounters. For example, the 2002-2010 observed catches of dogfish shark were high (25-39% of the total catch) in this 100-150 fm depth range in the areas north of 45°46' N. latitude; (Table C-80). Implementation of a 150 fm RCA (northern areas) may therefore reduce catches of dogfish shark for these sectors.

There is uncertainty regarding the level of savings (i.e., reduction in total mortality) that may occur by extending the seaward RCAs (i.e., trawl to 250 fm and fixed gear to 150 fm). Dogfish shark are incidentally caught while fishers target other species (Figure C-35). Moving the RCA deeper may require fishers to target the other groundfish species (e.g., sablefish for fixed gear) at more restrictive depths and potentially less productive grounds, while continuing to catch dogfish shark incidentally. Dogfish shark are still abundant seaward of 150 and 250 fm (Table C-80 and Table C-81).

Because catch rates for target species may decrease if the most productive fishing grounds are closed, fishing effort (towing hours) may increase in order to attain the quota pounds of target species (under the IFQ fishery), tier limits (for the limited entry sablefish fishery), and bimonthly trip limits for "daily trip limit" sablefish fisheries. This increased fishing effort could ultimately eliminate any potential savings of dogfish shark by moving the seaward RCA to 200 or 250 fm.

The WCGOP observer data demonstrates that, in some cases, the catch and CPUE for dogfish shark may be high at depths exceeding 300 fm. Extending RCAs beyond 300 is not analyzed herein, because the impacts to communities would likely be severe relative to No Action. Hence, only three relatively moderate RCA change will be analyzed herein: (a) move the shoreward trawl RCA from 75 fm to 50 fm between 45°46 to 48°10' N. latitude, (b) move the seaward trawl RCAs from 150 fathoms to 200 fathoms north of 48°10' and from 150/200 fathoms to 250 fathoms south of 48°10' N. latitude, and (c) move the seaward fixed gear RCA from 100 to 150 fm north of 45°46' N. latitude.

Note that there are numerous potential RCA alternatives that could be analyzed, depending on objectives and need. For example, another viable alternative may be to move the seaward trawl RCA to 200 fathoms coastwide, or 200 fathoms during all periods north of 45°46' where dogfish concentrations are highest. The impacts would be less severe than shown for the analyzed alternatives, but may provide the reduction in total mortality that is desired. The alternatives analyzed here are illustrative to promote discussion that may narrow the focus and improve the applicability of these analyses.

Spiny Dogfish Bycatch Reduction Areas

Potential inseason action to reduce spiny dogfish interactions in the at-sea and shoreside whiting component of the IFQ program includes implementing bycatch reduction areas (BRA), which would prohibit vessels from fishing shoreward of a boundary line approximating the 75, 100, or 150 fm depth contours (i.e., bottom depth). Dogfish are pelagic and can range from top to bottom of the water column across a wide range of depths. The reported depth distribution of dogfish is 0->640 fm and the depth distribution of highest density was 0-190 fm (PFMC, 2008).

Data from shoreside and at-sea whiting trips from 2007-2011 were analyzed to assess the impact to operations and evaluate potential reductions in spiny dogfish bycatch if BRAs in the area north of 47°30' N. latitude, the highest area of spiny dogfish occurrence in the groundfish trawl survey (Table C-78)[36], were implemented. Over 2007-2011, 20 percent of shoreside whiting tows were set in this area. On average, 32 percent of the catcher-processor tows and 37 percent of mothership tows occurred in this area from 2007-2011. These percentages varied by year with shoreside tows ranging from 6 to 38 percent, catcher processor tows from 19 to 40 percent, and mothership tows from 12 to 63 percent. Given the geographic distribution of historical operations north of 47°30' N. latitude, if BRAs were implemented, a substantial portion of the fishing grounds would have depth restrictions.

The average bottom depth for a majority of tows (~99 percent) for the at-sea sectors were on average 310 fm for catcher-processors and 237 fm for motherships. The historical tows were deeper than the most common depth of occurrence of dogfish in the groundfish trawl survey data (Table C-78) but similar to data from the non-whiting trawl fishery where high CPUEs were observed in deeper waters (i.e., to 300 fm; Table C-79). For the shoreside whiting sector, effort was shallower than the at-sea sectors with less than 18 percent of tows set deeper than 150 fm. A quarter of the shoreside whiting tows were set deeper than 100 fm. Implementing a 150 fm BRA would prohibit fishing in shallower waters that typically have not been fished by the at-sea sectors. Based on the historical shoreside data, implementing BRAs may prohibit fishing in waters historically fished by the shoreside whiting vessels. The data only include average depth; therefore, it is possible that fishing during the tow occurred in shallower and deeper waters. To the extent that implementing a BRA results in fishing activities in waters deeper than the dogfish distributions, spiny dogfish bycatch could be lower.

The average depth of fishing operations varied by year; however, it was often much shallower, on average 166 fm for catcher-processors and 122 fm for motherships, than the average bottom depth. This was anticipated since the target species for the at-sea sectors, Pacific whiting, has a pelagic or mid-water distribution. The data only include average depth; therefore, it is possible that fishing during the tow occurred in shallower and deeper waters. Implementing a BRA would regulate the area of fishing defined by bottom depth and not the depth of fishing; therefore, it is difficult to assess the effectiveness of BRAs. To the extent that implementing a BRA results in fishing activity that is deeper than the spiny dogfish distributions, bycatch would be reduced.

Comparison of Management Options

No Action

No Action management measures are shown for dogfish shark in Table C-73. Trip limits would remain high (60,000 lbs. / month for shoreside trawl and 150,000-200,000 /2 months for fixed gear), and RCAs shown for 2012 would remain in place for non-whiting trawl and fixed gear sectors. No Action for at-sea whiting fisheries include no trip limits and no RCA restrictions. The No Action dogfish shark management measures would remain in place and could be modified inseason through routine management measures to slow landings if necessary.

[36] Monterey is the area with the second greatest occurrence of spiny dogfish in the groundfish trawl survey; however, at-sea operations are prohibited in this area.

Under No Action, dogfish shark would continue to be sorted and reported to species on state landing reports and federal fish tickets. Historical discard rates would be used inseason for catch projections and the basis for trip limit adjustments. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard rates provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

Biological Impacts: Under No Action, one can assume that total catch and discards of dogfish would be similar to recent historical levels. Assuming 50 percent discard mortality for fixed gear and 100 percent discard mortality for trawl, total fishing mortality from 2006 – 2010 ranged from 1,032 – 2,393 mt; Table C-71). The total mortality observed in 2008 would exceed the 2013 and 2014 preferred component ABC (2,044 and 2,024 mt respectively, whereas the total mortalities observed during the other 4 of 5 years would be less than the preferred component ABC for dogfish shark.

<u>Socioeconomic Impacts:</u>

Affected Fisheries: The primary fisheries affected by No Action trip limits and RCAs are limited entry non-whiting trawl, limited entry non-nearshore fixed gear, and open access non-nearshore fixed gear. These fisheries accounted for approximately 63 percent of the dogfish shark total mortality in 2010 (Figure C-25; **Error! Reference source not found.**). Although most total mortality of dogfish shark is caused by the limited entry bottom trawl fishery (43% in 2010), management measures applied to the non-nearshore fixed gear, which accounted for 21 percent of the total mortality in 2010), may help reduce total mortality. Area closures, if deemed necessary, may be considered for at-sea and shore-side whiting fisheries, which accounted for 23 percent and 10 percent of the dogfish total mortality in 2010 (Figure C-25; **Error! Reference source not found.**). Even though these fisheries may fish within RCAs, area restrictions may be applied if deemed necessary to reduce bycatch. Other sectors showed relatively little impact on dogfish total mortality during 2010. It should be pointed out, however, that Washington Tribal fisheries have encountered substantial amounts of dogfish shark during certain years; set asides for Tribal fisheries should be high enough to take into account recent catches (e.g., 303 mt was taken by Tribal fisheries in 2008; **Error! Reference source not found.**).

Sector-specific allocations (Tables 2-11 and 2-12**)**, and the potential for exceeding those allocations under No Action management measures are shown in Table C-82. Expected total mortalities shown in Table Y1 were the minimum and maximum total mortalities from 2006-2010 (Hastie and Bellman 2007; Bellman et al. 2008, 2009, 2010, and 2011) adjusted assuming a 50 percent discard mortality for the non-trawl sector. If allocations are projected to be exceeded, then sector-specific trip limits or other management measures may be needed (see options below). In this case, the shore-side trawl sector may exceed its allocation under No Action management measures, whereas recent catches suggest that the non-trawl and at-sea whiting sectors may not exceed allocations or set-asides. Hence, additional management measures may be needed to reduce total mortality for shoreside trawl fisheries under No Action.

Table C-82. 2013 and 2014 dogfish shark preferred allocations for shoreside trawl, non-trawl, and non-tribal at-sea whiting sectors (also see Tables 2-11 and 2-12, DEIS).

Year	Sector	Preferred Allocation (mt)	No Action sector total mortality
2013	Shoreside trawl[a]	770	645 – 1,082
	Non-trawl	434.5	132 - 377
	Non-tribal at-sea whiting	534	23 - 513
2014	Shoreside trawl	755	645 – 1,082
	Non-trawl	429.5	132 - 377
	Non-tribal at-sea whiting	534	23 - 513

Notes: Expected range of total mortality by sector is shown for comparison (minimum and maximum). Expected mortality was calculated using historical total mortality data 2006 – 2010) presented by 2009 and 2010 by Hastie and Bellman (2007) and Bellman et al. (2008-2011) and adjusted assuming 50% discard mortality for non-trawl sectors.
[a]Total mortality ranged from 520 – 1,023 mt for non-whiting trawl and 16 - 125 mt for shoreside whiting.

Distribution of Fishery Effort: Approximately 92 percent of dogfish shark total mortality by limited entry non-whiting trawl and non-nearshore fixed gear fisheries occur north of 40°10’ N. latitude (Figure C-27); most dogfish shark landings occur in the Vancouver INPFC area (97%) for fixed gear fisheries and the Vancouver (35%) and Columbia (48%) INPFC areas for limited entry non-whiting trawl. Some non-whiting trawl landings of dogfish shark also occurred in the Monterey INPFC area (16%).

Importance to port groups/communities: Dogfish shark may be delivered almost exclusively by directed-dogfish trips or as a portion of mixed groundfish landings (see Figure C-35). Dogfish typically represents a small fraction of the total groundfish landings when delivered with other groundfish. Because most dogfish shark encountered are discarded, the total annual landings by non-nearshore and by limited entry non-whiting trawl fisheries have been relatively small, especially during recent years (107 mt and 70 mt during 2009 and 2010, respectively; Figure C-29).

Fixed gear deliveries of dogfish shark during 2006-2011 were almost exclusively made in Washington at Northern Puget Sound area ports (90%; Figure C-32, **Error! Reference source not found.**). Trace fixed gear landings were also made in Coos Bay, Brookings, San Francisco, and other area ports. Dogfish shark caught by limited entry non-whiting trawl were primarily landed at North Puget Sound (32%) and Columbia River Oregon (51%) area ports (Figure C-32; Table C-83). Fort Bragg and Monterey area ports received 6 percent and 11 percent of the trawl landings during the 2006-2011 period.

The ex-vessel value of dogfish shark by port group are shown in **Error! Reference source not found.**. Landings from January 2006 – October 2011 (= 5.83 years) were averaged as annual landings (i.e., by dividing the total landed weight by 5.83). Landings were then converted to value by multiplying by the average sector-specific landed weight (pounds; **Error! Reference source not found.**) by the annual average price per pound shown in Figure C-30. The average revenue, calculated using this method, was $42,964 for limited entry non-nearshore trawl and

$49,932 for limited entry and open access fixed gear (**Error! Reference source not found.**). Top two average annual revenues by gear/sector ranged from $13,920 (North Puget Sound area ports) to $21,827 (Columbia River Oregon area ports) for trawl and $3,094 (Coos Bay area ports) to $45,083 (Northern Puget Sound area ports) for fixed gear (**Error! Reference source not found.**).

Table C-83. Revenue and percent contribution of dogfish shark landings by port group area. Annual-landed weights were calculated by averaging the 2006 – October 2011 landings.

Gear/sector	Port-area group	2006-2011 Weight landed (lbs.)	2006-2011 Average Percent by area	Annual weight landed (Average; lbs.)	2006-2011 Average price per pound ($)	Average annual revenue ($)
LE Trawl	NPS	279,835	32.4%	47,999	0.29	$13,920
	CLO	438,789	50.8%	75,264	0.29	$21,827
	MNA	90,581	10.5%	15,537	0.29	$4,506
	BGA	49,215	5.7%	8,442	0.29	$2,448
	Remaining	5,302	0.6%	909	0.29	$264
	TOTAL	863,722	100.0%	148,151	0.29	$42,964
Fixed gear	NPS	1,251,593	90.3%	214,681	0.21	$45,083
	CBA	85,909	6.2%	14,736	0.21	$3,094
	BRA	35,512	2.6%	6,091	0.21	$1,279
	Remaining	13,201	1.0%	2,264	0.21	$476
	TOTAL	1,386,215	100.0%	237,773	0.21	$49,932

Note: Gear/sectors are: LE Trawl = limited entry non-whiting trawl; Fixed Gear = limited entry and open access groundfish fixed gear. Port group areas are: BGA = Fort Bragg; BRA = Brookings; CBA = Coos Bay; CLO – Columbia River Oregon; MNA = Monterey; NPS = North Puget Sound;. Other port groups were combined into "Remaining". The number of remaining port groups were 7 for LE trawl and 10 for fixed gear.

Options 1 - 7

Under all non-whiting management options, dogfish shark would continue to be sorted and reported to species on state landing reports and federal fish tickets. Inseason catch accounting and basis for trip limit and/or RCA adjustments will be made using: (a) historical discard rates with near real-time bycatch updates from the WCGOP observer program for the IFQ fishery to improve precision as the year proceeds and/or (b) historical discard amounts (e.g., average annual discard beginning 2006) added to landings data provided by PacFIN. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard amounts provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

<u>Option 1 – High Trip Limit</u>: Reduce the dogfish shark trip limit (a) from 60,000 lbs./month to 20,000 lbs./2 months for non-whiting trawl and (b) from 100,000-200,000 lbs./2 months to 18,000 lbs./2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 1 (high-trip limit) relative to No Action are shown in Table C-84 for dogfish shark (trawl and fixed gear). In this case, trip limits were 20,000 pounds/2 months for limited entry non-whiting trawl and 18,000 pounds/2 months for fixed gear sectors. These trip limits represent the 90th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery.

Table C-84. Option 1 "high" trip limits for dogfish shark and potential landings and lost revenue relative to No Action. Trip limits were selected based on the 90th percentile of landings over the period 2006 – October 2011 (see Figure C-36Figure C-37).

Gear/sector & Option	Trip limit (lbs.)	2006-2011 bimonthly trip limits exceeded (%)	2006-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 1 average annual landings (lbs.)	Option 1 average amount discarded or avoided due to trip limits (lbs.)	Option 1 average annual revenue lost ($)
No Action							
OA FG	100,000 /2 mos	0%	0%	31,643			
LE FG	100,000 /2 mos	0%	0%	206,677			
LE Trawl	60,000 /mo	0%	0%	148,371			
TOTAL				386,691			
Option 1							
OA FG	18,000 /2mo	2.0%	45%		17,418	14,225	$2,987
LE FG	18,000 /2mos	9.9%	53%		96,663	110,014	$23,103
LE Trawl	20,000 /2 mos	10.7%	32%		101,200	47,171	$13,680
TOTAL					215,281	171,410	$39,770

Note: Annual-landed weights were calculated by averaging the 2006 – October 2011 landings (see above). Average price per pound (2006-2011) used to estimate value was $0.29 for trawl and $0.21 for fixed gear. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 171,410 pounds (78 mt), or 44 percent for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings. If fishers' behavior remained unchanged, and assuming discard mortality were 100 percent for trawl and 50 percent for non-trawl, then total mortality would be reduced by 62,195 pounds (28 mt). Total mortality would be reduced even more (to 171,410 pounds or 78 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of dogfish shark (i.e., so that no additional discarding were caused by trip limits.

The maximum expected mortality under Option 1 would exceed the 2013 and 2014 ABC (2,044 and 2,024 mt, respectively).

Socioeconomic Impacts: Approximately 10 percent of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings (by number) may be affected by Option 1 trip limits (18,000 and 20,000 lbs./2 mos, respectively), whereas only 2 percent of the bimonthly landings by the open access fishery would be affected by 18,000 lb./2 month cumulative trip limits (Figure C-36and Figure C-37; Table C-84). Reducing trip limits from 60,000 lbs./month 20,000 lbs./2 months for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 32 percent (= 47,171 pounds or 21 mt) relative to No Action. Reducing trip limits from 100,000-200,000 lbs./2 months to 18,000 pounds/2 months for fixed gear sectors could reduce landed pounds by 53 percent for the limited entry fixed gear sector (= 110,014 pounds or 50 mt reduction relative to No Action) and 45 percent for the open access fixed gear sector (14,225 pounds or 7 mt relative to No Action).

The estimated value of dogfish shark revenue forgone under this Option 1 relative to No Action is $39,770. Washington port groups (Northern Puget Sound) and Oregon port groups (Columbia River Oregon) would be most impacted by dogfish shark trip limits (**Error! Reference source not found.**).

The only sector that may require trip limits to keep its mortality below its allocation option is the shoreside fishery (Table C-85). Trip limits described under Option 1 may not keep the total mortality by this sector (expected range = 624 – 1,082 mt) below its preferred allocation; expected mortality was reduced 0 – 21 mt relative to No Action. Note that the maximum expected mortality represents (a) the largest encounter rate during a five year period (2006-2010) and (b) assumes that fishermen behavior does not change and all forgone landings are converted to 100 percent discard mortality. The maximum mortality shown for the non-whiting trawl may also be reduced by 21 mt (to 1,062 mt) if all of the forgone landings were avoided rather than discarded. The expected mortality for the non-trawl sector, reduced 25 – 50 mt relative to No Action, remains below the sector allocation (as it was under No Action). Finally, the expected mortality for at-sea whiting remains the same as shown for No Action, because trip limits were not analyzed for that sector.

Table C-85. Expected range of total mortality by sector under Option 1, along with 2013 and 2014 preferred allocations and set-asides shoreside trawl, non-trawl, and at-sea whiting sectors (also see Tables 2-11 and 2-12) for comparison.

Year	Sector	Allocation Option (mt)	Option 1 sector total mortality
2013	Shoreside trawl[a]	770	624 – 1,082
	Non-trawl	434.5	75 - 349
	Non-tribal at-sea whiting	534	23 - 513
2014	Shoreside trawl	755	624 – 1,082
	Non-trawl	429.5	75 - 349
	Non-tribal at-sea whiting	534	23 - 513

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2006 – 2010 by Hastie and Bellman (2007) and Bellman et al. (2008, 2009, 2010, and 2011), but adjusted assuming 100% discard mortality for trawl and 50% discard mortality non-trawl gear (see Table C-84). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with 50 – 100% discard mortality rates) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 2 – Moderate-to-Low Trip Limit: Reduce the dogfish shark trip limit (a) from 60,000 lbs./month to 5,000 lbs./2 months for non-whiting trawl and (b) from 100,000-200,000 lbs./2 months to 2,500 lbs./2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 2 relative to No Action (moderate-to-low trip) are shown in Table C-86 for dogfish shark (trawl and fixed gear). In this case, trip limits were 5,000 pounds/2 months for limited entry non-whiting trawl and 2,500 pounds/2 months for fixed gear sectors. These trip limits represent the 75th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery.

Table C-86. Option 2 "moderate-to-low" trip limits for dogfish shark and potential landings and lost revenue relative to No Action.

Gear/sector & Option	Trip limit (lbs.)	2006-2011 bimonthly trip limits exceeded (%)	2006-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 2 average annual landings (lbs.)	Option 2 average amount discarded or avoided due to trip limits (lbs.)	Option 2 average annual revenue lost ($)
No Action							
OA FG	100,000 /2 mos	0%	0%	31,643			$
LE FG	100,000 /2 mos	0%	0%	206,677			
LE Trawl	60,000 /mo	0%	0%	148,371			
TOTAL				386,691			
Option 2							
OA FG	2,500 /2mo	11.2%	77%		7,365	24,278	$5,098
LE FG	2,500 /2mos	22.5%	86%		28,386	178,292	$37,441
LE Trawl	5,000 /2 mos	24.2%	69%		46,032	102,339	$29,678
TOTAL					81,783	304,909	$72,217

Note: Trip limits were selected based on the 75th percentile of landings over the period 2006 – October 2011 (see Figure C-36Figure C-37). Annual-landed weights were calculated by averaging the 2006 – October 2011 landings (see above). Average price per pound (2006-2011) used to estimate value was $0.29 for trawl and $0.21 for fixed gear. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 304,909 pounds (138 mt), or 79 percent for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings. If fishers' behavior remained unchanged, and assuming discard mortality were 100 percent, for trawl and 50 percent for non-trawl, then total mortality may be reduced by 102,275 pounds (47 mt). Total mortality would be reduced even more (to 304,909 pounds or 138 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of dogfish shark (i.e., so that no additional discarding were caused by trip limits).

The maximum expected mortality under Option 2 would exceed the 2013 and 2014 ABC (2,044 and 2,024 mt, respectively).

Socioeconomic Impacts: Approximately 23-24 percent of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings (by number) may be affected by the Option 2 trip limits (2,500 and 5,000 lbs./2 mos, respectively), whereas 11 percent of the open access bimonthly landings may be affected by 2,500 lb./2 month cumulative trip limits (Table C-86; Figure C-36 and Figure C-37). Reducing trip limits from 60,000 lbs./month to 5,000 lbs./2 months for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 69 percent (= 102,339 pounds or 46 mt) relative to No Action. Reducing trip limits from

100,000-200,000 lbs./2 months to 2,500 pounds/2 months for fixed gear sectors could reduce landed pounds by 86 percent for the limited entry fixed gear sector (178,292 pounds or 81 mt reduction relative to No Action) and 77 percent for the open access fixed gear sector (24,278 pounds or 11 mt reduction relative to No Action).

The estimated value of dogfish shark revenue forgone under this Option 2 relative to No Action is $72,217. Washington port groups (Northern Puget Sound) and Oregon Port Groups (Columbia River Oregon) would be most impacted by dogfish shark trip limits (**Error! Reference source not found.**).

The only sector that may require trip limits to keep its mortality below its allocation is the shoreside fishery (Table C-87). Trip limits described under Option 2 may not keep the total mortality by this sector (expected range = 599 – 1,082 mt) below its preferred allocation; expected mortality was reduced 0 – 46 mt relative to No Action. Note that the maximum expected mortality represents (a) the largest encounter rate during a five year period (2006-2010) and (b) assumes that fishermen behavior does not change and all forgone landings are converted to 100 percent discard mortality. The maximum mortality shown for the shoreside trawl may also be reduced by 46 mt (to 1,036 mt) if all of the forgone landings were avoided rather than discarded. The expected mortality for the non-trawl sector, reduced 46 – 92 mt relative to No Action, remains below the sector allocation (as it was under No Action). Finally, the expected mortality for at-sea whiting remains the same as shown for No Action, because trip limits were not analyzed for that sector.

Table C-87. Expected range of total mortality by sector under Option 2, along with 2013 and 2014 preferred allocations and set-asides shoreside trawl, non-trawl, and at-sea whiting sectors (also see Tables 2-11 and 2-12) for comparison.

Year	Sector	Allocation Option (mt)	Option 2 sector total mortality
2013	Shoreside trawl	770	599 – 1,082
	Non-trawl	434.5	40 - 331
	Non-tribal at-sea whiting	534	23 - 513
2014	Shoreside trawl	755	599 – 1,082
	Non-trawl	429.5	40 - 331
	Non-tribal at-sea whiting	534	23 - 513

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2006 – 2010 by Hastie and Bellman (2007) and Bellman et al. (2008, 2009, 2010, and 2011), but adjusted assuming 100% discard mortality for trawl and 50% discard mortality non-trawl gear (see Table C-84). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with 50 – 100% discard mortality rates) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

<u>Option 3 – Low Trip Limit</u>: Reduce the dogfish shark trip limit (a) from 60,000 lbs./month to 600 lbs./2 months for trawl and (b) from 100,000-200,000 lbs./2 months to 300 lbs./2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 3 (low trip limit) relative to No Action are shown in Table C-88 for dogfish shark (trawl and fixed gear). In this case, trip limits were 600 pounds/2 months for limited entry non-whiting trawl and 300 pounds/2 months for fixed gear sectors. These trip limits represent the 50th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery.

Table C-88. Option 3 "low" trip limits for dogfish shark and potential landings and lost revenue relative to No Action.

Gear/sector & Option	Trip limit (lbs.)	2006-2011 bimonthly trip limits exceeded (%)	2006-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 3 average annual landings (lbs.)	Option 3 average amount discarded or avoided due to trip limits (lbs.)	Option 3 average annual revenue lost ($)
No Action							
OA FG	100,000 /2 mos	0%	0%	31,643			
LE FG	100,000 /2mos	0%	0%	206,677			
LE Trawl	60,000 /mo	0%	0%	148,371			
TOTAL				386,691			
Option 3							
OA FG	300 /2mo	29.6%	90%		3,214	28,429	$5,970
LE FG	300 /2mos	50.5%	97%		6,050	200,627	$42,132
LE Trawl	600 /2 mos	49.3%	94%		8,255	140,116	$40,634
TOTAL					17,519	369,172	$88,736

Note: Trip limits were selected based on the 50th percentile of landings over the period 2006 – October 2011 (see Figure C-36 and Figure C-37). Annual-landed weights were calculated by averaging the 2006 – October 2011 landings (see above). Average price per pound (2006-2011) used to estimate value was $0.29 for trawl and $0.21 for fixed gear. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 369,172 pounds (167 mt), or 95 percent for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings. If fishers' behavior remained unchanged, and assuming discard mortality were 100 percent for trawl and 50 percent for non-trawl, then total mortality may be reduced by 114,528 pounds (52 mt). Total mortality would be reduced even more (to 369,172 pounds or 167 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of dogfish shark.

The maximum expected mortality under Option 3 would exceed the 2013 and 2014 ABC (2,044 and 2,024 mt, respectively).

Socioeconomic Impacts: Approximately 50 percent of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings (by number) may be affected by Option 3 trip limits (300 and 600 lbs./2 mos, respectively), whereas 30 percent of the open access bimonthly landings may be affected by 300 lb./2 month cumulative trip limits (Table C-88; Figure C-36 and Figure C-37). Reducing trip limits from 60,000 lbs./month to 600 lbs./2 months for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 94 percent (= 140,116 pounds or 63.5 mt) relative to No Action. Reducing trip limits from 100,000-200,000 lbs./2 months to 300 pounds/2 months for fixed gear sectors could reduce landed pounds by 97 percent for the limited entry fixed gear sector (200,627 pounds or 91 mt reduction relative to No Action) and 90 percent for the open access fixed gear sector (28,429 pounds or 11 mt reduction relative to No Action).

The estimated value of dogfish shark revenue forgone under Option 3 relative to No Action is $88,736. Washington port groups (Northern Puget Sound) and Oregon Port Groups (Columbia River Oregon) would be most impacted by dogfish shark trip limits (**Error! Reference source not found.**).

The only sector that may require trip limits to keep its mortality below its allocation is the shoreside fishery (**Error! Reference source not found.**). Trip limits described under Option 3 may not keep the total mortality by this sector (expected range = 582 – 1,082 mt) below its preferred allocation; expected mortality was reduced 0 – 63.5 mt relative to No Action. Note that the maximum expected mortality represents (a) the largest encounter rate during a five year period (2006-2010) and (b) assumes that fishermen behavior does not change and all forgone landings are converted to 100 percent discard mortality. The maximum mortality shown for the shoreside trawl may also be reduced by 63.5 mt (to 1,018.5 mt) if all of the forgone landings were avoided rather than discarded. The expected mortality for the non-trawl sector, reduced 52 – 104 mt relative to No Action, remains below the sector allocation (as it was under No Action). Finally, the expected mortality for at-sea whiting remains the same as shown for No Action, because trip limits were not analyzed for that sector.

Table C-89. Expected range of total mortality by sector under Option 3, along with 2013 and 2014 preferred allocations and set-asides shoreside trawl, non-trawl, and at-sea whiting sectors (also see Tables 2-11 and 2-12) for comparison.

Year	Sector	Allocation Option (mt)	Option 3 sector total mortality
2013	Shoreside trawl	770	582 – 1,082
	Non-trawl	434.5	29 - 325
	Non-tribal at-sea whiting	534	23 - 513
2014	Shoreside trawl	755	582 – 1,082
	Non-trawl	429.5	29 - 325
	Non-tribal at-sea whiting	534	23 - 513

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2006 – 2010 by Hastie and Bellman (2007) and Bellman et al. (2008, 2009, 2010, and 2011), but adjusted assuming 100% discard mortality for trawl and 50% discard mortality non-trawl gear (see Table C-84). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with 50 – 100% discard mortality rates) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 4 – Extend Shoreward Trawl RCA Shallower: Extend shoreward trawl RCAs to 50 fm (from 75 fm) between 45^{o}46'- 48^{o}10' N. latitude.

Biological Impacts: Extending the shoreward trawl RCA to 50 fm between 45^{o}46' and 48^{o}10' N. latitude may decrease encounters with dogfish shark relative to No Action (Table C-80). No action would be taken north of 48^{o}10' N. latitude, where the shoreward RCA is 0 fm. The CPUEs south of 45^{o}46' in the shallow areas are generally low (Table C-81), so no action in the south is proposed within this alternative. The actual savings in total catch cannot be estimated using the data obtained from the WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource. Although it is expected that dogfish mortality under this option would be lower than No Action, the level of savings is uncertain. Additional analyses with more data is required to estimate the savings.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) by moving the RCA shallower. However, it should be pointed out that most dogfish are discarded because few markets exist, resulting in ex-vessel value that is very small (**Error! Reference source not found.**) relative to the remaining groundfish landed by this fishery. That could change if markets strengthened. Nonetheless, other economic and safety impacts associated with moving the shoreward trawl RCA to 50 fm may be severe relative to No Action. This measure would (a) force fishers off some of their most productive fishing grounds in the nearshore area and onto less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) concentrate fishers into a smaller area, resulting in likelihood of increased gear conflicts, (d) reduce or eliminate the catch of nearshore flatfish species that are primarily found between 50 and 100 fm, and (e) create gear conflicts and potential competition with nearshore fixed gear fisheries. These socioeconomic impacts would be substantially greater than those expected No Action and Options 1 – 3.

Option 5 – Extend Seaward Trawl RCA Deeper: Extend trawl seaward RCA to 150 fathoms to 200 fathoms north of 48^{o}10' and from 150/200 fathoms to 250 fathoms south of 48^{o}10' N. latitude; Extend depth closures to, or create separate depth closure specific to, whiting trips under the IFQ program.

Biological Impacts: Extending the trawl RCA from 150 fathoms to 200 fathoms north of 48^{o}10' N. latitude and from 150/200 fathoms to 250 fathoms south of 48^{o}10' N. latitude may decrease encounters with dogfish shark substantially relative to No Action. North of 48^{o}10' N. latitude, the CPUE drops from 118 lbs./hr. at depths of 150-200 fm to less than 5 lbs./hr. at deeper depths. A reduction of encounters may also occur south 48^{o}10' N. latitude by moving the seaward RCA to 250 fm (from 150/200 fm). A reduction in encounters may even be substantial south of 40^{o}10 N. latitude relative to No Action (Table C-81). However, it must be stressed that relatively small amounts of dogfish are caught south of 40^{o}10 N. latitude relative to the area north (Figure C-27). CPUE by depth was not available for directed whiting trips in the shoreside sector at the time of writing. These trips use mid-water trawl gear to target whiting and have been exempted from the RCA. Given the different gears, CPUE would differ from CPUE by depth for bottom trawl gear. Nonetheless, the general depth pattern in CPUE by depth from the bottom trawl sector is expected to apply to whiting trips.

Although it is expected that dogfish mortality is less under Option 5 relative to No Action, the actual savings in total mortality cannot be estimated using the data obtained from the WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. However, it should be pointed out that most dogfish are discarded because few markets exist, resulting in current ex-vessel values that are small (**Error! Reference source not found.**) relative to the remaining groundfish landed by these fisheries. That could change if markets strengthened. Nonetheless, any revenue loss due to a reduction in dogfish landings may be inconsequential relative to other associated economic and safety impacts of a seaward RCA change. Other economic and safety impacts associated with moving the seaward RCA deeper may be severe. This measure would (a) force fishers off some of their most productive fishing grounds and on to less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) require fishers to travel greater distances and spend more time on the water to catch targeted species at levels similar to status quo, and (d) concentrate fishers into a smaller fishing area, resulting in likelihood of increased gear impacts. These impacts will either reduce landings of target species (e.g., sablefish, Dover sole, thornyheads), or increase time and expense (e.g., fuel, number of trips, and days at sea) to maintain status quo landings of target species. The same dynamic would be expected in directed whiting trips. Whiting tend to be available deeper later in the year and so a depth closure to mitigate dogfish bycatch may not have a large cost if put into place at that time. Participants in the shoreside whiting sector have different abilities to fish deep based on the location of their homeport, size of vessel, and other factors. In general, closed areas can lead to additional time at sea, running distance, and potential gear conflicts may result in increased accidents at sea. Finally, the anticipated savings in dogfish shark encounters under this measure may be offset by the need to increase fishing effort to levels necessary for attaining quota pounds of target species.

The socioeconomic impacts under Option 5 are expected to be substantially greater than those expected under Options 1 – 4.

<u>Option 6 – Extend Seaward Fixed Gear RCA Deeper:</u> Extend seaward fixed gear RCA from 100 to 150 fm north of 45°46' N. latitude.

Biological Impacts; Extending the seaward fixed gear RCA from 100 fathoms to 150 fathoms north of 45°46' N. latitude may decrease encounters with dogfish shark substantially. The percent of the total catch and the CPUEs were highest in these depth strata and these areas during 2002-2010 (Table C-80). Although dogfish mortality is expected to be lower compared to No Action, the actual savings in total catch cannot be estimated using the data obtained from the WCGOP. Additional data is required to provide a reasonable estimate of impacts to the resource.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. However, it should be pointed out that most dogfish are discarded because few markets exist, resulting in current ex-vessel values that are small (**Error! Reference source not found.**) relative to the remaining groundfish landed by this fishery. That could change if markets strengthened. Nonetheless, any revenue loss caused by a reduction in dogfish landings may be inconsequential relative to other associated economic and safety impacts of this alternative seaward RCA. Other economic and safety impacts associated with moving the seaward RCA deeper may be severe. This measure would (a) force fishers off some of their most productive fishing grounds and on to less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) require fishers to travel greater distances and spend more time on the water to catch targeted species at levels similar to status quo, and (d) concentrate fishers into a smaller fishing area, resulting in likelihood of increased gear impacts. These impacts will either reduce landings of target species (e.g., sablefish), or increase time and expense (e.g., fuel, number of trips, and days at sea) to maintain status quo landings of target species. The additional time at sea, running distance, and potential gear conflicts may result in increased accidents at sea. Finally, the anticipated savings in dogfish shark encounters under this measure may be offset by the need to increase fishing effort to levels necessary for attaining quota pounds, tier limits, and trip limits of target species.

The socioeconomic impacts under Option 6 are expected to be substantially greater than those expected under Options 1 – 4, but less than under Option 5.

<u>Option 7.</u> <u>Consideration of set asides, formal allocations, or depth closures for the at-sea sectors:</u>

Spiny dogfish catch for the non-tribal at-sea sectors has averaged nearly 150 mt per year combined over the period 2005-2010 (Table C-77). Catch was highly variable over this time period, ranging from 7 mt to 45 mt in the mothership sector; and, from 6 mt to 489 mt in the catcher processor sector—nearly three times that sector's average. This indicates that the annual dogfish catch in the at sea sectors has the potential to be large relative to the stock's ABC (see Table C-76).

To manage dogfish under the Amendment 20 at sea whiting harvest cooperative ("coop") programs, the Council could establish either: (1) a formal allocation, or, (2) a set aside. The Council has made formal allocations to the at sea sectors for the key bycatch stocks where the combined catch across sectors has the potential to reach or exceed an ACL (e.g., canary rockfish). Stocks with formal allocations to coops, or the non-coop fishery when active, are distributed to fishery participants on a permit basis, typically pro rata to the whiting allocated to each permit. A formal allocation can trigger a fishery closure, or if available, a mitigating management measure like a depth or area closure if catch is projected to exceed the allocation amount.

Set asides, in contrast, “are not formal allocations but they are amounts which are not available to the other fisheries during the fishing year.” (50 C.F.R. § 660.55(j)). The Council has established set asides for stocks where bycatch is non-negligible yet also unlikely to raise the need for inseason management. The set asides facilitate active management in other sectors and gives the sector for which the set aside is created some assurances that management measures will not be adjusted inseason as long as the set aside is not exceed. Inseason management of set aside stocks is possible where "there is a risk of a harvest specification being exceeded, unforeseen impact on another fisheries, or conservation concerns in which case inseason action may be taken” (50 C.F.R. 660.150(c)(i)(B)(2) and 660.160(c)(3)(ii)).

Unlike formal allocations, set asides are not permit based and are instead assigned to a sector or both sectors as whole. Another key difference between set asides and formal allocations is that set asides are not available for inseason reapportionment between the at sea sectors (50 C.F.R. 660.150 (c)(4)(iii)), under No Action. Under the proposed action, set-asides could be reapportioned (see C.2 Management of ACL Set-Asides).

The Council and NMFS would have authority to take inseason management action of dogfish bycatch in the at sea whiting sectors even without a formal allocation or set aside designation. The regulations allow for inseason action for a non-whiting bycatch in the at sea sectors where the same risk factors named above for set asides stocks arise (50 C.F.R. 660.150(c)(i)(B)(3) and 660.160(c)(3)(ii)).

Dogfish catch is likely truly incidental in the at sea sectors. Even the high catch seen in the catcher processor sector in 2008 amounted to only 0.4 percent of the whiting harvested by that sector by volume (Bellman et al., 2009). Depth closures would therefore be the most effective management measure for mitigating dogfish bycatch in this sector. The at sea sectors use midwinter trawl gear, yet are likely to encounter dogfish across the same depths as seen in the bottom trawl data (Bellman et al., 2009). The whiting sectors are not held to the RCA and so can currently operate in prime dogfish habitat. The biological and socioeconomic impacts relating to such depth closures under Option 5 apply generally to the at sea sectors as well.

Table C-90. Annual catch (mt) and discard percentage of dogfish in the two at sea whiting sectors, 2005-2010 (source: Hastie and Bellman (2006-2007); Bellman et al. (2008-2011)).

	2005	2006	2007	2008	2009	2010	2005-10 avg.
Catcher Processor							
Total catch (mt)	42	6	64	489	28	110	123
Discard (%)	93%	74%	55%	67%	93%	93%	--
+/- (%) from avg. catch	-66%	-95%	-48%	297%	-77%	-11%	--
Mothership							
Total catch (mt)	28	17	23	24	7	45	24
% discard	39%	76%	87%	83%	78%	97%	--
+/- (%) from avg. catch	17%	-29%	-4%	0%	-71%	88%	--

Other Potential Management Measures and Considerations

Other management measures or considerations are available to reduce fishing mortality for dogfish shark. The alternatives provided above may reduce dogfish shark landings and possibly encounters, but may result in a high cost to communities and fishers (especially RCA changes). The following considerations may reduce mortality of dogfish shark with lower associated impacts to communities than those described in the alternatives above.

- Gear modifications may reduce fishing mortality of dogfish shark. For example grates and raised footropes have recently been tested to reduce bycatch of spiny dogfish shark from silver hake trawls (Chosid et al., 2012). Artificial baits were shown to substantially reduce the catch of dogfish shark relative to longlines baited with herring, while showing no substantial reduction in catch of target species (e.g., Pacific halibut and sablefish; Erickson and Berkeley 2008). These types of potential management measures could be further explored and considered as a regulatory or a voluntary measure if it is anticipated that dogfish catch might exceed the component ABC under No Action management measures.

- Voluntary avoidance of areas with highest dogfish shark catch rates may be considered to keep dogfish shark catch below its contributing ABC level.

Summary of Management Options and Comparison of Impacts

A summary of management measures and associated impacts are provided in Table C-91. Under No Action, expected total mortality ranged from a minimum of 1,032 mt to a maximum of 2,393 mt. Hence, total mortality of dogfish shark may be higher than the preferred ABC contribution (i.e., greater than 2,046 and 2,024 mt for 2013 and 2014, respectively). The component ABCs would be exceeded only under the worst-case scenario (i.e., assuming highest catch and discard observed during 2006 – 2007 and assuming that fishermen behavior remains similar). The expected mortality was lower than the 2013-2014 preferred ABCs in 4 of 5 years.

Under No Action, the shoreside trawl allocation may be exceeded under the worst-case scenario. The 2013 allocation for this sector is 770 mt, and the range of expected mortalities is 645 – 1,082 mt. Allocations for non-trawl and at-sea whiting would not be expected to be exceeded under the No Action option.

Trip limit options (Options 1 – 3) are largely ineffective for substantially reducing No Action fishing mortality because most dogfish are already discarded; options 2 and 3 may moderately reduce fishing mortality relative to No Action. The effectiveness of trip limits depends on whether trip limits cause fishermen to avoid catching dogfish altogether (i.e., through area avoidance or gear modifications) or if trip limits create more discarding. It is important to note that 50% of the non-trawl discarded dogfish may survive, whereas 0% of the trawl-discarded dogfish may survive (i.e., 100% mortality).

Socioeconomic impacts of Options 1 – 3 are low (fleet-wide and coast-wide) relative to No Action (because more than 90% are discarded under No Action), but may be substantial for certain individuals, processing plants, and distinct areas. Impacts increase with increasing option number.

Moving the shoreward trawl RCA shallower (Option 4) or the seaward RCA deeper (Option 5) may decrease dogfish mortality relative to No Action, however, additional data is required to estimate the extent of that impact. Regardless, expanding the trawl RCAs to reduce mortality will have most substantial impacts on communities relative to No Action and relative to Options 1 – 3 (trip limits). Options 4 and 5 will have no impacts on non-trawl and at-sea whiting sectors (i.e., no difference from No Action)

Under Option 6, the seaward fixed gear RCA would be moved from 100 fm to 150 fm north of 45°46’ N. latitude. This depth closure could also be applied to directed whiting trips in the IFQ sector. Although dogfish mortality under Option 6 is expected to be less than under No Action, the extent of the savings is uncertain. The reduction in mortality would likely be higher under Option 6 than under No Action and Options 1-3. Socioeconomic impacts would be severe and substantial relative to No Action and Options 1-3 for non-trawl sectors.

Dogfish shark set-asides or allocations would be provided to at-sea whiting sectors under Option 7. The biological and socioeconomic impacts may be greater; area closures may be implemented under this Option 7 if at-sea whiting fisheries approach the maximum set-aside or allocation.

Voluntary avoidance or use of selective fishing gear (grates and escape panels for trawls and selective baits for hook-and-line) may be most effective at reducing mortality while having the least impact on communities.

Table C-91. Comparison and summary of management options.

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
No Action	Non-whiting trawl trip limit = 60,000 pounds / month Non-trawl trip limit = 150,000 to 200,000 pounds /2 months RCA: Same as 2012	Dogfish preferred component ABC = 2,044 mt (2013) and 2,024 mt (2014) Expected total mortality (all fisheries and set asides) = 1,032 – 2,393 mt (minimum and maximum)	**<u>Shoreside Trawl Allocation</u>:** Expected total mortality = 645 – 1,082 mt - Preferred Allocation (770 mt and 755 mt for 2013 and 2014) - ***Shoreside trawl allocation may be exceeded under No Action.*** **<u>Non-trawl Allocation</u>** Expected total mortality = 132 – 377 mt - Preferred Allocation (434.5 mt and 429 mt for 2013 and 2014) - Expected non-trawl mortality under No Action is expected to be less than its allocation. **Non-tribal At-sea Whiting Allocation** - Expected total mortality = 25 – 513 mt - Preferred Set-Aside (534 mt for 2013 and 2014) **Affected Area:** 92% of dogfish shark total mortality by non-whiting trawl and non-nearshore fixed gear fisheries occurs north of 40^{o} 10’ N. latitude. **<u>Revenue:</u>** Average annual ex-

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			vessel value was $42,964 (trawl) and $49,932 (LE and OA fixed gear). **<u>Fisheries Most Affected</u>**: Limited entry bottom trawl and non-nearshore fixed gear. At-sea whiting fisheries may also be affected. **<u>Discard and mortality rates</u>:** Recent discard rates exceed 90% for both trawl and fixed gear. Assumed discard mortality is 100% for trawl and 50% for fixed gear. **<u>Areas Most Affected</u>**: 92% of dogfish shark total mortality by non-whiting trawl and non-nearshore fixed gear fisheries occurs north of 40^{o} 10' N. latitude. Fixed-gear deliveries were made almost exclusively in Washington and Northern Puget Sound area ports (90%) Non-whiting trawl deliveries were predominately in North Puget Sound (32%) and Columbia River Oregon (51% area ports.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 1	Trawl trip limit = 20,000 lbs. / 2 months Non-trawl trip limit = 18,000 lbs. / 2 months	*ABC may be exceeded if maximum recent historical catch and discard rates occur.* Option 1 trip limits reduces total mortality (all sectors and set asides) by 28 – 78 mt relative to No Action	**<u>Shoreside Trawl Allocation</u>:** Expected Savings (reduction in mortality) relative to No Action = 0 – 21 mt Expected Total Mortality = 624 – 1,082 mt - Preferred Allocation (770 and 775 mt for 2013 and 2014)

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
		Expected total mortality (all fisheries and set asides) = 954 – 2,365 mt Preferred ABC = 2044 and 2,024 mt for 2013 and 2014	- ***Shoreside trawl allocation may be exceeded under Option 1.*** **<u>Non-trawl Allocation</u>** Expected savings (reduction in mortality) relative to No Action = 25 – 50 mt Expected Total mortality = 75 – 349 mt - Preferred Allocation (434.5 – 429.5 mt) **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $13,680 (trawl) and $26,090 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 47,171 pounds or 21 mt (trawl) and 124,239 pounds or 56 mt (LE and OA fixed gear) relative to No Action. *Impacts relative to No Action are not substantial (fleet-wide), because most dogfish are discarded; impacts may be substantial to certain individuals.*
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 2	Trawl trip limit = 5,000 lbs. / 2 months Non-trawl trip limit = 2,500 lbs. / 2 months	*ABC may be exceeded if maximum recent historical catch and discard rates occur.* Option 2 trip limits reduces total mortality (all sectors and set	**<u>Shoreside Trawl Allocation</u>:** Expected Savings (reduction in mortality) relative to No Action = 0 –46 mt Expected Total Mortality = 599 – 1,082 mt - Preferred Allocation (770 and 775 mt for 2013 and

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
		asides) by 46 – 138 mt relative to No Action Expected total mortality (all fisheries and set asides) = 894 – 2,347 mt Preferred ABC = 2044 and 2,024 mt for 2013 and 2014	2014) - ***Shoreside trawl allocation may be exceeded under Option 2.*** **<u>Non-trawl Allocation</u>** Expected savings (reduction in mortality) relative to No Action = 46 – 92 mt Expected Total mortality = 40 – 331 mt - Preferred Allocation (434.5 – 429.5 mt) **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $29,678 (trawl) and $42,539 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 102,339 pounds or 46 mt (trawl) and 202,570 pounds or 92 mt (LE and OA fixed gear) relative to No Action. *Impacts relative to No Action are not substantial (fleet-wide), because most dogfish are discarded; impacts may be substantial to certain individuals.* *Impacts are greater for Option 2 than for Option 1.*
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 3	Trawl trip limit = 600 lbs. / 2 months Non-trawl trip	*ABC may be exceeded if maximum recent historical catch and discard rates occur.*	**<u>Shoreside Trawl Allocation</u>:** Expected Savings (reduction in mortality) relative to No Action = 0 –64 mt

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
	limit = 300 lbs. / 2 months	Option 3 trip limits reduces total mortality (all sectors and set asides) by 52 – 167 mt relative to No Action Expected total mortality (all fisheries and set asides) = 865 – 2,341 mt Preferred ABC = 2044 and 2,024 mt for 2013 and 2014	Expected Total Mortality = 582 – 1,082 mt - Preferred Allocation (770 and 775 mt for 2013 and 2014) - ***Shoreside trawl allocation may be exceeded under Option 3.*** **Non-trawl Allocation** Expected savings (reduction in mortality) relative to No Action = 52 – 104 mt Expected Total mortality = 29 – 325 mt - Preferred Allocation (434.5 – 429.5 mt) **Revenue:** Average annual ex-vessel value was reduced by $40,634 (trawl) and $48,102 (LE and OA fixed gear) relative to No Action. **Landings:** Average annual landings reduced by 140,116 pounds or 64 mt (trawl) and 229,056 pounds or 104 mt (LE and OA fixed gear) relative to No Action. *Impacts relative to No Action are not substantial (fleet-wide), because most dogfish are discarded; impacts may be substantial to certain individuals.* *Impacts are greater for Option 3 than for Options 1 and 2.*
Option 4	Extend shoreward trawl RCAs to 50	*Mortality reduced compared to No*	**Shoreside Trawl:**

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
	fm (from 75 fm) between 45°46'-48°10' N. latitude	*Action, but the magnitude is uncertain.*	*The socioeconomic impact of Option 4 would be severe for certain individuals and processors and substantially higher than expected impacts of No Action and of Options 1 – 3.* **<u>Non-trawl:</u>** *No Substantial Impact*
Option 5	Extend trawl seaward RCA to from 150 fathoms to 200 fathoms north of 48°10' and from 150/200 fathoms to 250 fathoms south of 48°10' N. latitude; Extend depth closure to directed whiting trips in the IFQ sector.	*Mortality reduced compared to No Action, but the magnitude is uncertain.*	**<u>Shoreside Trawl</u>:** *The socioeconomic impact of Option 5 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 4* **<u>Non-trawl:</u>** *No Substantial Impact*
Option 6	Extend seaward fixed gear RCA from 100 to 150 fm north of 45°46' N. latitude.	*Mortality reduced compared to No Action, but the magnitude is uncertain.*	**<u>Shoreside Trawl</u>:** *No Substantial Impact* **<u>Non-trawl:</u>** *The socioeconomic impact of Option 6 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 3. The impacts are substantially greater than Options 4 and 5 for non-trawl.*
Option 7	Set-asides, formal allocations, or depth closures for at-sea whiting fisheries	Area closures may be implemented if these levels are approached.	**<u>Shoreside Trawl</u>:** *No Substantial Impact* **<u>Non-trawl:</u>**

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			No Substantial Impact **At-sea whiting:** *Impacts substantial relative to No Action and Options 1 – 6.*

C.18 Increase the California Recreational Bocaccio Bag Limit

Overview

The recreational fishery has been managed to a recreational harvest guideline (HG) since the early 2000s, which is 131 mt in 2012; the presumptive harvest guidelines are expected to increase to 168 mt (2013) and 174 mt (2014; Table C-92). For 2012 recreational groundfish fisheries in California, anglers are allowed two bocaccio within a 10 fish Rockfish, Cabezon, Greenling (RCG) complex bag limit. In addition, bocaccio are the only rockfish subject to a recreational size limit, which is a 10 inch minimum size limit to protect recruiting juvenile fish (Table C-93). The majority of the bocaccio catch comes from the southern part of the state (south of Point Conception - 34°27' N. latitude) where recreational anglers are allowed to access the shelf 10 months of the year to depths of 60 fm (360 feet).

Because bocaccio have a high susceptibility to barotrauma[37] the statewide two fish sub-bag limit results in discarding (and subsequent mortalities) of bocaccio caught in excess of the bag limit. Rather than adding the extra bocaccio to their bag, anglers are required to discard and therefore fish longer to achieve their 10 fish bag limit, increasing the likelihood of encounters with overfished species.

[37] Bocaccio has a discard mortality rate of 100% in depths of 40 fm or greater (PFMC and NMFS, 2009).

Table C-92. 2012 Harvest specifications for bocaccio south of 40°10' N. latitude in metric tons, implemented in regulation.

Species	OFL	ABC	ACL	HG
Bocaccio	732	700	263	131

Table C-93. Recreational statewide management measures for bocaccio in California in 2012.

Bag Limit –2 fish w/in the 10 fish RCG complex bag limit
Size limit – 10 inch minimum size
Seasons and Depth Restrictions—Same as those for other rockfish and lingcod by Management Area

Management Issue

Due to the need to protect overfished rockfish and the lack of access to deeper water on the shelf, California's recreational fishery has been unable to attain the bocaccio HG in recent years (Table 3). Bocaccio has shown steady progress toward rebuilding under the current rebuilding plan. Application of the constant harvest rate in the current rebuilding plan corresponds with an ACL for 2013-2014 that is larger than the ACL in recent years. The Council proposes to increase the bag limit for bocaccio and the additional projected mortality can be accommodated within the higher 2013-2014 ACLs and HGs.

Table C-94. West Coast Groundfish total mortality estimates of bocaccio south of 40°10' N. latitude (in metric tons) for the California recreational fishery compared to the harvest guideline from 2006-2010

Year	Total Mortality	HG	% of HG
2006	420	43.0	98%
2007	53.6	66.3	81%
2008	35.0	66.3	53%
2009	46.4	66.3	70%
2010	57.2	66.3	86%

Management Options

Option 1- No Action: Maintain the two fish sub-bag limit for bocaccio within the 10 fish RCG bag limit

Under Option 1, the sub-bag limit for bocaccio would continue to be two fish within the 10 fish RCG bag limit. It is expected that anglers will discard bocaccio in excess of the sub-bag limit while in pursuit of other fish, increasing the likelihood of encounters with other overfished species. Under Option 1, bocaccio encounters and associated total catch mortality are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected some increased encounter rate (and discarding) would be expected.

Biological Impacts under Option 1

Projected Impacts

Table C-95 summarizes projected mortality of overfished species under Option 1. Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, under Option 1 some increased encounter rate (and discarding) would be expected, although the amount cannot be quantified. In its report under Agenda Item E.4.b (November 2011), the Groundfish Management Team concluded that any increase in bocaccio mortality in 2013, as a result of the 2010 year class, is not expected to exceed the 2011 California recreational HG (131 mt). If the 2010 year class is not as strong as projected, mortality under Option 1 would likely be similar to previous years.

Table C-95. Projected mortality to overfished species under Option 1.

Species	Projected Mortality (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

<u>Stock Status</u>

Results of the current assessment indicate that bocaccio are rebuilding quickly. Under Option 1, no changes to stock status or rebuilding progress are expected since total mortality will be within the ACL.

<u>Socioeconomic Impacts</u>

Option 2: Increase the bocaccio sub-bag limit from two to three fish within the RCG complex

Under Alternative 2, the sub-bag limit on bocaccio would be increased statewide from two to three fish within the RCG complex.

RecFIN data from 2004 to 2009 was used to analyze impacts to bocaccio as a result of increasing the sub-bag limit. Using the RecFIN Hypothetical Bag Limit Analysis tool, estimates of increased mortality of bocaccio was calculated using A+B1+B2 fish. For the purpose of this analysis, A fish include sampled dead fish, B1 fish includes both bocaccio fillets and fish thrown back dead due to low survival rates in deep water, and B2 fish includes mainly live fish in excess of bag limits or undersized fish. Since RecFIN cannot estimate the proportion of fish that were undersized, this analysis assumes that no sub-legal fish were discarded (thus overestimating impacts). The analysis also assumes that all B2 fish would be retained if the bag limit were increased, as the most conservative estimate. All bags over the existing limit were then set to the hypothetical limit to calculate increased take.

Biological Impacts under Option 2

<u>Projected Impacts</u>

Under Option 2, bocaccio mortality is expected to increase by 11.5 percent (5.8 mt) as a result of the increase in the sub-bag limit (Table C-96). The HG is not expected to be exceeded under Option 2, given the magnitude of the buffer between projected mortality and the recreational allocation. Similar to Alternative 1, bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. The increased mortality (if they materialize) could also be accommodated under Option 2 without exceeding the HG, let alone the entire bocaccio ACL.

The Council is also proposing two additional changes to management measures in the recreational fishery related to bocaccio – removing the 10 inch minimum size limit and allowing retention of shelf rockfish (including bocaccio) inside the Cowcod Conservation Area. The cumulative mortality of all of these proposed changes are not expected to exceed the harvest guideline or ACL therefore the measures will be unlikely to affect rebuilding.

Table C-96. Projected mortality (in metric tons) of increasing the bocaccio bag limit from two to three fish compared to the No Action harvest guideline

	Alternative 1	Alternative 2
Projected Impact	50.7	56.5
% HG	38.7%	43.1%

<u>Impacts on Overfished Species</u>

Table 6 summarizes mortality of all overfished species under Option 2. No additional mortality of other overfished species are expected to occur by increasing the sub-bag limit on bocaccio. Because the majority of the bocaccio encountered in the recreational fishery comes from southern California, mortality of canary and yelloweye rockfish should not increase because they are not commonly found in that part of the state. No additional mortality of cowcod are expected because bocaccio are commonly encountered in different areas inside the CCA than cowcod.

Table C-97. California recreational projected mortality of overfished species for 2013-2014 under Option 2.

Species	Projected Mortality (mt)
Bocaccio	56.5
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

Stock status

Under Option 2, no changes to stock status or rebuilding progress are expected compared to Option 1.

Socioeconomic Impacts

Increasing the bocaccio bag limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

C.19 Increase the California Recreational Greenling Bag Limit

For 2011-12 groundfish fisheries, kelp greenling in California have been managed as part of the Other Fish complex and its harvest specifications contribute to the complex as a whole. The ACL contribution for kelp greenling was substantially increased in 2011-2012 based on new methods for estimating harvest specifications for data limited species (Table C-98). However, more conservative state regulations including a total allowable catch (TAC) [38] of 17 mt currently govern the catch of kelp greenling in California. Recreational management measures include the same season and depth restrictions as rockfish, lingcod, and many other groundfish, as well as a two fish sub-bag limit within the 10 fish RCG complex (Table C-99). Kelp Greenling are also

[38] A state total allowable catch (TAC) is equivalent to an annual catch limit (ACL)

subject to a 12 inch minimum size limit. The state is in the process of increasing the kelp greenling TAC to conform to the higher federal ACL contribution and implementing a higher recreational sub-bag limit of 10 fish.

The majority of California's recreational kelp greenling catch comes from the area between San Francisco and the Oregon Border. Depth is restricted to 30 fm (180 ft) in the San Francisco area and 20 fm (120 ft) from Point Arena north. Kelp greenling inhabit kelp beds and rocky reefs but have also been found to frequent sandy bottom areas. They are solitary fish commonly found at depths between 10 and 60 feet.

Table C-98. 2012 Harvest Specifications for Kelp Greenling in Metric Tons, within the Other Fish Complex Implemented in Regulation.

Species	OFL	ABC	ACL
Kelp Greenling (contribution to Other Fish)	111	55.3	55.3

Table C-99. Recreational Management Measures for Kelp Greenling in California in 2012

Bag Limit	Two fish sub-bag limit within the RCG complex
Size limit	12 inch minimum size
Seasons and Depth Restrictions	Same as those for rockfish and lingcod by Management Area

Management Considerations:

A revised kelp greenling contribution to the other fish complex was analyzed and adopted for use in management in 2011-12 (2011-12 FEIS). As a result, the state is requesting federal conformance to state rulemaking by increasing the recreational kelp greenling bag limit. The kelp greenling contribution to the other fish complex is also expected to further increase for 2013-14; therefore increased mortality as a result of this action could be accommodated with low risk of exceeding a harvest guideline, let alone the kelp greenling ABC contribution to the complex. Between 2006 and 2010, total mortality of kelp greenling in the California recreational fishery has ranged from 8.2 mt to 15.2 mt (Table C-100).

Table C-100. Estimates of kelp greenling total mortality in the California recreational fishery from 2006 to 2010, in metric tons (source: West Coast Groundfish Total Mortality Reports)

Year	Total Mortality (mt)
2006	8.2
2007	9.5
2008	9.4
2009	15.2
2010	10.5

Range of Options for Consideration

Option 1 - No Action: Maintain the kelp greenling sub-bag limit at 2 fish

Under Option 1, the kelp greenling sub-bag limit will be two fish in federal waters within the 10 fish RCG complex. Anglers will have less opportunity and be required to discard kelp greenling in excess of the sub-bag limit; the recreational allocation will also not be attained. In addition, when new state regulations increasing the kelp greenling sub-bag limit to 10 fish become effective, state and federal regulations will be inconsistent and state regulations will be more liberal.

Biological Impacts under Option 1

Projected Mortality

Under Option 1, the projected impact to kelp greenling based on a two fish sub-limit is 14.6 mt; Table C-101 summarizes projected mortality of all overfished species. Due to the shallow distribution of kelp greenling, and the fact that over half of the catch comes from shore anglers, encounters with overfished species are expected to be minimal.

Table C-101. Projected mortality of overfished species under Alternative 1

Species	Projected Mortality (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

Stock Status

A formal stock assessment was conducted in 2005 for kelp greenling in California but it was not adopted for use in management; therefore, stock status is unknown.

Option 2: Increase the kelp greenling sub-bag limit to 5 fish

Under Option 2, the kelp greenling bag limit would be increased from two to five fish within the 10 fish RCG complex; no change to the minimum size limit is proposed. Under this alternative, anglers would be able to keep more of their catch—reaching their 10 fish RCG bag limit sooner reducing the possibility of encountering canary or yelloweye rockfish (which is unlikely given the depths where greenlings are caught.)

RecFIN data from 1995-2001 and 2009-2010 were used to analyze mortality of greenlings under a five-fish and 10-fish.bag limit. Due to differences in management measures, two time periods were investigated. The first time period (1995-2001) includes years when the fishery was much less regulated and there was a 10-fish bag limit per angler per day; whereas the second period (2009-2010) includes more recent years when the bag limit was two fish per angler per day. The sample data from both time periods was ultimately combined for this analysis. Only catch estimates from north of Point Conception (34º27' N. latitude) were used since very few greenlings are taken in southern California.

Since this analysis estimates the amount of fish that potentially would be taken, estimates of increased mortality of greenling were calculated using A+B1+B2 fish. For the purpose of this analysis, A fish include sampled dead fish, B1 fish includes both greenling fillets and fish thrown back dead, and B2 fish includes mainly live fish in excess of bag limits or undersized fish. Since RecFIN cannot estimate the proportion of fish that were undersized, this analysis also assumes that no sub-legal fish were discarded. The analysis also assumes that all B2 fish would be available if the bag limit were increased, as the most conservative estimate. All bags over the existing limit were then set to the hypothetical limit to calculate increased take. For a full description of the sub-bag limit analysis refer to Appendix A.

Socioeconomic Impacts

Increasing the greenling bag limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Biological Impacts under Option 2

Projected Impacts

Under Option 2, the projected mortality of greenlings is expected to increase by 6.6 percent (1.0 mt) compared to Option 1. This increase is not expected to exceed the kelp greenling harvest guideline or ACL. No additional impacts are expected on overfished species compared to Option 1 (Table C-101) because kelp greenling are commonly encountered in shallower depths and more than 50 percent of the catch comes from shore anglers.

Stock Status

Under Option 2, no changes to stock status are expected compared to Option 1.

Option 3, Preferred: Increase the kelp greenling bag limit to 10 fish

Under Alternative 3, the Council is proposing to increase the sub-bag limit from two fish to 10 fish to provide more opportunity for anglers to achieve their allocation of kelp greenling; no changes to the minimum size limit are proposed. This measure would maintain consistency with state regulations, which are being modified to reflect the greenling contribution to the "Other Fish" complex.

Socioeconomic Impact

Increasing the greenling bag limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Biological Impacts under Option 3

Projected Impacts

Under Option 3, the projected impact to greenlings is expected to increase by 7.4 percent (1.1 mt) compared to Option 1. The projected impacts of increasing the sub-bag limit on kelp greenling is not expected to exceed the harvest guideline or ACL. No additional impacts are expected on overfished species compared to Option 1 (Table C-101) because kelp greenling are commonly encountered in shallower depths and more than 50 percent of the catch comes from shore anglers

Stock Status

Under Option 3, no changes to stock status are expected compared to Option 1.

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Appendix D GROUNDFISH FMP EXCERPTS OF REVISIONS ASSOCIATED WITH AMENDMENT 21-2

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

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This appendix provides excerpts from the Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery (FMP) showing the revisions associated with Amendment 21-2. The revised FMP in its entirety will be available on the Pacific Council's web site at http://www.pcouncil.org/groundfish/fishery-management-plan/ once the Secretary of Commerce approves FMP Amendment 21-2. The heading numbers in the following excerpts comport with the chapter sections in the FMP.

Excerpts Associated with FMP Amendment 21-2

5.5.2 Inseason Establishment and Adjustment of ACLs, OYs, HGs, and Quotas

ACLs, OYs ACTs, and HGs or quotas may be established and adjusted inseason (1) for resource conservation through the "points of concern" framework described in Section **Error! Reference source not found.**; (2) in response to a technical correction to OFL described above; or, (3) under the socioeconomic framework described in Section **Error! Reference source not found.**.

Quotas may be established and adjusted inseason only for resource conservation or in response to a technical correction to OFL. These constraints on establishing and adjusting ACLs, OYs, ACTs, HGs, and quotas do not apply to the process for establishing and adjusting off the top deductions, which is provided in Section 0, or sector-specific catch limits, which is provided in Section **Error! Reference source not found.**.

6.2.1 Routine Management Measures Overview

6.2.1.1 Routine Management Measures ~~through Amendment 18~~:

This section outlines those actions determined to be routine. Additional actions may be designated as routine through the biennial specifications process as outlined above and/or specified in regulations therefore they may not appear in this section. The current list of routine management measures is published in Federal regulations at 50 CFR 660.60(c).

All fisheries, all gear types:

Depth-based management measures, particularly the setting of closed areas known as GCAs may be imposed on any sector of the groundfish fleet using specific boundary lines that approximate depth contours with latitude/longitude coordinates. Depth-based management measures and the setting of closed areas may be used to: protect and rebuild overfished stocks; extend the fishing season; for the commercial fisheries, to minimize disruption of traditional fishing and marketing patterns; to reduce discards; for the recreational fisheries, to spread the available catch over a large number of anglers; to discourage target fishing while allowing small incidental catches to be landed; and to allow small fisheries to operate outside the normal season.

~~The current list of routine management measures is published in Federal regulations at 50 CFR 660.370.~~

Routine management measures have been developed to deal with management uncertainty in the groundfish fishery. The process allows timely adjustment of measures inseason to respond to the most current scientific and management information. These routine management measures are AMs under the Magnuson-Stevens Act as amended.

Deductions ~~amounts~~ of yield from ACLs made prior to fishery allocations to accommodate research fisheries, exempted fishing permits and groundfish bycatch in non-groundfish fishery sectors can be adjusted routinely in accordance with sector needs as determined by the Council. Any changes must be made in accordance with Section 6.2 paragraph B above.

Commercial limited entry and open access fisheries:

Trip landing and frequency limits, size limits, for all gear types may be imposed: to extend the fishing season; to minimize disruption of traditional fishing and marketing patterns; to reduce discards; to discourage target fishing while allowing small incidental catches to be landed; to protect overfished species; to allow small fisheries to operate outside the normal season; and, for the open access fishery only, to maintain landings at the historical proportions during the 1984-88 window period.

Trip landing and frequency limits have been designated as routine for the following species or species groups: black rockfish, blue rockfish, bocaccio, canary rockfish, chilipepper rockfish, cowcod, darkblotched rockfish, Pacific ocean perch, shortbelly rockfish, splitnose rockfish, widow rockfish, yelloweye rockfish, yellowtail rockfish, minor nearshore rockfish or shallow and deeper minor nearshore rockfish, shelf or minor shelf rockfish, and minor slope rockfish; DTS complex, which is composed of Dover sole, sablefish, shortspine thornyheads, and longspine thornyheads, both as a complex and for the species within the complex; arrowtooth flounder, English sole, petrale sole, Pacific sanddabs, rex sole, and the Other Flatfish complex, which is composed of those species plus any other FMP flatfish species; Pacific whiting; lingcod; cabezon; Pacific cod; spiny dogfish; and Other Fish as a complex consisting of all groundfish species listed in the FMP and not otherwise listed as a distinct species or species group.

Size limits have been designated as routine for sablefish and lingcod.

Trip landing and frequency limits that differ by gear type and closed seasons may be imposed or adjusted on a biennial or more frequent basis for the purpose of rebuilding and protecting overfished or depleted stocks. To achieve the rebuilding of an overfished or depleted stock, a sector or sectors of the primary Pacific whiting may be closed if a total catch limit of an overfished species has been designated for the whiting fishery and that total catch limit is reached before the sector's whiting allocation is reached. Total catch limits in the primary Pacific whiting fishery may be established or adjusted as routine management measures. In the shorebased IFQ fishery, changes to the surplus carry-over percentages may be routinely adjusted (see Appendix E, Section E.2.1.3 and Table 1, A-2.2.2.b).

Recreational fisheries all gear types:

Routine management measures for all groundfish species, separately or in any combination, include: bag limits, size limits, time/area closures, boat limits, hook limits, and dressing requirements. All routine management measures on recreational fisheries are intended to keep landings within the harvest levels announced by NMFS, to rebuild and protect overfished or depleted species, and to maintain consistency with State regulations, and for the other purposes set forth in this section.

Bag limits may be imposed to spread the available catch over a large number of anglers; to protect and rebuild overfished species; to avoid waste.

Size limits may be imposed to protect juvenile fish; to protect and rebuild overfished species; to enhance the quality of the recreational fishing experience.

Season duration restrictions may be imposed to spread the available catch over a large number of anglers; to protect and rebuild overfished species; to avoid waste; to enhance the quality of the recreational fishing experience.

~~**All fisheries, all gear types:**~~

~~Depth-based management measures, particularly the setting of closed areas known as GCAs may be imposed on any sector of the groundfish fleet using specific boundary lines that approximate depth contours with latitude/longitude coordinates. Depth-based management measures and the setting of closed areas may be used to: protect and rebuild overfished stocks; extend the fishing season; for the commercial fisheries, to minimize disruption of traditional fishing and marketing patterns; to reduce discards; for the recreational fisheries, to spread the available catch over a large number of anglers; to discourage target fishing while allowing small incidental catches to be landed; and to allow small fisheries to operate outside the normal season.~~

~~The current list of routine management measures is published in Federal regulations at 50 CFR 660.370.~~

~~Routine management measures have been developed to deal with management uncertainty in the groundfish fishery. The process allows timely adjustment of measures inseason to respond to the most current scientific and management information. These routine management measures are AMs under the Magnuson-Stevens Act as amended.~~

11.2.2 Allocations Between the Limited Entry and Open Access Fisheries and Management of the Open Access Fishery

1. The division of the fleet into LE and open access participants will require that separate allocations be established for each group where management measures are required to prevent harvest in excess of annual catch limits. For those species, species groups and areas covered by the trawl/-non-trawl allocations provided in Table 6- 1 and for which the Council determines an allocation is necessary, ad hoc allocations to the directed open access sector will be established as needed through the biennial specifications process.
2. For those species for which trawl/non-trawl allocations are not established in Table 6- 1, allocations for the open access fishery will be based on historical catch levels for the period July 11, 1984 to August 1, 1988 by exempted, longline, and fishpot gears used by vessels which did not receive an endorsement for the gear where management measures are required to prevent harvest in excess of ACLs.

a. On the basis of landings over this period, a percentage of catch[1] for these gears will be determined and applied to harvest guidelines and quotas in order to establish the allocation for the open access portion of the fishery. The open access portion of harvest guideline or quota will be set aside before other allocations are made.

b. LE/open access allocation percentages for specific species and species groups will be determined after this LE program is implemented, and permitted and non-permitted vessels are identified.

c. An open access allocation based on catch history will be determined for each separate species, species group, and area for which the Council determines an allocation is necessary.

d. Initial determination and any subsequent revision of the species or species groups and areas for which an open access allocation will be made will occur through a rulemaking under the appropriate framework in Chapter 6 of this plan.

e. Open access allocations for species, species groups and areas identified for such allocation by the Council will be specified during the biennial process for setting specifications described in Section **Error! Reference source not found.** of this plan.

f. A change in the catch history allocation method for determining the allocation for the open access fishery will require a plan amendment.

g. If a group of vessels that initially is to participate in the open access fishery later receives permits in the limited access fishery, the historical catch levels of those vessels shall be deducted from the historical catch levels used to calculate the open access allocation, and the percentages used in setting the open access allocation recalculated. For example, if a vessel whose gear is prohibited by a state or the Secretary of Commerce qualifies for a LE permit under Section **Error! Reference source not found.**(9), or if a small LE fleet is incorporated under Section **Error! Reference source not found.**(9) and its vessels are issued LE permits, their catch history with the banned gear or the LE gear for which they are now going to receive permits shall be deducted from the open access fishery's historical catch levels, and open access percentages will be recalculated.

h. Prior to expiration of “B” endorsements, vessels' catch history using gears for which they receive “B” endorsements is not included in the catch history used to calculate the percentage of catch for open access vessels. When “B” endorsements expire, the historic catch levels of vessels which received “B” endorsements for longline or fishpot gear when using that gear will then count toward determining the proportion allocated to the open access quota. The historic catch levels of vessels which received “B” endorsements for trawl gear will continue to count toward determining the limited access quota and will not be transferred to the catch history used to determine the open access quota, even after trawl “B” endorsements expire.

3. For International North Pacific Fisheries Commission areas where quotas or harvest guidelines for a stock are not fully utilized, no limited/open access allocation will be established until it is anticipated the allowable catch for a species or group of species will be reached.

4. Any groundfish catch by a vessel registered to an LE permit will be counted against the allocation for the limited entry gear(s) that the permit is endorsed for when the fishery for the limited entry gear is allowed, except when the vessel is fishing in a fishery for which

[1] Percentage of catch as determined through the Pacific Coast Fisheries Information Network database or some comparable database.

the catch has already been accounted for in the preseason set-asides deducted from the ACLs. A vessel may not carry or deploy limited entry gear for which its permit is endorsed when the limited entry fishery for that gear is closed or otherwise prohibited. Once the limited entry fishery for the gear for which the permit is endorsed has closed, any groundfish landings by the vessel with open access gear will count toward the allocation covering the open access fishery. The catch of vessels fishing without LE permits will count toward the allocation covering the open access fishery regardless of what open access gear is used, except when the vessel is participating in a fishery for which the catch has already been accounted for in the preseason set-asides deducted from the ACLs.

~~Groundfish catch will be counted against the allocation to the fishery or sector into which the vessel has declared or is otherwise participating.~~

5. Allocations among gear types for species other than sablefish north of 36° N. latitude may be established in the future. If this occurs, portions of the new allocations may, in turn, be allocated to the open access fishery under the principles set forth in this section.
6. Management of the open access fishery.
   a. The open access portion of the fishery will be managed to provide year-round fishing opportunity.
   b. The purpose of providing an open access alternative for vessels using longline or fishpot gear is to allow a group of vessels which has historically fished at low levels, with minimal impacts on the resource (fewer than 5 or 6 landings greater than 500 pounds per vessel during the qualifying window period, July 1, 1984 through August 1, 1988), to remain in the fishery without creating permits which may be used at higher effort levels.
   c. The open access fishery will be managed with the intent of maintaining the historic fishing opportunities for the participant groups and to keep the overall catch in line with historic harvests. For example, trip limits for non-permitted longline and fishpot gears operating in the open access fishery will likely be fairly low because the historic fishing levels of this group are low. Trip limits, when necessary, for some exempted gears will probably be higher because their historic fishing levels are higher.

APPENDIX E COMMENT LETTERS RECEIVED ON THE DEIS

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

September 2012

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
620 SW Main Street, Suite 201
Portland, Oregon 97205-3026

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IN REPLY REFER TO
ER12/429

Electronically Filed

July 30, 2012

William W. Stelle, Jr.
Regional Administrator
NMFS Northwest Region
National Oceanic and Atmospheric Administration
7600 Sandpoint Way NE
Seattle, Washington 98115

Dear Mr. Stelle, Jr.:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for the Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast FMP. The Department does not have any comments to offer.

We appreciate the opportunity to comment.

Sincerely,

Allison O'Brien

Allison O'Brien
Regional Environmental Officer

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
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July 27, 2012

William W. Stelle, Jr., Regional Administrator
NMFS Northwest Region
National Oceanic and Atmospheric Administration
7600 Sandpoint Way NE
Seattle, Washington 98115

Re: EPA comments on the Draft Environmental Impact Statement for the Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan, EPA Project #12-0029-NOA.

Dear Mr. Stelle:

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan (CEQ # 20120190). We have reviewed the EIS in accordance with our responsibilities under National Environmental Policy Act and Section 309 of the Clean Air Act. Section 309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions as well as the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.

We understand that the purpose of this action is to set the 2013-2014 season biennial limits for 40 management unit species, including seven overfished species, as well as reinstate a provision inadvertently deleted in a previous Fishery Management Plan amendment. In addition to the No Action alternative, the EIS evaluates 8 "integrated" action alternatives. The EIS states that the Pacific Fishery Management Council has identified Alternative 1 as its preferred alternative, noting that the Council may identify additional changes to the this alternative at the June 2012 Council meeting.

We have assigned a rating of EC-2 (Environmental Concerns-Insufficient Information) to this EIS. A description of our rating system is enclosed (Enclosure 1). We recognize the need to balance the economic needs of the communities with the continued harvest, even unintentional, of the overfished species. However, we are concerned that all alternatives include harvest levels that will extend the length of time it will take to reach rebuilding targets for both Pacific Ocean Perch and Canary Rockfish. We also have concerns related to the identified adverse impacts to non-target species, such as leatherback turtles.

The EIS does not include an alternative that considers annual catch limits for both species that are lower than the current conditions (No Action). We recommend that the National Marine Fisheries Service consider such an alternative. If deemed not reasonable, or unable to meet the community considerations required by the Magnuson-Stevens Fishery Conservation and Management Act, we recommend that a discussion of this conclusion be included in the Final EIS. We believe such an alternative may decrease the time needed to rebuild both species as well as minimize impacts to non-target species.

We commend the National Marine Fisheries Service and Council for the inclusion and evaluation of new accountability measures that are intended to improve the performance of the management program, as well as the extensive environmental justice analysis included in the EIS. We believe both will strengthen implementation of the management plan and support the requirements of the Magnuson-Stevens Act.

Again, we appreciate the opportunity to offer comments on the Draft EIS. Please contact me at (206) 553-1601 or by email reichgott.christine@epa.gov, or you may contact Jennifer Curtis of my staff in Anchorage at (907) 271-6324 or by email at curtis.jennifer@epa.gov with any questions you have regarding our comments.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediments Management Unit

Enclosure

ENCLOSURE 1

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Appendix A DESCRIPTION OF PROJECTION MODELS

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

September 2012

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This Appendix describes the projection models used for each fishery to estimate the total catch of selected non-overfished species (generally target species) and overfished species.

A.1 Commercial Landings Distribution Model

The purpose of the commercial fishery landings distribution model (LDM) is to inform the Council's management processes by projecting where (PacFIN PCID) landings are likely to occur under a set of alternative scenarios (e.g., alternative ACLs or management measures). The projected landings ports can then be mapped onto Port Area aggregations to allow comparison of the geographic distribution of ex-vessel revenues under the alternatives. Since all the alternatives are modeled consistently, projections from the LDM facilitate comparison of the alternatives in an apples-to-apples fashion.

A list of Port Areas and underlying PCIDs is shown in Table 1. Although used primarily to inform the groundfish management processes, the LDM methodology can be applied to analyze any west coast fishery. In the case of groundfish, exvessel revenue results from the LDM, aggregated by Port Area, are fed directly into the IO Pac input-output model and vessel net revenue projection model, where they are used to calculate and compare economic impacts under the different alternatives.

A.1.1 Data Elements

The core of the LDM is a recent-year commercial fishing landings data report from the Pacific Coast Fisheries Information Network (PacFIN) data system. The standardized PacFIN daily vessel landing is used for this purpose. The PacFIN website briefly describes the vdrfd table thus:

> **Vdrfd table**: The relationship between vessels, tickets, date-of-landing, permit(s), fish-ticket category, and post-distribution species id code. (Produced by prod/refresh_vdrfd.sql.)

For analyzing the 2013-2014 groundfish management specifications, a vdrfd table for 2011 was used.

Key data elements of the LDM provided by the PacFIN data report include:

- Inventories of all species (SPIDs including nominal and market categories after application of species composition factors), round weights and ex-vessel values landed during the year by port ((PCID).
- Assignment of each landing to a fisheries management sector.
- Distribution of species landings and revenues by vessel (DRVID).
- Distribution of species landings and revenues among first receivers (Processor ID).

This historical information forms one of baselines against which changes under the management alternatives can be measured.

A.1.2 Model

Groundfish landings records in the vessel landings table are categorized by fisheries sector. This categorization is based on Council area, port, species and the gear used. The fisheries sector categories align with the GMT fishery sector projection models listed below. The GMT models project landings in each of five sectors under the management alternative as part of their overall analysis of harvest specifications and management measures. The next step is to compute the base year percentage of landings for each fishery sector by each combination of Area, Vessel ID, SPID and PCID. The "area" used for this calculation varies according to the resolution of the corresponding fishery sector projection model, as noted below. The percentages are then applied to the results from the GMT fishery sector projection models to estimate the geographic distribution of landings across ports (PCIDs) in each fishery.

To project the geographic distribution of landings under the alternatives, results from the commercial fisheries sector landings projection models are applied to the landings percentages calculated from the vdrfd report as noted above. Unless indicated otherwise (by the GMT model results or the proposed management measures), landings under the alternatives are assumed to occur in the same ports in proportion to landings observed in the base year vdrfd table. Only landings of the main economic groundfish species that are modeled for each fisheries sector are of concern in the LDM. Landings of nongroundfish species, incidentally-caught groundfish species and overfished species such as canary rockfish, bocaccio and cowcod are generally ignored, as these are not managed by the Council or do not generate significant revenues in groundfish fisheries.

The level of detail carried over from the GMT models to the LDM varies considerably by fisheries sector (Figure A-1). The most detailed results are produced by the IFQ catch projection model which generates a table of projected landings by species category for each groundfish permit ID.

Less detailed results and mappings are used to link the LDM with the remaining fishery sector models. For example, the Non-nearshore fisheries model projects landings of sablefish (and incidentally-caught overfished species) in aggregate for the LE and OA fixed gear fisheries north of 36° N. latitude. So, unless otherwise constrained or indicated under the alternatives, a port (PCID) that received, e.g., 8 percent of the north of 36° LE fixed gear sablefish landings in 2011 is expected to receive 8 percent of projected north of 36° LE fixed gear sablefish landings under each alternative each year of the biennial cycle. The same rationale is applied to distribute OA-DTL fixed gear sablefish landings.

Linkage between the LDM and the Nearshore fisheries model is similar, except the additional area detail in the nearshore model is incorporated to distribute projected landings of nearshore groundfish species by area to the ports (PCIDs) associated with each catch area and in proportion to the distribution of landings observed in the base year vdrfd data table.

The main features the GMT model inputs and additional procedures used for integrating this information in the LDM are described below:

- **IFQ catch projection model:** Projected groundfish target species landings by each vessel/permit participating in the LE trawl fishery. The list of target species projected includes Sablefish, Longspine thornyhead, Shortspine thornyhead, Dover sole, Arrowtooth flounder, Petrale sole, English sole, Other flatfish, and Pacific whiting. Incidental landings of nontarget overfished species are also projected by the model, however these projections are not generally incorporated for economic analysis.
- **Non-nearshore fisheries model:** Projected maximum aggregate landings of sablefish and incidentally caught overfished species north of 36° by vessels participating in the fixed-gear LE and OA-DTL fisheries. Only sablefish landings are used in the economic analysis. Note: To date sablefish landings south of 36° have not been explicitly modeled by the GMT. Instead the sablefish OYs/ACLs under each alternative are compared with landings observed in the base year, and then those ratios are applied to project landings under the alternatives.
- **Nearshore fisheries model:** Projected aggregate landings by area (Oregon, California north of 40°10 and California south of 40°10) of nearshore target species (black rockfish, blue rockfish, cabezon, kelp greenling, lingcod, and other minor nearshore rockfish) by vessels participating in the fixed gear OA fishery. Landings of canary and yelloweye rockfish are also projected however these are not used in the economic analysis of this sector.

- **At-sea whiting fisheries model:** Projected alternative allocations of Pacific whiting to the at-sea CP and mothership fisheries, constrained by anticipated relevant overfished species allocations and observed bycatch rates, if applicable.
- **Tribal fisheries model:** Projected total whiting (shoreside and at sea) and nonwhiting groundfish target species landings by the tribal groundfish fisheries.

A.1.2.1 IFQ fishery

Information in the final end-of-year run for the relevant year from the IFQ catch projection model is used to adjust records in the vdrfd table for IFQ fishery participants. This step produces a calibrated landings report that can be readily linked with IFQ catch projections generated for each groundfish management option or alternative. Projected landings by vessels (permits) are assumed to distribute to ports (PCIDs) based on where those vessels (permits) landed in the base year vdrfd table.

A.1.2.2 Non-Nearshore fisheries

Total sablefish landings projected under each option or alternative for the fixed gear LE and OA-DTL fisheries north of 36° by the non-nearshore fisheries model are distributed to participating vessels and ports (PCIDs) in proportion to where sablefish landings occurred in the base year vdrfd table. For areas south of 36° a different procedure is used. The ratio of sablefish landings in the base year to the corresponding sablefish ACL is calculated. This ratio is then applied to the ACL projected under each option or alternative to estimate total sablefish landings south of 36° under each scenario. Estimated total landings are then distributed to associated landing ports south of 36° in proportion to where sablefish landings occurred in the base year vdrfd table.

A.1.2.3 Nearshore fisheries

For the fixed gear OA fishery, total projected nearshore target species landings under each option or alternative projected by the nearshore fishery model are distributed to participating vessels and ports in the proportions observed in the base year vdrfd table. Nearshore target species distributed in this manner include black rockfish, blue rockfish, cabezon, kelp greenling, lingcod, and other minor nearshore rockfish. The most recent three nearshore fishery catch areas: Oregon, California north of 40°10 and California south of 40°10Whiting fisheries

Total projected landings and deliveries by the two nontribal at-sea whiting fisheries (CP and motherships) under each option or alternative are distributed among vessels that participated in the whiting fishery in proportion to their participation in the base year. Pacific whiting harvest is regulated separately from the nonwhiting groundfish specifications process, but a range of possible Pacific whiting harvests is sometimes analyzed in the groundfish DEIS for purposes of comparison.

A.1.2.4 Tribal groundfish fisheries

Total projected landings and deliveries under each option or alternative by the tribal groundfish fisheries, including shoreside and at sea whiting, are distributed among vessels and ports that participated in those fisheries in proportion to their participation in the base year.

A.1.3 Assumptions and Caveats

Major simplifying assumptions are highlighted here, including:

- Average exvessel prices observed in the base year will carry over to the projection period(s).
- There is no cross hauling of raw product. That is the amount landed in each port area is also processed there.
- Average annual ex-vessel prices are assumed to apply in each port no matter when during the year landings occur.

One concern with this approach is that the more future ex-vessel prices deviate from the range of prices observed in the base year, the more projected revenue impacts may be inaccurate. However if better information is available on future exvessel price trends, it is possible to incorporate this type of information into the revenue projections.

Landings and revenue impacts projected for groundfish by the LDM are used in the IO Pac model to estimate community income impacts under the alternatives. To the degree that processing activities, the vessel's home port, or the residences of owners and workers are located in the port of landing, then a larger portion of the impacts generated by these landings will to accrue in the community associated with the port. However to the extent that processing activities, the vessel's home port, or the residences of workers and owners are located elsewhere, the pattern of landings may overstate the value of these activities to the local economy. Where landings are made in one port but a vessel's home port or crew reside elsewhere, or where first receivers transfer landings elsewhere for processing, at least a portion of projected income impacts may be attributed to the wrong port.

A.1.4 Results

Results from the LDM are used as inputs to estimate community income impacts and vessel sector net revenues ("profits") under the alternatives. Projected revenues by species, fishing sector and port are fed into the IO Pac model to generate community personal income impacts under each alternative. IO Pac is in input-output economic model constructed using landings data, vessel cost estimates, and secondary economic data to estimate income and employment impacts resulting from a change in the distribution of commercial fishery landings. Projected landings and revenue for groundfish species by each groundfish fishery sector coupled with vessel cost estimates from IO Pac are also used to estimate net revenues accruing to vessel owners participating in west coast groundfish fisheries. Estimates from these two models are used to compare and contrast economic impacts under the groundfish management alternatives.

Tables 2 and 3 compare results generated using the LDM to analyze management measures and harvest specifications for the 2007-2008 and 2009-2010 groundfish management cycles with actual landings recorded during those periods.

Table A-1. List of Port Groups and PCIDs in the Landings Distribution Model.

State	Port Group Area	County	PCID	Port Name
Washington	**Puget Sound**	Whatcom	BLN	Blaine
		Whatcom	BLL	Bellingham Bay

State	Port Group Area	County	PCID	Port Name
		San Juan	FRI	Friday Harbor
		Skagit	ANA	Anacortes
		Skagit	LAC	La Conner
		Snohomish	ONP	Other North Puget Sound Ports
		Snohomish	EVR	Everett
		King	SEA	Seattle
		Pierce	TAC	Tacoma
		Thurston	OLY	Olympia
		Mason	SHL	Shelton
	North Washington Coast	Jefferson	TNS	Port Townsend
		Clallam	SEQ	Sequim
		Clallam	PAG	Port Angeles
		Clallam	NEA	Neah Bay
		Clallam	LAP	La Push
	South & Central WA Coast	Grays Harbor	CPL	Copalis Beach
		Grays Harbor	GRH	Grays Harbor
		Grays Harbor	WPT	Westport
		Pacific	WLB	Willapa Bay
		Pacific	LWC	Ilwaco/Chinook
		Klickitat	OCR	Other Columbia River Ports
Oregon	**Columbia River**	Multnomah	CRV	Psuedo Port Code for Columbia River
	Astoria-Tillamook	Clatsop	AST	Astoria
		Clatsop	GSS	Gearhart - Seaside
		Clatsop	CNB	Cannon Beach
		Tillamook	NHL	Nehalem Bay
		Tillamook	TLL	Tillamook / Garibaldi
		Tillamook	NTR	Netarts Bay
		Tillamook	PCC	Pacific City
	Newport	Lincoln	SRV	Salmon River
		Lincoln	SLZ	Siletz Bay
		Lincoln	DPO	Depoe Bay
		Lincoln	NEW	Newport
		Lincoln	WLD	Waldport
		Lincoln	YAC	Yachats
	Coos Bay	Lane	FLR	Florence
		Douglas	WIN	Winchester Bay
		Coos	COS	Coos Bay
		Coos	BDN	Bandon
	Brookings	Curry	ORF	Port Orford
		Curry	GLD	Gold Beach
		Curry	BRK	Brookings
California	**Crescent City**	Del Norte	CRS	Crescent City
		Del Norte	ODN	Other Del Norte County Ports
	Eureka	Humboldt	ERK	Eureka (Includes Fields Landing)
		Humboldt	FLN	Fields Landing
		Humboldt	TRN	Trinidad
		Humboldt	OHB	Other Humboldt County Ports
	Fort Bragg	Mendocino	BRG	Fort Bragg

State	Port Group Area	County	PCID	Port Name
		Mendocino	ALB	Albion
		Mendocino	ARE	Arena
		Mendocino	OMD	Other Mendocino County Ports
	San Francisco (incl. Bodega Bay)	Sonoma	BDG	Bodega Bay
		Marin	BOL	Bolinas
		Marin	TML	Tomales Bay
		Marin	RYS	Point Reyes
		Marin	OSM	Other Son. and Mar. Co. Outer Coast Ports
		Marin	SLT	Sausalito
		Alameda	OAK	Oakland
		Alameda	ALM	Alameda
		Alameda	BKL	Berkely
		Contra Costa	RCH	Richmond
		San Francisco	SF	San Francisco
		San Mateo	PRN	Princeton
		San Francisco	SFA	San Francisco Area
		San Francisco	OSF	Other S.F. Bay and S.M. Co. Ports
	Monterey	Santa Cruz	CRZ	Santa Cruz
		Monterey	MOS	Moss Landing
		Monterey	MNT	Monterey
		Monterey	OCM	Other S.C. and Mon. Co. Ports
	Morro Bay	San Luis Obispo	MRO	Morro Bay
		San Luis Obispo	AVL	Avila
		San Luis Obispo	OSL	Other S.L..O. Co. Ports
	Santa Barbara	Santa Barbara	SB	Santa Barbara
		Santa Barbara	SBA	Santa Barbara Area
		Ventura	HNM	Port Hueneme
		Ventura	OXN	Oxnard
		Ventura	VEN	Ventura
		Ventura	OBV	Other S.B. and Ven. Co. Ports
	Los Angeles	Los Angeles	TRM	Terminal Island
		Los Angeles	SPA	San Pedro Area
		Los Angeles	SP	San Pedro
		Los Angeles	WLM	Willmington
		Los Angeles	LGB	Longbeach
		Orange	NWB	Newport Beach
		Orange	DNA	Dana Point
		Orange	OLA	Other LA and Orange Co. Ports
	San Diego	San Diego	SD	San Diego
		San Diego	OCN	Oceanside
		San Diego	SDA	San Diego Area
		San Diego	OSD	Other S.D. Co. Ports

Table A-2. Projections under the LDM compared with actual landings: 2007-2008.

		2005 (Base Year)		2007-2008 Spex Final Council Preferred Alt.		PacFIN Actual landings 2007		PacFIN Actual landings 2008		Projections / Actual (% difference) 2007		Projections / Actual (% difference) 2008	
Groundfish Sector	**Port Area**	mt	$ million	**mt**	**$ million**	mt	$ million	mt	$ million	mt	$ million	mt	$ million
Non-whiting Trawl	Puget Sound	2,080.1	2.1	**2,118.3**	**1.9**	893.0	1.0	823.1	1.0	137.2%	98.2%	157.4%	94.7%
	North Washington Coast	552.8	0.5	**514.4**	**0.4**	74.5	0.1	30.5	0.0	590.6%	474.0%	1587.7%	849.6%
	South and Central Washington Coast	483.0	0.5	**458.7**	**0.4**	1,190.2	1.4	1,330.8	1.5	-61.5%	-69.9%	-65.5%	-70.9%
	Astoria-Tillamook	5,641.9	6.5	**6,578.3**	**6.9**	6,391.8	6.7	7,934.1	8.8	2.9%	3.9%	-17.1%	-21.2%
	Newport	1,653.5	2.2	**1,971.3**	**2.4**	2,245.7	3.2	3,136.2	4.6	-12.2%	-24.7%	-37.1%	-48.9%
	Coos Bay	2,230.6	2.6	**2,697.4**	**2.9**	3,080.5	3.8	3,547.6	4.6	-12.4%	-21.9%	-24.0%	-36.7%
	Brookings	679.7	0.8	**910.7**	**1.0**	1,052.0	1.4	1,277.6	1.9	-13.4%	-28.1%	-28.7%	-46.1%
	Crescent City	621.6	0.8	**709.3**	**0.8**	672.8	0.9	752.5	1.0	5.4%	-9.1%	-5.7%	-15.8%
	Eureka	1,860.1	2.2	**2,158.2**	**2.4**	2,880.8	3.6	2,921.2	4.0	-25.1%	-33.1%	-26.1%	-38.9%
	Fort Bragg	1,545.4	1.7	**2,179.8**	**2.3**	1,276.1	1.9	1,508.5	2.3	70.8%	22.5%	44.5%	1.8%
	San Francisco-Bodega Bay	579.7	0.8	**561.6**	**0.8**	1,120.2	1.8	1,057.8	1.8	-49.9%	-58.9%	-46.9%	-57.4%
	Monterey	602.7	0.8	**725.6**	**0.9**	240.6	0.5	286.1	0.5	201.5%	101.4%	153.6%	84.9%
	Morro Bay	410.0	0.5	**460.0**	**0.5**	26.5	0.1	165.5	0.3	1635.9%	767.0%	178.0%	50.3%
	Santa Barbara					0.0	0.0	0.4	0.0			-100.0%	-100.0%
Limited Entry Fixed Gear	Puget Sound	670.7	2.0	**570.0**	**1.6**	554.0	1.9	326.9	1.5	2.9%	-18.3%	74.3%	2.2%
	North Washington Coast	172.3	0.6	**134.6**	**0.5**	180.8	0.8	257.5	0.8	-25.6%	-45.2%	-47.7%	-42.0%
	South and Central Washington Coast	289.5	1.1	**222.9**	**0.9**	231.4	1.0	334.8	1.6	-3.6%	-12.4%	-33.4%	-46.8%
	Astoria-Tillamook	204.1	0.8	**156.2**	**0.6**	135.2	0.6	140.9	0.8	15.6%	1.7%	10.9%	-20.2%
	Newport	378.3	1.5	**287.5**	**1.2**	320.4	1.6	372.6	2.1	-10.3%	-28.2%	-22.8%	-44.9%
	Coos Bay	271.8	1.2	**206.1**	**0.9**	187.0	1.0	183.4	1.1	10.2%	-7.5%	12.4%	-17.0%
	Brookings	148.1	0.6	**115.3**	**0.5**	142.7	0.6	162.2	0.8	-19.2%	-29.7%	-28.9%	-45.1%
	Crescent City	83.1	0.2	**66.4**	**0.2**	61.4	0.2	64.6	0.3	8.1%	-17.6%	2.7%	-40.7%
	Eureka	87.8	0.3	**68.5**	**0.2**	104.4	0.4	123.0	0.5	-34.4%	-38.7%	-44.3%	-51.0%
	Fort Bragg	64.4	0.2	**49.9**	**0.2**	93.9	0.4	108.6	0.5	-46.9%	-54.0%	-54.1%	-65.2%
	San Francisco-Bodega Bay	43.8	0.2	**34.6**	**0.2**	40.4	0.1	43.0	0.2	-14.3%	11.2%	-19.6%	-8.5%
	Monterey	146.3	0.4	**122.7**	**0.4**	145.2	0.5	143.6	0.5	-15.5%	-29.5%	-14.5%	-26.4%
	Morro Bay					1.6	0.0	30.7	0.1	-100.0%	-100.0%	-100.0%	-100.0%
	Santa Barbara	65.2	0.3	**60.7**	**0.2**	44.9	0.3	31.9	0.2	35.1%	-16.7%	90.2%	-0.2%
	Los Angeles	119.7	0.7	**111.7**	**0.7**	127.5	0.8	114.6	0.8	-12.3%	-17.1%	-2.5%	-13.2%
	San Diego	53.9	0.3	**49.2**	**0.3**	60.0	0.4	105.2	0.8	-18.0%	-29.9%	-53.2%	-63.8%
Open Access	Puget Sound	10.9	0.0	**10.1**	**0.0**	1.4	0.0	0.1	0.0	612.9%	174.5%	8500.6%	1409.6%
	North Washington Coast	38.8	0.1	**30.5**	**0.1**	29.5	0.1	29.8	0.1	3.3%	-28.7%	2.2%	4.9%
	South and Central Washington Coast	137.2	0.5	**103.9**	**0.4**	46.6	0.2	68.4	0.3	122.9%	124.6%	52.0%	31.5%
	Astoria-Tillamook	84.2	0.3	**71.5**	**0.2**	55.9	0.2	52.0	0.2	27.9%	0.4%	37.6%	-4.0%
	Newport	24.5	0.1	**21.1**	**0.1**	29.5	0.1	44.8	0.2	-28.7%	-57.8%	-53.0%	-74.8%
	Coos Bay	104.9	0.3	**82.5**	**0.3**	40.3	0.2	81.1	0.4	104.5%	57.8%	1.7%	-37.3%
	Brookings	273.1	1.2	**236.8**	**1.1**	193.3	1.0	227.4	1.2	22.5%	11.4%	4.1%	-13.2%
	Crescent City	88.5	0.4	**87.7**	**0.4**	100.0	0.5	107.1	0.5	-12.3%	-29.1%	-18.1%	-32.6%
	Eureka	88.1	0.2	**70.5**	**0.2**	45.5	0.2	72.4	0.3	54.9%	24.2%	-2.6%	-31.3%
	Fort Bragg	298.8	1.0	**233.0**	**0.8**	108.4	0.5	111.7	0.6	115.0%	72.6%	108.7%	35.8%
	San Francisco-Bodega Bay	49.6	0.3	**47.0**	**0.3**	50.4	0.3	43.2	0.3	-6.7%	-18.9%	8.8%	-27.3%
	Monterey	187.8	0.5	**164.0**	**0.5**	73.5	0.4	112.6	0.5	123.0%	16.1%	45.6%	-12.5%
	Morro Bay	83.7	1.0	**83.1**	**1.0**	188.6	1.4	161.4	1.4	-56.0%	-30.7%	-48.5%	-30.9%
	Santa Barbara	26.8	0.1	**26.8**	**0.1**	20.9	0.2	36.4	0.3	27.8%	-38.9%	-26.6%	-49.8%
	Los Angeles	32.6	0.1	**32.1**	**0.1**	23.6	0.1	25.4	0.1	36.0%	-15.6%	26.6%	-21.8%
	San Diego	34.5	0.2	**31.8**	**0.2**	14.0	0.1	15.4	0.1	126.8%	94.9%	105.9%	124.8%
	TOTAL	**23,304.2**	**39.2**	**25,632.3**	**37.8**	**24,596.9**	**42.6**	**28,504.5**	**51.8**	**4.2%**	**-11.2%**	**-10.1%**	**-26.9%**

Table A-3. Projections under the LDM compared with actual landings: 2009-2010.

Groundfish Sector	Port Area	2007 (Base Year) mt	2007 (Base Year) $ million	2009-2010 Spex Final Council Preferred Alt. mt	2009-2010 Spex Final Council Preferred Alt. $ million	PacFIN Actual landings 2009 mt	PacFIN Actual landings 2009 $ million	PacFIN Actual landings 2010 mt	PacFIN Actual landings 2010 $ million	Projections / Actual (% difference) 2009 mt	Projections / Actual (% difference) 2009 $ million	Projections / Actual (% difference) 2010 mt	Projections / Actual (% difference) 2010 $ million
Non-whiting Trawl	Puget Sound	852.5	0.9	**1,013.9**	**1.0**	1,300.2	1.1	1,265.9	1.0	-22.0%	-8.6%	-19.9%	4.5%
	North Washington Coast	109.9	0.1	**113.9**	**0.1**	53.5	0.1	10.7	0.0	112.8%	76.3%	967.9%	961.5%
	South and Central Washington Coast	460.0	0.5	**494.8**	**0.6**	1,352.6	1.1	866.2	0.5	-63.4%	-52.0%	-42.9%	0.4%
	Astoria	5,797.1	6.6	**6,674.5**	**7.4**	8,415.3	8.0	7,332.0	6.9	-20.7%	-8.3%	-9.0%	6.7%
	Tillamook	9.0	0.0	**9.0**	**0.0**	27.6	0.0	9.5	0.0	-67.5%	-65.1%	-5.8%	-14.4%
	Newport	1,922.7	2.5	**2,166.9**	**2.9**	3,773.7	5.1	2,722.9	3.7	-42.6%	-43.6%	-20.4%	-21.5%
	Coos Bay	3,534.8	4.0	**3,911.9**	**4.6**	3,625.7	4.2	3,617.5	4.1	7.9%	9.5%	8.1%	11.7%
	Brookings	961.6	1.1	**1,047.5**	**1.3**	1,198.6	1.6	1,321.3	1.8	-12.6%	-21.2%	-20.7%	-29.1%
	Crescent City	695.5	0.8	**743.1**	**0.9**	986.7	1.3	259.3	0.4	-24.7%	-32.9%	186.6%	129.4%
	Eureka	3,034.8	3.5	**3,285.5**	**3.8**	2,667.5	3.5	2,444.5	3.3	23.2%	9.6%	34.4%	15.8%
	Fort Bragg	1,783.5	1.9	**2,055.2**	**2.3**	1,684.3	2.6	1,574.8	2.2	22.0%	-14.0%	30.5%	0.5%
	Bodega Bay	28.5	0.0	**29.6**	**0.0**	52.6	0.1	30.2	0.1	-43.7%	-52.8%	-1.8%	-27.9%
	San Francisco	1,038.6	1.4	**1,131.9**	**1.5**	661.6	1.0	636.5	0.9	71.1%	53.0%	77.8%	71.9%
	Monterey	526.3	0.5	**578.7**	**0.6**	292.7	0.5	340.0	0.5	97.7%	21.9%	70.2%	14.5%
	Morro Bay	26.1	0.0	**28.7**	**0.0**	99.9	0.2	0.0	0.0	-71.3%	-79.5%	100.0%	100.0%
	Santa Barbara					0.0	0.0	0.0	0.0				
Limited Entry Fixed Gear	Puget Sound	528.8	1.8	**629.7**	**2.3**	289.3	1.6	141.3	0.9	117.6%	41.4%	345.6%	155.7%
	North Washington Coast	168.4	0.8	**216.1**	**1.0**	221.9	1.0	142.0	0.8	-2.6%	7.1%	52.2%	30.9%
	South and Central Washington Coast	178.9	0.8	**232.2**	**1.0**	313.5	1.5	505.5	3.1	-25.9%	-33.6%	-54.1%	-67.2%
	Astoria	134.0	0.6	**174.3**	**0.8**	148.5	0.8	22.3	0.1	17.3%	-1.8%	680.3%	475.9%
	Tillamook	0.1	0.0	**0.1**	**0.0**	0.0	0.0	0.0	0.0	100.0%	100.0%	100.0%	100.0%
	Newport	317.6	1.6	**419.2**	**2.1**	529.9	3.1	475.5	3.2	-20.9%	-32.5%	-11.8%	-33.9%
	Coos Bay	185.2	1.0	**244.1**	**1.3**	195.8	1.2	337.3	2.3	24.7%	6.5%	-27.6%	-42.2%
	Brookings	142.2	0.6	**180.4**	**0.8**	264.1	1.4	267.3	1.5	-31.7%	-43.1%	-32.5%	-46.5%
	Crescent City	63.7	0.2	**79.1**	**0.3**	108.4	0.5	50.6	0.2	-27.1%	-50.0%	56.3%	18.9%
	Eureka	100.8	0.4	**131.3**	**0.5**	101.8	0.4	134.4	0.7	28.9%	15.1%	-2.3%	-27.4%
	Fort Bragg	94.6	0.4	**122.9**	**0.5**	151.8	0.9	195.4	1.2	-19.1%	-39.2%	-37.1%	-54.4%
	Bodega Bay	4.4	0.0	**4.4**	**0.0**	9.5	0.1	11.9	0.1	-53.8%	-69.3%	-63.0%	-78.9%
	San Francisco	37.1	0.1	**48.7**	**0.2**	59.9	0.3	49.5	0.3	-18.7%	-34.0%	-1.6%	-49.3%
	Monterey	145.4	0.5	**177.2**	**0.6**	108.2	0.4	145.4	0.6	63.8%	50.9%	21.9%	10.5%
	Morro Bay	8.6	0.0	**10.7**	**0.1**	200.1	0.7	193.2	0.7	-94.6%	-92.1%	-94.5%	-92.4%
	Santa Barbara	45.0	0.3	**97.6**	**0.5**	35.7	0.3	69.5	0.5	173.6%	79.3%	40.5%	-0.1%
	Los Angeles	124.7	0.8	**353.7**	**2.0**	119.2	0.9	124.7	0.9	196.6%	127.6%	183.7%	117.1%
	San Diego	59.9	0.4	**177.1**	**1.1**	82.3	0.6	86.6	0.7	115.2%	67.4%	104.5%	55.8%
Nearshore Open Access	Puget Sound	0.0	0.0	**0.0**	**0.0**	0.0	0.0	0.0	0.0				
	North Washington Coast	2.9	0.0	**2.9**	**0.0**	0.2	0.0	0.8	0.0	1506.1%	1903.4%	254.5%	-8.5%
	South and Central Washington Coast	1.4	0.0	**1.4**	**0.0**	0.0	0.0	1.0	0.0	5350.4%	605.5%	35.9%	-69.8%
	Astoria	1.4	0.0	**1.4**	**0.0**	0.2	0.0	0.3	0.0	752.9%	96.7%	397.2%	-1.6%
	Tillamook	36.9	0.2	**36.9**	**0.2**	32.0	0.1	24.0	0.1	15.3%	11.5%	53.5%	48.7%
	Newport	12.4	0.1	**12.4**	**0.1**	10.2	0.0	12.9	0.0	20.8%	36.4%	-4.4%	15.9%
	Coos Bay	7.9	0.0	**7.9**	**0.0**	3.9	0.0	5.3	0.0	103.3%	53.8%	48.1%	-10.3%
	Brookings	108.1	0.5	**108.1**	**0.5**	161.4	0.9	114.7	0.7	-33.0%	-46.1%	-5.8%	-30.5%
	Crescent City	72.6	0.3	**72.6**	**0.3**	77.5	0.3	47.9	0.2	-6.3%	-7.1%	51.6%	50.9%
	Eureka	15.4	0.0	**15.4**	**0.0**	14.3	0.1	4.0	0.0	8.0%	-10.4%	284.4%	178.1%
	Fort Bragg	9.1	0.1	**9.1**	**0.1**	14.9	0.2	14.4	0.2	-39.0%	-62.6%	-37.2%	-60.9%
	Bodega Bay	1.0	0.0	**1.0**	**0.0**	2.4	0.0	2.8	0.0	-56.9%	-80.2%	-64.0%	-83.5%
	San Francisco	5.2	0.0	**5.2**	**0.0**	20.2	0.1	9.9	0.1	-74.4%	-73.2%	-47.8%	-69.7%
	Monterey	6.3	0.1	**6.3**	**0.1**	16.3	0.2	13.2	0.1	-61.1%	-69.2%	-52.3%	-62.8%
	Morro Bay	23.8	0.2	**23.8**	**0.2**	67.4	0.9	74.9	0.9	-64.7%	-72.9%	-68.2%	-73.4%
	Santa Barbara	0.6	0.0	**0.6**	**0.0**	14.9	0.2	17.2	0.2	-95.9%	-98.3%	-96.4%	-98.5%
	Los Angeles	0.3	0.0	**0.3**	**0.0**	4.9	0.0	5.8	0.0	-93.7%	-95.7%	-94.7%	-94.8%
	San Diego	0.6	0.0	**0.6**	**0.0**	3.8	0.0	1.4	0.0	-85.0%	-80.6%	-58.7%	-65.2%
Non-Nearshore Open Access	Puget Sound	3.2	0.0	**3.7**	**0.0**	0.0	0.0	0.8	0.0	100.0%	100.0%	100.0%	100.0%
	North Washington Coast	27.8	0.1	**35.9**	**0.2**	23.1	0.1	16.9	0.1	55.3%	79.2%	112.7%	80.3%
	South and Central Washington Coast	35.4	0.2	**46.7**	**0.2**	41.5	0.2	56.5	0.3	12.6%	-1.1%	-17.3%	-41.5%
	Astoria	18.6	0.1	**24.2**	**0.1**	17.1	0.1	8.5	0.0	41.7%	18.6%	184.1%	120.6%
	Tillamook	3.3	0.0	**6.6**	**0.0**	2.7	0.0	3.5	0.0	141.8%	112.2%	87.4%	45.6%
	Newport	12.0	0.0	**15.7**	**0.1**	34.3	0.2	24.6	0.2	-54.1%	-67.6%	-36.0%	-59.6%
	Coos Bay	37.4	0.2	**49.2**	**0.2**	82.7	0.4	46.0	0.3	-40.5%	-50.3%	7.0%	-20.4%
	Brookings	80.4	0.5	**104.5**	**0.6**	114.9	0.6	75.0	0.4	-9.0%	-3.1%	39.3%	33.2%
	Crescent City	25.7	0.2	**23.6**	**0.2**	4.2	0.0	0.7	0.0	461.4%	865.8%	3518.6%	6051.4%
	Eureka	33.5	0.1	**43.3**	**0.2**	59.2	0.3	59.6	0.3	-27.0%	-38.3%	-27.4%	-45.8%
	Fort Bragg	101.0	0.4	**132.1**	**0.5**	88.4	0.4	73.4	0.4	49.5%	20.5%	80.1%	38.1%
	Bodega Bay	3.9	0.0	**4.5**	**0.0**	14.9	0.1	29.5	0.2	-69.9%	-36.5%	-84.8%	-75.9%
	San Francisco	35.3	0.2	**39.6**	**0.2**	27.0	0.1	23.1	0.2	46.5%	63.2%	71.8%	54.4%
	Monterey	65.9	0.3	**79.6**	**0.4**	58.0	0.3	69.0	0.3	37.3%	40.8%	15.4%	29.8%
	Morro Bay	160.3	1.1	**199.4**	**1.3**	449.6	1.7	461.9	1.9	-55.7%	-24.0%	-56.8%	-33.0%
	Santa Barbara	24.4	0.2	**25.8**	**0.2**	63.7	0.3	168.9	0.7	-59.4%	-11.7%	-84.7%	-67.7%
	Los Angeles	34.0	0.1	**105.5**	**0.3**	10.2	0.1	8.2	0.1	933.6%	368.5%	1186.0%	477.8%
	San Diego	12.8	0.1	**31.0**	**0.3**	13.7	0.0	29.9	0.1	126.3%	536.9%	3.7%	259.5%
	TOTAL	**24,140.5**	**39.9**	**27,860.4**	**48.6**	**30,682.0**	**54.4**	**26,890.1**	**51.4**	**-9.2%**	**-10.7%**	**3.6%**	**-5.5%**

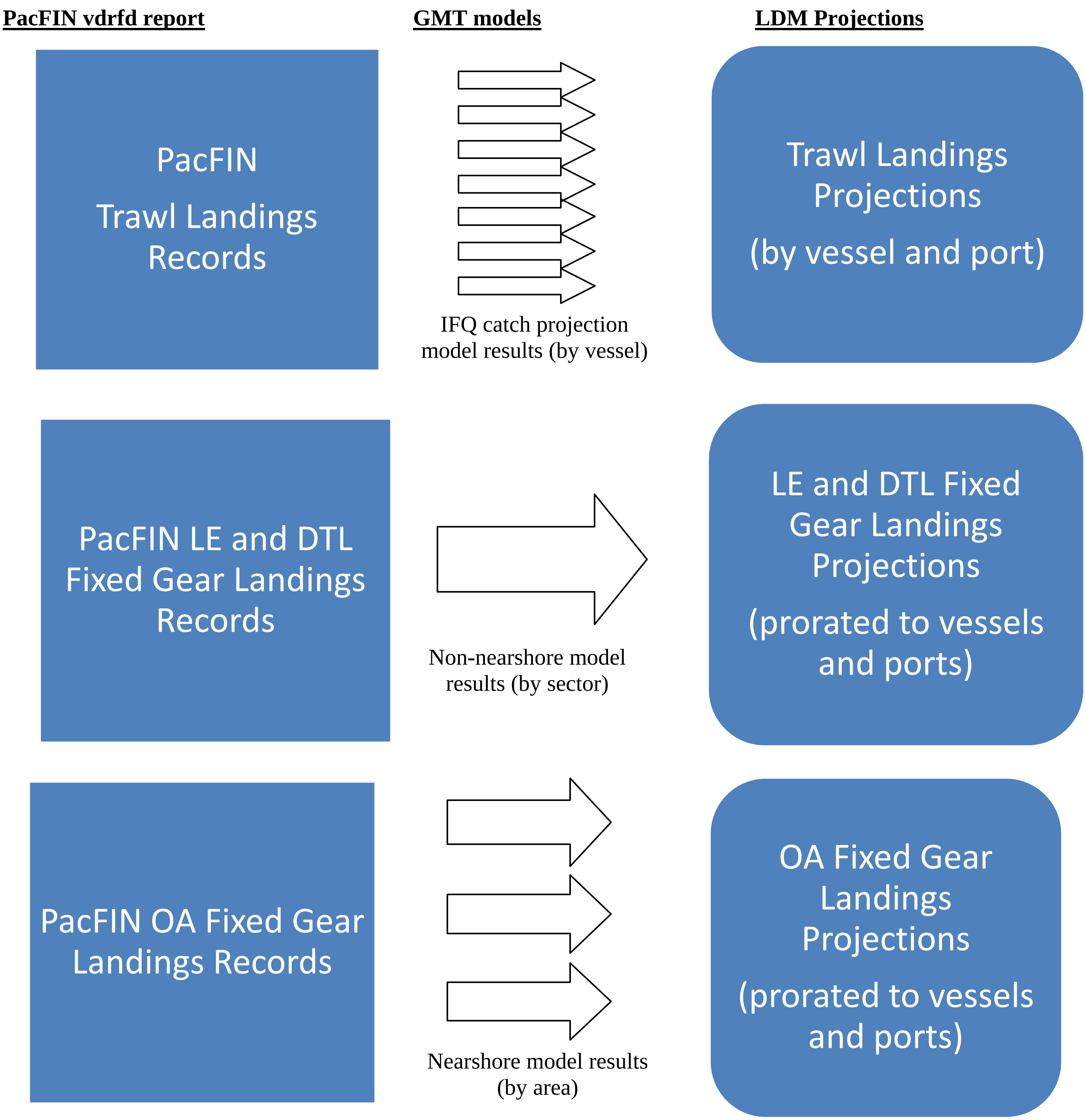


Figure A-1. Linkages between base year data, GMT landings projections, and the LDM.

Note: Results from the at-sea whiting fisheries and tribal fisheries models are incorporated in similar fashion.

A.2 Shorebased IFQ

A.2.1 Analytical description

The purposes of this analysis are to compare the relative predicted total catches and relative constraining influences among the proposed alternatives, in order to explore the range of alternatives, and assist in making the choice of a final preferred alternative in the biennial groundfish harvest specifications for 2013 and 2014. This was accomplished through the development of a new IFQ catch projection model, through the collaboration of staff from the NMFS Northwest Region (Dr. Sean Matson) and the Northwest Fishery Science Center (Dr. Jim Hastie and Dr. Ian Taylor). The model was coded in the R programming language, and executed in R version 2.1.3.0.

A.2.2 Model summary

The purpose of the model is to predict annual total annual catch of target and rebuilding species in the IFQ fishery, under different proposed allocations structures, and to produce landings estimates of each target species for input into economic models, for use in the 2013-14 biennial harvest specifications EIS. Data inputs consist of vessel-species-trip level catch data, vessel account information (total annual quota pounds (QP) by species and vessel account) and fleet allocations by species from the NMFS, IFQ Vessel Accounts system. Total catch is defined here as landings plus discards, and total bycatch is defined the same way, for rebuilding species and Pacific halibut. The model functions at the vessel-species level, and vessel predictions were summed to produce fleet estimates of catch for each IFQ species category. Figure A-2 illustrates the flow of information through the model.

The model predicts catch in three ways: it predicts catch of target species according to annual vessel QP for those species, and expected attainment of target species QP, either as observed in catch data, or the observed attainment rates can be modified by a user-defined formula, for each species, which is applied to every vessel. The model also predicts catch of target species according to the amount of bycatch of rebuilding species (the combination of observed, vessel-specific bycatch ratios and vessel QP of each rebuilding species). It predicts catch of rebuilding species (and Pacific halibut) by applying observed bycatch ratios to final predicted target catch. Observed species and vessel-specific retention rates are applied to final predicted catch, to produce landings estimates.

Catch of target species was deterministically modeled as related to vessel and species-specific attainment of QP. The relationship between variability in observed vessel QP and observed total catch is shown for each IFQ species in Table A-4. The proportion of variation among vessels in catch of each species category, which is explained by variation in QP, is expressed as R^2. Values of this parameter range from 99.9 percent for Pacific whiting, to 95.8 percent for sablefish, north of 36° N. lat., to 52 percent for minor slope rockfish, south of 40°10’ N. lat., to 34.9 percent for arrowtooth flounder, to 0.9 percent for minor shelf rockfish, south of 40°10’ N. lat. These R^2 values give an indication of the reliability of estimates of total catch by species.

Catch of non-target species was modeled as a function of vessel QP and vessel-specific bycatch rates. Thus, catch projections for rebuilding species depend upon the combination of vessel-specific QP for rebuilding species, bycatch ratios of those species, and vessel-specific aggregates of target species attainment rates.

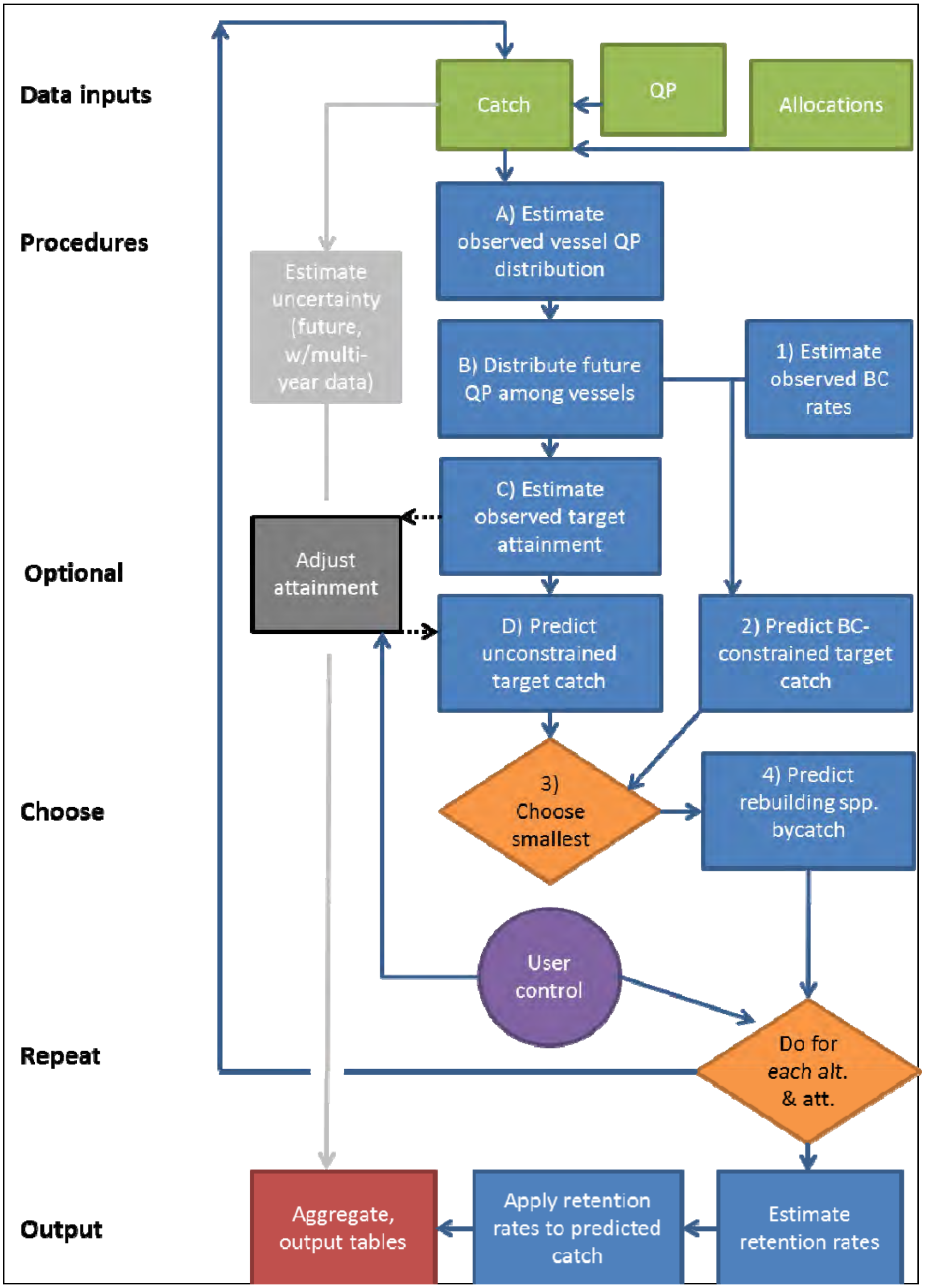


Figure A-2. Diagram illustrating information flow in the IFQ catch projection model, used in the 2013-14 West Coast groundfish harvest specifications.

Table A-4. Estimates of the proportion of variation in observed vessel catch of IFQ species in 2011, explained by variation in vessel QP, for each species category.

IFQ species category	R^2	lo CI	hi CI	p	sig.	n
Pacific whiting	0.999	0.999	0.999	0.000	*	91
Chilipepper rockfish south of 40°10' N.	0.966	0.933	0.999	0.000	*	11
Sablefish north of 36° N.	0.958	0.942	0.974	0.000	*	100
Sablefish south of 36° N.	0.832	0.685	0.979	0.000	*	12
Petrale sole	0.781	0.696	0.866	0.000	*	75
Widow rockfish	0.769	0.669	0.869	0.000	*	58
Longspine thornyheads north of 34°27' N.	0.760	0.669	0.851	0.000	*	76
Shortspine thornyheads north of 34°27' N.	0.642	0.528	0.756	0.000	*	92
Shortspine thornyheads south of 34°27' N.	0.575	-0.607	1.757	0.452		3
Pacific ocean perch north of 40°10' N.	0.546	0.392	0.700	0.000	*	68
Minor slope rockfish south of 40°10' N.	0.520	0.267	0.773	0.000	*	24
Starry flounder	0.460	0.136	0.784	0.005		15
Dover sole	0.444	0.298	0.590	0.000	*	95
Yellowtail rockfish north of 40°10' N.	0.369	0.162	0.576	0.000	*	48
Arrowtooth flounder	0.349	0.196	0.502	0.000	*	93
Pacific cod	0.322	0.096	0.548	0.000	*	40
Lingcod	0.314	0.154	0.474	0.000	*	84
Pacific halibut (IBQ) north of 40°10' N.	0.293	0.125	0.461	0.000	*	75
Darkblotched rockfish	0.289	0.131	0.447	0.000	*	85
Minor slope rockfish north of 40°10' N.	0.176	0.025	0.327	0.000	*	76
English sole	0.148	-0.006	0.302	0.002	*	65
Bocaccio rockfish south of 40°10' N.	0.147	-0.189	0.483	0.275		10
Other flatfish	0.100	-0.019	0.219	0.003	*	84
Minor shelf rockfish north of 40°10' N.	0.071	-0.046	0.188	0.034	*	64
Canary rockfish	0.054	-0.059	0.167	0.090		54
Splitnose rockfish south of 40°10' N.	0.038	-0.124	0.200	0.470		16
Cowcod south of 40°10' N.	0.037	-0.274	0.348	0.807		4
Yelloweye rockfish	0.012	-0.092	0.116	0.735		12
Minor shelf rockfish south of 40°10' N.	0.009	-0.084	0.102	0.086		11

A.2.3 “Unconstrained” target catch prediction

The model predicts total catch of IFQ target species by vessel, by applying the proportion of each vessel’s total annual quota pounds (QP = total allowable catch by species for one particular vessel) which it caught in 2011, to that vessel’s estimated future QP, under a proposed fleet allocation structure. A vessel’s future QP for a particular species category is estimated as the same proportion of the future year’s fleet allocation of that species category, as existed in the observed year. This routine relies upon end-of-year, total QP weights from IFQ vessel accounts. We refer to this as the “unconstrained target catch prediction”, since it is not constrained by bycatch of rebuilding species.

In making predictions of catch, the model either assumes the same attainment level of each vessel’s QP in 2011, or the user adjusts attainment levels for each species category, for a given set of proposed fleet allocations. Vessel total annual QP can be scaled up according to a user-defined function, and parameter value(s). In this case, annual vessel attainment (through November 30) for each species was multiplied by 1.0909, in order to add the equivalent of an additional average month of catch for each vessel. A limit of 100 percent of vessel QP for each species was applied to attainment. This attainment adjustment resulted in a similar monthly catch pattern to 2010. This model was not intended for inseason analysis; however the adjustable attainment mechanism enabled imputation of December catch, in order to meet the deadline for the DEIS.

A.2.4 "Constrained" target catch prediction and bycatch estimation

The model then makes a second type of prediction of target species catch ("constrained target catch prediction"), which is limited by the combination of each vessel's bycatch limits of each rebuilding species (QP), and its bycatch ratios of each rebuilding species, according to the following formula, in order to predict the "constrained" sum target catch:

predicted constrained sum target catch = QP of rebuilding species "X" / bycatch ratio of species "X"

Bycatch ratios are estimated for each species, for each vessel from observed (2011) data as the ratio of each rebuilding species catch, to the observed sum of target species catch.

The two predictions of the sum of target species catch for each vessel are then compared, and the smaller is accepted (either "unconstrained" or "constrained"), reported, and labeled at "target" or "rebuild" in the model output.

Observed bycatch ratios are applied to the final sum of predicted vessel target catch, to produce total bycatch predictions for rebuilding species. The accepted prediction of sum target catch is distributed among target species categories according to the catch composition produced in the unconstrained prediction of target species catch.

A.2.5 Landings estimation

Finally, vessel and species-specific retention rates from 2011 catch data were applied to the predictions of total catch in order to provide landings estimates for revenue modeling by the economic analytical team.

A.2.6 Assumptions and limitations

Although these predictions of catch constitute the best available information at the time of the analysis, several assumptions needed to be made for this exercise. First, due to the timeline for production of the DEIS, catch and vessel account data were truncated at November 30, 2011 to produce vessel landings estimates in time for further analysis by economists, etc. This model was intended to function with one full year of catch data as an input, and so December catch had to be imputed. However, any lack of accuracy of the imputed December catch data does not compromise the usefulness of the model output for the purpose of making relative comparisons of the predictions among alternatives.

Since this is the first year of the IFQ groundfish fishery, and no historic data regarding attainment of allocations exist for the fishery under this management regime, which is vastly different than that of trip limits, it was assumed that the fishery would progress through December of 2011 with vessels fishing at their average monthly vessel and species-specific attainment rate of QP, from January through November of 2011. Imputing December catch in this way also produced a monthly catch time series for DTS species (Dover sole, sablefish, and thornyheads), similar to that of 2010. In the NMFS mid-year IFQ catch report (Matson, 2011), it was shown that Dungeness crab fishery participation was strongly and negatively related to IFQ fishing participation from January through June of 2011 (R^2=0.83). The crab fishery often opens during December, however it was uncertain when this would happen during December of 2011, and thus how much effort could potentially be diverted away from IFQ.

It was also assumed for the purposes of the analysis that all quota pounds (QP) transactions had finished for the year, although additional trading could occur until December 15, 2011. A means for modeling commerce of vessel QP does not yet exist in the current model, although it may be added in the next biennial cycle.

It is inherently assumed in the model predictions of catch that bycatch rates and target species attainment rates will be the same as estimated for 2011. Given that IFQ management for this fishery has existed for less than one year, these rates could change as ratios of QP for different species on each vessel change, new fishing strategies are perfected, risk pools are formed, and different ratios of trawl gear and fixed gear are used.

A.2.7 Bias in catch projections

Catch projections from this analysis are likely to be biased low for 2013 and 2014, and since catch of bycatch species is estimated as a function of vessel catch of all target species, they are affected as well. There are two apparent reasons for this. One stems from the data used for input, and another from the method this first version of the model uses for projecting target catch.

As described earlier, the catch data used for input was incomplete, December catch was imputed, and actual December catch was higher than expected; also incomplete distributions QP to vessel accounts were used, and with no historical annual catch history available in this new fishery, it was impossible to impute the final amounts of QP, thus the QP distributions were biased low.

The second source of low bias in projected catch was also discussed earlier, but it should be noted that it affects projections for bycatch species as well as target species. This source is that the estimation method likely relies too heavily on vessel attainment proportions of their QP for some species. Stated simply, using arrowtooth flounder as an example, it does not seem likely that catch of arrowtooth will drop as drastically as predicted, just because the allocation has dropped drastically, given that this species is vastly underexploited; it's fleet-level attainment rate was only approximately 20 percent in 2011. The amount of variance in vessel catch in this species explained by QP is approximately 35 percent, the rest is likely explained my other predictors such as market influences, processor limits, etc. However, the current version of the model assumes that catch of arrowtooth drops proportionately with the amount of QP available to each vessel.

Since the catch of arrowtooth is relatively large (2 percent of the entire IFQ fishery catch by weight, and 13 percent of the nonwhiting IFQ fishery catch), and since bycatch ratios of rebuilding species are estimated relative to total target species catch, for each vessel, bias in projections of arrowtooth flounder should carry through to those of rebuilding species as well, for vessels which catch arrowtooth. Catch projections for rebuilding species were lower for the alternatives other than No Action, as were arrowtooth flounder, English sole, sablefish north of 36° N. lat., while petrale sole allocations were higher than No Action in all other alternatives (however, the size of the petrale sole allocation is only approximately 5 percent of the sum of the arrowtooth flounder, English sole, and sablefish allocations, for No Action - not enough to counterbalance effects of the other species on projected amounts of total vessel target species catch). It should be noted that vessel catch of sablefish north of 36° N. lat. is strongly related to vessel QP of this species (R^2=0.958).

At least two possible solutions to this problem exist for implementation in the model used for the next harvest specifications and management measures cycle. One is to mediate the proportion of total vessel QP caught for each target species that the model uses to project future target catch by the proportion of the variance in vessel-species catch which is explained by variance in vessel QP for each species (R^2value). For those species whose catch is strongly correlated with the amount of QP available (the amount of QP available results from changes to fleet allocations) projected catch would continue to covary strongly with QP as well. However, for species such as arrowtooth flounder, which weakly covaries with QP, the projected change in catch in response to change in QP would be correspondingly weak (according to R^2 or similar estimate of explicable variance due to QP). Bounds could be placed on projected catch of certain species, corresponding to historical maximums and minimums as well.

Another factor that is often absent from projection models, this one included, is the possibility of change in fisher behavior. The model does not factor the possibility for increased risk in fisher behavior in pursuit of more target catch, and higher resulting bycatch rates of rebuilding species, which could potentially be associated with higher allocations of rebuilding species, and increased confidence after one year of the new IFQ fishery. This situation could be remedied by estimating uncertainty associated with a range of increase or decrease in bycatch rate. This uncertainty could be informed by actual data, when more than one year of catch data exists, such as by the next biennial cycle.

For now, one can look to actual catch data for 2011, as an additional source of inference about absolute amounts of species allocations of bycatch species that are likely to be needed for the next biennium, with the caveat that 2011 was only the first year of the fishery, and one might expect more confidence surrounding bycatch, coinciding with more cooperation and organization among fishermen in the coming seasons, which could enable more full use of bycatch allocations, in pursuit of target species attainment.

A.3 Non-Nearshore

The non-nearshore model projects bycatch impacts for limited entry and open access fixed gear vessels that are fishing seaward of the nontrawl RCA. The main focus is on bycatch of the rebuilding rockfish, canary and yelloweye in particular, as described in Appendix D. WCGOP observations on discards and landed catch 2002-2009 provide the primary data input for estimating bycatch with PacFIN fish ticket data also providing information on the distribution of catch among gear types. Data from 2009 were the most recent data available at the time of the analysis.

As also described in Appendix C, sablefish is the primary target for vessels fishing in these sectors. The sablefish ACL north of 36° N. latitude is apportioned according to the formal intersector allocations shown in Figure A-3. Management measures are intended to keep the total mortality—i.e. discard mortality and landings—within the allocation for each sector. Because of the economic importance of sablefish, the bycatch impact analysis assumes that the annual sablefish allocation will be fully attained by the fixed gear fleets seaward of the RCA. WCGOP bycatch observations are therefore expressed as a ratio to the expected landings of sablefish.

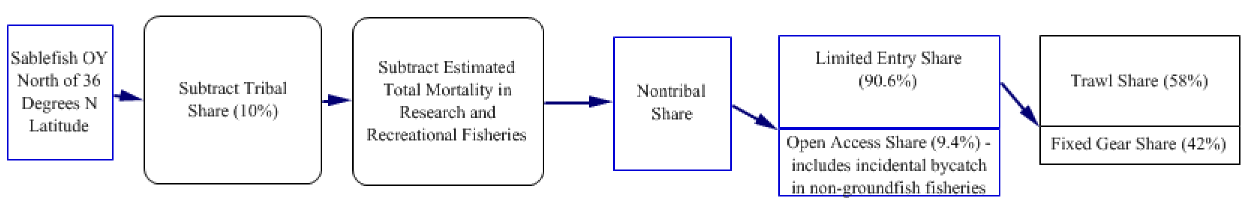


Figure A-3. The formal intersector allocations of sablefish north of 36° N. latitude.

The structure of the projection model has not been changed from that used during the 2009-10 and 2011-12 analyses. Observations were added from 2009 and the model now combines data from the fixed gear sablefish fishery north and south of 40°10' N. latitude from the years 2002-2009. Data from each year is weighted equally. There are tradeoffs with data accuracy and precision involved with stratifying observations to finer levels across attributes (i.e. time, area, depth, and gear type). Aggregating data across years allows reporting of retained and discarded catch of groundfish species by gear type at a finer latitudinal and depth scale than would otherwise be possible. Differences in the encounter rate of yelloweye and canary rockfish between depths and areas are the major focus of the model and so these stratifications have taken priority. The data is stratified by gear because of the differences in the rate of encounter between pot and longline gear types.

Data summarizing observed retained and discarded catch from fishing efforts north of 40°10' N. latitude are stratified across three alternative depth ranges that are used to evaluate the potential impact of extending the seaward boundary of the nontrawl RCA on bycatch levels. As described in Appendix D, the seaward RCA boundary is the key bycatch management measures in these non-nearshore sectors. Although the range of depths recorded for an individual fixed gear set by observers is commonly much smaller than for observed trawl tows, there is some uncertainty in the assignment of catch and discard from many sets to a specific 25 fm interval. For this exercise, the average of the beginning and ending depths of each set was used to represent the depth at which all fish on the set were caught.

The area stratification used in this model was developed first for use in the 2009-10 biennial management cycle. This stratification was arrived at through consideration of canary and yelloweye bycatch north of 40°10' N. latitude by depth and area and provides the Council with the option of employing differential seaward RCA boundaries within these areas. Four subareas were identified bounded by: Cape Mendocino at 40°10' N. latitude, the boundary of the Columbia and Eureka INPFC areas (43°10' N. latitude), Cascade Head (45.064°10' N. latitude), Point Chehalis (46.888°10' N. latitude), and the U.S.-Canada border. Several alternative boundaries were evaluated. Analysts determined that the four listed above provided the greatest contrast and reliability between areas of high and low yelloweye bycatch. Since rockfish bycatch in the pot gear fleet is very small and there are very limited numbers of pot gear observations in some areas, results for this group are summarized with respect to depth only (without subareas). The seaward boundary of the nontrawl RCA south of 40°10' N. latitude has always been 150 fm and so no data is available shallower than that depth.

To produce estimates of catch by area, the model must assume a distribution of sablefish catch between the areas north and south of 40°10' N. latitude and between longline and pot gear types for both the open access and limited entry sectors. The assumed distribution is based on fish ticket landings for the years 2002-2009 (Table A-5). The 2002-2009 average of WCGOP observed landings are then used to project the distribution of the longline catch north of 40°10' N. latitude among the four management subareas (Table A-6). The model then applies WCGOP observed discard rates to these projected catch distributions using the appropriate area, depth, and gear stratification to produce annual estimates of discard for the rebuilding rockfish encountered by the non-nearshore fixed gear sectors. Discard rates were calculated by dividing the total observed discard weight for each species by the weight of retained sablefish and are reported in Table A-7 through Table A-10. Data is available for all species encountered in the non-nearshore sectors, however, this projection model focuses on the rebuilding rockfish stocks and the potential need to adjust the seaward boundary of the RCA to lower their catch. The total mortality of other groundfish species discarded and landed by these sectors is reviewed and accounted for annually and will be addressed if catch reaches levels where a sector allocation or other catch limit is at risk of being exceeded. If necessary, the structure and data in this model could be used to project bycatch of species for which discard becomes a concern in the non-nearshore sectors. The analysis of impact associated with alternative RCA specifications based on this methodology is discussed in Appendix C.

Table A-5. Distribution of fish ticket landings among longline (hkl) and pot gear types in the limited entry and open access non-nearshore fixed gear sectors, 2002-2009.

	LIMITED ENTRY						OPEN ACCESS				
	36° - 40°10'		North of 40°10'		TOTAL (LE)		36° - 40°10'		North of		TOTAL (OA)
	hkl	pot	hkl	pot			hkl	pot	hkl	pot	
2002	154	16	783	345	1,298	2002	125	82	138	16	361
2003	201	24	1,013	587	1,825	2003	126	148	246	29	549
2004	214	58	1,264	575	2,111	2004	90	156	191	10	447
2005	212	-	1,319	623	2,154	2005	111	262	419	101	893
2006	186	50	1,389	564	2,189	2006	78	247	280	182	787
2007	190	45	1,117	391	1,742	2007	31	209	185	32	458
2008	226	39	1,146	398	1,809	2008	66	206	273	24	570
2009	377	63	1,481	441	2,363	2009	279	319	305	37	940
Total	1,758	295	9,513	3,924	15,490	Total	906	1,629	2,038	432	5,005
% of LE total	11%	2%	61%	25%	100%	% of OA total	18%	33%	41%	9%	100%

Table A-6. Distribution of observed longline sablefish landings among the four management subareas north of 40°10' N. latitude, 2002-2009.

	Longline				
	North of 40°10' N	**40°10' - Col./Eur. line 43°**	**Col./Eur. line 43° - Cascade Head 45.064°**	**Cascade Head 45.064° - Pt. Chehalis 46.888°**	**North of Pt. Chehalis 46.888°**
Observed sablefish landings (mt)	2,058	296	537	324	900
% of total		**14%**	**26%**	**16%**	**44%**
min (02-09)		*6%*	*17%*	*4%*	*24%*
max (02-09)		*24%*	*37%*	*45%*	*55%*
mean (02-09)		*14%*	*26%*	*18%*	*42%*
stdev (02-09)		*6%*	*7%*	*13%*	*11%*

Table A-7. Rates of species discard (2002-2009 average) for the rebuilding rockfish species relative to retained sablefish, used to project bycatch impacts for longline gear south of 40°10' N. latitude and for pot gear types north and south of north of 40°10' N. latitude.

	36° - 40°10' N. lat.		North of 40°10' N. Lat Pot		
	Longline	Pot	100 fm	125 fm	150fm
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0000	0.0000	0.0000	0.0000	0.0000
Canary rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0014	0.0010	0.0007	0.0007	0.0007
Yelloweye rockfish	0.0002	0.0000	0.0000	0.0000	0.0000

Table A-8. Rates of species discard (2002-2009 average) observed on fixed gear sablefish sets deeper than 100 fm for rebuilding rockfish species, relative to retained sablefish, used to project bycatch impacts for longline gear north of 40°10' N. latitude by management subareas.

	North of 40°10' N	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0001	0.0004	0.0000	0.0000	0.0001
Canary rockfish	0.0016	0.0001	0.0002	0.0021	0.0027
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0025	0.0094	0.0028	0.0009	0.0005
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0001	0.0000

Table A-9. Rates of species discard (2002-2009 average) observed on fixed gear sablefish sets deeper than 125 fm for rebuilding rockfish species, relative to retained sablefish, used to project bycatch impacts for longline gear north of 40°10' N. latitude by management subareas.

	North of 40°10' N	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0001	0.0004	0.0000	0.0000	0.0000
Canary rockfish	0.0012	0.0000	0.0001	0.0001	0.0025
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0030	0.0098	0.0035	0.0019	0.0005
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0001	0.0000

Table A-10. Rates of species discard (2002-2009 average) observed on fixed gear sablefish sets deeper than 150 fm for rebuilding rockfish species, relative to retained sablefish, used to project bycatch impacts for longline gear north of 40°10' N. latitude by management subareas.

	North of 40°10' N	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°
Bycatch ratios (total catch lbs / retained sablefish lbs)					
Rebuilding species					
Bocaccio	0.0000	0.0001	0.0000	0.0000	0.0000
Canary rockfish	0.0012	0.0000	0.0001	0.0000	0.0025
Darkblotched rockfish	0.0000	0.0000	0.0000	0.0000	0.0000
Pacific ocean perch	0.0039	0.0111	0.0055	0.0025	0.0006
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0000	0.0000

A.4 Coastwide Sablefish Trip Limits

The following section discusses catch projection and trip limit analyses for the four fixed gear, daily trip limit (DTL) fisheries, including both limited entry (LE) and open access (OA), north and south of 36° N. lat. for 2011. Hereafter, they will be referred to as follows: LE North, LE South, OA North, and OA South.

Proposed trip limits for 2013 and 2014 in the fixed gear, sablefish, DTL fisheries were produced through iteration using GMT catch projection models (models described briefly below, and in detail in the 2011-2012 SPEX EIS).

Proposed trip limits in the Preferred Alternatives for 2013 and 2014 were reduced or increased to bring projected catch to within new management targets, resulting from changes to the sablefish ACLs for the areas north and south of 36° N. lat. Landings projections were approximately 91 percent of the landings target, in order to produce trip limits which are likely to result in full attainment of harvest guidelines, while providing sufficient catch buffer, appropriate for the uncertainty in accuracy of estimated landings data, and normal uncertainty associated with statistical model projections. This strategy was supported by the Council in establishing sablefish DTL trip limits for 2012, in the November, 2011 Council meeting.

For 2013, in the LE North fishery, proposed trip limits for 2013 were reduced to approximately 85 percent of No Action levels; for the OA North fishery, proposed trip limits were reduced to 68 percent of No Action. In the area south of 36° N. lat., harvest guidelines were higher than No Action (due to a slightly higher sablefish ACL for 2013 and 2014 in this area). For LE South, proposed trip limits were 104 percent of no action; for OA South, 108 percent. Trip limits for 2014 were slightly higher than for 2013 (2 to 5 percent higher) across all four sablefish DTL fisheries, due to higher ACLs in 2014.

A.4.1 Analytical description

The purposes of this analysis are to compare predicted landings between the No Action Alternative and the Preferred Alternative, under their resultant regional allocations, and fishery harvest guidelines, for the four fixed gear, sablefish daily trip limit (DTL) fisheries, including limited entry (LE) and open access (OA), both north and south of 36° N. lat.

The ACLs, regional allocations, and fishery landing targets (LTs) only vary between the No Action Alternative, versus the Preferred Alternative and all other alternatives, within each year. Levels of these three harvest control points vary only between years (2013-2014), and between No Action and all other alternatives. Within this analysis, “harvest guidelines” is defined as numerical management harvest objectives which are not quotas. These are either cited in regulation or calculated from other higher level numerical management objectives appearing in regulation. These harvest guidelines were reduced to account for discard mortality, the method and rationale for which is described below, to produce “landings targets”, which were used in projection modeling to predict landings, and determine necessary trip limits.

A.4.2 Model description

The catch projection models used in this analysis are linear regression models that relate trip limits to monthly or bimonthly landings, separately for each fishery. Detailed descriptions of the models can be found in Appendix A. of the 2011-2012 harvest specifications EIS.

Limited entry models were specified as described in the 2011-2012 EIS. Minor differences in model specification were made in the open access models for 2013-2014. Sablefish ex-vessel revenue and fuel prices were removed as predictor variables in the open access North and South models. Although these variables present a meaningful picture in retrospect, when their historical values are known, they do not provide valuable information for making projections of future catch, since fuel prices and sablefish prices in the future are not known, are subject to substantial variability, and either assumptions or projections must be made about these would-be predictor variables themselves. Error in assumptions regarding future values of these variables introduces bias and significantly affects accuracy of projections; using them inflates apparent accuracy and precision, producing unrealistically high multiple-R^2 values and low standard errors for the regressions. Trip limits, on the other hand, are known (are set by the Council process), and their use for projecting catch into the future presents a realistic picture of uncertainty. Data from years 2004-2006, when there was extremely small variation in trip limits, and provided little information content for the model, were removed from the OA South model, and resulted in increased model fit.

A.4.3 Model input data

Landings and catch data were acquired from PacFIN using the query "slct_ves_sabl_arid_DTL_no_EFP.sql". As described in the GMT inseason statements from the April, June, September, and November 2011 Council meetings, data from this query were found this year to have two substantial problems, both of which were corrected before use in the analysis for these harvest specifications. First, historical landings of sablefish with fixed gear, in the LE North, DTL fishery were substantially underestimated from 2004 through 2011, as the software in the PacFIN database which estimates division of fixed gear sablefish landings between the sablefish primary fishery and DTL fisheries was malfunctioning. The software has since been modified to make the most accurate division of catch between the two fisheries which is currently possible, and the GMT and Council are working on a long-range solution that would provide direct catch accounting, which would replace the currently necessary computational estimation procedure. Second, gear-switching provisions under IFQ lead to misattribution of IFQ landings of sablefish using fixed gear, to the various sablefish DTL fisheries. This has also been corrected, and screening procedures have been put in place both in PacFIN and with the states to flag and remove IFQ fish tickets from the "slct_ves_sabl_arid_DTL_no_EFP.sql" query for the sablefish DTL projection models.

A.4.4 Accounting for discards and discard mortality

Landings targets which appear in this section have been reduced from harvest guidelines that would appear in regulation, where applicable, in order to account for discard mortality. The harvest guideline (a specified numerical harvest objective that is not a quota) was multiplied by 15.9 percent (discard rate estimate), and by 20 percent (discard mortality rate estimate), and then that product (estimated dead discarded sablefish) was subtracted from the harvest guideline, resulting in a "landings target", which projected landings should be beneath, in order to keep total catch within the harvest guideline. The estimated discard rate used by GMT was taken from the 2010 West Coast Groundfish Observer Program (WCGOP) Total Mortality Report. In the 2009-10 management cycle, the discard rate estimate was the same, and was derived from data in the 2007 WCGOP Total Mortality Report, which was the most recent available data at that time. That discard mortality rate estimate was taken from information in Davis (2001, LTtp://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2001.tb00495.x/abstract), Shirrippa and Colbert (2005, LTtp://www.pcouncil.org/wp-content/uploads/Sable05_complete.pdf), and Shirrippa (2007, LTtp://www.pcouncil.org/wp-content/uploads/Sable07v3_0.pdf). Shirrippa (2005) used experimental data and sea surface temperature to predict varying release mortality by gear. The GMT considered that Davis (2001) demonstrated high sensitivity to temperature and deck time, along with high variability of predicted discard mortality in Shirrippa (2005) informed by sea surface temperature data, and adopted an estimate of 20 percent. This value was also adopted by Taylor 2011 in the current sablefish stock assessment.

A.4.5 Results

A.4.5.1 No Action Alternative

Under No Action, the following Rockfish Conservation Area boundaries for use of fixed gear, from 2012 regulations, would remain in place for 2013 and 2014 (Table A-11).

Table A-11. Rockfish Conservation Area (RCA) boundaries for fixed gear, under the No Action Alternative.

Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
North of 46° 16'	shore - 100 fm					
45° 03' 83" - 46° 16'	30 - 100 fm					
43° - 45° 03' 83"	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)					
42° - 43°	20 - 100 fm					
40° 10' - 42°	20 fm depth contour - 100 fm					
34° 27' - 40° 10'	30 fm - 150 fm line					
South of 34° 27' (w/islands)	• m - 150 fm line					

Projected impacts (No action)

Projected landings under the No Action Alternative are presented in Table A-12. The GMT and the Council considered, while constructing and adopting them, respectively, the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings) along with the normal uncertainty associated with projection models, the No Action trip limit structures for 2012 for each fishery presented here. The No Action Alternative resulted in projected attainments in the range of 91 percent to 93 percent, aiming to enable harvest of a high proportion of the HG, yet accommodating previously described uncertainty.

Table A-12. Model-projected impacts of trip limits under the No Action Alternative, for the fixed-gear, sablefish, DTL fisheries. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	LT	No act. projection	% of LT
LE N.	North of 36° N. lat.	265	242	91%
OA N.	North of 36° N. lat.	419	381	91%
LE S.	South of 36° N. lat.	380	353	93%
OA S.	South of 36° N. lat.	309	284	92%

These trip limits can be adjusted inseason as needed to influence higher or lower catch as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure (which was appreciated by the GAP, in their statement, in the November 2011 Council meeting), and to avoid starting the year with highly variable trip limits, such as resulted from the "rolling over" of 2010 trip limits into 2011, due to unforeseeable delays in implementation (Table A-13).

Table A-13. Trip limits for sablefish DTL fisheries under No Action.

<table>
<tr><th>Area</th><th>Fishery</th><th>Jan-Feb</th><th>Mar-Apr</th><th>May-Jun</th><th>July-Aug</th><th>Sept-Oct</th><th>Nov-Dec</th></tr>
<tr><td rowspan="2">North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)</td><td>LE N.</td><td colspan="6">1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.</td></tr>
<tr><td>OA N.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 900 lb., not to exceed 1,800 lb. per 2 mo.</td></tr>
<tr><td rowspan="2">South of 36° N. lat.</td><td>LE S.</td><td colspan="6">1,800 lb. per week</td></tr>
<tr><td>OA S.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 1,350 lb., not to exceed 2,700 lb. per 2 mo.</td></tr>
</table>

A.4.5.2 Preferred and remaining alternatives

Preferred Alternative for 2013

Projected landings under the Preferred Alternative are presented in Table A-14. As with the No Action Alternative, we considered the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The Preferred Alternative results in projected attainments of 91 percent, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the PPA and all alternatives other than No Action, within each year.

Table A-14. 2013 Model-projected impacts of trip limits under the Preferred Alternative, No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	LT	PPA projection	% of LT
LE N.	North of 36° N. lat.	197	179	91%
OA N.	North of 36° N. lat.	291	266	91%
LE S.	South of 36° N. lat.	446	405	91%
OA S.	South of 36° N. lat.	362	330	91%

Projected landings under the PPA were lower than No Action for the LE North and OA North fisheries (74 percent and 70 percent of No Action, respectively), and higher than No Action for the LE South and OA South (115 percent and 116 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table A-15 and Figure A-4.

Table A-15. 2013 Model-projected impacts of trip limits under the Preferred Alternative (equal to alternatives other than No Action), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected impacts are in metric tons (mt).

Fishery	Area	PPA projection	No act. projection	% of No act.
LE N.	North of 36° N. lat.	179	242	74%
OA N.	North of 36° N. lat.	266	381	70%
LE S.	South of 36° N. lat.	405	353	115%
OA S.	South of 36° N. lat.	330	284	116%

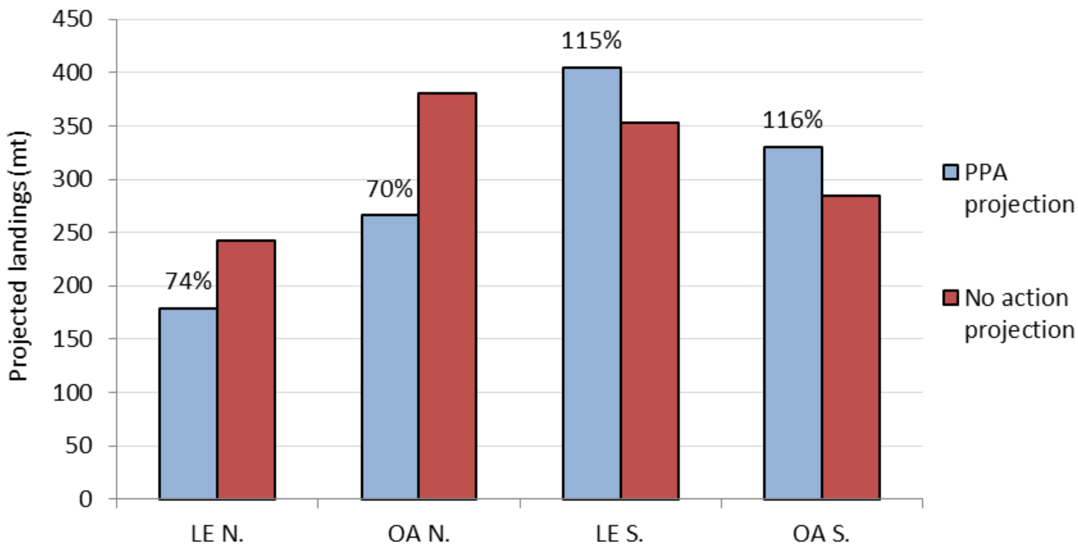


Figure A-4. Projected landings for 2013 under the PPA and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show PPA projection as a percentage of No Action.

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table A-16), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 800 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 290 pounds per week and 580 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 80 pounds per week was possible in the LE South fishery, while an increase of 110 pounds per week and 220 pounds per bimonthly period was possible in the OA South fishery.

Table A-16. 2013 Proposed trip limits for 2013 in sablefish DTL fisheries under the PPA, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					

to 36° N. lat.)	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.
South of 36° N. lat.	LE S.	1,880 lb. per week
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.

Preferred Alternative for 2014

Projected landings under the Preferred Alternative for 2014 are presented in Table A-17. As with the No Action Alternative, we considered uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2014 for each fishery presented here. The Preferred Alternative for 2014 results in projected attainments of 91 percent, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2014 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the PPA and all alternatives other than No Action, within each year.

Table A-17. Model-projected impacts of trip limits under the Preferred Alternative, No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	LT PPA	PPA projection	% of LT
LE N.	North of 36° N. lat.	214	194	91%
OA N.	North of 36° N. lat.	319	290	91%
LE S.	South of 36° N. lat.	483	441	91%
OA S.	South of 36° N. lat.	393	359	91%

Projected landings under the PPA were lower than No Action for the LE North and OA North fisheries (80 percent and 76 percent of No Action, respectively), and higher than No Action for the LE South and OA South (125 percent and 126 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2014; see Table A-18 and Figure A-5.

Table A-18. Model-projected impacts of trip limits under the Preferred Alternative, No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	PPA projection	No act. projection	% of No act.
LE N.	North of 36° N. lat.	194	242	80%
OA N.	North of 36° N. lat.	290	381	76%
LE S.	South of 36° N. lat.	441	353	125%
OA S.	South of 36° N. lat.	359	284	126%

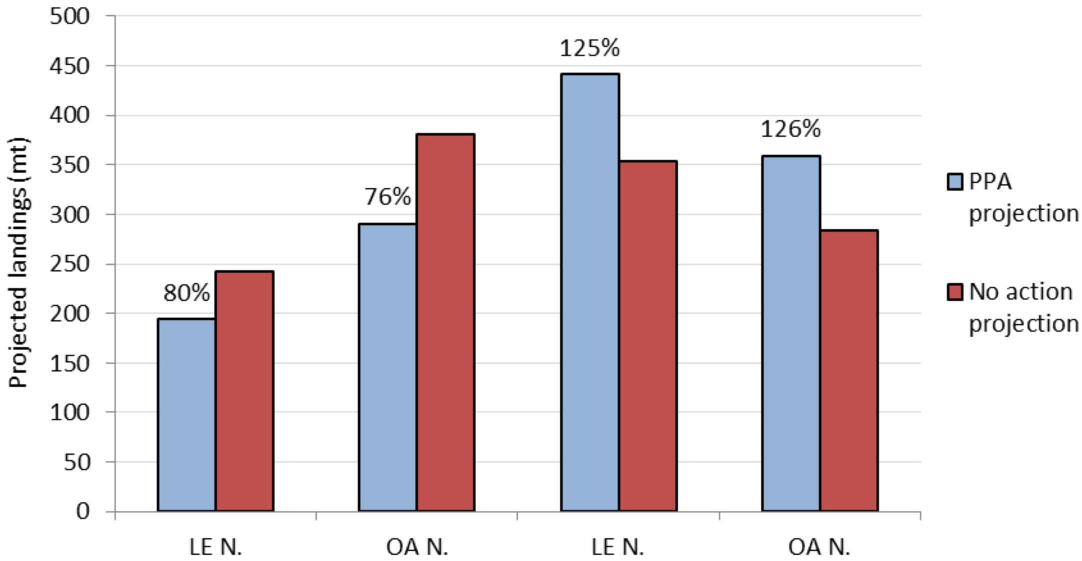


Figure A-5. Projected landings for 2014 under the PPA and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show PPA projection as a percentage of No Action.

Table A-19. Proposed trip limits for 2014, in sablefish DTL fisheries under the PPA, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N	1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.					
	OA N	300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.					
South of 36° N. lat.	LE S	1,930 lb. per week					
	OA S	300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.					

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table A-19), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 600 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 225 pounds per week and 450 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 130 pounds per week was possible in the LE South fishery, while an increase of 175 pounds per week and 350 pounds per bimonthly period was possible in the OA South fishery.

A.5 Non-Nearshore: Blackgill Rockfish South of 40°10 N. Latitude Trip Limits

The following analytical treatment of the 2005-2010 PacFIN data aims to define bi-monthly period limits for the limited entry and fixed gear nontrawl fleets. Given the yearly harvest guideline is known, the two main unknowns in these calculations are how many vessels will participate each bi-monthly period and how much of the period limit they will attain. If one assumes each vessel fully attains the limit each period, the corresponding limit given a certain number of vessels per period is expressed as an exponentially declining function (Figure A-6). The two methods used to calculate period limits explore different attainment and vessel participation assumptions to define a range of period limits with differing levels of risk.

A.5.1 Method 1: Used to calculate the most conservative estimates of bi-monthly period limits.

Assumptions
Vessel attainment: All latent removal by every participating vessel in each fishery is realized, therefore any limit is fully realized by all vessels in every bi-monthly period.

Vessel participation: The mean and standard deviation of vessel numbers by each year and bi-monthly period are used to define a normal distribution of expected number of vessels per bi-monthly period (Figure A-7 and Figure A-8).

Calculations
The bi-monthly limit is then calculated as:

$$P = \left(\frac{HG}{6}\right) \Big/ V$$

where P = period limit; HG = yearly harvest guideline; v = number of vessels. Five different vessel participation assumptions (values for V) were explored, where the mean is the least conservative and the 99 percent is the most conservative (Table A-20).

A.5.2 Method 2: Used to calculate less conservative estimates of bi-monthly period limits.

Assumptions

- Vessel attainment: Instead of assuming each vessel participating will attain the full limit, a threshold value is used to determine which vessels will and will not attain the full limit. Vessels with average catch over a given time period that exceeds the threshold are assumed to catch the period limit; vessels with average catch below the threshold are assumed to catch their average value in any given period:

$$C_{v,b,y,P_y,T} = \begin{Bmatrix} P_y & \text{if } \hat{C}_{v,b,y} > T \\ \hat{C}_v & \text{if } \hat{C}_{v,b,y} \leq T \end{Bmatrix}$$

  where C_v = catch per vessel within bi-monthly period b across years y; $\hat{C}_{v,b,y}$= average catch of vessel v within bi-monthly period b across years y; T = threshold value.
- Vessel participation: For a given set of years, any vessel that caught blackgill in any bi-monthly period will contribute an average catch to that period's total catch.

Calculation

- The bi-monthly period limit ($P_{HG,y}$) is subsequently solved to allow vessel catches over all periods to obtain the yearly harvest guideline for a given T and series of years:

$$HG = \sum_{b=1}^{6} C_{v,b,y,P_{HG,y},T}$$

A.5.3 Applications

Method 1
Table A-3 provides application of method 1 to each fleet and area. Figure A-8 shows how alternative allocation scenarios of the nontrawl harvest guideline between the limited entry and fixed gear fleets will change the limited entry period limit.

Method 2
Table A-21 provides the catch per vessel by periods and years used to calculate threshold values. Table A-22 gives the period limits as calculated for several threshold values and data assumptions.

Each method can be updated at each in-season consideration using the remaining amount of the harvest guideline and any updated information on number of vessels, allowing for adjustable period limits to avoid harvest guideline overages. It can also be updated easily to accommodate different limited entry:open access allocations.

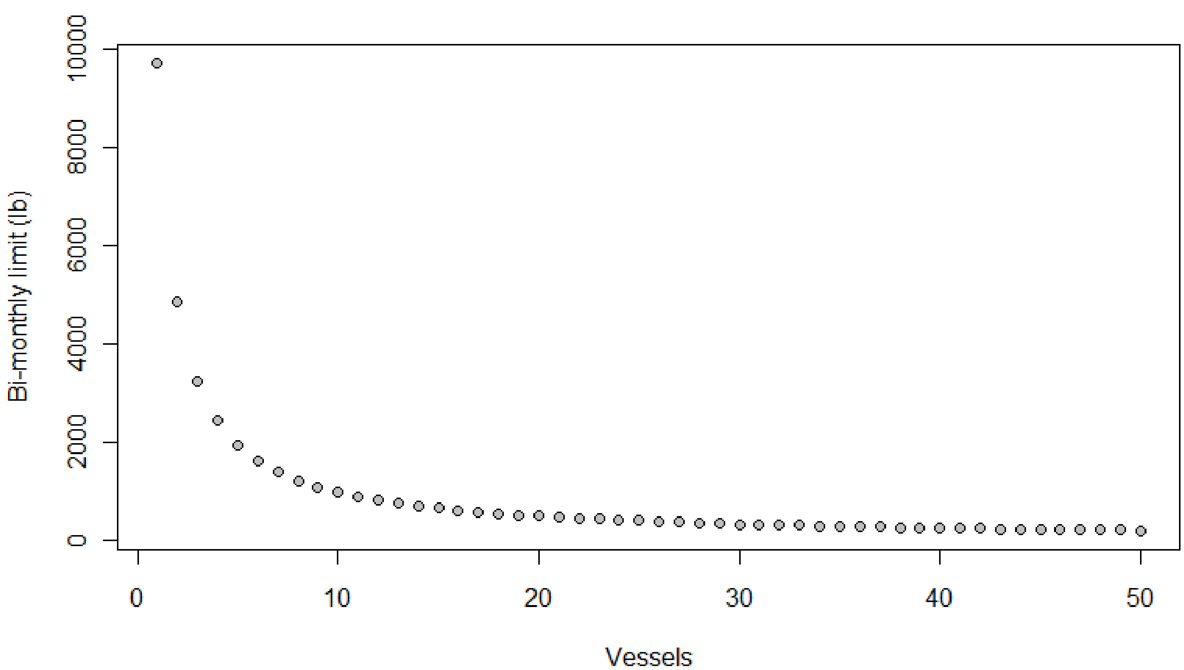


Figure A-6. Relationship between number of vessels and the bi-monthly limit (in lb) of blackgill rockfish (assuming no discards) in the limited entry fishery for the 2013 harvest guideline assuming 60% allocation to the limited entry fishery.

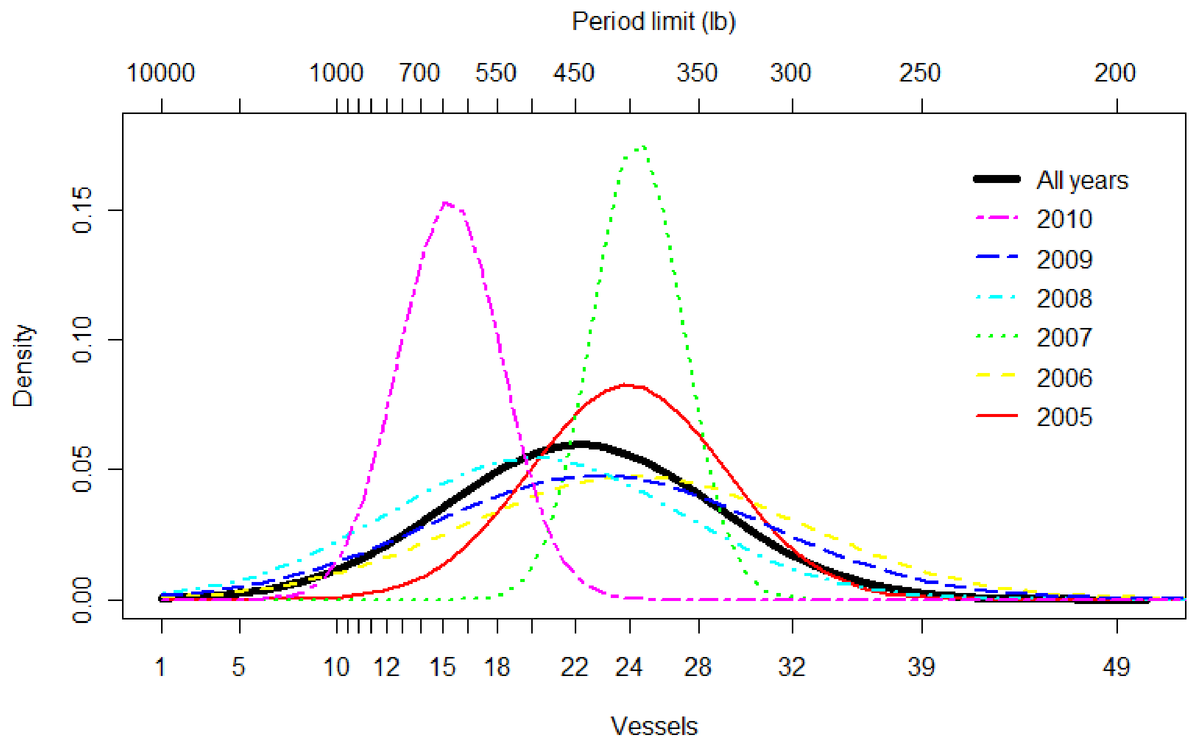


Figure A-7. Normal probability density function distribution for bi-monthly trips that caught blackgill rockfish in each year and all years combined for the limited entry fishery south of 40.10. Secondary x-axis identifies the bi-monthly blackgill rockfish trip limits associated with the number of vessels that would reach the 2013 blackgill harvest guideline (26.4 mt).

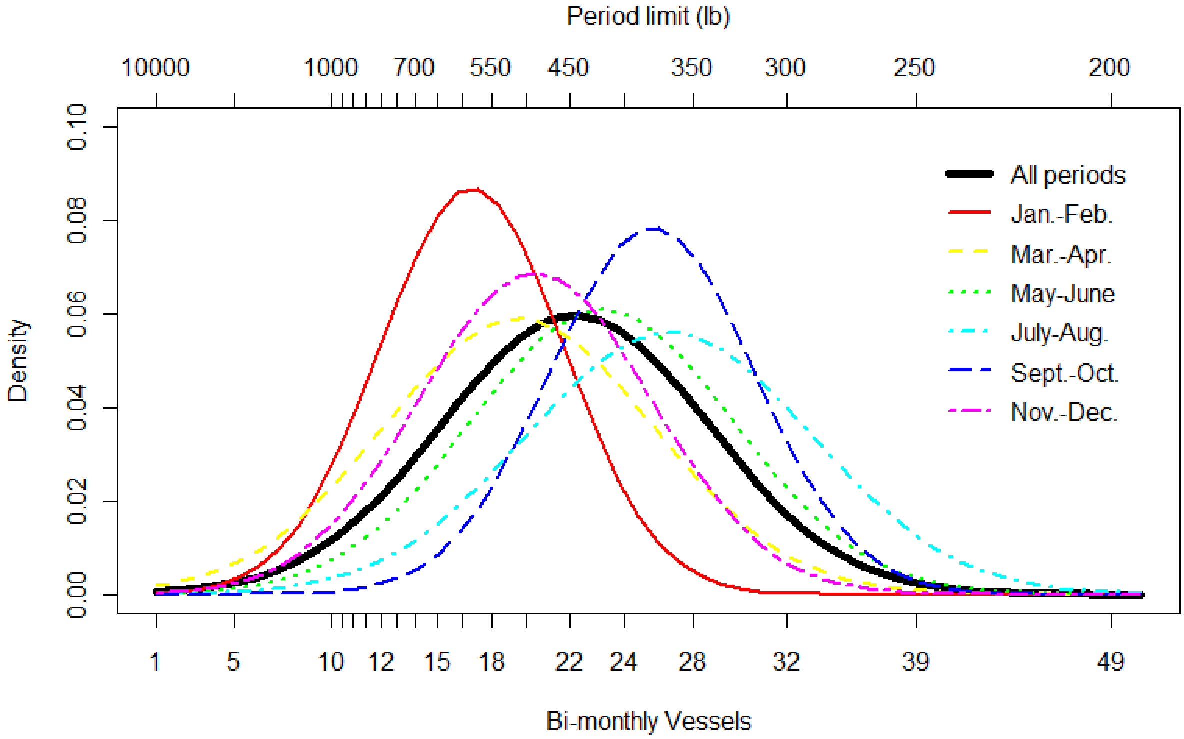


Figure A-8. Normal probability density function distribution for bi-monthly trips that caught blackgill rockfish in each bi-monthly period across all years and all combined bi-monthly periods for the limited entry fishery south of 40.10. Secondary x-axis identifies the bi-monthly blackgill rockfish trip limits associated with the number of trips that would reach the blackgill harvest guideline for the 2013.

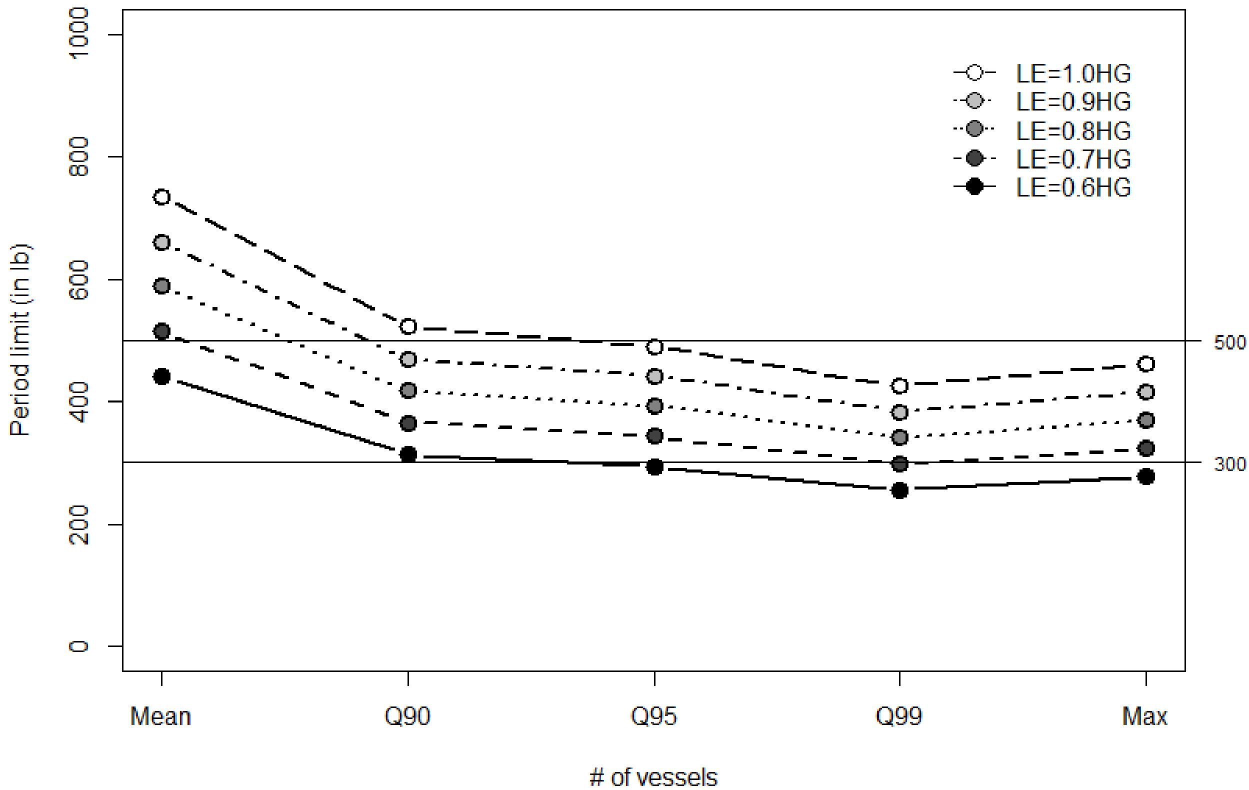


Figure A-9. Bi-monthly period limits (in pounds) of blackgill rockfish under different estimates of vessels in the limited entry (LE) fishery for different scenarios of harvest guideline (HG) allocation to the limited entry fishery. Horizontal lines are two possible period limits. Points at or below lines would result in yearly catches at or below the HG.

Table A-20. Number of vessels and the associated bi-monthly period limits for several measures along the normal probability density distribution summarized for years, bi-monthly periods, and all years/periods combined for all nontrawl gears and areas.

A) Limited Entry

	# Vessels					Bi-monthly limit (lb)				
Time	Mean	Q=90%	Q=95%	Q=99%	Maximum	Mean	Q=90%	Q=95%	Q=99%	Maximum
Year										
2005	25	31	33	36	28	388	313	294	269	346
2006	25	36	39	45	35	388	269	249	216	277
2007	25	28	29	30	27	388	346	334	323	359
2008	20	29	32	37	29	485	334	303	262	334
2009	23	34	37	43	32	422	285	262	226	303
2010	16	19	20	22	18	606	511	485	441	539
Bi-monthly period										
Jan-Feb	17	23	25	28	22	571	422	388	346	441
Mar-Apr	19	28	31	35	28	511	346	313	277	346
May-June	24	32	34	39	32	404	303	285	249	303
July-Aug	27	36	39	44	35	359	269	249	220	277
Sept-Oct	26	33	35	38	32	373	294	277	255	303
Nov-Dec	20	28	30	34	27	485	346	323	285	359
All years, periods	22	31	33	38	35	441	313	294	255	277

B) Open Access N 38°

	# Vessels					Bi-monthly limit (lb)				
Time	Mean	Q=90%	Q=95%	Q=99%	Maximum	Mean	Q=90%	Q=95%	Q=99%	Maximum
Year										
2005	1	2	3	3	2	100	50	33	33	50
2006	1	2	3	3	2	100	50	33	33	50
2007	2	5	6	7	6	50	20	17	14	17
2008	1	2	2	3	2	100	50	50	33	50
2009	1	2	2	2	1	100	50	50	50	100
2010	3	5	6	7	6	33	20	17	14	17
Bi-monthly period										
Jan-Feb	1	2	3	3	2	100	50	33	33	50
Mar-Apr	1	2	2	2	1	100	50	50	50	100
May-June	2	3	3	3	2	50	33	33	33	50
July-Aug	2	5	6	7	6	50	20	17	14	17
Sept-Oct	3	5	6	7	6	33	20	17	14	17
Nov-Dec	1	2	2	2	1	100	50	50	50	100
All years, periods	2	3	4	5	6	50	33	25	20	17

B) Open Access S 38°

	# Vessels					Bi-monthly limit (lb)				
Time	Mean	Q=90%	Q=95%	Q=99%	Maximum	Mean	Q=90%	Q=95%	Q=99%	Maximum
Year										
2005	14	17	18	20	17	455	375	354	318	375
2006	17	23	24	27	22	375	277	265	236	289
2007	14	19	21	24	19	455	335	303	265	335
2008	12	20	22	26	21	531	318	289	245	303
2009	20	27	29	33	26	318	236	220	193	245
2010	18	28	31	36	26	354	227	205	177	245
Bi-monthly period										
Jan-Feb	11	14	15	17	14	579	455	424	375	455
Mar-Apr	14	18	19	21	17	455	354	335	303	375
May-June	18	26	29	33	26	354	245	220	193	245
July-Aug	18	26	29	33	26	354	245	220	193	245
Sept-Oct	18	26	28	32	26	354	245	227	199	245
Nov-Dec	15	23	25	29	21	424	277	255	220	303
All years, periods	16	23	25	29	26	398	277	255	220	245

Table A-21. Blackgill pounds per vessel by year and bi-monthly period for the A) Limited Entry, B) Open Access North of 38○, and C) Open Access South of 38○ fixed gear fisheries.

A) Limited Entry

Year	Bi-monthly period Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.	Nov.-Dec.
2005	294	277	86	197	118	131
2006	220	465	81	152	539	389
2007	79	166	113	179	140	173
2008	67	103	675	121	143	562
2009	1151	596	455	460	441	256
2010	216	530	428	373	730	743

B) Open Access N 38°

Year	Bi-monthly period Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.	Nov.-Dec.
2005	26	0	13	161	10	2
2006	0	2	16	8	13	14
2007	12	4	12	0	30	30
2008	0	0	0	0	14	10
2009	0	0	32	1	6	0
2010	1	3	12	11	32	8

C) Open Access S 38°

Year	Bi-monthly period Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.	Nov.-Dec.
2005	559	257	191	296	876	448
2006	237	427	308	268	306	175
2007	180	874	559	517	63	60
2008	233	323	190	198	46	80
2009	315	156	265	673	181	222
2010	164	361	523	497	678	896

Table A-22. Bi-monthly period limits that correspond to various catch thresholds and years used to calculate vessel average catch for nontrawl fleets.

		Average catch years	
Fleet	Catch threshold	2005-2010	2008-2010
Limited Entry	**238**	**768**	1137
	300	865	1218
	448	1019	**1586**
	500	1115	1710
	750	1232	1967
	1000	1315	2226
	Maximum	1586	2675
Open access S 38	208	582	394
	249	676	**399**
	254	688	402
	282	**739**	402
	500	1002	416
	750	1344	359
	1000	2117	300
	Maximum	2880	422

A.6 Nearshore

A.6.1 Modeling Open Access Impacts

Impacts associated with the directed open access daily-trip-limit fishery targeting sablefish are modeled using the primary sablefish model described above. Nearshore commercial fisheries in waters off Oregon and California are modeled separately from offshore efforts targeting sablefish.

A.6.2 Modeling Nearshore Commercial Impacts

The nearshore commercial model incorporates fleet-wide discard estimates by depth from West Coast Groundfish Observer Program (WCGOP) data, landings data from PacFIN, and depth-specific discard mortality rates derived by the Groundfish Management Team (GMT) (refer to 2009/2010 Harvest Specifications and Management Measures FEIS for full description of model). The WCGOP began pilot coverage of vessels targeting nearshore rockfish and associated species, such as cabezon and kelp greenling, in January 2003 for the California nearshore fishery and in May 2004 for the Oregon nearshore/rockfish fisheries. Data from these vessels from January 2003 – December 2009 were averaged for analyses. Data from 2009 were the most recently available data at the time of the analysis. Although the number of observed trips has increased since the WCGOP began monitoring the fleet, coverage levels are still lower than for other fleets and thus greater uncertainty in estimating discard relationships exists (Table A-23).

Table A-23. Summary of WCGOP observer coverage (2003-2009)

Area/Depth	# Trips	# Sets	# Vessels
North of 42° N lat.			
0-10 fm	484	632	85
10-20 fm	540	713	81
> 20 fm	48	53	27
42° to 40° 10' N lat.			
0-10 fm	160	215	23
10-20 fm	216	256	21
> 20 fm	37	41	10
South of 40° 10' N lat.			
0-10 fm	335	542	83
10-20 fm	241	317	65
> 20 fm	40	63	20

In 2010-11, the nearshore model structure was modified to include finer area stratifications and used modified landings data to project overfished species impacts. These modifications would facilitate management, provide greater protection to stocks while minimizing adverse impacts to communities, and provide the best estimate of fishery needs. No changes are proposed to the model for 2013-14.

The nearshore model is stratified into three areas based on available WCGOP data: (1) north of 42° N lat; (2) between 42° and 40°10' N lat; and (3) south of 40°10' N lat. These finer area stratifications facilitate overfished species impact projections on a smaller scale, reduce adverse actions to lower bycatch areas, and allowed incorporation of state specific management measures.

Instead of using a single previous year landings data to project overfished species impacts, average landings were used as the best estimate of fishery needs. As a starting point, average landings from the last four years (2007-2010) were used for both Oregon and California; the year with the lowest landings was excluded for projections. Landings data were adjusted from this starting point based on new information (i.e., change in ACL) or based on increased availability in overfished species (i.e., higher nearshore allocation of yelloweye). Opportunities were maximized for this fishery where available while staying within available overfished species impacts.

Table A-25, Table A-26, Table A-27summarize the ratios of observed discarded and retained catch for each of the three depth intervals (0-10 fm, 11-20 fm, and 21-50 fm) used to model impacts in nearshore commercial fisheries.

A.6.3 Allocation of Overfished Species (Canary and Yelloweye Rockfish) Between States

In 2011-12, a de-facto allocation for canary (OR = 26.7 percent; CA = 73.3 percent) and yelloweye rockfish (OR = 72.7 percent; CA = 27.3 percent) was used which resulted from specific landings that were meant to keep both fisheries at harvest levels similar to previous years.

For 2013-14, the GMT maintained the 2011-12 status quo allocations for modeling impacts. In addition, two alternative relationships were examined to demonstrate the tradeoffs of varying overfished species allocations. Equal catch sharing (50:50) and reverse status quo were chosen to bracket the upper and lower ranges of landings and management measures (Table A-24).

Table A-24. Comparison of canary and yelloweye rockfish allocations for Oregon and California under three catch sharing alternatives.

		Status Quo	Equal Sharing	Reverse Status Quo
OR	Canary	26.7%	50%	73.3%
	Yelloweye	72.7%	50%	27.3%
CA	Canary	73.3%	50%	26.7%
	Yelloweye	27.3%	50%	72.7%

Table A-25. Average Bycatch and discard rates (2003-2009) from the commercial nearshore projection model north of 42° N. latitude.

NORTH of 42° N. lat.	Observed discard (mt)			Observed retained (mt)			% of observed landings by depth			Discard mortality rate		
	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm
Rebuilding species												
Bocaccio	0.000	0.000	0.000	0.000	0.000	0.000				30%	54%	100%
Canary rockfish	0.149	0.548	0.059	0.000	0.001	0.000				32%	54%	100%
Darkblotched rockfish	0.000	0.000	0.000	0.000	0.082	0.000						
Widow rockfish	0.000	0.000	0.000	0.000	0.005	0.005				32%	54%	100%
Yelloweye rockfish	0.061	0.471	0.063	0.000	0.001	0.000				32%	56%	100%
Other species												
Black rockfish	1.305	1.231	0.043	24.369	23.738	0.821	49.8%	48.5%	1.7%	23%	42%	90%
Blue rockfish	0.619	1.336	0.079	0.955	1.390	0.135	38.5%	56.0%	5.4%	29%	49%	100%
Cabezon	0.481	0.833	0.006	3.444	8.347	0.368	28.3%	68.7%	3.0%	7%	7%	7%
Kelp greenling	0.626	0.656	0.024	3.876	3.679	0.149	50.3%	47.7%	1.9%	7%	7%	7%
Lingcod	3.636	5.325	0.414	3.596	7.475	0.616	30.8%	64.0%	5.3%	7%	7%	7%
Other minor nearshore rockfish	0.089	0.200	0.013	1.777	4.243	0.367	27.8%	66.4%	5.7%	24%	48%	100%

Table A-26. Average bycatch and discard rates (2003-2009) from the commercial nearshore projection model north of 42° N. latitude to 40°10' N. latitude.

42° to 40°10' N. lat.	Observed discard (mt)			Observed retained (mt)			% of observed landings by depth			Discard mortality rate		
	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm
Rebuilding species												
Bocaccio	0.000	0.000	0.000	0.000	0.001	0.000				30%	54%	100%
Canary rockfish	0.069	0.486	0.142	0.000	0.000	0.000				32%	54%	100%
Darkblotched rockfish	0.000	0.000	0.000	0.000	0.000	0.000						
Widow rockfish	0.000	0.026	0.005	0.002	0.062	0.003				32%	54%	100%
Yelloweye rockfish	0.013	0.131	0.223	0.000	0.000	0.000				32%	56%	100%
Other species												
Black rockfish	0.124	0.089	0.002	15.420	16.375	1.216	44.5%	52.3%	3.2%	23%	42%	90%
Blue rockfish	0.186	0.440	0.045	1.356	5.082	0.884	18.1%	70.7%	11.2%	29%	49%	100%
Cabezon	0.186	0.179	0.040	0.583	0.455	0.172	46.6%	39.7%	13.8%	7%	7%	7%
Kelp greenling	0.199	0.180	0.016	0.130	0.201	0.003	37.7%	61.4%	0.9%	7%	7%	7%
Lingcod	0.614	1.132	0.120	1.199	1.840	0.876	30.4%	47.9%	21.7%	7%	7%	7%
Other minor nearshore rockfish	0.002	0.009	0.010	0.494	1.046	1.057	18.9%	41.5%	39.7%	24%	48%	100%

Table A-27. Average bycatch and discard rates (2003-2009) from the commercial nearshore projection model south of 40°10' N. latitude.

	Observed discard (mt)			Observed retained (mt)			% of observed landings by depth			Discard mortality rate		
SOUTH of 40°10' N. lat.	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm	0-10 fm	11-20 fm	> 20 fm
Rebuilding species												
Bocaccio	0.000	0.001	0.001	0.000	0.000	0.051				30%	54%	100%
Canary rockfish	0.012	0.271	0.085	0.000	0.000	0.000				32%	54%	100%
Cowcod	0.000	0.000	0.000	0.000	0.000	0.000						
Darkblotched rockfish	0.000	0.000	0.000	0.000	0.000	0.000						
Widow rockfish	0.000	0.000	0.000	0.000	0.001	0.000				32%	54%	100%
Yelloweye rockfish	0.000	0.010	0.006	0.000	0.000	0.000				32%	56%	100%
Other species												
Black rockfish	0.100	0.102	0.008	0.385	0.402	0.044	46.3%	48.4%	5.3%	23%	42%	90%
Blue rockfish	0.231	0.368	0.169	0.410	0.314	0.054	52.7%	40.4%	6.9%	29%	49%	100%
Cabezon	2.110	0.269	0.038	4.591	0.191	0.070	94.6%	3.9%	1.4%	7%	7%	7%
Deeper nearshore rockfish	0.157	0.193	0.036	1.751	3.501	0.455	30.7%	61.3%	8.0%	23%	48%	100%
Kelp greenling	0.602	0.155	0.062	0.344	0.026	0.00635	91.5%	6.8%	1.7%	7%	7%	7%
Lingcod	1.555	1.343	0.118	1.809	1.390	0.129	54.4%	41.8%	3.9%	7%	7%	7%
Shallow nearshore rockfish	0.739	0.530	0.096	3.464	1.210	0.339	69.1%	24.1%	6.8%	25%	49%	100%

A.7 Washington Recreational

The Washington Ocean Sampling Program (OSP) generates catch and effort estimates for the recreational boat-based groundfish fishery, which are provided to Pacific States Marine Fisheries Commission (PSMFC) and incorporated directly into RecFIN. The OSP provides catch in total numbers of fish, and also collects biological information on average fish size, which is provided to RecFIN to enable conversion of numbers of fish to total weight of catch. Boat egress from the Washington coast is essentially limited to four major ports, which enables a sampling approach to strategically address fishing effort from these ports. Effort estimates are generated from exit-entrance counts of boats leaving coastal ports while catch per effort is generated from angler intercepts at the conclusion of their fishing trip. The goal of the program is to provide information to RecFIN on a monthly basis with a one-month delay to allow for inseason estimates. For example, estimates for the month of May would be provided at the end of June. Some specifics of the program are:

Exit/entrance count - boats are counted either leaving the port (4:30 AM - end of the day) or entering the port (approximately 8:00 AM through end of the day) to give a total count of sport boats for the day.

Interview - boats are encountered systematically as they return to port; anglers are interviewed for target species, number of anglers, area fished, released catch data and depth of fishing (non-fishing trips are recorded as such and included in the effort expansion). The OSP collects information on released catch but does not collect information on the condition of the released fish. Therefore, released catches must be post-stratified as live or dead based upon an assumed discard mortality rate. Onboard observers are deployed on charter vessels throughout the salmon season primarily to observe hatchery salmon mark rates but also to collect rockfish discard information on these trips.

Examination of catch - catch is counted and speciated by the sampler. Salmon are electronically checked for coded wire tags and biodata is collected from other species.

Sampling Rates - vary by port and boat type. Generally, at boat counts less than 30, the goal is 100 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, one permanent technician generating in-season estimates of groundfish catch, approximately twenty-two port samplers, three on-board observers and one data keypuncher.

Volume of data - Between 20,000 and 30,000 boat interviews completed per season coastwide.

Data Expansion:
Algorithm for expanding sampled days:

$$\frac{\text{Exit Count}}{\text{Total boats sampled}} * P_s \text{ sampled} = P_t$$

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:

$$\text{Total Weekday Catch} = \frac{\Sigma(P_t) \text{ on sampled weekdays}}{\text{number weekdays sampled}} * \text{no. of weekdays in stratum}$$

$$\text{Total Weekend Catch} = \frac{\Sigma(P_t) \text{ on sampled weekend days}}{\text{number weekend days sampled}} * \text{no. weekend days in stratum}$$

Total weekend catch + total weekday catch = total catch in stratum

Notes on Data Expansion:
Salmon and halibut catch estimates are stratified by week; catch estimates for 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, albacore)

Washington Recreational Fishery Impact Modeling

A.7.1 Pre-Season Catch Projections

Projected impacts for Washington's recreational fishery are essentially based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in RecFIN. This is especially true if recreational regulations remain consistent.

Washington's management measures have relied on the use of depth closures in waters deeper than 20 or 30 fathoms since 2005 and therefore historical catch estimates will be representative of projected mortalities. Depth restrictions for Washington's recreational fisheries are primarily designed to reduce encounters with yelloweye and canary rockfish but are especially restrictive to keep yelloweye rockfish impacts below the Washington recreational fishery harvest target. Because the ACL alternative and resulting Washington recreational harvest target for yelloweye rockfish that is being considered for 2013-2014 is only slightly higher than the yelloweye harvest target adopted for 2011-2012 no changes to depth restrictions or other management measures are being proposed for this management cycle and as such the most recent catch and effort estimates from 2011 is the basis for projected catch for 2013-2014.

A.7.2 Inseason Catch Projections for 2013-2014

Inseason catch projections are based upon the most recent OSP estimates and incorporated in RecFIN (with a one-month time lag) with subsequent months extrapolated from the pre-season catch projections. Beginning in 2009, depth dependant mortalities have been applied uniformly to all discarded fish coast wide through RecFIN. It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons will continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

A.8 Oregon Recreational

A.8.1 Harvest and discard mortality calculations

Groundfish impacts by recreational anglers in Oregon are estimated and tracked inseason by the Oregon Department of Fish and Wildlife (ODFW). Impacts consisting of weights of harvested fish and released fish that are presumed to die (discard mortality) are estimated for ocean boat anglers using Oregon Recreational Boat Survey (ORBS) data and are estimated for shore and estuary anglers using Shore and Estuary Bank Survey (SEBS) data from 1998-2002 (discontinued after 2002). Impacts are monitored inseason for black rockfish (RF), blue RF, yelloweye RF, canary RF, other nearshore RF species complex (quillback , China , grass , brown , and copper RF), greenlings species complex (rock and kelp greenling), cabezon, and lingcod.

Methods: Ocean boat fishery
Harvest and discard mortality estimates (mt) are calculated by month and are typically completed within thirty days of the end of the month. Harvest estimate calculations, number of harvested fish multiplied by the average weight of harvested fish, remain the same as in previous cycles.

Discard mortality estimate calculations, number of discarded fish multiplied by average weight of discarded fish multiplied by discard mortality rate, remain the same as well. However, a new method for calculating discard mortality rates is now being used due recent availability of released fish by depth data obtained by ORBS. Starting in March 2009, anglers were asked the depth they fished. Previous discard mortality rate estimates used depth of release data from observed charter trips. The new method is advantageous because: (a) greater sample sizes (e.g., > 1000 vs 51 yelloweye rockfish), (b) incorporates private boat data, (c) accounts for monthly variations in catches (fixed rates previously used for all months), (d) same methodology used by the Recreational Fisheries Information Network (RecFIN) and (e) estimates should be closer to what is actually occurring. The new ORBS depth data is also very useful for economic modeling because percentages of effort by depth bin can be calculated and potential decreases in angler trips due to proposed depth restrictions can be modeled. Mean weights of discarded fish continue to be calculated from observed charter trips (updated with newest data) since accurate weights of discarded fish cannot be obtained from angler reported releases.

Only a fraction (typically > 20 percent) of anglers are interviewed; therefore, a total discard mortality rate is applied to expanded total discards. Since discard mortality rates vary by depth bin (Table A-28), the total discard mortality rate is the sum of the products, by depth bin, of the proportion of fish released (from ORBS data) multiplied by the discard mortality rate (from GMT depth dependent discard mortality matrix; Table A-28). An example of a total discard mortality rate is shown in Table A-29.

Table A-28. GMT discard mortality rates for select rockfish species by depth bin. The discard mortality rates of cabezon, lingcod, and greenling species are 7%, regardless of depth, to account for hooking mortality (as these fish do not suffer barotrauma).

	Mortality rate				
Species	< 10 fm	11-20 fm	21-30 fm	31-40 fm	> 40 fm
Black RF	11%	20%	29%	63%	63%
Blue RF	18%	30%	43%	100%	100%
Brown RF	12%	22%	33%	100%	100%
China RF	13%	24%	37%	100%	100%
Copper RF	19%	33%	48%	100%	100%
Quillback RF	21%	35%	52%	100%	100%
Canary RF	21%	37%	53%	100%	100%
Yelloweye RF	22%	39%	56%	100%	100%

Table A-29. Sample calculation of the new method for calculating total discard mortality using data of fish release by depth (obtained from angler interviews). Total discard mortality rate is multiplied by released fish to determine total discard mortality (mt).

Depth bin (fm)	Fish	Proportion		Mortality rate		Product	
0-10	6	0.133	x	0.22	=	0.029	
11-20	24	0.533	x	0.39	=	0.208	
21-30	12	0.267	x	0.56	=	0.149	
> 30	3	0.067	x	1.00	=	0.067	
					∑ =	0.453	= Total mortality rate

Methods: Shore and estuary

Landings and discard impacts for shore and estuary caught species were modeled on a season total basis using the 1998-2002 averages from the discontinued Oregon SEBS program. This fishery is managed for a year-round season, as it does not impact yelloweye or canary rockfish. The metric tons were adjusted for changes in length limits applied to cabezon and greenling since that period. Cabezon and greenling that were landed from 1998-2002 that would be sub-legal under current regulations are now considered discards. A mortality rate of 7 percent was applied to all species discarded in the shore and estuary fishery to account for hooking mortality, as the waters are not deep enough to cause mortality from barotrauma.

A.8.2 Groundfish fishery projection model

Introduction:

Depth restriction is the main management method used by ODFW in the recreational groundfish fishery to reduce overfished species impacts, particularly yelloweye rockfish. Further depth restrictions may be implemented inseason if anglers are projected to attain overfished species caps before the end of the season with existing preseason depth restrictions. Exceeding overfished species caps can result in complete closure of the recreational groundfish fishery (and possibly the Pacific halibut fishery), regardless of remaining quota of harvestable species. Implementing shallower depth restrictions reduces overfished species impacts by reducing catches (catch rates increase with depth) and decreasing discard mortality (mortality rate increases with depth). Depth restrictions can also affect impacts of harvestable groundfish species (e.g., impacts to groundfish more commonly caught in shallower waters may increase if anglers are restricted to shallower waters).

Old and new model descriptions:
The old depth restriction impact model was developed before angler reported catch rate and effort by bin data existed and consequently used scaling rules based on observed charter data to project impacts by depth restriction and month (Table A-30). Projected impacts by depth restriction were calculated by multiplying three year mean impacts during status quo depth restrictions by the scaling rule of the proposed depth restriction.

Table A-30. Scaling rules by depth restriction and month used in the old model to project discard mortality of yelloweye rockfish in the groundfish fishery. Values were multiplied by three year means of observed impacts during status quo months (1.00 denotes status quo depth restriction) to project impacts given proposed depth restrictions.

	Depth restriction (fm)				
Month	Any	40	30	25	20
Jan	1.00	0.71	0.71	0.61	0.29
Feb	1.00	0.71	0.71	0.61	0.29
Mar	1.00	0.71	0.71	0.61	0.29
Apr	1.40	1.00	1.00	0.86	0.41
May	1.40	1.00	1.00	0.86	0.41
Jun	1.40	1.00	1.00	0.86	0.41
Jul	1.40	1.00	1.00	0.86	0.41
Aug	1.40	1.00	1.00	0.86	0.41
Sep	1.40	1.00	1.00	0.86	0.41
Oct	1.00	0.71	0.71	0.61	0.29
Nov	1.00	0.71	0.71	0.61	0.29
Dec	1.00	0.71	0.71	0.61	0.29

The old model relied, due to lack of better data, on the unlikely assumption that observed charter data was representative of the entire fleet (charter and private anglers). The old model also relied on fixed discard mortality rates, which has been shown to be incorrect (Table A-31).

Table A-31. Total discard mortality rate of yelloweye rockfish in the groundfish fishery for the new calculation method (2009 and 2010) versus the old method (fixed for all years).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	0.39	0.38	0.79	0.48	0.46	0.42	0.41	0.38	0.39	0.35	0.00	0.35
2009	0.77	0.52	0.88	0.42	0.42	0.54	0.41	0.35	0.39	0.54	0.39	0.75
Old	0.66	0.66	0.66	0.51	0.51	0.51	0.51	0.51	0.51	0.66	0.66	0.66

The new depth restriction projection model no longer requires these flawed assumptions since it uses newly acquired data of angler reported catch rate and effort by depth bin to provide better estimates of where anglers fish, how angler behavior may be affected by depth restrictions, and what actual discard mortalities are.

The new depth restriction impact model, outlined in Table A-32, utilizes the new data of angler reported catch rate and effort by depth bin. To increase sample sizes for catch rates and proportions of anglers by depth bin, data from months with similar status quo depth restrictions is pooled (Jan-Mar; Apr-Sept; Oct-Dec). Pooling also occurs across years to further increase sample sizes. Catch rates and proportions of anglers by depth bin vary among pooling periods but are the same within a period, average groundfish anglers is a three year mean for the month, and the rest of the variables are fixed for all months (fish weight, discard mortality rate by depth bin, and weight conversion). Table A-32 models discard mortality, and can be changed to model harvest by replacing discard mortality rates to 1.00 for all depth bins (catch rate is also change to harvested per angler instead of released per angler).

Table A-32. Example of data and calculations used in the new depth restriction projection model for the groundfish fishery and an example of the difference in estimates between a 40 fm depth restriction and a 30 fm depth restriction. This example projects discard mortality and a harvest projection can be made by changing the discard mortality rates to 1.00 for all depth bins (and changing catch rates from discarded per angler to harvest per angler).

Depth bin (fm)	Catch per angler		Proportion of anglers		avg. anglers		Mean fish weight (kg)		Discard mort. rate		Kg to mt conv.		Impact by bin
40 fm depth restriction													
<10 fm	0.013	x	0.381	x	12185	x	1.289	x	0.22	x	0.001	=	0.016
10-20	0.041	x	0.489	x	12185	x	1.289	x	0.39	x	0.001	=	0.123
20-25	0.129	x	0.063	x	12185	x	1.289	x	0.56	x	0.001	=	0.071
25-30	0.126	x	0.018	x	12185	x	1.289	x	0.56	x	0.001	=	0.020
30-40	0.027	x	0.050	x	12185	x	1.289	x	1.00	x	0.001	=	0.021
													∑ = 0.252 = Expected impact
30 fm depth restriction													
<10 fm	0.013	x	0.400	x	12185	x	1.289	x	0.22	x	0.001	=	0.017
10-20	0.041	x	0.515	x	12185	x	1.289	x	0.39	x	0.001	=	0.129
20-25	0.129	x	0.066	x	12185	x	1.289	x	0.56	x	0.001	=	0.075
25-30	0.126	x	0.019	x	12185	x	1.289	x	0.56	x	0.001	=	0.021
													∑ = 0.242 = Expected impact

Table A-32 also shows how differences in projected impacts by depth restriction are calculated. All variables remain the same except for the proportion of anglers by depth bin. No declines in angler trips are assumed because we know little of changes in angler behavior in response to regulatory changes and it is better to have models that overestimate impacts for catch accounting and conservation purposes. In this example, the proportion of anglers that fished the 30-40 fm depth bin (dark grey box) are proportionally redistributed among the available depth bins given a 30 fm depth restriction (light grey boxes). This was done instead of a shift to the next deepest depth bin available because deep water trips are typically specialty trips for large lingcod (anecdotal evidence) and it is assumed that these displaced anglers would return to “typical bottomfish trips”.

An advantage to the new model is that variables can easily be adjusted provided due evidence. For example, if we develop a method to better predict angler effort.

A summary table of projected outputs by depth restrictions by month is automatically updated given new data and is used for management purposes (Table A-33). Two versions exist of the model for projecting impacts by depth restriction in the groundfish fishery. The preseason version uses data prior to the projection year and the inseason version uses data from the projection year when it becomes available. The data pooling rules are the source of change for the inseason version.

Table A-33. Summary table of projected canary rockfish impacts (mt) by month and depth restriction from the groundfish fishery.

Groundfish fishery projected impacts

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<20 fm	0.040	0.052	0.075	0.200	0.336	0.605	0.537	0.568	0.255	0.082	0.012	0.021
<25 fm	0.045	0.059	0.085	0.239	0.401	0.722	0.640	0.677	0.304	0.090	0.013	0.023
<30 fm	0.045	0.059	0.085	0.253	0.425	0.765	0.679	0.718	0.322	0.099	0.014	0.025
<40 fm	0.046	0.059	0.085	0.259	0.434	0.782	0.693	0.733	0.329	0.166	0.023	0.042
>40 fm	0.091	0.118	0.171	n/a	n/a	n/a	n/a	n/a	n/a	0.273	0.038	0.069

Average weights used in models

Average weights of released yelloweye rockfish and canary were assumed to increase with depth in the old calculation method and the old groundfish depth projection model; however, the same weights are used in the new versions because there does not appear to be a relationship between depth and weight of either species (Figure A-10; from catch data from observed charter trips). Fixed mean weights were consequently used for yelloweye rockfish (1.29 kg) and canary rockfish (0.69 kg) in the new method for calculating discard mortality and in the new groundfish depth projection model. Data of weights of fish caught beyond 40 fm is lacking and should be addressed in the future to determine if the same average weights are applicable to deep water (> 40 fm).

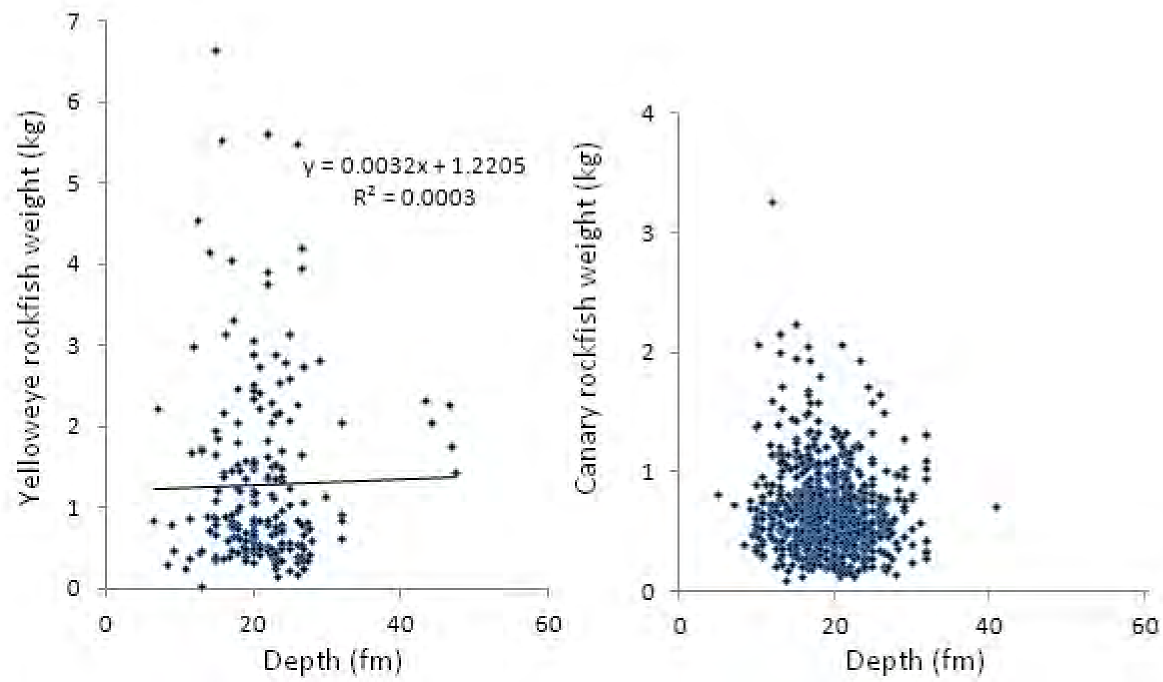


Figure A-10. Relationship between depth and weight of released yelloweye rockfish and canary rockfish from observed charter trips, 2006-2010.

Incorporation of variance into the groundfish projection model

Point estimates of depth restriction models are valuable for setting preseason depth restrictions by month. However, greater than expected impacts of yelloweye rockfish often lead to greater inseason depth restrictions. Incorporation of variance into the yelloweye rockfish projection model allows for development of prediction intervals that are useful for management decisions because it gives managers a better understanding of potential ranges of impacts.

Yelloweye rockfish encounters are extremely variable (Figure A-11) and difficult to predict. For example, June 2011 discards (~950 fish; outlier dot) were more than twice expected.

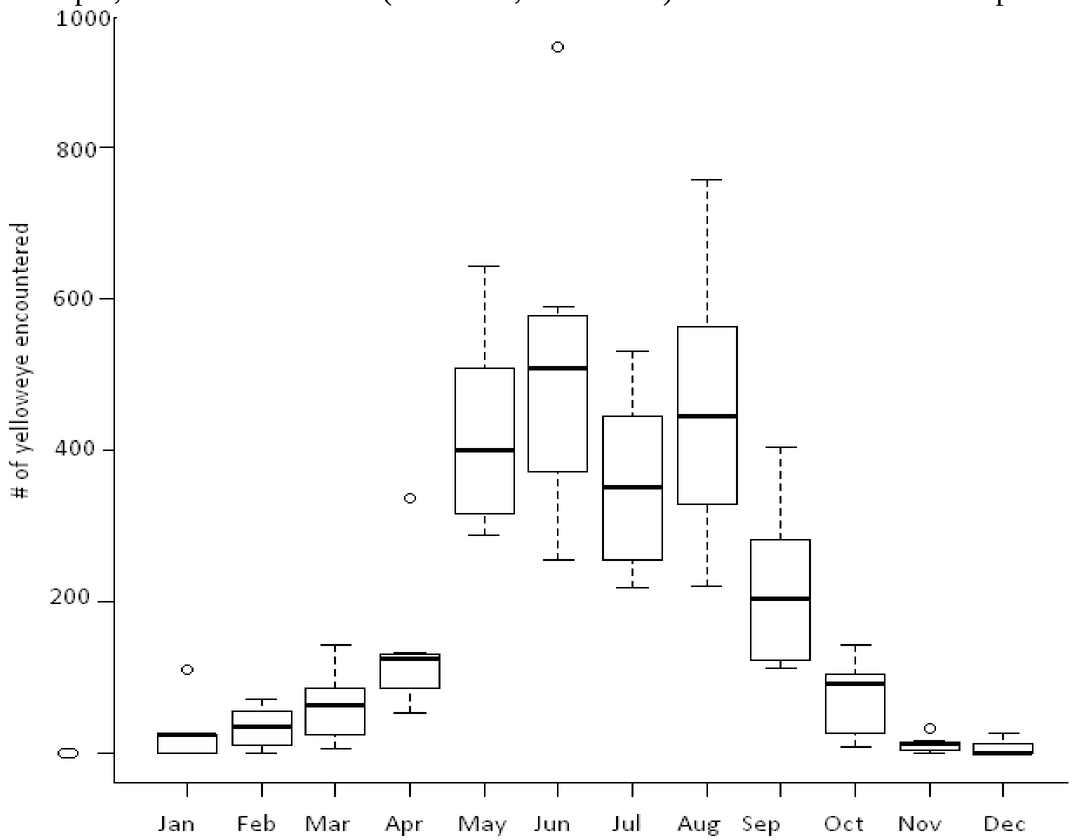
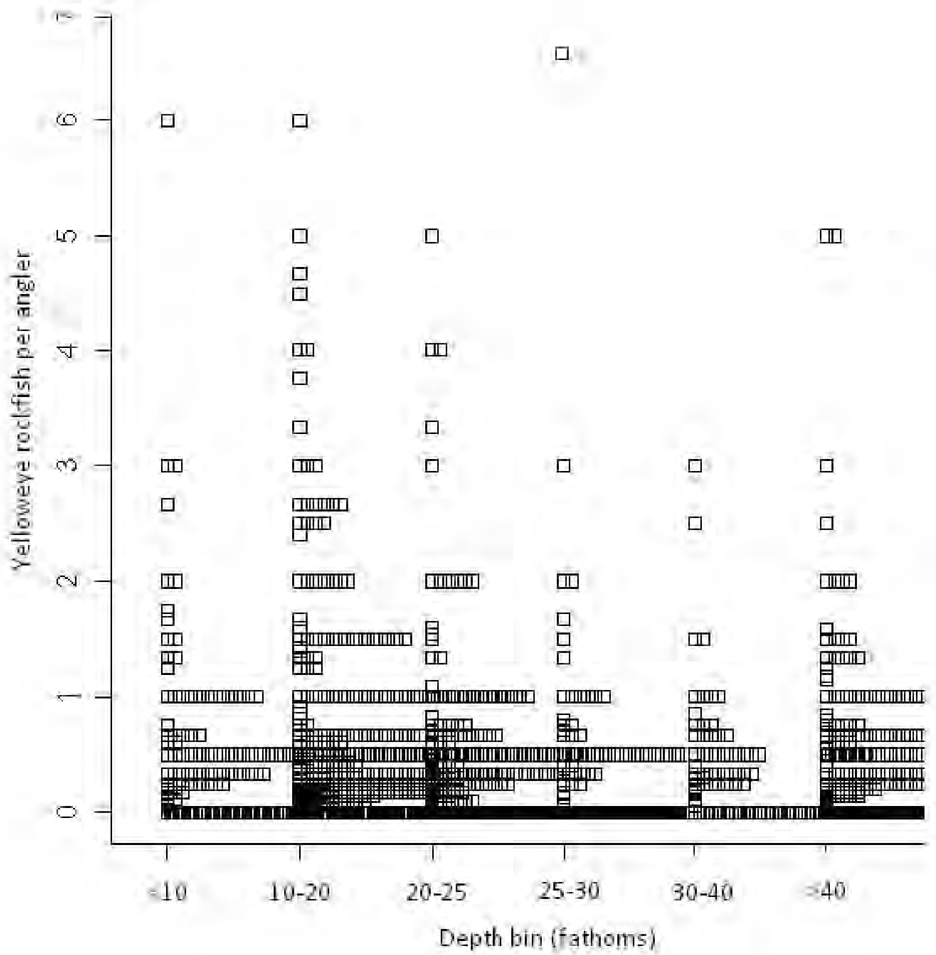


Figure A-11. Number of yelloweye rockfish encountered (discarded and harvested illegally) by month from recreational anglers in Oregon, 2004-2011.

Variation in yelloweye rockfish discards is attributed to variance in effort (total and by depth bin) and catch rates because the other variables are fixed (e.g., average fish weight, discard mortality rates). Catch rates (discarded per angler) and angler trips are also highly variable (Figure A-12 and Figure A-13).



Yelloweye rockfish per angler
0
1
2
3
4
5
6
7
<10
10-20
20-25
25-30
30-40
>40
Depth bin (fathoms)

Figure A-12. Yelloweye rockfish catch rates (discards per angler) by depth bin.

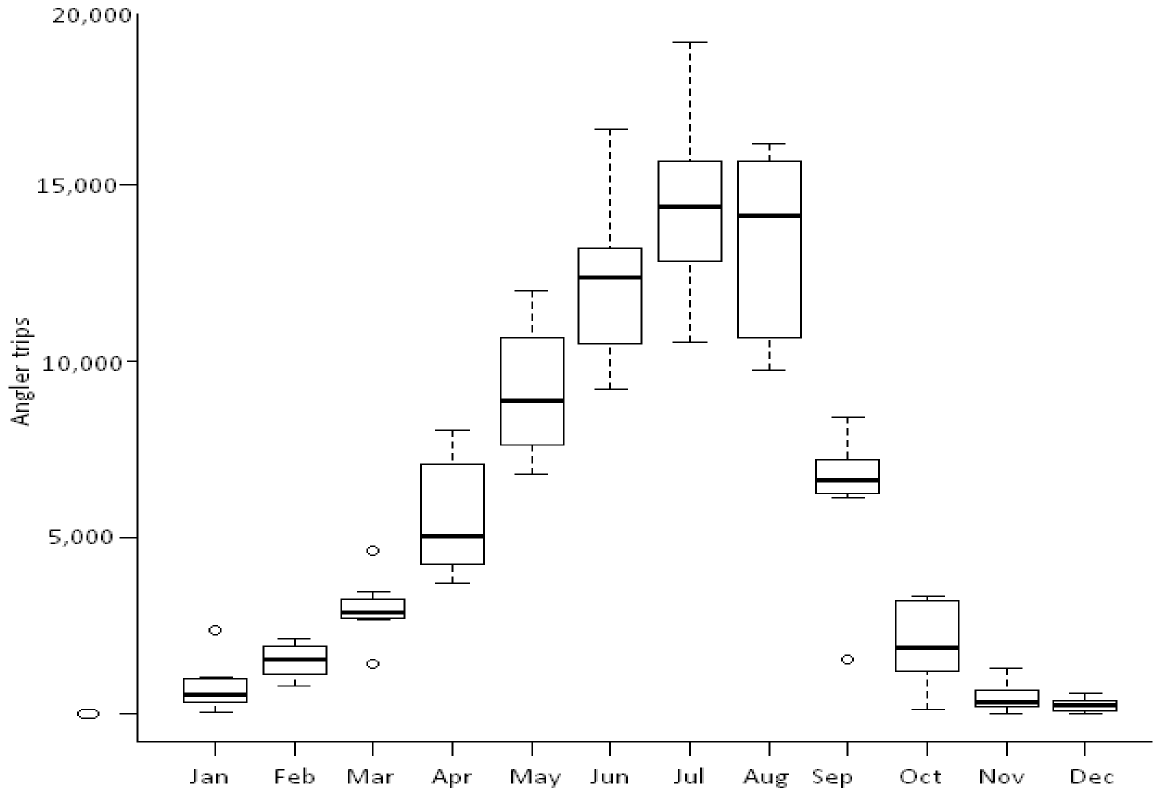


Figure A-13. Groundfish angler trips by month, 2004-2011.

Due to all the variation in variables used in modeling, a standard error based prediction interval would likely provide too wide of bands for management purposes (i.e., upper bounds above harvest guide line for all depth restrictions and a negative lower bounds, especially if a small alpha value is used). Further, carryover of variances to develop prediction intervals would require complex calculations that may be beyond the skill sets of fishery managers.

For simplicity and to simulate more probable yelloweye rockfish impacts, pseudo prediction intervals were developed using upper and lower ranges of catch rates and angler effort. Combined record high catch rates and effort would represent a worst case scenario, whereas combined record low catch rates and effort would represent a best case scenario. Although possible, it is unlikely that record catch rates and effort would coincide (either high or low); therefore, actual impacts would not be expected outside of the pseudo prediction interval bands. Expected impacts, with pseudo prediction intervals, for a year round 30 fm depth restriction are shown in Figure A-14.

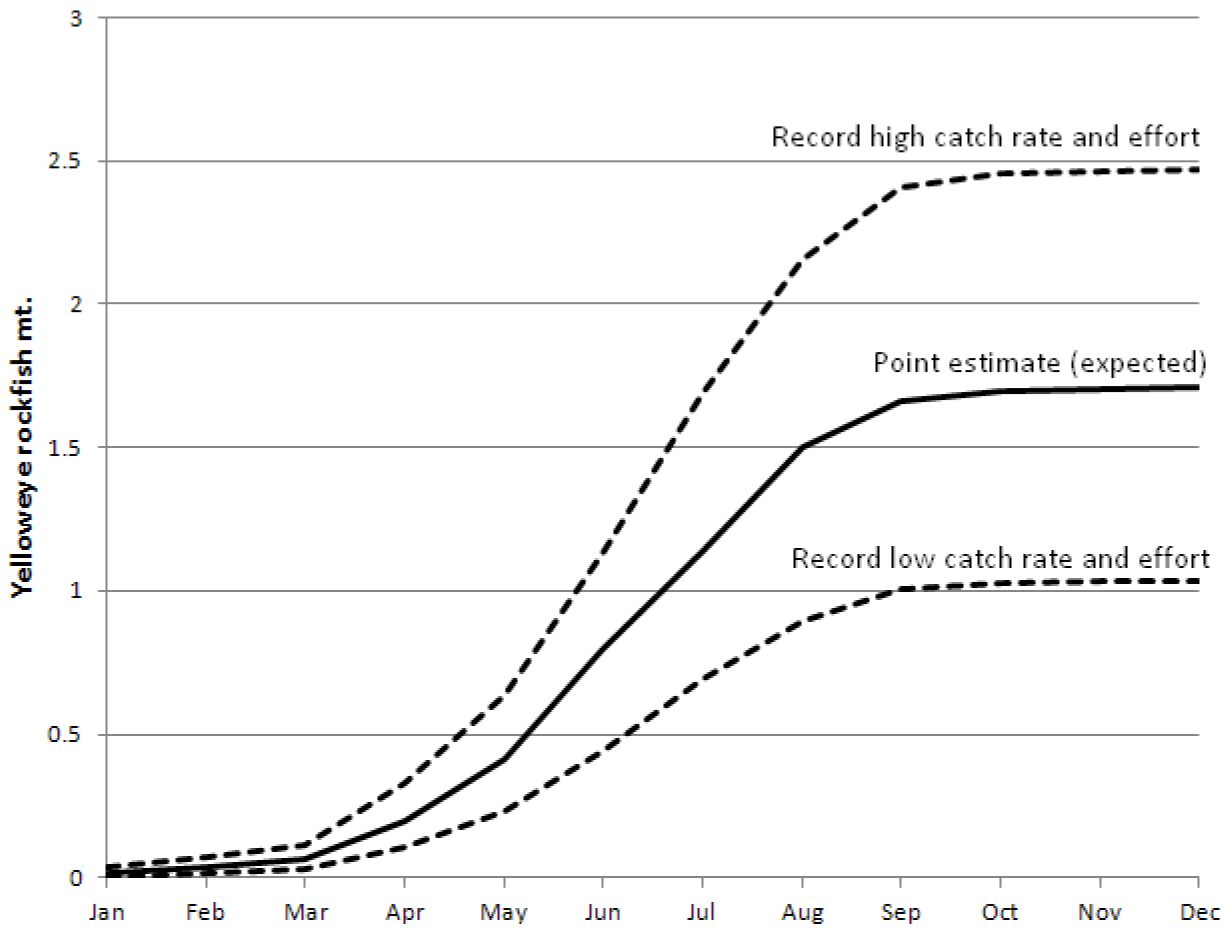


Figure A-14. Expected cumulative yelloweye impacts (average catch rates and effort) for a year round 30 fm depth restriction and pseudo (not standard error derived) prediction intervals (record high and low catch rates and effort).

A.8.3 Projected species impacts from the groundfish projection model

Five depth restriction alternatives were modeled for yelloweye rockfish (RF), canary RF, black RF, blue RF, greenlings (kelp greenling and rock greenling combined), cabezon, and other nearshore rockfish (brown, copper, China, grass, and quillback RF combined). The modeled depth restrictions were: < 20 fm, < 25 fm, <30 fm, < 40 fm, and > 40 fm (all-depths). Variables used in calculations were calculated by depth bin: 0-10 fm, 10-20 fm, 20-25 fm, 25-30 fm, 30-40 fm, and > 40 fm. Depth bins are similar to those used by the GMT due to similar discard mortality rates, but some GMT depth bins are split to allow projections of depth restrictions that could be less restrictive for management purposes. For example, a 20 fm depth restriction severely hinders groundfish fishing for Garibaldi, but a 25 fm restriction does not. Harvested and released impacts were calculated for species with federal landing caps (as required) and harvested impacts only for species with state landings caps. Tables of projected harvest and release impacts were created for each depth restriction alternative. Year totals for constant depth restrictions are summed, and combinations of depth restrictions during different months can be calculated by summing the corresponding month/depth values.

Black rockfish

Annual black rockfish harvest impacts are projected to be less than 310 mt for all depth restriction alternatives (Table A-34). Greater harvests are expected with shallower depth restrictions because effort in deep bins, with lesser catch rates, would be shifted to shallower bins, with greater catch rates. Black rockfish release mortality impacts are projected to be less than 4.2 mt for all depth restriction alternatives and are projected to increase as depth restrictions become shallower (Table A-35).

Table A-34. Projected black rockfish harvests impacts (mt) by month and by depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	4.67	6.04	8.74	22.02	36.96	66.53	59.02	62.42	28.05	9.00	1.26	2.26	306.97
<25 fm	4.61	5.98	8.64	21.72	36.47	65.65	58.24	61.59	27.67	8.71	1.22	2.19	302.70
<30 fm	4.61	5.98	8.64	21.56	36.19	65.16	57.80	61.13	27.47	8.56	1.20	2.15	300.46
<40 fm	4.51	5.85	8.45	21.38	35.89	64.61	57.32	60.62	27.24	8.12	1.14	2.04	297.19
40+ fm	4.08	5.29	7.65	n/a	n/a	n/a	n/a	n/a	n/a	7.01	0.98	1.76	n/a

Table A-35. Projected black rockfish discard mortality (mt) by month and by depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.05	0.07	0.10	0.30	0.50	0.90	0.80	0.84	0.38	0.13	0.02	0.03	4.11
<25 fm	0.05	0.07	0.10	0.29	0.48	0.87	0.77	0.82	0.37	0.12	0.02	0.03	3.98
<30 fm	0.05	0.07	0.10	0.28	0.48	0.86	0.76	0.81	0.36	0.12	0.02	0.03	3.93
<40 fm	0.05	0.07	0.10	0.28	0.47	0.85	0.76	0.80	0.36	0.11	0.02	0.03	3.89
>40 fm	0.05	0.06	0.09	n/a	n/a	n/a	n/a	n/a	n/a	0.09	0.01	0.02	n/a

Blue rockfish

Blue rockfish harvests are projected to be less than 40.0 mt for all depth restriction alternatives (Table A-36). Greater harvests are expected with intermediate depth restrictions (25-30 fm) because effort in deep bins, with lesser catch rates, would be shifted to intermediate depth bins, with greatest catch rates.

Table A-36. Projected blue rockfish harvest impacts (mt) by month and by depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.63	0.82	1.19	0.84	1.41	2.53	2.25	2.37	1.07	1.06	0.15	0.27	14.59
<25 fm	0.66	0.85	1.23	0.89	1.49	2.68	2.38	2.52	1.13	1.15	0.16	0.29	15.43
<30 fm	0.66	0.85	1.23	0.89	1.50	2.70	2.39	2.53	1.14	1.17	0.16	0.29	15.51
<40 fm	0.65	0.84	1.22	0.89	1.49	2.68	2.38	2.52	1.13	1.11	0.16	0.28	15.33
>40 fm	0.59	0.76	1.10	n/a	n/a	n/a	n/a	n/a	n/a	0.97	0.14	0.24	n/a

Other nearshore rockfish species complex (brown, quillback, China, grass, and copper RF)

Other nearshore rockfish harvest impacts are analyzed by individual species, but are summed in this report because of the aggregate state landing cap for these species. Harvest estimates are projected to be less than 12.0 mt for all depth restriction alternatives (Table A-37). Unlike for black rockfish and blue rockfish, lesser harvest impacts are expected with shallower depth restrictions because effort in deep bins, with greatest catch rates, would be shifted to shallower bins, with lesser catch rates.

Table A-37. Projected other nearshore rockfish harvest impacts (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.14	0.18	0.26	0.63	1.07	1.92	1.70	1.80	0.81	0.36	0.05	0.09	9.00
<25 fm	0.15	0.20	0.28	0.82	1.37	2.47	2.19	2.32	1.04	0.40	0.06	0.10	11.40
<30 fm	0.15	0.20	0.28	0.86	1.44	2.59	2.30	2.43	1.09	0.41	0.06	0.10	11.92
<40 fm	0.15	0.19	0.28	0.86	1.45	2.61	2.31	2.45	1.10	0.39	0.06	0.10	11.94
>40 fm	0.14	0.18	0.26	n/a	n/a	n/a	n/a	n/a	n/a	0.34	0.05	0.08	n/a

Greenling species complex (rock greenling and kelp greenling)

Greenlings harvests are analyzed by individual species, but are summed in this report because of the aggregate landing cap for these species. Harvest estimates are projected to be less than 6.5 mt for all depth restriction alternatives (Table A-38). Greater harvest impacts are expected with shallower depth restrictions because effort in deep bins, with lesser catch rates, would be shifted to shallower bins, with greater catch rates.

Table A-38. Projected greenlings harvest impacts (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.11	0.14	0.21	0.45	0.76	1.37	1.21	1.28	0.58	0.17	0.02	0.04	6.34
<25 fm	0.11	0.14	0.21	0.45	0.76	1.37	1.21	1.28	0.58	0.16	0.02	0.04	6.33
<30 fm	0.11	0.14	0.21	0.45	0.75	1.36	1.20	1.27	0.57	0.16	0.02	0.04	6.29
<40 fm	0.11	0.14	0.20	0.45	0.75	1.35	1.19	1.26	0.57	0.15	0.02	0.04	6.22
>40 fm	0.10	0.13	0.19	n/a	n/a	n/a	n/a	n/a	n/a	0.13	0.02	0.03	n/a

Cabezon

Cabezon impacts are only projected through August because harvest rate is not available in latter months due to early attainment of the cabezon quota in years since depth data become available (2009). Impacts for all depth restrictions are projected to be less than 24.0 mt harvested and 1.2 mt released (Table A-39 and Table A-40). Cabezon catch rates are greater in shallow depth bins; therefore, cabezon impacts are expected to be greater for shallow depth bins.

Table A-39. Projected cabezon harvest impacts (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.38	0.49	0.71	1.97	3.31	5.96	5.28	5.59	na	na	na	na	23.68
<25 fm	0.41	0.52	0.76	1.92	3.22	5.80	5.15	5.44	na	na	na	na	23.23
<30 fm	0.41	0.52	0.76	1.90	3.19	5.75	5.10	5.39	na	na	na	na	23.02
<40 fm	0.40	0.52	0.75	1.89	3.17	5.71	5.06	5.36	na	na	na	na	22.86
>40 fm	0.39	0.51	0.73	n/a	n/a	n/a	n/a	n/a	n/a	na	na	na	n/a

Table A-40. Projected cabezon discard mortality (mt) by month and depth restriction.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.06	0.08	0.11	0.08	0.13	0.24	0.21	0.22	n/a	n/a	n/a	n/a	1.12
<25 fm	0.06	0.07	0.11	0.08	0.13	0.23	0.21	0.22	n/a	n/a	n/a	n/a	1.11
<30 fm	0.06	0.07	0.11	0.08	0.13	0.23	0.20	0.22	n/a	n/a	n/a	n/a	1.10
<40 fm	0.06	0.07	0.11	0.08	0.13	0.23	0.20	0.22	n/a	n/a	n/a	n/a	1.09
>40 fm	0.05	0.07	0.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Yelloweye rockfish

Yelloweye rockfish harvest has been prohibited since 2004; therefore, the majority of impacts are now due to discard mortality. Yelloweye rockfish impacts are projected to be less than 1.8 mt for all depth restriction scenarios (Table A-41). Shallower depth restrictions are expected to reduce yelloweye rockfish impacts due to lesser catch rates and discard mortality rates in shallow water depth bins.

Table A-41. Expected yelloweye rockfish discard mortality by month and depth restriction in the bottomfish fishery.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.015	0.019	0.027	0.077	0.130	0.233	0.207	0.219	0.098	0.016	0.002	0.004	1.046
<25 fm	0.016	0.020	0.029	0.113	0.189	0.340	0.302	0.319	0.144	0.025	0.003	0.006	1.507
<30 fm	0.016	0.020	0.029	0.123	0.206	0.372	0.330	0.349	0.157	0.030	0.004	0.008	1.643
<40 fm	0.021	0.028	0.040	0.126	0.212	0.382	0.339	0.358	0.161	0.068	0.010	0.017	1.762
>40 fm	0.051	0.066	0.095	n/a	n/a	n/a	n/a	n/a	n/a	0.140	0.020	0.035	n/a

Canary rockfish

Canary rockfish release impacts are projected to be less than 3.7 mt for all depth restriction alternatives (Table A-42). Shallower depth restrictions are expected to reduce catch rockfish release impacts due to lesser catch rates and mortality rates in shallow water depth bins.

Table A-42. Expected canary rockfish discard mortality (mt) by month and depth restriction in the bottomfish fishery.

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<20 fm	0.040	0.052	0.075	0.200	0.336	0.605	0.537	0.568	0.255	0.082	0.012	0.021	2.782
<25 fm	0.045	0.059	0.085	0.239	0.401	0.722	0.640	0.677	0.304	0.090	0.013	0.023	3.297
<30 fm	0.045	0.059	0.085	0.253	0.425	0.765	0.679	0.718	0.322	0.099	0.014	0.025	3.488
<40 fm	0.046	0.059	0.085	0.259	0.434	0.782	0.693	0.733	0.329	0.166	0.023	0.042	3.652
>40 fm	0.091	0.118	0.171	n/a	n/a	n/a	n/a	n/a	n/a	0.273	0.038	0.069	n/a

A.8.4 Pacific halibut fishery projection model

Yelloweye rockfish and canary rockfish are typically the only groundfish species with impact limits caught in the Pacific halibut fishery; therefore, Pacific halibut fishery projection models exist only for these species.

Old and new projection models

The old model was ratio based and projected 0.00557 mt of yelloweye rockfish and 0.003065 mt of canary rockfish per 1,000 lbs of Oregon Pacific halibut quota. However, a ratio based projection method appears inappropriate because there does not appear to be a relationships between Oregon Pacific halibut quota and yelloweye rockfish catches (Figure A-15; $R^2 < 0.01$) nor canary rockfish catches (Figure A-16; $R^2 < 0.01$) (given in fish due to change in discard mortality calculations). Yelloweye rockfish and canary rockfish may be unrelated to Pacific halibut quota because of different habitat preferences of the fish (i.e., rocky reefs for rockfish and gravel/sand for Pacific halibut).

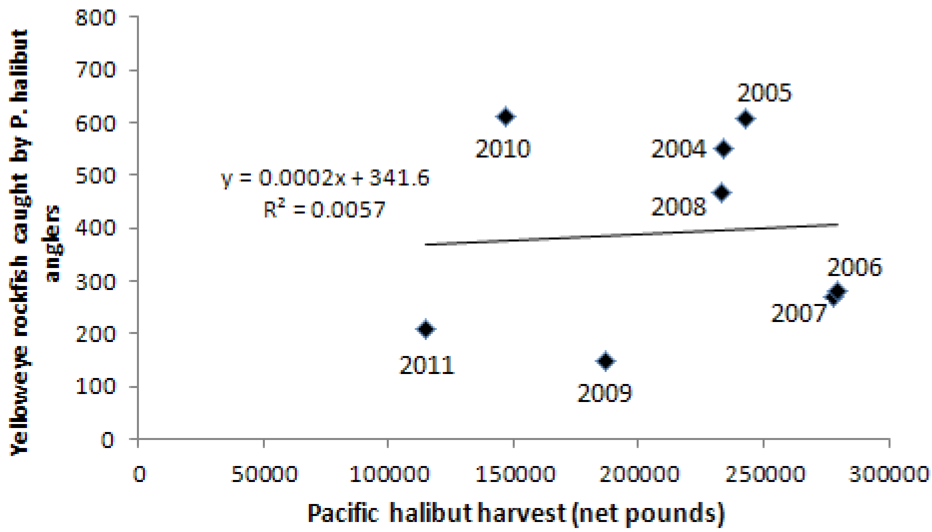


Figure A-15. Relationship between yelloweye rockfish catches (discards) and Oregon Pacific halibut quota.

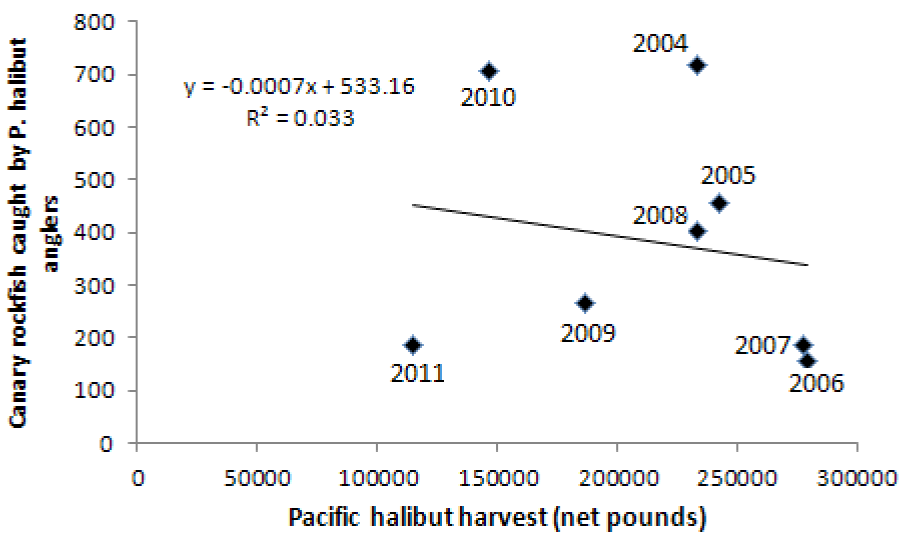


Figure A-16. Relationship between canary rockfish catches (discards) and Oregon Pacific halibut quota.

Instead of using a ratio based approach, the new Pacific halibut model simply uses mean impacts, regardless of quota (0.49 mt for yelloweye rockfish and 0.69 mt for canary rockfish).

Incorporation of variance into the Pacific halibut projection model

Prediction intervals (not confidence intervals) for a one year prediction of canary rockfish and yelloweye rockfish were made for α=0.1 and 0.2 values using the following formula.

$$\overline{X} \pm K \cdot s \qquad K = t_{1-\alpha/k,n-1}\sqrt{\frac{1}{n}+\frac{1}{m}}$$

k = number of sampling periods interested in
m = number of samples per sampling period
n = number of background samples
1-α/2k = level of confidence

The yelloweye rockfish prediction intervals were 0.49 ± 0.68 (α=0.1) and ± 0.405 (α=0.2). The canary rockfish prediction intervals were 0.69 ± 0.44 (α=0.1) and ± 0.26 (α=0.2). These wide ranges make it difficult to project future impacts of these species from the Pacific halibut fishery.

A.8.5 Bag limit models

Bag limits have been used by ODFW to manage the recreational groundfish fishery since 1976. The rockfish, greenling, and cabezon (RGC) aggregate bag limit encompasses the most commonly harvested groundfish species. The RGC bag limit since 2004 has ranged from five to ten fish. This variation was used to determine if RGC bag limits can be used to alter angler catch rates and impacts of RGC target species or incidentally caught overfished species. Only black rockfish and blue rockfish catch rates appear to be affected by differences in RGC bag limits; therefore, RGC bag limits only appear to be effective at manipulating impacts (mt landed) of those species. Catch rates of other species included in the RGC bag limit, including overfished species, are not expected to be affected by RGC bag limit adjustments (catch rates unrelated to RGC bag limits). Of RGC species, cabezon are least affected by bag limits. Even year-round one cabezon sub-bag limits are not expected to result in significant cabezon harvest reductions.

Introduction:
Bag limits are a commonly used fisheries management method for controlling harvests. Only anglers with catches within the scope of bag limit changes are affected. For example, a bag limit reduction from six fish to four fish will not affect the catches of those anglers that caught zero to four fish. Bag limits reductions would be expected to reduce releases of overfished species (harvest prohibited) because anglers may catch bag limits in less time, resulting in decreased fishing effort. However, bag limit reductions may not reduce prohibited species impacts if releases of these species are more dependent on where anglers fish than how long they fish.

Analysis of adjustments to the rockfish, greenling, and cabezon (RGC) aggregate bag limit:
Analysis of bag limit adjustments used data from angler interviews from the Oregon Recreational Boat Survey (ORBS) since 2004 (first year yelloweye rockfish and canary rockfish harvest was prohibited). The RGC bag limit has been five through eight and ten (Table A-43). RGC bag limit analysis was performed for black rockfish (RF), blue RF, greenlings (rock greenling and kelp greenling combined), cabezon, other nearshore RF (brown RF, grass RF, China RF, quillback RF, and copper RF combined), yelloweye RF, and canary RF.

Table A-43. RGC bag limits by month and by year, 2004-2011.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	10	10	10	10	10	10	10	10	10	10	10	10
2005	8	8	8	8	8	8	8,5	5	5	5	5	5
2006	6	6	6	6	6	6	6	6	6	6	6	6
2007	6	6	6	6	6	6	6	6	6	6	6	6
2008	6	6	6	6	6	6	6,5	5	5	5	5	5
2009	6	6	6	6	7	7	7	7	7	7	7	7
2010	7	7	7	7	7	7	7	7	7	7	7	7
2011	7	7	7	7	7	7	7	7	7	7	7	7

Black RF

A percentage of anglers caught RGC bag limits that were comprised only of black RF for all RGC bag limits (5, 6, 7, 8, 10; Table 5-2); therefore, adjustments to RGC bag limits can be used to alter black RF harvests. Differences between black RF harvests under different RGC bag limits were made by (a) multiplying the percent of anglers that caught zero fish by zero, the percent that caught one by one, the percent that caught two by two, and so on until 10 for each RGC bag limit, (b) summing those products for each RGC bag limit, and (c) comparing the total values for each RGC bag limit. Angler catch rates that exceed bag limits were removed due to probable data errors (e.g., 57 black RF per angler under a five RGC limit). Projections of black RF catches under two, three, four and nine RGC bag limits were also made by shifting the percentage of anglers that caught the bag limit under a greater RGC bag limit to the bag limit of a lower RGC bag limit. For example, a projection of a nine RGC bag limit was made from the 10 RGC bag limit by deleting the 7.5 percent of angers that caught 10 fish and by adding that 7.5 percent to the percentage that caught nine fish. Projections of two, three, and four RGC bag limits were made from when the RGC bag limit was six rather than five due to much greater sample size (78,729 anglers vs. 10,343 anglers). A multiplier table was then created to compare black RF harvests under different RGC bag limits (Table A-44). To determine differences between harvests for a given month under different RGC bag limits, multiply the harvest impact estimate by the multiplier.

Table A-44. Percent of bottomfish anglers that caught 0-10 black RF (fish/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 black RF under 2, 3, 4, and 9 RGC bag limits. Projected angler percentages of 2-4 bag limits were based off data from when the bag limit was 6 instead of 4 due to a greater sampler size.

	Bag limit								
fish/ang	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	11.7	11.7	11.7	12.8	11.7	12.0	10.8	13.1	13.1
1	12.7	12.7	12.7	17.9	12.7	15.0	11.5	9.2	9.2
2	75.6	11.2	11.2	15.5	11.2	14.5	9.9	7.9	7.9
3	0.0	64.4	12.3	15.8	12.3	12.8	9.9	7.5	7.5
4	0.0	0.0	52.1	21.4	14.6	11.0	11.2	8.7	8.7
5	0.0	0.0	0.0	16.7	21.1	12.6	12.3	7.2	7.2
6	0.0	0.0	0.0	0.0	16.4	12.8	12.3	7.7	7.7
7	0.0	0.0	0.0	0.0	0.0	9.3	13.8	9.1	9.1
8	0.0	0.0	0.0	0.0	0.0	0.0	8.2	10.6	10.6
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	11.5

10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5
total	100	100	100	100	100	100	100	100	100

Table A-45 calculation of a bag limit of 4 (based off 6) example: The percentage of anglers that would have caught 1-3 fish is the same for bag limits of 4 and 6 (would not have been affected by a bag limit of 4). Those that caught 5 or 6 fish (with a bag of 6) would have had their catches reduced to 4 fish with a bag limit of 4, so the expected percentage of anglers catching the limit with a 4 fish bag limit is the sum of the anglers that caught 4-6 fish with a bag limit of 6 (14.6 + 21.1 + 14.6 = 52.1).

Table A-45. Multiplier table to compare differences in black RF harvests (mt) under different RGC bag limits.

	Bag from:								
Bag to:	2	3	4	5	6	7	8	9	10
2	1.000	0.718	0.585	0.618	0.490	0.495	0.406	0.339	0.333
3	1.393	1.000	0.814	0.860	0.683	0.690	0.566	0.472	0.464
4	1.711	1.228	1.000	1.057	0.839	0.847	0.695	0.579	0.570
5	1.619	1.163	0.946	1.000	0.794	0.802	0.658	0.548	0.540
6	2.040	1.465	1.192	1.260	1.000	1.010	0.829	0.691	0.680
7	2.019	1.450	1.180	1.247	0.990	1.000	0.820	0.684	0.673
8	2.462	1.768	1.439	1.520	1.207	1.219	1.000	0.834	0.821
9	2.953	2.120	1.726	1.824	1.448	1.463	1.200	1.000	0.985
10	2.999	2.153	1.753	1.852	1.470	1.486	1.218	1.016	1.000

Blue RF

The same bag limit analysis was used for blue RF and black RF. As for black RF, RGC bag limits can be used to adjust blue rockfish impacts, although to a much lesser degree because a lesser percentage of anglers are catching RGC bag limits that consist only of blue RF (<1%;Table A-46) than black RF (7.5 percent-16.7 percent). Accordingly, the blue RF multiplier table shows lesser impacts due to RGC bag limit changes than for black RF (Table A-47).

Table A-46. Percent of anglers that caught 0-10 blue RF (BRF/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 blue RF under 2, 3, 4, and 9 RGC bag limits.

	Bag limit								
Fish/ang.	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	96.37	96.37	96.37	95.00	96.34	90.92	95.36	93.24	93.24
1	3.12	3.12	3.12	4.24	3.12	7.63	4.05	5.82	5.82
2	0.35	0.35	0.35	0.40	0.35	0.94	0.39	0.60	0.60
3	0.16	0.09	0.09	0.17	0.09	0.25	0.06	0.22	0.22
4	0.00	0.08	0.05	0.16	0.05	0.12	0.10	0.05	0.05
5	0.00	0.00	0.02	0.02	0.03	0.04	0.01	0.01	0.01
6	0.00	0.00	0.00	0.00	0.02	0.07	0.01	0.04	0.04
7	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.03	0.03
8	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01

9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
total	100	100	100	100	100	100	100	100	100

Table A-47. Multiplier table to compare differences in blue RF harvests (mt) under different RGC bag limits.

	Bag from:								
Bag to:	2	3	4	5	6	7	8	9	10
2	1.00	0.92	0.89	0.65	0.88	0.56	0.25	0.50	0.50
3	1.08	1.00	0.97	0.71	0.96	0.61	0.27	0.55	0.55
4	1.12	1.03	1.00	0.73	0.98	0.63	0.28	0.56	0.56
5	1.53	1.41	1.37	1.00	1.35	0.86	0.39	0.77	0.77
6	1.13	1.05	1.02	0.74	1.00	0.64	0.29	0.57	0.57
7	1.78	1.64	1.59	1.16	1.57	1.00	0.45	0.90	0.89
8	3.94	3.64	3.53	2.57	3.48	2.22	1.00	1.99	1.98
9	1.99	1.83	1.78	1.30	1.75	1.12	0.50	1.00	1.00
10	1.99	1.83	1.78	1.30	1.75	1.12	0.50	1.00	1.00

Other nearshore RF (China, quillback, copper, brown, and grass RF combined)

Other nearshore RF bag limit analysis was the same as used for black RF. Unlike for black RF and blue RF, RGC bag limits do not appear to affect other nearshore RF catch rates since (a) 0 percent of anglers caught RGC bag limits that comprised only of other nearshore RF, (b) the percentage of anglers that caught 0, 1, 2, and 3 other nearshore RF were similar for all RGC bag limits, and (c) greater than 99 percent of anglers caught fewer than 2 other nearshore RF for all RGC bag limits (Table A-48).

Table A-48. Percent of anglers that caught 0-10 other nearshore RF (fish/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 other nearshore RF under 2, 3, 4, and 9 RGC bag limits.

	Bag limit								
Fish/ang.	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	92.75	92.75	92.75	95.63	92.75	92.79	95.82	95.01	95.01
1	6.45	6.45	6.45	4.02	6.45	6.61	3.97	4.82	4.82
2	0.80	0.61	0.61	0.28	0.61	0.41	0.18	0.09	0.09
3	0.00	0.18	0.12	0.07	0.12	0.13	0.03	0.07	0.07
4	0.00	0.00	0.06	0.00	0.05	0.04	0.00	0.01	0.01
5	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
total	100	100	100	100	100	100	100	100	100

Greenlings (kelp greenling and rock greenling)

RGC bag limits would be expected to have little to no impact on greenlings catch rates since (a) fewer than 0.01 percent of anglers harvested RGC bag limits that were comprised only of greenlings, (b) the percentage of anglers that caught 0, 1, 2, and 3 greenlings were similar for all RGC bag limits, and (c) greater than 99 percent of anglers caught fewer than 2 greenlings for all RGC bag limits (Table A-49).

Table A-49. Percent of anglers that caught 0-10 greenlings (fish/ang) under 5, 6, 7, 8, and 10 RGC bag limits (bold values) and projected percent of anglers that would have caught 0-10 greenlings under 2, 3, 4, and 9 RGC bag limits.

	Bag limit								
Fish/ang.	2	3	4	**5**	**6**	**7**	**8**	9	**10**
0	96.4	96.4	96.4	95.0	96.3	90.9	95.4	93.2	93.2
1	3.1	3.1	3.1	4.2	3.1	7.6	4.0	5.8	5.8
2	0.4	0.4	0.4	0.4	0.4	0.9	0.4	0.6	0.6
3	0.2	0.1	0.1	0.2	0.1	0.3	0.1	0.2	0.2
4	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total	100	100	100	100	100	100	100	100	100

Overfished rockfish: Yelloweye RF and canary RF

Since harvest of yelloweye and canary RF is prohibited, anglers can continue to catch and release these species until they stop fishing (due to RGC attainment or other). Lesser overfished species releases would be expected with reduced RGC bag limits because of reduced fishing effort per angler (less time to catch limit). However, there is a curvilinear relationship between RGC bag limit and percentages of anglers releasing 1-4 yelloweye or canary RF (peaks at RGC bag limit of 7; Figure A-17 and Figure A-18). The curvilinear relationship may be due to the rebuilding of the stocks; greater catches have occurred in recent years (7 and 6 RGC bag limits) than earlier years (8 and 10 RGC bag limits). It is also possible that encounters of overfished stocks may be more related to where an angler fishes than how long they fish.

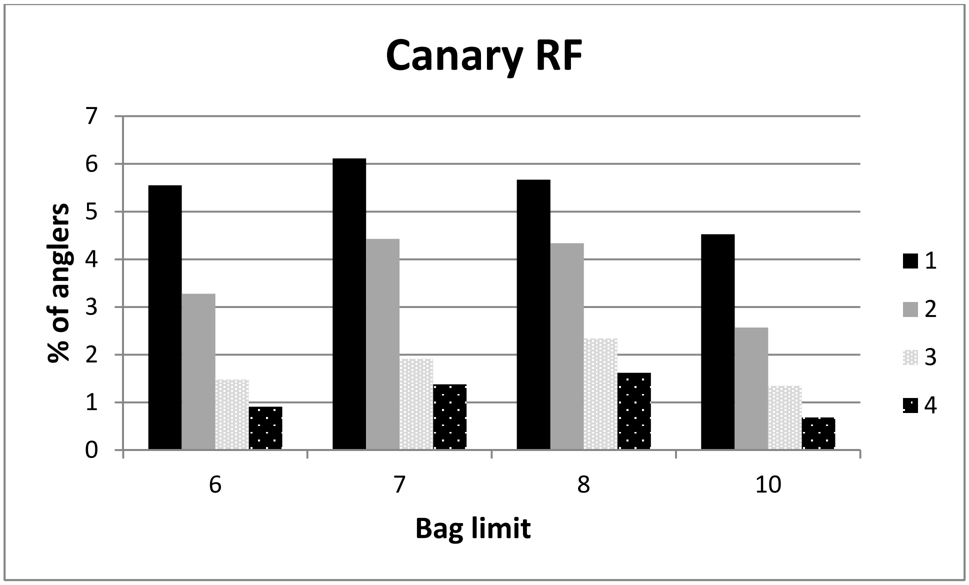


Figure A-17. Percentage of anglers that caught 1-4 canary rockfish under 6-10 RGC bag limits.

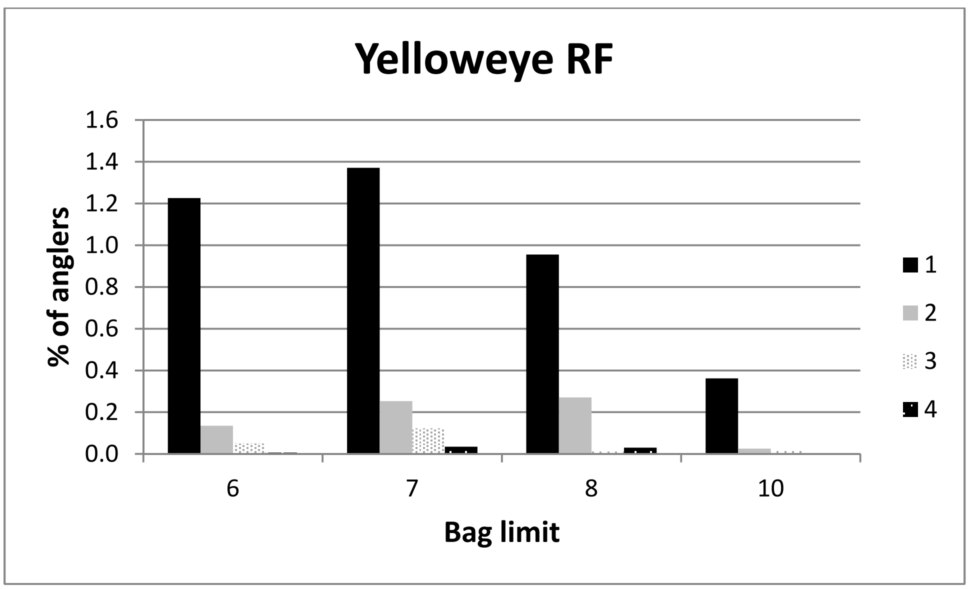


Figure A-18. Percentage of anglers that caught 1-4 yelloweye rockfish under 6-10 RGC bag limits.

Cabezon:

Inseason closure of cabezon retention has occurred before October in all years since 2004 (due to attainment of quota), and closures have occurred during July in 2010 and 2011.

Only 3.3 percent of anglers that kept cabezon kept more than one when permitted (cabezon harvest could equal RGC bag); therefore, cabezon catch rates or harvest impacts would not be expected to be significantly altered by reductions in the RGC bag limit or even one cabezon sub-bag limits (only one can be cabezon)(Table A-50). As evidence, the earliest inseason closure of cabezon occurred in the only year (2011) with a one cabezon sub-bag limit. Accordingly, year-round retention of cabezon may not be able to occur with per angler bag or sub-bag limits. A one cabezon per boat bag limit could result in year-round harvest opportunities, but would disproportionally impact vessels with multiple anglers (e.g., charters).

Table A-50. Expected cabezon harvests (mt) with a one cabezon per boat limit, one cabezon per angler limit, and a seven cabezon per angler limit.

	Bag limit		
Month	1 / boat	1 / angler	7 (RGC)
Jan	0.24	0.41	0.43
Feb	0.31	0.52	0.54
Mar	0.43	0.73	0.77
Apr	1.01	1.53	1.63
May	1.76	2.66	2.84
Jun	2.31	3.49	3.73
Jul	2.97	4.50	4.81
Aug	2.23	3.38	3.61
Sep	1.23	1.87	2.00
Oct	n/a	n/a	n/a
Nov	n/a	n/a	n/a
Dec	n/a	n/a	n/a
Total	12.49	19.09	20.37

Notes: Used 2008-2011 data. Impacts for a seven cabezon bag limit were calculated for each month by multiplying average catch rate by average cabezon weight (kg) by average angler trips by .001 (kg to mt conversion). One cabezon per angler impacts were calculated with the same formula, but reducing all catch rates greater than one to one. Impacts for a one cabezon per boat limit were calculated with the same formula, but reducing catch rates greater than one per boat to one. Estimates were not made for Oct-Dec because cabezon retention was prohibited for those months in all years (cabezon releases averaged less than 0.2 mt for October and less than 0.1 mt for Nov and Dec).

A.8.6 Multivariate forecasting: yelloweye rockfish (excluding management regulations)

Yelloweye rockfish have been the most constraining groundfish species because annual catch limits of this species have generally been obtained before catch limits of other non-overfished groundfish species or species complexes. Therefore, the objective of most management measures is to reduce yelloweye rockfish impacts, to allow greater utilization of other groundfish stocks. The ability to accurately predict yelloweye catches could increase the effectiveness of management measures. Unfortunately, yelloweye rockfish catches are rare (Figure A-19), highly variable (Figure A-20), and do not appear to be strongly related to economic indicators (e.g., gas prices, stock market, unemployment), weather (e.g., wind, waves, or ocean condition (wind and waves interaction together), or strength of other fisheries (e.g., tuna, halibut, and salmon harvests) (Figure A-21). Weak relationships between the mentioned indicators and yelloweye impacts would lead to poor goodness of fit with multivariate analysis (e.g., regression), and would lead to wide prediction intervals with little value for management purposes. Until more accurate predictions of yelloweye rockfish impacts can be made, inseason management of groundfish fisheries will have to remain reactionary.

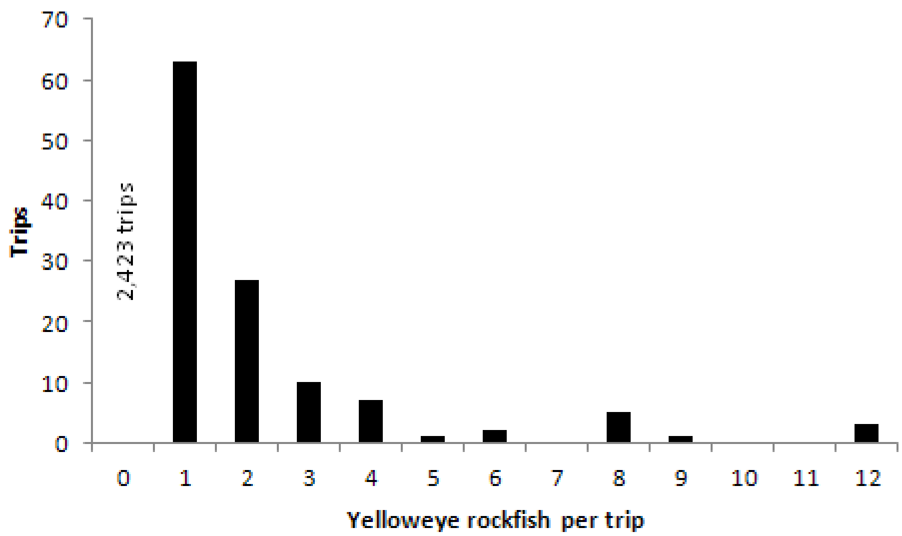


Figure A-19. Yelloweye rockfish per angler trip for June 2011.

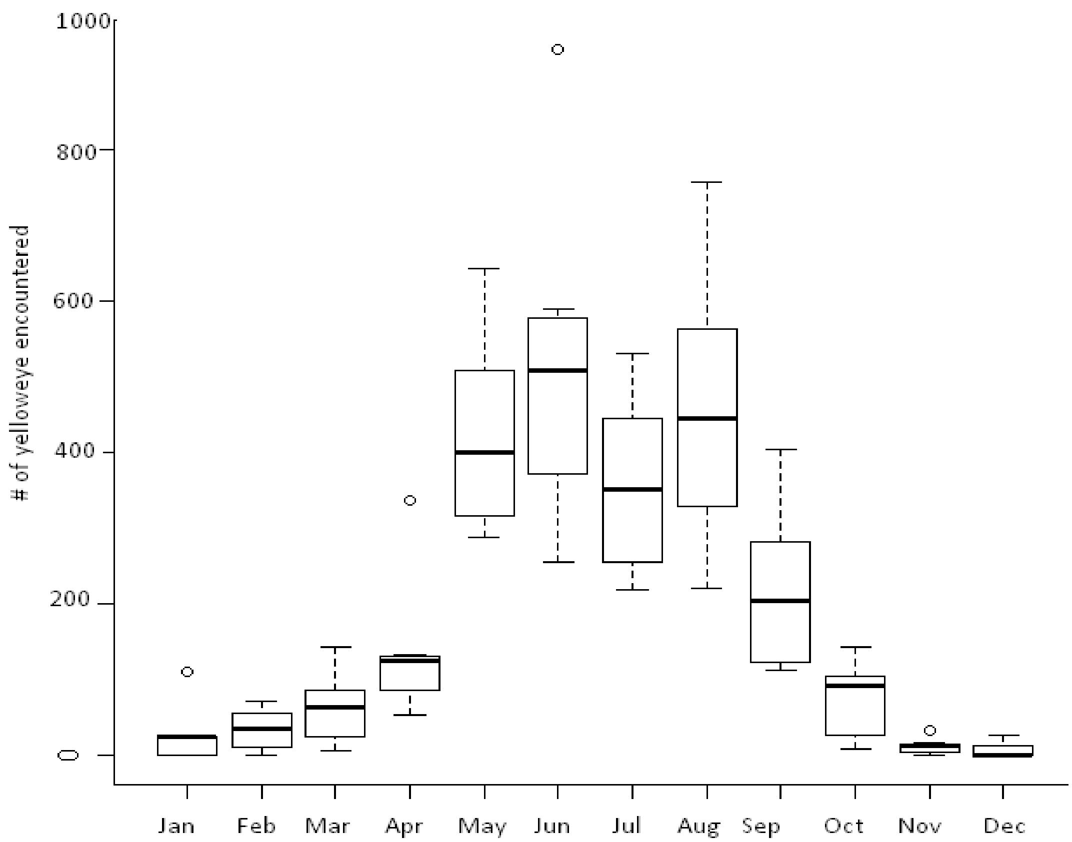


Figure A-20. Yelloweye rockfish encounters (landed + released) by month for the bottomfish fishery, 2004-2011.

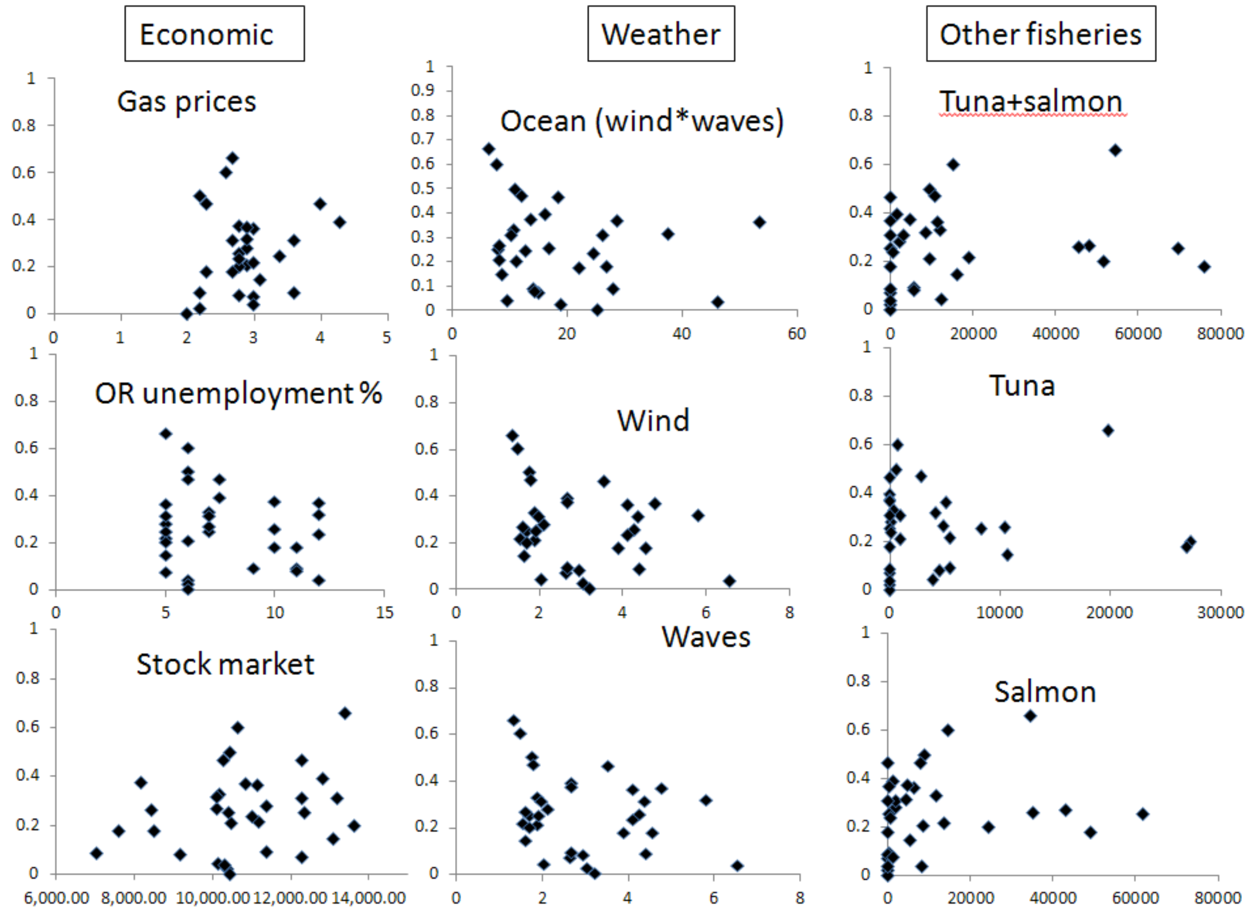


Figure A-21. Relationship between yelloweye impacts and economic indicators, weather, and strength of other fisheries for months with < 40 fm depth restrictions (months with majority of impacts), 2004-2010. y axis = mt of yelloweye rockfish; x axis units: gas = $, unemployment = %; stock market = DOW points; ocean = kts X swell feet; wind = kts; waves = swell feet; other fisheries = fish landed).

A.8.7 Model performance

The ability to accurately predict groundfish species impacts (harvests and discards) under different management restrictions is essential to reduce the possibility of inseason closures of fisheries. In Oregon, the ability to predict groundfish species impacts given different depth restrictions in the groundfish fishery is of greatest importance because other management restrictions do not appear capable of significantly manipulating impacts (e.g., bag limits unless set unrealistically low) or have not been examined (e.g., additional area closures). Of particular concern is the ability to accurately predict yelloweye rockfish impacts since they are the most limiting species to groundfish management in Oregon (only species in which quotas are typically obtained and because impacts cannot be reduced by prohibiting harvest because retention is always prohibited). Although the same models are used to predict impacts of all groundfish species with impact caps, only the ability of models to predict yelloweye rockfish impacts is examined, due to their relative importance, by comparing actual versus expected impacts.

Effects of new data source for determining discard mortality rates

Acquiring data of anger catches and efforts by depth has given ODFW a much greater understanding of where anglers fish, how angler behavior may be affected by depth restrictions, and what actual discard mortalities are than when only observed charter data on fish releases was available (see section 1). This newly acquired information shows that discard mortalities rates fluctuate and that the assumption of fixed discard mortalities used in previous calculations of discard mortalities was consequently inaccurate. Since the same fixed discard mortalities were used in both the old projection model and old discard mortality rate calculations, this created a greater chance of more aligned estimates and projections (although more inaccurate) than with the new projection model, which has to account for the variable discard mortality rates of the new calculation method.

Old model performance 2007-2009: actual versus expected impacts for discard mortality from groundfish fishery

Prior to 2010, the new and old projection models cannot be compared because data necessary for the new model (catch rate and effort by depth) did not exist (first obtained in 2009 but need a full year of data for the model). Therefore, it was only possible to compare actual versus expected values for the old model. Only three years were compared (2007-2009) because this model is no longer used and because three years of comparisons were sufficient enough to prove that the old model had poor predictive abilities.

The close to expected year end totals for yelloweye rockfish discard mortalities from the groundfish fishery for 2009 (-11.7 percent error) and 2008 (-6.1 percent error) are misleading because substantial monthly positive and negative errors cancelled each other out (typically > ± 20 percent; Table A-51). The -38.6 percent error in 2007 is more representative of the true predictive ability of the old model.

The old model was also fairly poor at predicting total discard mortality from the Pacific halibut fishery and harvest from all fisheries (Table A-51). The old model appeared to be fairly accurate at predicting total impacts (discard mortality plus harvest) in 2007 (3.4 percent error) and 2008 (2.0 percent error), but this was misleading because substantial errors of the different fisheries canceled each other out.

Table A-51. Comparison of actual versus expected yelloweye rockfish discard mortalities from the groundfish fishery by month and year for the old model (2007-2009). Actual and expected values are in metric tons; depth = depth restriction; negative error = projection < actual.

	2009					2008					2007				
Month	Depth	Expected	Actual	Actual-Expected	% error	Depth	Expected	Actual	Actual-Expected	% error	Depth	Expected	Actual	Actual-Expected	% error
Jan	All	0.010	0.119	0.109	-91.6	All	0.046	0.045	-0.001	2.0	All	0.041	0.0469	0.006	-12.6
Feb	All	0.019	0.075	0.056	-75.1	All	0.077	0.076	-0.002	2.0	All	0.035	0.0523	0.017	-33.1
Mar	All	0.085	0.100	0.015	-15.3	All	0.162	0.159	-0.003	2.0	All	0.172	0.2562	0.084	-32.9
Apr	40	0.064	0.087	0.023	-26.1	40	0.360	0.312	-0.048	15.3	40	0.041	0.0696	0.029	-41.1
May	40	0.148	0.176	0.028	-16.1	40	0.537	0.466	-0.071	15.3	40	0.147	0.2496	0.103	-41.1
Jun	40	0.220	0.376	0.156	-41.4	40	0.454	0.393	-0.060	15.3	40	0.085	0.1438	0.059	-40.9
Jul	40	0.205	0.175	-0.030	17.0	20	0.107	0.159	0.051	-32.4	40	0.117	0.1986	0.082	-41.1
Aug	40	0.370	0.259	-0.111	42.7	20	0.121	0.179	0.058	-32.4	40	0.388	0.6598	0.272	-41.2
Sep	40	0.177	0.077	-0.100	129.9	40	0.047	0.090	0.043	-47.9	40	0.184	0.3127	0.129	-41.2
Oct	All	0.084	0.168	0.084	-50.2	40	0.095	0.211	0.116	-54.9	All	0.114	0.1696	0.056	-32.8
Nov	All	0.026	0.011	-0.015	139.4	40	0.028	0.061	0.034	-54.9	All	0.019	0.0289	0.010	-34.2
Dec	All	0.054	0.032	-0.022	68.8	40	0.012	0.027	0.015	-54.9	All	0.009	0.0126	0.004	-28.7
Total		1.461	1.655	0.194	-11.7		2.046	2.178	0.132	-6.1		1.352	2.201	0.849	-38.6

Table A-52. Comparison of actual versus expected yearly yelloweye rockfish discard mortalities, harvests, and total impacts (2007-2009). Negative error = projection < actual.

	Discard mort. GF fishery			Discard mort. P. halibut fishery			Harvest (all fisheries)			Total impacts (all)		
Year	expected	actual	% error	expected	actual	% error	expected	actual	% error	expected	actual	% error
2009	1.461	1.656	-11.8	0.974	0.312	212.2	0.055	0.075	-26.7	2.490	2.043	21.9
2008	2.046	2.178	-6.1	1.200	1.010	18.8	0.068	0.062	9.7	3.314	3.250	2.0
2007	1.352	2.201	-38.6	1.548	0.590	162.3	0.053	0.064	-17.2	2.953	2.855	3.4

New model performance 2010-2011: actual versus expected impacts for discard mortality from groundfish fishery

The old projection model became obsolete when it was discovered that assumption of fixed discard mortality rates was incorrect for the groundfish fishery; therefore, there is no need to compare the predictive ability of the old and new models for the discard mortality from the groundfish fishery.

Instead, projected discard mortality from the groundfish fishery is compared with two variations of the new model. The preseason version of the new model uses only data prior to the projection year and the inseason version uses monthly data from the projection year when it becomes available. The inseason version was expected to have better predictive abilities because it could incorporate trends from the projection year that would be expected to continue for the entire year (e.g., greater than expected catch rates from Jan-May would be expected to result in greater than expected catch rates for the rest of the year).

As expected, the inseason version was better at predicting total year discard mortality than the preseason version for 2010 (-12.6 percent and -21.4 percent error, respectively) and 2011 (-6.8 percent and -11.2 percent error, respectively) (Table A-53). Percent error for the inseason version was greatest during months with relatively low impacts (typically > 20 percent and often nearly 100 percent or greater; Jan-Mar and Sep-Dec). Discard mortality is very difficult to accurately project during these months because efforts are much less than during summer months (small sample size issue) and catch rates are highly variable. Of greater concern is the ability to accurately predict discard mortality during summer months (Jun-Aug) when the majority of impacts occur. Percent error with the inseason version was less than 20 percent for each of these months during 2010 and during July of 2011. The relatively large percent error during June 2011 (-63.3 percent) was due more than double record yelloweye rockfish discards (released fish) for the month (due to record catch rates and record effort). Inclusion of the record June 2011 catch rate data into model caused the inseason projections for July-Sept to increase, but actual catch rates returned to normal, resulting in projections greater than what actually occured for the period.

Table A-53. Actual versus expected yelloweye rockfish discard mortalities from the groundfish fishery for the preason (PRE; using data before projection year) and inseason (IN; using data for the projection year when available) versions of the new projection method. Negative error = projection < actual.

		2011								2010							
		Expected (mt)		Actual (mt)	Actual - expected		% error			Expected (mt)		Actual (mt)	Actual - expected		% error		
Month	Depth	PRE	IN		PRE	IN	PRE	IN	Depth	PRE	IN		PRE	IN	PRE	IN
Jan	All	0.027	0.027	0.023	-0.004	-0.004	19.1	19.1	All	0.022	0.022	0.012	-0.010	-0.010	76.3	76.3
Feb	All	0.047	0.047	0.029	-0.018	-0.018	64.2	64.2	All	0.026	0.026	0.035	0.009	0.009	-24.7	-24.7
Mar	All	0.071	0.071	0.026	-0.045	-0.045	174.1	174.1	All	0.056	0.056	0.063	0.007	0.007	-10.7	-10.7
Apr	40	0.104	0.102	0.052	-0.052	-0.050	99.4	95.6	40	0.082	0.086	0.033	-0.049	-0.053	151.8	164.1
May	40	0.177	0.174	0.165	-0.012	-0.009	7.2	5.4	40	0.148	0.155	0.313	0.165	0.158	-52.8	-50.5
Jun	40	0.205	0.201	0.547	0.342	0.346	-62.6	-63.3	40	0.172	0.180	0.181	0.009	0.001	-5.1	-0.6
Jul	20	0.172	0.236	0.210	0.038	-0.026	-18.1	12.4	40	0.280	0.224	0.241	-0.039	0.017	16.2	-7.0
Aug	20	0.147	0.203	0.151	0.004	-0.052	-2.9	34.1	20	0.099	0.157	0.132	0.033	-0.025	-24.9	19.1
Sep	20	0.072	0.099	0.055	-0.017	-0.044	29.9	78.7	20	0.044	0.069	0.062	0.018	-0.007	-28.9	11.5
Oct	All	0.061	0.048	0.136	0.075	0.088	-55.2	-64.7	20	0.021	0.023	0.004	-0.017	-0.019	420.8	470.4
Nov	All	0.014	0.012	0.001	-0.013	-0.011	834.8	701.3	20	0.006	0.006	0.000	-0.006	-0.006	no impacts	
Dec	All	0.01	0.008	NA	NA	NA	NA	NA	20	0.003	0.003	0.005	0.002	0.002	-39.1	-39.1
Total		1.097	1.220	1.396	0.299	0.176	-21.4	-12.6		0.959	1.007	1.080	0.121	0.073	-11.2	-6.8

Model comparison for predicting discard mortality in Pacific halibut fishery

Near 100 percent discard mortalities of yelloweye rockfish caught in the Pacific halibut fishery make it possible to compare the old and new models for projecting discard mortality in the fishery. Both methods are much simpler than the groundfish discard mortality models: the old method is ratio based and projects 0.00557 mt of yelloweye rockfish per 1,000 lbs of Pacific halibut quota for Oregon fisheries and the new method assumes 0.455 mt total, regardless of the Oregon quota (see section 4).

The new model resulted in a smaller mean percent error than the old model (-15 percent and 95 percent, respectively) and consequently appears to be the better projection model (Table A-54). Inconsistencies in percent errors with the old model means that a simple ratio approach would not fit the data well or have accurate predictive abilities.

Table A-54. Actual versus expected yelloweye rockfish discard mortality from the Pacific halibut fishery. Negative error = projection < actual.

		Expected		Actual - Expected		% error	
Year	Actual	New	Old	New	Old	New	Old
2011	0.531	0.466	1.044	0.065	-0.513	-12	97
2010	0.770	0.466	0.886	0.304	-0.116	-39	15
2009	0.312	0.466	1.036	-0.154	-0.724	49	232
2008	1.010	0.466	1.200	0.544	-0.190	-54	19
2007	0.590	0.466	1.264	0.124	-0.674	-21	114
				Mean error =		-15	95

A.8.8 Model output use in management

Model outputs are used to keep projected impacts within catch limits while minimizing potential reductions in angler trips. An example of a potential 3.5 mt canary rockfish harvest guideline (HG) is used to outline the steps in the process.

The first step in the process is to create regulatory and season framework options to keep projected impacts within catch limits. Model outputs of projected impacts from the Pacific halibut fishery and from the groundfish fishery, by depth restriction, are used to keep total projected impacts within 3.5 mt HG (Table A-55). Status quo regulations are projected to result in impacts (4.68 mt) greater than the HG (Option SQ; Table A-56). Projected impacts can be kept within the HG by either limiting the groundfish fishery to 20 fm for the entire year and keeping the Pacific halibut fishery open (3.47 mt; Option 1; Table A-56) or by limiting the groundfish fishery to 30 fm for the entire year and closing the Pacific halibut fishery (3.49 mt; Option 2; Table A-56).

Table A-55. Projected canary rockfish impacts (mt) by month and depth restriction from the groundfish fishery and from the Pacific halibut fishery.

Groundfish fishery projected impacts

Depth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<20 fm	0.040	0.052	0.075	0.200	0.336	0.605	0.537	0.568	0.255	0.082	0.012	0.021
<25 fm	0.045	0.059	0.085	0.239	0.401	0.722	0.640	0.677	0.304	0.090	0.013	0.023
<30 fm	0.045	0.059	0.085	0.253	0.425	0.765	0.679	0.718	0.322	0.099	0.014	0.025
<40 fm	0.046	0.059	0.085	0.259	0.434	0.782	0.693	0.733	0.329	0.166	0.023	0.042
>40 fm	0.091	0.118	0.171	n/a	n/a	n/a	n/a	n/a	n/a	0.273	0.038	0.069

(Pacific halibut projection = 0.690 mt)

Table A-56. Regulatory options of potential depth restrictions by month for the groundfish fishery and presence/absence (present unless specified) to keep projected impacts (mt) of canary rockfish (CAN) within a 3.5 mt HG.

Option	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	CAN
SQ	all-depth			40 fm						all-depth			4.68
1	20 fm												3.47
2	30 fm --No Pacific halibut												3.49

The next step is to determine which option results in the fewest potential decrease in angler trips. Potentially eliminated groundfish trips are calculated by multiplying the percent of sampled trips that occured seaward of a proposed depth restriction during months with status quo depth restrictions by expanded total trips for the month (the new angler effort by depth data is vital for this calculation). All Pacific halibut trips are deducted if this fishery is closed. These estimates are upper range projections because anglers would have had the option of fishing shallower permissible depths or could have fished for other species. If all displaced anglers would have found substitute fishing opportunities, then the lower range of the projected decrease in angler trips would be zero. Socioeconomic survey data on potential changes in angler behavior due to proposed restrictions would be beneficial for point estimate projections.

Option 1 would be preferred instead of Option 2 because of fewer potential reductions in angler trips (Table A-57). Potential decreases in angler trips with Option 1 are 8,493 (9 percent) and 26,567 (28.3 percent) for Option 2. This example only has two regulatory options to simply outline how calculations and decisions are made. Five to ten options are typically analyzed and are discussed with members of the public before a decision on regulations is made.

Table A-57. Comparison of potential decreases in angler trips by fishery and port for Options 1 and 2 of Table 7-2.

	Decline in trips with Option 1									Status quo trips					
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
Port	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	% decrease
Astoria	12	9	21	0	0	0	12	9	21	37	243	159	148	587	3.5
Garibaldi	1789	2525	4314	0	0	0	1789	2525	4314	3548	3812	574	2457	10392	41.5
Pacific City	5	24	29	0	0	0	5	24	29	337	2753	6	705	3801	0.8
Depoe Bay	970	129	1099	0	0	0	970	129	1099	9208	1713	1211	552	12684	8.7
Newport	546	135	680	0	0	0	546	135	680	10984	5089	1781	9505	27359	2.5
Florence	0	0	0	0	0	0	0	0	0	0	0	0	241	241	0.0
Winchester	5	7	13	0	0	0	5	7	13	5	31	0	265	302	4.2
Charleston	365	917	1282	0	0	0	365	917	1282	3221	5794	325	969	10309	12.4
Bandon	141	229	370	0	0	0	141	229	370	932	1094	79	423	2527	14.6
Port Orford	7	62	70	0	0	0	7	62	70	30	430	147	104	711	9.8
Gold Beach	145	190	335	0	0	0	145	190	335	731	2372	9	106	3218	10.4
Brookings	191	89	281	0	0	0	191	89	281	3146	15472	19	3127	21764	1.3
Total	4178	4315	8493	0	0	0	4178	4315	8493	32181	38804	4310	18602	93896	9.0

	Decline in trips with Option 2									Status quo trips					
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
Port	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	% decrease
Astoria	12	9	21	159	148	307	171	156	328	37	243	159	148	587	55.8
Garibaldi	407	1863	2269	574	2457	3031	981	4320	5300	3548	3812	574	2457	10392	51.0
Pacific City	0	0	0	6	705	711	6	705	711	337	2753	6	705	3801	18.7
Depoe Bay	279	49	329	1211	552	1763	1490	601	2091	9208	1713	1211	552	12684	16.5
Newport	380	97	477	1781	9505	11286	2161	9602	11763	10984	5089	1781	9505	27359	43.0
Florence	0	0	0	0	241	241	0	241	241	0	0	0	241	241	100.0
Winchester	5	7	13	0	265	265	5	273	278	5	31	0	265	302	92.2
Charleston	49	362	411	325	969	1294	374	1332	1705	3221	5794	325	969	10309	16.5
Bandon	0	7	7	79	423	502	79	430	509	932	1094	79	423	2527	20.1
Port Orford	0	0	0	147	104	251	147	104	251	30	430	147	104	711	35.3
Gold Beach	95	0	95	9	106	115	104	106	209	731	2372	9	106	3218	6.5
Brookings	15	19	34	19	3127	3146	34	3146	3180	3146	15472	19	3127	21764	14.6
Total	1242	2413	3655	4310	18602	22912	5552	21015	26567	32181	38804	4310	18602	93896	28.3

Potential decreases in angler trips (Table A-57) are used in conjunction with economic survey data to determine potential decreases in saltwater angler expenditures (i.e., gas, lodging, food, charter tickets, tackle, bait, licenses, etc.) by county in Oregon (Table A-58).

Option 1 is projected to reduce annual saltwater angler expenditures by $5.160 million, and more than half of this loss would be expected from Tillamook County (Table A-58). Option 2 is projected to reduce annual saltwater angler expenditures by $14.265 million (nearly three times that of Option 1).

Table A-58. Expected decreases in saltwater angler expenditures (all costs related to fishing trip) by county for Options 1 and 2 (Table 7-2).

	Status quo		Option 1		Option 2	
County	$ (millions)	Trips	Δ trips	Δ $	Δ trips	Δ $
Clatsop	5.766	5,545	-21	-0.022	-328	-0.341
Tillamook	21.235	24,026	-4,343	-3.838	-6,011	-5.313
Lincoln	21.466	51,353	-1,779	-0.744	-13,854	-5.791
Lane	2.628	814	0	0	-241	-0.778
Douglas	6.998	6,386	-13	-0.014	-278	-0.305
Coos	8.365	17,722	-1,652	-0.78	-2,215	-1.046
Curry	5.183	27,273	-685	-0.13	-3,640	-0.692
Total	71.641	133,119	-8,493	-5.528	-26,567	-14.265

Notes: $= angler expenditures (i.e., gas, lodging, tackle, etc.); trips = angler trips for all target species (e.g., tuna, salmon, bottomfish, halibut); Δ trips = projected decline in angler trips for Options 1 and 2; Δ $ = projected decrease in angler expenditures from Options 1 and 2 . Clatsop= Astoria; Tillamook= Garibaldi and Pacific City; Lincoln= Depoe Bay and Newport; Lane= Florence; Douglas= Winchester Bay; Coos= Charleston and Bandon; Curry= Port Orford, Gold Beach, and Brookings.

A.9 California Recreational Catch and Effort Model

Recreational fisheries management for multi-species assemblages in California presents many challenges. In recent years, declining stocks of several rockfish species have dictated recreational groundfish management seasons and depths in California. Increasingly complex restrictions have been necessary to keep total catch of depleted species within the reduced limits that are necessary to rebuild the stocks while providing fishing opportunity.

Prior to 2000, the recreational daily bag limit for rockfish was 15 fish per angler with no closed months or depths. Beginning in 2000, the daily bag limit was reduced to 10 fish. Regulations have changed each year since 2000, making analyses of the effects of particular regulations difficult. In addition, regulations have become more region-specific, adding to the difficulty of modeling projected catches.

A.9.1 Methodology Used to Project Recreational Catches for 2013-14

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 used for 2013-14 is the same as for 2011–12. The 2008-2010 data from the California Recreational Fishery Survey (CRFS) program serves as a baseline. The model output predicts expected catch under any combination of season and depth fishing restrictions for each of the regions

A.9.2 Changes to the RecFISH Model for 2013-2014

The CRFS estimates from 2008 to 2010 were inputted into the RecFISH model to determine the proposed season structure and species projected impacts. The proportion of catch by depth applied to the depth dependent mortality rates to derive Management Area Specific discard mortality rates were updated and applied to the 2008-2010 CRFS estimates. In addition, the proportion of catch by time and by depth in the historical catch were revised as described below, to better reflect the seasonality of effort North of Point Arena and the proportion of catch by depth North of 40° 10' min N. Latitude respectively.

A.9.3 Model Assumptions

The following assumptions were made for projecting impacts in the California recreational fishery.

- 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 applied to account for increased effort in a smaller fishing area.
- Discard Mortality: Depth-dependent mortality rates for discarded rockfish are applied to the discarded fish (B2 & B3) in 10-fm increments. When projecting the 2013-14 season catch, discard catch estimates are multiplied by the proportion of catch in a given 10-fm depth increment times the depth-dependent mortality rate for the corresponding depth for each species.

A.9.4 Methodology Used to Calculate Annual Unrestricted Catch

- Pull (A+B1+B2+B3) Catch for each year from RecFIN[1]: Specify species and select the parameters month and district under Define Table Layout.
- Pull historical catch by depth (1999-2000, most recent years unregulated by depth) from the RecFIN boatdepth3 CDFG private access website. 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.
- Pull historical catch through time (1993-1999, the most recent years unregulated by monthly closure) from RecFIN[2] : Calculate average percent catch by wave 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.
- For each management region and species, calculate total regulated catch based on months that each set of regulations was in effect. For example, if fishing was only open from 0-60 fm for March-December, sum total catch for those months only. Each management region should 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.
- 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 by the depth where fishing was open. This is the total expected catch for all depths. For example, if fishing for a MR set was open less than 20 fm, divide the total catch by the percentage of the catch less than 20 fm using the appropriate Depth Profile (historical unregulated catch data) for each species and region.
- Effort Shift. If the depth restriction is confined to 20 or 30 fm, we assume a shift in effort in shallower depth occurred for these months. To account for this effect, apply an effort shift factor to the constrained depth zone. For example, if a 0-20 fm restriction was in

[1] http://www.psmfc.org/recfin/forms/est2004.html
[2] http://www.psmfc.org/recfin/forms/est.html

effect multiply the total expected catch for all depths by 1.393 to calculate final total expected catch for those months. Similarly, use a factor of 1.276 if fishing was restricted within 30 fm. No effort shift is applied for depth restrictions greater than 30 fm.

- Accounting for Closed Months. After expanding to all depths and removing effort shift (if needed), sum all final expected catch values across all 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 percent catch by wave 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.
- Input expected annual unregulated catch for each region-species into the Catch by Year Table in the RecFISH Model database. The weighting of the different years' data to be used by the model in projecting catch can be selected at the model-user interface.

A.9.5 Description of the Catch Projection Model (RecFISH)

To improve the accuracy of catch estimates north of Point Arena for all rockfish including yelloweye rockfish, the following method was applied when modeling the effect of depth restrictions on rockfish species.

- For expanding baseline input catch data from regulated seasons to all depths, unregulated depth distribution of catch data from other areas can be used to supplement the existing historical data; these data must be from unregulated years to be able to expand to all depths. In the Northern Management Area, data from 1999-2003 were used (years unregulated by depth), recent unregulated Oregon catch by depth (1999-2003), and 1999-2000 data from the North-Central area that is north of Point Arena (for bathymetric and fishing effort similarities to the North). For the North-Central area, additional data from dockside party charter catch by depth data from 1999-2000 were used.

A.9.6 Inputs and Key Parameters for the Model

Weighting of Base Years: Base year data 2008-2010 were given nearly equal weighting by applying a 0.99 decay function. This is the same approach used in 2011-12.

Base Year Catch: CRFS catch estimates were summed for angler retained fish ("A" fish), angler-reported dead fish ("B1" fish), and a proportion of CRFS reported discarded fish derived ("B2" fish) using depth-based mortality estimates. Base year catch estimates are assumed to be for an unrestricted fishery that is open year-round at all depths. Therefore, for each year, a back calculation method was used to obtain an estimate for what catch would have been had the fishery been open for all months and at all depths. This back calculation uses month and depth catch proportions derived from historical catch estimates from seasons unregulated by month and depth.

Historical Catch By Month: Estimates of historical catch (in percent) by two-month period were calculated for each region based on Marine Recreational Fisheries Statistics Survey (MRFSS) data (weight of A+B1) from 1993-99, which was a time period when seasons and depths were unconstrained. Proxies were considered on a species by species basis for regions where there was a lack of catch data for that area. Monthly estimates of percent catch then were divided equally (50:50) for each pair of months.

Historical Catch by Depth: Estimates of percent catch by depth were calculated for each region based on MRFSS depth sample data (numbers caught A+B1 for CPFV and A+B1+B2 for PR) from 1999-2000, which was a time period when depths were unconstrained. Proxies were considered on a species by species basis for regions where there was a lack of catch data for that area.

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A.9.7 Determining the Proportion of Angler Reported Unavailable Dead Catch for Yelloweye and Canary Rockfish that was Composed of Discarded Dead Fish:

CRFS uses several different catch types in generating catch estimates which include A, B1, B2 etc. The B1 category includes disposition such as retained (filleted fish, fish given away, used for bait or otherwise unavailable) and fish discarded dead. Unfortunately, since CRFS began in 2004, the disposition of the B1 has not been recorded for the majority of private and rental trips which are sampled in the PR1 mode. Therefore, it is not possible to separate the discarded dead fish from the retained unavailable fish in B1 without use of a proxy for the proportion of fish discarded dead. Attempts have been made to apply the available data to the B1 fish, but few data exist for species such as yelloweye and canary rockfish, which are not allowed to be retained.

To estimate the proportion of yelloweye and canary rockfish B1 catch that is discarded dead, a "compliance factor" (CF) was determined for each management area for all groundfish species using CRFS data from 2008 to 2010. The CF was calculated by dividing B2 catch by total catch (A+B1+B2); this represents the proportion of fish reported discarded live by anglers. The CF is used as a proxy for the proportion of B1 that is discarded dead, and so it is multiplied by the B1 catch to estimate the total fish discarded dead. This amount is added to the known B2 catch to calculate total discards. This value is then multiplied by depth dependant mortality rate to obtain the discard mortality. Total mortality is the sum of retained catch (A+B1, less the proportion of B1 designated discarded dead) plus discard mortality. Because CFs are conservative, the proportions of B1 that are considered unavailable dead (filleted, used for bait, given away) are be biased high; this could result in an overestimate of total mortality.

A.10 California Recreational: Bocaccio Size Limit

Length data from the California Recreational Fisheries Survey (CRFS) from 2005 to 2010 were used to analyze the projected impacts to bocaccio as a result of removing the recreational size limit; both raw sample and estimate data were used.

The following steps were taken to calculate the increase in projected impacts expected as a result from removing the recreational size limit. The total weight of all sampled released fish (CRFS type "3" and "3d" catch types) was calculated along with the total weight of all sampled released fish under 10 inches. This was done to determine the proportion of fish under ten inches out of the total sampled fish. This proportion was then multiplied by the estimated weight of released fish ("B2" fish) to get the estimated weight of all fish under 10 inches. The estimated weight of fish under ten inches was then divided by the total weight of encountered fish (A+B1+B2) to determine what percentage of fish under ten inches is accounted for in the total encounters. That percentage was then applied to CDFG's RecFISH catch projection model results for bocaccio to determine the expected increase in projected impacts as a result of removing the size limit.

A.11 California Recreational: Greenling Bag Limit

RecFIN raw sample data were extracted and downloaded from the public web page for two time periods: 1995-2001 and 2009-2010. The years 1995-2001 were used as a base comparison time period because during those years there was a greenling ten-fish bag limit. These data were extracted from the Marine Recreational Fisheries Statistical Survey (MRFSS). The years 2009-2010 were chosen as a recent period because a greenling two-fish bag limit was in place and landings were very equal to or above the annual

TAC allocation for those years. The 2009-2010 RecFIN estimate data for greenlings were also extracted from the California Recreational Fisheries Survey (CRFS)

For each time period, three types of data were extracted: type 1, type 2, and type 3 so that summaries captured the header data and the A (kept) + B1 (unavailable dead) + B2 (released alive) fish. Only data from northern California (north of Point Conception) data were used; all modes and fishing areas within this area were included. Data were extracted and downloaded as comma delimited text files and converted into Access tables capturing the following fields:

- Type 1 records (header information)
- Type 2 records (B fish) – fish returned
- Type 3 records (A fish) – fish that were kept and available for inspection

Using Access, two tables were created for each time period: one table for the type 2 fish and one for the type 3 fish with four identification/update fields added to each table.

- A "Type" field was added to identify all "A" fish (type 3 records) or "B" fish (type 2 records) based upon the extracted record type (3 or 2)
- A "Trip type" field was identified and was updated with a "Y" for any record where:
  - greenlings (kelp, rock, genus, or family) were in the SP_CODE field
  - greenlings were identified in the PRIM1 or PRIM2 fields
    1. PRIM1 were fish identified by the angler as the primary target for the trip
    2. PRIM2 were the secondary target
- A "Trip type 2" field that was identified and was updated for all records that met any of the following criteria (using the Trip type 2 sub-codes as follows):
  - 1 = records where PRIM1 or PRIM2 were greenling
  - 2 = records where the SP_CODE (species code) was a greenling
  - 3a = records where the MODE_f was 2 or 5 (beach/bank) and PRIM1 or PRIM2 was cabezon, lingcod, rockfish genus, or monkeyface prickleback
  - 3b = records where the MODE_f was 2 or 5 and the SP_CODE was greenling, cabezon, lingcod, rockfish genus, or monkeyface prickleback
  - 3c = records where the MODE_f was 5 and the SP_CODE was any shallow nearshore rockfish
  - 4a = records where the MODE_f was 6, 7, or 8 and PRIM1 or PRIM2 was any shallow nearshore rockfish, cabezon, or monkeyface prickleback
  - 4b = records where the MODE_f was 6, 7, or 8 and the SP_CODE was any shallow nearshore rockfish, cabezon, or monkeyface prickleback
- A "GL" field that was identified and was updated for any record that had greenlings in the SP_CODE field
- All records that had a "Trip type 2" identifier as per any of the above were then used to update all "Trip type" records to a "Y" status – meaning that any bag/trip that was updated to a "Y" status (as per above) was identified and categorized as one that either had greenling as part of the bag or had the potential to have had a greenling
- Therefore, all records with a "Y" in the "GL" field were identified as greenling bags and any record with a "Trip type" identified as a "Y", but had a null value for the "GL" field were identified as a zero greenling bag
- Once a record was identified accordingly, all the records belonging to that bag (based on the same bag ID_CODE number) were updated so that each bag (in its entirety) had a uniform "Trip type" code identifier

Using both the updated main A fish and B fish tables, greenling COUNT tables were created that summed the number of greenlings per bag (based on the ID_CODE (using the Group By query function)) and the number of anglers per bag (using the CNTRBTRS (number of contributors – or anglers) field).

- Aggregate bags (bags with more than one angler) were factored in by dividing the number of greenlings per bag by the number of anglers resulting in many bags with a fractional amount of greenling(s) per bag
- Many bags had a zero or null value in the CNTRBTRS field and to correct for this a temporary table was created for A fish and B fish where the ID_CODE records were grouped and the CNTRBTRS was also grouped (where CNTRBTRS was >0 or not null). The temporary table and main tables were then linked and the main tables were then updated for those records missing a CNTRBTRS value. This yielded a more robust anglers/bag set of data which were used to update the 0 or null values in the A and B fish greenling COUNT tables. Type 1 records were not used because many records in those database tables also had 0 or null values in the CNTRBTRS field.

Bins were then set-up that summed the number of bags (based on the grouped ID_CODE) for all potential greenling trips where greenlings were not part of the bag (zero bag trips) and those where greenlings made up part of the bag. After the bin counts were completed, the estimated take at the two-fish, five-fish, and 10-fish levels were calculated for the base period using the following:

- A summed total (count) for each bin was calculated using this summary method:

  0 bags – no greenlings per bag
  0.01 – 1 greenling per bag
  1.01 – 2 greenlings per bag
  2.01 – 3 greenlings per bag
  Etc.
- A percent for each bin was calculated from the overall total number of bags (excluding those categorized as zero bags) with a cumulative running total noted at the two-fish bag level, the five-fish bag level, and at the 10-fish bag level
- For this base period, the percent difference between the two-fish, five-fish, and 10-fish amounts were noted
- Using the same method for the two-year recent period (2009-2010), the percent for the two two-fish bin was calculated, which included all bags that were in excess of the two-fish bin as part of the two-fish percentage.
- A 20 percent buffer was applied (i.e. the calculated percentage was increased by 20 percent) and the higher percentage was multiplied by the 50 mt new TAC allocation amount to estimate the status quo amount.
- To the two-fish percentage the difference between the two-fish and five-fish percentages was added from the base period to get a hypothetical five-fish bin percentage
- The five-fish percentage was multiplied by 50 mt amount to calculate that estimated harvest amount
- To the five-fish percentage the difference between the five-fish and 10-fish percentage was added from the base years and multiplied by 50 mt to estimate the harvest amount with a 10-fish bin

Assumptions used in the Model

- Since this model estimates (predicts) the amount of fish that potentially would be taken, all A fish (those retained in the bag), and B1 and B2 (fish returned dead or alive or eaten or given away, etc.) were included
- Only data from north of Point Conception were used because few greenling are taken south
- It is assumed that the number of bags per bin reflects a proportional amount of greenlings that would be taken

- Zero bags were identified using the above criteria to ascertain the number of bags (trips) where greenlings could have reasonably been taken as part of the fishing trip taking into consideration the mode and associated species for the mode
- The associated species used in the categorization criteria focused on those species commonly caught or potentially could be caught with greenlings from the same fishing area, method of catch, and habitat
- A 20 percent buffer was factored in to account for possible future (2012-2013) catch increases as the most conservative estimate possible
- For the base period, the differences between bin percentages were calculated using only bins with fish (the zero bins were excluded) because this yielded slightly higher percentage differences and was a more conservative approach

Appendix B: ANALYSIS OF THE INTEGRATED ALTERNATIVES

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

September 2012

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This apendix provides more detailed information behind the analysis of the integrated alternatives, compared to what was presented in Chapter 2, Section 2.4. The impacts of implementing the strategic combination of overfished species ACLs along with the management measures necessary to stay within those ACLs or achieve other management objectives outlined in the GFMP are presented by fishery and alternative.

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B.1 Shorebased IFQ

Predictions of total catch were made for a suite of alternatives with varying allocation structures, using a new catch-projection model for the shorebased IFQ fishery, to compare predicted impacts across the range of alternatives and enable community-level economic analyses, for the biennial groundfish harvest specifications environmental impact statement (See Appendix A for more information on the modeling platform). The species-specific allocations that varied the most among alternatives were those of canary rockfish and Pacific ocean perch, the levels of which varied in different combinations, in and out of phase, in order to elucidate potential constraints of each on predicted target catch. Variation in allocations of other species was either comparatively very low, or occurred only between the No Action alternative and all others.

The Preferred Alternative, Alternative 1, and Alternative 2 with canary and Pacific ocean perch (POP) allocations in the middle of the range that was analyzed, are predicted to produce lower levels of constraint (< 6 percent, measured as proportion of vessels which caught 100 percent of one or more rebuilding species QPs, and whose predicted target catch was limited as a result) than the other alternatives, except for Alternatives 6, and 7, which had allocations of canary in the middle of the range, and POP allocations at the high end of the range. Alternatives 3, 4, and 5, with different combinations of a low allocation for either canary or POP, with a medium or high allocation for the other species of those two, were predicted to produce higher levels of constraint (near 20 percent) on target catch. The term "constrained" is defined for this analysis as a vessel catching 100% of its QP for a particular rebuilding or other bycatch species, at which point it would be prevented from catching further target species, for which QP of the limiting bycatch species would be needed; this is more fully explained later in this document. The level of constraint was quantified as percent of the total vessels, which were limited by their QP of bycatch species (among those which caught IFQ species in the fishery). Alternative 2 is the same as the Preferred Alternative.

At the April 2012 meeting the Council added Alternative 8, which is the same as the Preferred Alternative, except for a higher for canary rockfish ACL (147 mt). Catch projections for this alternative were subsequently made and revealed that catches in the IFQ fishery are the same as under the Preferred Alternative and Alternative 1. This overview, prepared before the Council adopted Alternative 8, does not include it, but the results of the subsequent analysis are discussed below (see page B-36).

In those alternatives where constraint levels were low (< 6 percent under the Preferred Alternative, Alternative 1, and Alternative 2), higher numbers of vessels were predicted to attain their full quota pounds for target species categories such as sablefish north of 36° N. lat., or Pacific whiting, and where constraint levels were higher, there were corresponding negative differences in numbers vessels attaining full QP of target species categories.

Predicted catch of rebuilding species under all alternatives was less than No Action. Predicted catch of target species categories rose and fell predictably among alternatives, negatively covarying with levels of constraint by rebuilding species.

From an absolute standpoint, catch estimates for several species in this analysis are likely to be biased low for several reasons. Due to the rapid timeline for production of the DEIS, input data had to be truncated at less than one full year. This meant that December catch was imputed, based on monthly catch trends from 2010 and 2011, and vessel account input data (amount of QP available for each vessel) was frozen at November 28. Outcomes of this included that actual December catch was higher than expected, likely due delays in the winter crab season, which was shown to distract participation from IFQ, early in 2011. The results also cannot account for additional QP trading which happened between November 28 and December 15 (the closing date for QP trading); trading during this time period would theoretically enable purchase of QP for potentially constraining bycatch species, and thus enable more target catch.

From a relative standpoint, although the aforementioned assumptions need to be noted, the current analysis still allows for fair comparison among the proposed alternatives, in terms of relative catch and bycatch constraint. Modeling is always limited by the available data, and this analysis utilized the best data which were available at the time the analysis needed to be performed. In short, substantial differences were apparent among the alternatives, which should allow an informed choice of the appropriate alternative among them by the Council.

Variation in allocations among alternatives

Across the range of alternatives, the only fleet allocations that vary substantially are those of canary rockfish, Pacific ocean perch (POP), Petrale sole, widow rockfish, English sole, arrowtooth flounder, and sablefish, north of 36° N. lat. The allocation levels of canary rockfish and POP vary among individual alternatives. Cowcod allocations vary between the Preferred Alternative (34 percent to trawl and 66 percent to non-trawl) and the remaining alternatives (66 percent to trawl and 34 percent to non-trawl). Petrale sole, widow rockfish, English sole, arrowtooth flounder, and sablefish, north of 36° N. lat. allocations only vary between the No Action Alternatives and all others. Petrale sole and widow rockfish allocations are more than twice that of the No Action Alternative, in the other alternatives analyzed. Sablefish allocations are approximately 20 percent lower in all other alternatives than the No Action Alternative (Table B-2). Arrowtooth flounder allocations for alternatives other than No Action are less than half of No Action, and English sole allocations are approximately one third less.

Levels of the proposed allocations for canary rockfish and POP vary between low, medium, and high levels, in and out of phase with one another, among alternatives (Figure B-1, Table B-1). This approach could reveal which species or combination of allocation levels for these species is responsible for projected differences in target catch, attainment, or number of constrained vessels. See Table B-2 for the range of proposed allocations analyzed, for all IFQ species categories. Further, the cowcod allocations vary between the Preferred Alternative (34 percent to trawl and 66 percent to non-trawl) and the remaining alternatives (66 percent to trawl and 34 percent to non-trawl).

Catch of lingcod was projected coastwide using the model, because that is how the allocations and QP distribution were structured in the observed data (2011). Distribution of catch north and south of 40°10' N. lat. , as well as north and south of 42° N. lat. was estimated using haul-level catch data from the West Coast Groundfish Observer Program, of the Northwest Fisheries Science Center. Those distributions were then applied to the coastwide model projections. Lingcod catch estimates are presented north and south of 40°10' N. lat. for the Preferred Alternative and Alternatives 1 through 7, and north and south of 42° N. lat. for the No Action Alternative. See Table B-2 for the specific levels of lingcod allocations and Table B-5, Table B-8, Table B-9, Table B-12, Table B-14, Table B-16, Table B-18, Table B-20, Table B-22, and Table B-23 for predicted catch by area, for lingcod and the remaining species categories.

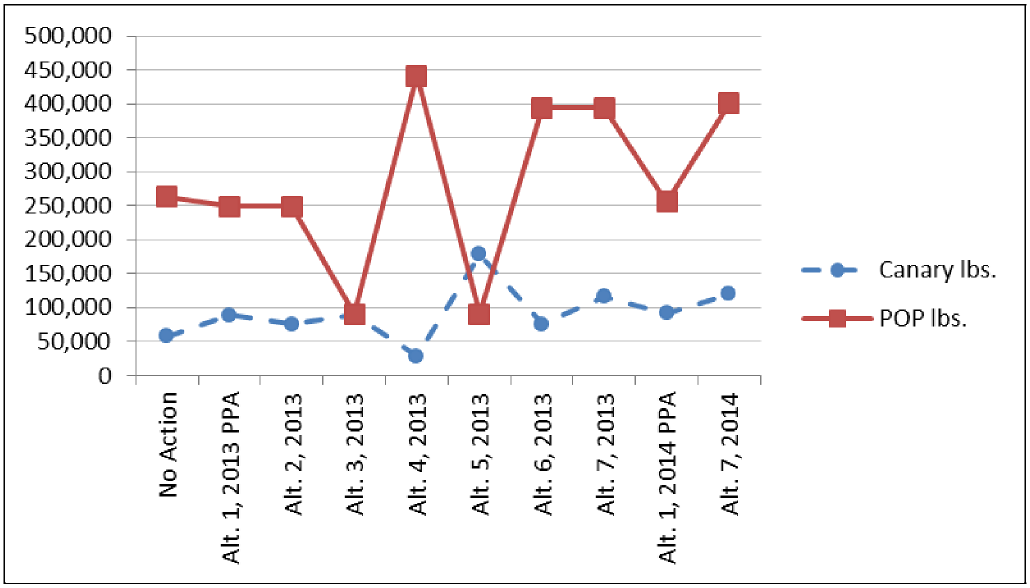

Figure B-1. Illustration of how allocations of canary rockfish and Pacific ocean perch (POP) vary across the range of alternatives.

Table B-1. Variation in IFQ fishery allocation level for canary rockfish and Pacific ocean perch, in pounds, nominally, and percentage of the No Action Alternative, among the alternatives.

Alternative	Canary lbs.	Canary nom.	POP lbs.	POP nom.	Can. % of No Action	POP % of No Action
No action	57,761	med-low	263,452	med	100%	100%
2013 Preferred and Alt. 1	88,846	med	249,122	med	154%	95%
Alt. 2, 2013	75,398	med	249,122	med	131%	95%
Alt. 3, 2013	88,846	med	90,390	low	154%	34%
Alt. 4, 2013	28,219	low	440,925	high	49%	167%
Alt. 5, 2013	178,354	high	90,390	low	309%	34%
Alt. 6, 2013	75,398	med	394,627	high	131%	150%
Alt. 7, 2013	116,625	med-high	394,627	high	202%	150%
2014 Preferred and Alt. 1	91,492	med	255,736	med	158%	97%
Alt. 7, 2014	120,152	med-high	401,241	high	208%	152%

Table B-2. Range of allocations for the shorebased IFQ fishery, in pounds, used to inform model-based catch projections, for the 2013-2014 groundfish harvest specifications.

IFQ Species a/	No Action, 2012	2013 Preferred & Alt. 1	Alt. 2, 2013	Alt. 3, 2013	Alt. 4, 2013	Alt. 5, 2013	Alt. 6, 2013	Alt. 7, 2013	2014 Preferred & Alt. 1	Alt. 7, 2014	2011 obs.
Bocaccio S. of 40°10	132,277	169,535	169,535	169,535	169,535	169,535	169,535	169,535	175,929	175,929	132,277
Canary rockfish	57,761	88,846	75,398	88,846	28,219	178,354	75,398	116,625	91,492	120,152	57,100
Cowcod S. of 40°10 b/	3,968	2,205/4,189	4,189	4,189	4,189	4,189	4,189	4,189	2,205/4,189	4,189	3,968
Darkblotched rockfish	548,819	590,839	590,839	590,839	590,839	590,839	590,839	590,839	615,090	615,090	552,997
POP N. of 40°10	263,452	249,122	249,122	90,390	440,925	90,390	394,627	394,627	255,736	401,241	263,148
Petrale sole	2,324,995	5,460,850	5,460,850	5,460,850	5,460,850	5,460,850	5,460,850	5,460,850	5,593,128	5,593,128	1,920,226
Yelloweye rockfish	1,323	2,205	2,205	2,205	2,205	2,205	2,205	2,205	2,205	2,205	1,323
Arrowtooth flounder	20,861,131	8,496,616	8,496,616	8,496,616	8,496,616	8,496,616	8,496,616	8,496,616	7,661,064	7,661,064	27,406,105
Chilipepper S. of 40°10	2,934,904	2,440,517	2,440,517	2,440,517	2,440,517	2,440,517	2,440,517	2,440,517	2,369,969	2,369,969	3,252,370
Dover sole	49,018,682	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,019,784	49,018,682
English sole	21,037,611	14,032,423	14,032,423	14,032,423	14,032,423	14,032,423	14,032,423	14,032,423	11,587,496	11,587,496	41,166,808
Lingcod	3,991,800	3,791,951	3,791,951	3,791,951	3,791,951	3,791,951	3,791,951	3,791,951	3,589,126	3,589,126	4,107,873
N of 40°10	-	2,702,867	2,702,867	2,702,867	2,702,867	2,702,867	2,702,867	2,702,867	2,546,339	2,546,339	-
S of 40°10	-	1,089,084	1,089,084	1,089,084	1,089,084	1,089,084	1,089,084	1,089,084	1,042,786	1,042,786	-
N of 42°	1,851,883	-	-	-	-	-	-	-	-	-	-
S of 42°	2,139,917	-	-	-	-	-	-	-	-	-	-
Longspine thornyheads N. of 34°27	4,219,648	4,100,598	4,100,598	4,100,598	4,100,598	4,100,598	4,100,598	4,100,598	3,992,572	3,992,572	4,334,839
Minor shelf rockfish N. of 40°10	1,150,813	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,157,206	1,150,813
Minor shelf rockfish S. of 40°10	189,598	179,897	179,897	179,897	179,897	179,897	179,897	179,897	179,897	179,897	189,598
Minor slope rockfish N. of 40°10	1,828,779	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,715,196	1,828,779
Minor slope rockfish S. of 40°10	831,958	824,529	824,529	824,529	824,529	824,529	824,529	824,529	831,143	831,143	831,958
Other flatfish	9,253,683	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,237,369	9,253,683
Pacific cod	2,502,247	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,495,633	2,502,247
Pacific halibut (IBQ) N. of 40°10	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524	257,524
Pacific whiting	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442	204,628,442
Sablefish N. of 36°	5,438,804	4,023,436	4,023,436	4,023,436	4,023,436	4,023,436	4,023,436	4,023,436	4,376,176	4,376,176	5,613,719
Sablefish S. of 36°	1,133,352	1,327,183	1,327,183	1,327,183	1,327,183	1,327,183	1,327,183	1,327,183	1,439,619	1,439,619	1,170,390
Shortspine thornyheads N. of 34°27'	3,120,533	3,084,267	3,084,267	3,084,267	3,084,267	3,084,267	3,084,267	3,084,267	3,053,402	3,053,402	3,156,138

IFQ Species a/	No Action, 2012	2013 Preferred & Alt. 1	Alt. 2, 2013	Alt. 3, 2013	Alt. 4, 2013	Alt. 5, 2013	Alt. 6, 2013	Alt. 7, 2013	2014 Preferred & Alt. 1	Alt. 7, 2014	2011 obs.
Shortspine thornyheads S. of 34°27	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231	110,231
Splitnose rockfish S. of 40°10	3,206,513	3,351,026	3,351,026	3,351,026	3,351,026	3,351,026	3,351,026	3,351,026	3,476,690	3,476,690	3,045,245
Starry flounder	1,480,404	1,657,876	1,657,876	1,657,876	1,657,876	1,657,876	1,657,876	1,657,876	1,666,695	1,666,695	1,471,586
Widow rockfish	755,348	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	2,204,623	755,348
Yellowtail rockfish N. of 40°10	6,850,556	6,148,692	6,148,692	6,148,692	6,148,692	6,148,692	6,148,692	6,148,692	6,155,306	6,155,306	6,821,455

a/ All area designations are north latitude.

b/ The trawl allocation of cowcod is 2,205 pounds under the Preferred Alternative and 4,189 pounds under the Action Alternatives

B.1.1 IFQ: No Action Alternative

Under the No Action Alternative, Table B-3 and Table B-4 list the Rockfish Conservation Area boundaries that with no changes would be in effect, for trawl gear and fixed gear, respectively, in 2013 and 2014. For the trawl boundaries, it should be noted that the seaward line during March to April from 45°46' to 48°10' was changed from 200 fm to 150 fm, to take effect in 2012. Model-based catch projections were made under the RCA structure that was in place during 2011, since those are the current data which exist to inform the model of catch under IFQ; this includes the 200 fm seaward line during March and April, from 45°46' to 48°10'. As explained in the November 2011 GMT statement, we examined time-weighted average bycatch rates from WCGOP, from 2005 to 2010, data which are available for this area, during this period (Table B-5). It generally shows increased bycatch rates of rebuilding species in Period 2, in the area seaward of 150 fm, versus the area seaward of 200 fm, indicating that if the seaward RCA were moved from 200 fm to 150 fm during periods 1 and 2 of 2012, that the probability of encountering darkblotched rockfish, Pacific ocean perch, widow rockfish and yelloweye rockfish will likely be slightly higher than if the No Action seaward boundaries remained in place. However, this fishery is now managed under IFQ, and attainment of these rebuilding species is currently very low (NMFS report under Agenda Item E.6.b., Status Report on the 2011 Rationalized Trawl Fishery), at 17%, 19%, 35% and 6% respectively, as of October 11, 2011. Fishing behavior, and bycatch rates, could potentially be different than those observed during pre-IFQ. We also note that the request was made for a relatively small area of the coast (45°46' to 48°10' N. lat.).

Table B-3. Rockfish Conservation Area (RCA) boundaries for trawl gear, under the No Action Alternative.

Area	Jan Feb	Mar Apr	May Jun	Jul Aug	Sep Oct	Nov Dec
North of 48°10'	shore – ^{m}200	shore - 200	shore - 150		shore - 200	shore - ^{m}200
48°10' - 45°46'	75 - ^{m}200	75 - 150*	75 - 150	100 - 150	75 - 150	
45°46' - 40°10'		75 - 200	75 - 200	100 - 200	75 - 200	75 - ^{m}200
40°10' - 34°27'	100 - 150					
South 34°27' (mainland)						
South 34°27' (islands)	shore - 150					

^{m} Superscript "m" designates the modified 200 fm seaward line.

* This 150 fm line was not in place for 2011, rather it was 200 fm.

Table B-4. Rockfish Conservation Area (RCA) boundaries for fixed gear (applies to vessels under the gear switching provision, under the No Action Alternative.

Area	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
North of 46° 16'	shore - 100 fm
45° 03' 83" - 46° 16'	30 - 100 fm
43° - 45° 03' 83"	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)
42° - 43°	20 - 100 fm
40° 10' - 42°	20 fm depth contour - 100 fm
34° 27' - 40° 10'	30 fm - 150 fm line
South of 34° 27' (w/islands)	m - 150 fm line

Table B-5. Time-weighted average, pre-IFQ bycatch rates of rebuilding species, seaward of 150 fm and 200 fm, for Period 2, over the years 2005-2010, in the area north of 40°10'N. lat.

Species	> 150 fm	> 200 fm
Bocaccio rockfish	0.0001%	0.0001%
Canary rockfish	0.0030%	0.0044%
Cowcod rockfish	0.0000%	0.0000%
Darkblotched rockfish	0.7734%	0.5875%
POP	0.5384%	0.3041%
Widow rockfish	0.0084%	0.0061%
Yelloweye rockfish	0.0002%	0.0001%

No Action Alternative (2012), allocations and projections
Allocations to the IFQ fleet, projected total catch, and projected attainment under the No Action Alternative (2012) are listed in Table B-2, along with those for 2011, for comparison. Inclusion of 2011 estimates also gives the opportunity for discussion of methods and assumptions of this analysis. Total catch for December of 2011 was imputed, as described in the model section, since this analysis was begun in early December of 2011. Most allocations differed little between No Action and 2011, except the Petrale sole allocation was 17% higher for 2012, and the allocations for arrowtooth flounder and English sole were substantially lower in 2012. More vessels were predicted to be constrained by rebuilding species in 2011 (39%) than in 2012 (14%). For instance, 23% of vessels were predicted to be constrained by Petrale sole, compared with <6% in 2012. Also, 13% of vessels were predicted to be constrained by canary rockfish in 2011, compared with <6% of vessels in 2012, although the canary rockfish allocation was only approximately 700 pounds smaller in 2011 than 2012. See Table B-2 for the allocation levels of those alternatives analyzed.

The relatively sharp projected differences in the number of vessels constrained by a bycatch species between 2011 and 2012 (and the other alternatives) is primarily due to the Petrale sole allocation being smaller in 2011 than 2012 (and the other alternatives). In addition, the estimated number of vessels constrained in 2011 could be amplified somewhat, due to a potential artifact which would stem from the incomplete 2011 catch data used as an input for the analysis. Specifically, to accommodate the schedule for the DEIS, the expected attainment of target species was adjusted without an available mechanism for a concomitant redistribution of QP; the model uses a snapshot of QP distribution (from early December, in this analysis), a routine for dynamic redistribution of QP is not yet part of the model. Use of a final snapshot of vessel QP-distribution may have allowed for vessel operators to make further bycatch allowances for their anticipated December catch. Nonetheless, the same assumptions were applied to all alternatives, and these model projections should enable a fair comparison among them. This projection model and all of the inputs represent the best scientific information available at the time the analysis was performed.

The term "constrained" is defined for this analysis as a vessel catching 100% of its QP for a particular rebuilding or other bycatch species. For a particular vessel-specific catch estimate to be labeled as bycatch-constrained within the model, the amount of target species catch estimated according to the amount of rebuilding species QP available to that vessel, and its bycatch rates of that particular rebuilding species, must be smaller than the estimate of target catch made using the target species attainment rates and QP amounts. That is, the projection of target catch which was produced by the bycatch limited routine in the model was smaller than that of the target QP limited routine.

As noted in the model description, catch projections for target species with a strong relationship between 2011 catch and 2011 QP, such as Pacific whiting, sablefish, chilipepper rockfish, and thornyheads are likely to be more reliable when allocations change dramatically than those with weak relationships between these two variables, such as English sole, minor slope rockfish, and arrowtooth flounder. Thus, for the projection for English sole catch to drop dramatically, proportionate with the allocation, although it is dramatically underutilized, is not necessarily realistic, as its catch levels are weakly related to vessel QP of this species. Other factors are likely more important for predicting the catch of such a species, such as market factors, and/or processor limits.

For target species, catch estimates and expected attainments, as well as numbers of vessels predicted to attain 100% of their target QP varied little between the No Action Alternative (2012) and 2011 (Table B-6 and Table B-7).

Table B-6. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between the No Action Alternative and early estimates for 2011 (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation 2011	Catch 2011	Attainment 2011	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	132,277	7,507	6%	100%	103%	103%
Canary rockfish	57,761	7,651	13%	57,100	7,886	14%	99%	103%	104%
Cowcod south of 40°10' N.	3,968	39	1%	3,968	40	1%	100%	103%	103%
Darkblotched rockfish	548,819	121,713	22%	552,997	123,411	22%	101%	101%	101%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	263,148	71,893	27%	100%	103%	103%
Petrale sole	2,324,995	1,334,856	57%	1,920,226	1,380,462	72%	83%	103%	125%
Yelloweye rockfish	1,323	102	8%	1,323	106	8%	100%	104%	104%
Arrowtooth flounder	20,861,131	4,096,046	20%	27,406,105	5,216,797	19%	131%	127%	97%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	3,252,370	699,533	22%	111%	108%	97%
Dover sole	49,018,682	16,668,724	34%	49,018,682	16,359,774	33%	100%	98%	98%
English sole	21,037,611	152,809	1%	41,166,808	287,762	1%	196%	188%	96%
Lingcod coastwide	3,991,800	526,447	13%	4,107,873	528,701	13%	103%	100%	98%
Lingcod north of 40°10' N.	-	-	-	-	525,000	-	-	-	-
Lingcod south of 40°10' N.	-	-	-	-	3,701	-	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,334,839	2,082,564	48%	103%	101%	98%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,150,813	28,529	2%	100%	97%	97%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	189,598	4,880	3%	100%	99%	99%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,828,779	290,473	16%	100%	97%	97%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	831,958	90,356	11%	100%	98%	98%
Other flatfish	9,253,683	1,528,418	17%	9,253,683	1,480,532	16%	100%	97%	97%
Pacific cod	2,502,247	576,976	23%	2,502,247	558,302	22%	100%	97%	97%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	66,733	26%	100%	97%	97%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,631,339	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	5,613,719	4,914,623	88%	103%	102%	98%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,170,390	831,938	71%	103%	102%	99%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,156,138	1,454,071	46%	101%	99%	98%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,045,245	54,965	2%	95%	94%	99%
Starry flounder	1,480,404	28,135	2%	1,471,586	27,370	2%	99%	97%	98%
Widow rockfish	755,348	295,502	39%	755,348	297,163	39%	100%	101%	101%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,821,455	1,306,405	19%	100%	99%	99%

Table B-7. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative.

IFQ species category	No action	2011	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	13%	≥ 7%
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	9%	≥ 3%
Pacific ocean perch north of 40°10' N.	< 6%	11%	≥ 5%
Petrale sole	< 6%	23%	≥ 17%
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	< 6%	(-) ≥ 4%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	< 6%	(-) ≥ 5%
English sole	< 6%	< 6%	-
Lingcod	8%	< 6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	6%	-5%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	≥ 2%
Pacific halibut (IBQ) north of 40°10' N.	9%	< 6%	(-) ≥ 3%
Pacific whiting	28%	22%	-6%
Sablefish north of 36° N.	41%	25%	-16%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	< 6%	(-) ≥ 8%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	11%	(-) ≥ 5%
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

Projected catch and attainment of allocations for rebuilding species were slightly higher for 2011 (1 to 4 percent higher), with the exception of attainment for Petrale sole, which was 25% higher in 2011 than under No Action, coinciding with a lower allocation in 2011. Projected catch differed very little between 2011 and No Action, with the exception of arrowtooth flounder (88 percent higher in 2011) and English sole (27 percent higher in 2011), which were driven primarily by expected vessel attainment. As discussed earlier in this section, these two projections are not particularly informative.

B.1.2 IFQ: Preferred Alternative

The Preferred Alternative differs from the No Action Alternative in that the allocation of canary rockfish is 154% of that for No Action and the cowcod allocation percentage is the opposite of that under No Action (34 percent non-trawl and 66 percent trawl). The POP allocation is nearly the same, at 95% of No Action. This alternative is considered a medium level for canary rockfish, and medium for POP, considering the range of alternatives. Allocations under the Preferred Alternative for both widow rockfish and Petrale sole are more than double than the No Action alternative, and the same can be said of the action alternatives. The arrowtooth flounder allocation is less than half in the action alternatives compared to No Action, and the sablefish allocation north of 36° N. lat. is approximately 20% less in the action alternatives compared to No Action. Thus, projected catch and attainment will often differ to the same degree between the action alternatives, except where canary rockfish or POP are predicted to limit access to target species for some fishermen.

Projected catch varies predictably along with allocation levels in the Preferred Alternative (Table B-8 and Table B-9), revealing the relative low level of bycatch constraints on target catch in this alternative (Table B-10). The percentage of vessels constrained by rebuilding species was less than 6% under the Preferred Alternative for 2013, while that number was 14% for the No Action Alternative. This difference is likely due to the higher allocation of canary rockfish under the Preferred Alternative.

The percentage of vessels predicted to attain 100% of their target QP was higher for a few species in the Preferred Alternative than No Action, including sablefish north of 36° N. lat. (9%), Pacific whiting (6%), and minor slope rockfish north of 40°10' N. (4%). The predicted numbers of vessels to reach their target species QP limits are equal under the Preferred Alternative. Other metrics vary little between the Preferred Alternative and No Action.

When examining the range of proposed alternatives, comparing numbers of vessels constrained by rebuilding species, one sees higher levels of constraint for the No Action Alternative, Alternatives 3, 4, and 5, than for the Preferred Alternative, Alternative 1, Alternative 2, Alternative 6, and Alternative 7 for 2013 or 2014 (Figure B-2, Table B-8). It implies a threshold of constraint for canary rockfish (within this range of allocations) of approximately 75,000 to 80,000 pounds, below which, the predicted number of constrained vessels increases. The resolution of a threshold for POP is less precise, due to the difference between the medium and low levels of allocation, but it appears to lie somewhere beneath 250,000 pounds. When the POP allocation was at the low level, at approximately 90,000 pounds, and the canary allocation was at either the low or high levels, the number of constrained vessels was relatively equal, at 19% of the fleet (Alternatives 3 and 5). With the low canary allocation and the high POP allocation (Alternative 4), the constraint level was still at 17 percent of vessels. When the POP allocation was higher, but the canary rockfish allocation was at the medium level, of higher than 75,000 pounds (Alternative 6), the constraint level was much lower, at less than 6%. In 2011, the predicted number of vessels constrained by QP of rebuilding species was much higher, but as discussed earlier, most of the difference in predicted constraint between 2011 and 2012 was due to the lower Petrale sole allocation in 2011.

Predicted attainment levels are lower for rebuilding species under the Preferred Alternative, than for No Action, ranging between 38 percent and 90 percent of No Action. Predicted attainment for target species under the Preferred Alternative is generally equal to No Action levels, except for widow rockfish, which is only 33 percent of No Action. Widow rockfish catch was predicted in the model as a rebuilding species, using bycatch rates, and operating under an assumption of no targeting. Predicted attainment under the Preferred Alternative in 2014 is essentially equal to that of the 2013 Preferred Alternative, and does not warrant specific discussion, yet the results are listed in Table B-9 for completeness. Nine percent more vessels are expected to catch their full QP amount of sablefish north of 36° N. lat. under the Preferred Alternative than No Action, due to the lower allocation for all alternatives other than No Action.

Table B-8. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between the Preferred (PA) for 2013 and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation 2013 PA	Catch 2013 PA	Attainment 2013 PA	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	88,846	6,885	8%	154%	90%	59%
Cowcod south of 40°10' N.	3,968	39	1%	2,205	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,170	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	249,122	59,791	24%	95%	85%	90%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,096	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,572	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,734,220	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,213	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,810	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,304	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod north of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,009,498	49%	97%	98%	100%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,760	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,055	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,626	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,476	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,068	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	200,218,033	98%	100%	99%	99%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,589,688	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,453,189	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	287,374	13%	292%	97%	33%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,182,477	19%	90%	89%	99%

Table B-9. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between the Preferred Alternative (PA) for 2014, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation 2014 PA	Catch 2014 PA	Attainment 2014 PA	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	175,929	6,644	4%	133%	91%	68%
Canary rockfish	57,761	7,651	13%	91,492	6,862	7%	158%	90%	57%
Cowcod south of 40°10' N.	3,968	39	1%	2,205	36	1%	106%	93%	88%
Darkblotched rockfish	548,819	121,713	22%	615,090	107,966	18%	112%	89%	79%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	255,736	59,413	23%	97%	85%	88%
Petrale sole	2,324,995	1,334,856	57%	5,593,128	1,182,762	21%	241%	89%	37%
Yelloweye rockfish	1,323	102	8%	2,205	90	4%	167%	88%	53%
Arrowtooth flounder	20,861,131	4,096,046	20%	7,661,064	1,506,454	20%	37%	37%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,369,969	530,711	22%	81%	82%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,741,680	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	11,587,496	84,407	1%	55%	55%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,589,126	474,054	13%	90%	90%	100%
Lingcod north of 40°10' N.	-	-	-	2,546,339	470,735	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,042,786	3,318	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	3,992,572	1,958,461	49%	95%	95%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,763	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,197	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	831,143	92,694	11%	100%	101%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,753	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,485	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,101	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	200,928,317	98%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,376,176	3,905,913	89%	80%	81%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,439,619	1,032,130	72%	127%	127%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,053,402	1,439,593	47%	98%	98%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,476,690	63,385	2%	108%	109%	100%
Starry flounder	1,480,404	28,135	2%	1,666,695	31,677	2%	113%	113%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	289,045	13%	292%	98%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,155,306	1,187,145	19%	90%	90%	100%

Table B-10. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for No Action, the 2013 PA, and the 2014 PA.

IFQ species category	No action	2013 PA	2014 PA	2013 dif.	2014 dif.
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Canary rockfish	< 6%	< 6%	< 6%	-	-
Cowcod south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Darkblotched rockfish	< 6%	< 6%	< 6%	-	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	< 6%	-	-
Petrale sole	< 6%	< 6%	< 6%	-	-
Yelloweye rockfish	< 6%	< 6%	< 6%	-	-
Arrowtooth flounder	10%	12%	12%	2%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Dover sole	11%	11%	11%	0%	0%
English sole	< 6%	< 6%	< 6%	-	-
Lingcod	8%	9%	9%	1%	1%
Longspine thornyheads north of 34°27' N.	11%	12%	12%	1%	1%
Minor shelf rockfish north of 40°10' N.	7%	9%	9%	2%	2%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Minor slope rockfish north of 40°10' N.	6%	10%	10%	4%	4%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Other flatfish	10%	9%	9%	-1%	-1%
Pacific cod	< 6%	6%	6%	-	-
Pacific halibut (IBQ) north of 40°10' N.	9%	12%	12%	3%	3%
Pacific whiting	28%	33%	33%	6%	6%
Sablefish north of 36° N.	41%	50%	50%	9%	9%
Sablefish south of 36° N.	< 6%	< 6%	< 6%	-	-
Shortspine thornyheads north of 34°27' N.	14%	15%	15%	1%	1%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	< 6%	-	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Starry flounder	< 6%	< 6%	< 6%	-	-
Widow rockfish	< 6%	< 6%	< 6%	-	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	< 6%	-	-

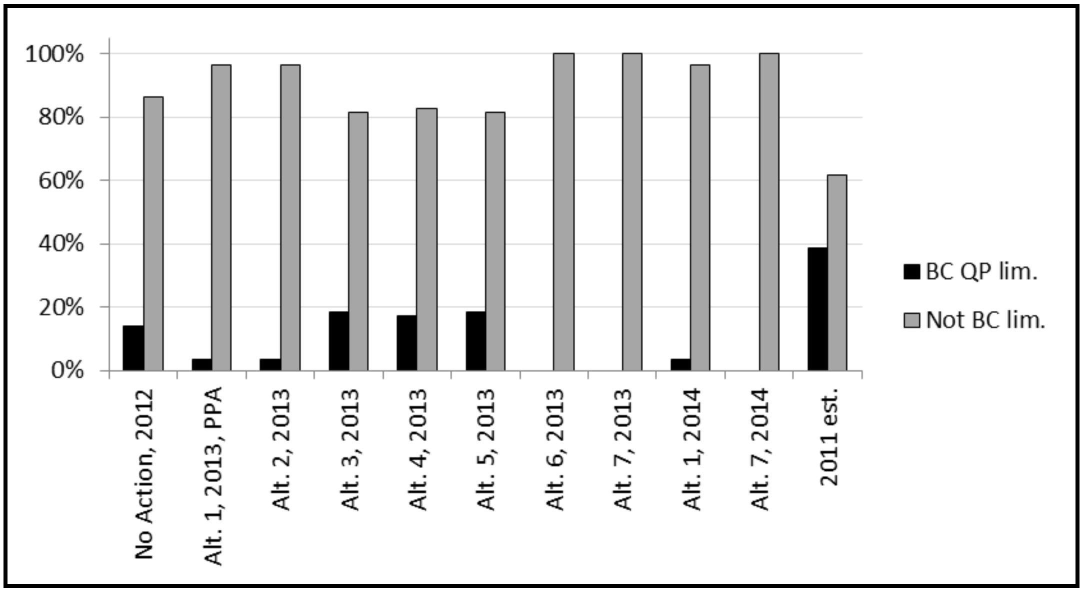

Figure B-2. Percent of vessels in the fleet, whose target attainment was predicted to be limited by QP of bycatch species, versus those not limited by QP of bycatch species, by alternative.

Table B-11. Percent of vessels in the fleet, whose target attainment was predicted to be limited by QP of bycatch species, versus those not limited by QP of bycatch species, by alternative.

Alternative	BC QP limited %	Not BC limited %
No action, 2012	14%	86%
Preferred Alt. 2013 and Alt 1	< 6%	> 94%
Alt. 2, 2013	< 6%	> 94%
Alt. 3, 2013	19%	81%
Alt. 4, 2013	17%	83%
Alt. 5, 2013	19%	81%
Alt. 6, 2013	0%	100%
Alt. 7, 2013	0%	100%
Alt. 1, 2014	< 6%	> 94%
Alt. 7. 2014	0%	100%
2011 est.	39%	61%

B.1.3 IFQ: Alternative 1 (2013)

Alternative 1 is the same as the Preferred Alternative, except the cowcod allocation is higher (4,189 pounds) compared to the Preferred Alternative (2,205 pounds). The reduced cowcod allocation did not result in changes to the projected mortalities for other species; therefore the conditions are the same as described under the Preferred Alternative.

B.1.4 IFQ: Alternative 2 (2013)

Alternative 2 differs from the No Action Alternative in that the allocation of canary rockfish is 131% of that for No Action, only slightly lower than in the Preferred Alternative. The POP allocation is nearly the same (95% of No Action). The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 2 (Table B-12). Predicted catch of canary rockfish under Alternative 2 is 90 percent of that under No Action, the same as under the Preferred Alternative. This alternative is considered to have a medium level of allocation for canary rockfish and for POP, considering the range of alternatives.

Other projected catch results are also essentially the same as for the Preferred Alternative. Catch of rebuilding species is predicted to be slightly lower than the No Action Alternative, although the allocations are slightly higher (Table B-12). This is due to predicted catch of target species remaining very similar in aggregate, by vessel, since rebuilding species are predicted as bycatch.

The slightly lower canary rockfish allocation also did not result in additional numbers of vessels predicted to be constrained by rebuilding species. Predicted numbers of vessels constrained by rebuilding species are all less than 6%, thus enabling a higher proportion of vessels to catch 100 percent of their QP for target species such as sablefish north of 36° N., whiting, and minor slope rockfish north of 40°10' N. (Table B-13). Other metrics vary little between the Alternative 2 and No Action, including predicted attainment. Where they do differ, these differences are essentially the same as between the Preferred Alternative and No Action (see the Preferred Alternative section).

Table B-12. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 2 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 2, 2013	Catch Alt. 2, 2013	Attainment Alt.2, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	75,398	6,885	9%	131%	90%	69%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,170	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	249,122	59,791	24%	95%	85%	90%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,096	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,572	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,734,220	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,213	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,810	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,304	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod N of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod S of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,009,498	49%	97%	98%	100%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,760	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,055	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,626	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,476	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,068	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	200,218,033	98%	100%	99%	99%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,589,688	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,453,189	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	287,374	13%	292%	97%	33%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,182,477	19%	90%	89%	99%

Table B-13. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 2 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 2, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	-
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	12%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	11%	0%
English sole	< 6%	< 6%	-
Lingcod	8%	9%	1%
Longspine thornyheads north of 34°27' N.	11%	12%	1%
Minor shelf rockfish north of 40°10' N.	7%	9%	2%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	10%	4%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	9%	-1%
Pacific cod	< 6%	6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	12%	3%
Pacific whiting	28%	33%	6%
Sablefish north of 36° N.	41%	50%	9%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	15%	1%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.5 IFQ: Alternative 3 (2013)

Alternative 3 differs from the No Action Alternative in that the allocation of canary rockfish is 154% of that for No Action, the same as the Preferred Alternative. The POP allocation is only 34 percent of the No Action level. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 3 (Table B-14). This alternative is considered to have a medium level of allocation for canary rockfish and a low level for POP, considering the range of alternatives.

Catch of rebuilding species is predicted to be lower than the No Action Alternative (Table B-14). The same is true for attainment, except for POP, which has higher attainment due to a combination of the low allocation in this alternative (Alternative 3), and bycatch-driven prediction of catch for this rebuilding species.

The lower POP allocation of Alternative 3 resulted in a predicted 19 percent of vessels being constrained by this species, compared with less than 6 percent under no action (Table B-15). Catch of POP under Alternative 3 was 55 percent of that under No Action. Catch of canary rockfish was 80 percent of that predicted under the No Action Alternative.

Table B-14. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 3 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 3, 2013	Catch Alt. 3, 2013	Attainment Alt. 3, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	88,846	6,098	7%	154%	80%	52%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	85,823	15%	108%	71%	65%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	90,390	38,363	42%	34%	55%	160%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,029,418	19%	235%	77%	33%
Yelloweye rockfish	1,323	102	8%	2,205	78	4%	167%	77%	46%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,319,875	16%	41%	32%	79%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	14,272,816	29%	100%	86%	86%
English sole	21,037,611	152,809	1%	14,032,423	94,502	1%	67%	62%	93%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	429,835	11%	95%	82%	86%
Lingcod north of 40°10' N.	-	-	-	2,702,867	426,826	16%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,009	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	1,674,247	41%	97%	81%	84%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	24,712	2%	101%	84%	83%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	202,183	12%	94%	68%	72%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	90,074	11%	99%	98%	99%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,368,547	15%	100%	90%	90%
Pacific cod	2,502,247	576,976	23%	2,495,633	503,501	20%	100%	87%	87%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	55,120	21%	100%	80%	80%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	182,256,102	89%	100%	90%	90%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,074,980	76%	74%	64%	86%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	946,940	71%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,185,802	38%	99%	81%	82%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,085	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	30,714	2%	112%	109%	97%
Widow rockfish	755,348	295,502	39%	2,204,623	237,628	11%	292%	80%	28%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,043,894	17%	90%	79%	88%

Table B-15. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 3 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 3, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	19%	≥ 12%
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	6%	-4%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	6%	-5%
English sole	< 6%	< 6%	-
Lingcod	8%	< 6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	8%	-3%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	6%	-3%
Pacific whiting	28%	26%	-2%
Sablefish north of 36° N.	41%	40%	-1%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	8%	-6%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.6 IFQ: Alternative 4 (2013)

Alternative 4 differs from the No Action Alternative in that the allocation of canary rockfish is 49 percent of that for No Action, and the POP allocation is 167 percent of the No Action level. This alternative is considered to have a low allocation of canary rockfish, and a high allocation of POP, considering the range of alternatives. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 4 (Table B-16).

Catch of rebuilding species is predicted to be lower for Alternative 4 than the No Action Alternative (Table B-16). The same is true for attainment, except of course for canary rockfish, which has higher attainment due to the low allocation in this alternative (Alternative 4).

The lower canary allocation of Alternative 4 resulted in a predicted 18 percent of vessels being constrained by this species, compared with less than 6 percent under no action (Table B-17). Catch of canary rockfish under Alternative 4 was 70 percent of that under No Action. The higher allocation of POP resulted in less than 6 percent of vessels being constrained by this species. Predicted catch of POP under Alternative 4 was 71 percent of that under No Action.

Table B-16. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 4 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 4, 2013	Catch Alt. 4, 2013	Attainment Alt. 4, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,529	4%	128%	89%	70%
Canary rockfish	57,761	7,651	13%	28,219	5,325	19%	49%	70%	142%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	94,749	16%	108%	78%	72%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	440,925	49,959	11%	167%	71%	43%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,036,690	19%	235%	78%	33%
Yelloweye rockfish	1,323	102	8%	2,205	68	3%	167%	67%	40%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,481,265	17%	41%	36%	89%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	447,956	18%	83%	69%	83%
Dover sole	49,018,682	16,668,724	34%	49,019,784	15,347,281	31%	100%	92%	92%
English sole	21,037,611	152,809	1%	14,032,423	87,841	1%	67%	57%	86%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	442,388	12%	95%	84%	88%
Lingcod north of 40°10' N.	-	-	-	2,702,867	439,291	16%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,097	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	1,822,354	44%	97%	89%	91%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	22,439	2%	101%	76%	76%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,544	3%	95%	92%	97%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	249,414	15%	94%	84%	89%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	75,053	9%	99%	82%	82%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,375,737	15%	100%	90%	90%
Pacific cod	2,502,247	576,976	23%	2,495,633	457,552	18%	100%	79%	80%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	60,562	24%	100%	88%	88%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	179,508,151	88%	100%	89%	89%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,313,775	82%	74%	69%	93%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	930,577	70%	117%	115%	98%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,302,196	42%	99%	89%	90%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	57,356	2%	105%	99%	94%
Starry flounder	1,480,404	28,135	2%	1,657,876	27,797	2%	112%	99%	88%
Widow rockfish	755,348	295,502	39%	2,204,623	242,608	11%	292%	82%	28%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,017,591	17%	90%	77%	86%

Table B-17. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 4 for 2013, and the No Action Alternative.

Species	No action	Alt. 4, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	18%	≥ 12%
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	-
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	8%	-2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	8%	-3%
English sole	< 6%	< 6%	-
Lingcod	8%	6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	10%	-1%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	8%	-1%
Pacific whiting	28%	26%	-2%
Sablefish north of 36° N.	41%	41%	0%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	12%	-2%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.7 IFQ: Alternative 5 (2013)

Alternative 5 differs from the No Action Alternative in that the allocation of canary rockfish is 309 percent of that for No Action, and the POP allocation is only 34 percent of the No Action level. This alternative is considered to have a high allocation of canary rockfish, and a low allocation of POP, considering the range of alternatives. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 5 (Table B-18).

Catch of rebuilding species is predicted to be lower for Alternative 5 than the No Action Alternative (Table B-18). The same is true for attainment, except for POP, which has higher attainment due to the low allocation in this alternative.

The lower POP allocation of Alternative 5 resulted in a predicted 19 percent of vessels being constrained by this species, compared with less than 6 percent under No Action (Table B-19). Catch of canary rockfish under Alternative 5 was 80 percent of that under No Action. The higher allocation of canary rockfish resulted in less than 6 percent of vessels being constrained by this species. Predicted catch of POP under Alternative 5 was 55 percent of that under No Action.

Table B-18. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 5 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 5, 2013	Catch Alt. 5, 2013	Attainment Alt. 5, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	178,354	6,098	3%	309%	80%	26%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	85,823	15%	108%	71%	65%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	90,390	38,363	42%	34%	55%	160%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,029,418	19%	235%	77%	33%
Yelloweye rockfish	1,323	102	8%	2,205	78	4%	167%	77%	46%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,319,875	16%	41%	32%	79%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	14,272,816	29%	100%	86%	86%
English sole	21,037,611	152,809	1%	14,032,423	94,502	1%	67%	62%	93%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	429,835	11%	95%	82%	86%
Lingcod north of 40°10' N.	-	-	-	2,702,867	426,826	16%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,009	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	1,674,247	41%	97%	81%	84%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	24,712	2%	101%	84%	83%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	202,183	12%	94%	68%	72%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	90,074	11%	99%	98%	99%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,368,547	15%	100%	90%	90%
Pacific cod	2,502,247	576,976	23%	2,495,633	503,501	20%	100%	87%	87%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	55,120	21%	100%	80%	80%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	182,256,102	89%	100%	90%	90%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,074,980	76%	74%	64%	86%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	946,940	71%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,185,802	38%	99%	81%	82%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,085	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	30,714	2%	112%	109%	97%
Widow rockfish	755,348	295,502	39%	2,204,623	237,628	11%	292%	80%	28%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,043,894	17%	90%	79%	88%

Table B-19. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 5 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 5 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	19%	≥ 13%
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	6%	-4%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	6%	-5%
English sole	< 6%	< 6%	-
Lingcod	8%	< 6%	(-) ≥ 2%
Longspine thornyheads north of 34°27' N.	11%	8%	-3%
Minor shelf rockfish north of 40°10' N.	7%	< 6%	(-) ≥ 1%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	< 6%	-
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	< 6%	(-) ≥ 4%
Pacific cod	< 6%	< 6%	-
Pacific halibut (IBQ) north of 40°10' N.	9%	6%	-3%
Pacific whiting	28%	26%	-2%
Sablefish north of 36° N.	41%	40%	-1%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	8%	-6%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.8 IFQ: Alternative 6 (2013)

Alternative 6 differs from the No Action Alternative in that the allocation of canary rockfish is 131 percent of that for No Action, and the POP allocation is 150 percent of the No Action level. This alternative is considered to have a medium allocation of canary rockfish, and a high allocation of POP, considering the range of alternatives. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 5 (Table B-20).

Catch of rebuilding species is predicted to be lower for Alternative 6 than the No Action Alternative. The same is true for attainment (Table B-20). Predicted numbers of vessels constrained by rebuilding species are all less than 6%, thus enabling a higher proportion of vessels to catch 100 percent of their QP for target species such as sablefish north of 36° N., whiting, and minor slope rockfish north of 40°10' N. (Table B-21).

Catch of canary rockfish under Alternative 6 was 90 percent of that under No Action. The higher allocation of canary rockfish under Alternative 6, compared to No Action, resulted in less than 6 percent of vessels being constrained by this species. Predicted catch of POP under Alternative 6 was 85 percent of that under No Action.

Table B-20. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 6 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 6, 2013	Catch Alt. 6, 2013	Attainment Alt. 6, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	75,398	6,900	9%	131%	90%	69%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,176	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	394,627	59,793	15%	150%	85%	57%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,565	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,869	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,745,565	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,219	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,879	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,373	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,012,468	49%	97%	98%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,766	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,348	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,820	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,494	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,121	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,720,185	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,591,809	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,454,645	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	291,333	13%	292%	99%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,189,649	19%	90%	90%	100%

Table B-21. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 6 for 2013, and the No Action Alternative.

IFQ species category	No action	Alt. 6, 2013	Difference
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	-
Canary rockfish	< 6%	< 6%	-
Cowcod south of 40°10' N.	< 6%	< 6%	-
Darkblotched rockfish	< 6%	< 6%	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	-
Petrale sole	< 6%	< 6%	-
Yelloweye rockfish	< 6%	< 6%	-
Arrowtooth flounder	10%	12%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	-
Dover sole	11%	12%	1%
English sole	< 6%	< 6%	-
Lingcod	8%	10%	2%
Longspine thornyheads north of 34°27' N.	11%	13%	2%
Minor shelf rockfish north of 40°10' N.	7%	11%	4%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	-
Minor slope rockfish north of 40°10' N.	6%	11%	5%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	-
Other flatfish	10%	11%	1%
Pacific cod	< 6%	8%	≥ 2%
Pacific halibut (IBQ) north of 40°10' N.	9%	13%	4%
Pacific whiting	28%	37%	9%
Sablefish north of 36° N.	41%	53%	12%
Sablefish south of 36° N.	< 6%	< 6%	-
Shortspine thornyheads north of 34°27' N.	14%	16%	2%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	-
Starry flounder	< 6%	< 6%	-
Widow rockfish	< 6%	< 6%	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	-

B.1.9 IFQ: Alternative 7 (2013 and 2014)

Alternative 7 for 2013 differs from the No Action Alternative in that the allocation of canary rockfish is 202 percent of that for No Action, and the POP allocation is 150 percent of the No Action level. For 2014, the canary allocation is 208 percent of No Action, and the POP allocation is 152 percent of No Action. The other differences between Alternative 2 allocations and No Action are all the same as described under the Preferred Alternative section, except the cowcod allocation is higher under Alternative 7 (Table B-22). These two alternatives are considered to have medium and medium-high allocations of canary rockfish, respectively, and medium and high allocations of POP, respectively, considering the range of alternatives.

Catch of rebuilding species is predicted to be lower for Alternative 7 than the No Action Alternative (Table B-22). The same is true for attainment. Predicted numbers of vessels constrained by rebuilding species are less than 6% for each one, including canary rockfish and POP, thus enabling a higher proportion of vessels to catch 100 percent of their QP for target species such as sablefish north of 36° N., whiting, and minor slope rockfish north of 40°10' N. (Table B-23).

Table B-22. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 7 for 2013, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2013	Catch Alt. 7, 2013	Attainment Alt. 7, 2013	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	169,535	6,705	4%	128%	92%	72%
Canary rockfish	57,761	7,651	13%	116,625	6,900	6%	202%	90%	45%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	37	1%	106%	94%	89%
Darkblotched rockfish	548,819	121,713	22%	590,839	108,176	18%	108%	89%	83%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	394,627	59,793	15%	150%	85%	57%
Petrale sole	2,324,995	1,334,856	57%	5,460,850	1,188,565	22%	235%	89%	38%
Yelloweye rockfish	1,323	102	8%	2,205	88	4%	167%	86%	52%
Arrowtooth flounder	20,861,131	4,096,046	20%	8,496,616	1,670,869	20%	41%	41%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,440,517	546,509	22%	83%	84%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,745,565	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	14,032,423	102,219	1%	67%	67%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,791,951	500,879	13%	95%	95%	100%
Lingcod north of 40°10' N.	-	-	-	2,702,867	497,373	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,089,084	3,506	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	4,100,598	2,012,468	49%	97%	98%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,766	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,348	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	824,529	91,956	11%	99%	100%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,820	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,494	23%	100%	100%	100%
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,121	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,720,185	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,023,436	3,591,809	89%	74%	74%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,327,183	951,519	72%	117%	117%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,084,267	1,454,645	47%	99%	99%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2013	Catch Alt. 7, 2013	Attainment Alt. 7, 2013	Allocation comparison	Catch comparison	Attainment comparison
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,351,026	61,094	2%	105%	105%	100%
Starry flounder	1,480,404	28,135	2%	1,657,876	31,509	2%	112%	112%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	291,333	13%	292%	99%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,148,692	1,189,649	19%	90%	90%	100%

Table B-23. Allocations (lbs.), predicted total catch (lbs.), attainment (%) and comparison between Alternative 7 for 2014, and the No Action Alternative (as % of No Action), in the Shorebased IFQ Fishery, by species category.

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2014	Catch Alt. 7, 2014	Attainment Alt. 7, 2014	Allocation comparison	Catch comparison	Attainment comparison
Bocaccio rockfish south of 40°10' N.	132,277	7,314	6%	175,929	6,644	4%	133%	91%	68%
Canary rockfish	57,761	7,651	13%	120,152	6,870	6%	208%	90%	43%
Cowcod south of 40°10' N.	3,968	39	1%	4,189	36	1%	106%	93%	88%
Darkblotched rockfish	548,819	121,713	22%	615,090	107,968	18%	112%	89%	79%
Pacific ocean perch north of 40°10' N.	263,452	69,945	27%	401,241	59,414	15%	152%	85%	56%
Petrale sole	2,324,995	1,334,856	57%	5,593,128	1,182,923	21%	241%	89%	37%
Yelloweye rockfish	1,323	102	8%	2,205	90	4%	167%	88%	53%
Arrowtooth flounder	20,861,131	4,096,046	20%	7,661,064	1,506,557	20%	37%	37%	100%
Chilipepper rockfish south of 40°10' N.	2,934,904	648,477	22%	2,369,969	530,711	22%	81%	82%	101%
Dover sole	49,018,682	16,668,724	34%	49,019,784	16,745,565	34%	100%	100%	100%
English sole	21,037,611	152,809	1%	11,587,496	84,409	1%	55%	55%	100%
Lingcod coastwide	3,991,800	526,447	13%	3,589,126	474,088	13%	90%	90%	100%
Lingcod north of 40°10' N.	-	-	-	2,546,339	470,770	18%	-	-	-
Lingcod south of 40°10' N.	-	-	-	1,042,786	3,319	0%	-	-	-
Lingcod north of 42° N.	1,851,883	522,762	28%	-	-	-	-	-	-
Lingcod south of 42° N.	2,139,917	3,685	0.2%	-	-	-	-	-	-
Longspine thornyheads north of 34°27' N.	4,219,648	2,059,067	49%	3,992,572	1,959,451	49%	95%	95%	101%
Minor shelf rockfish north of 40°10' N.	1,150,813	29,526	3%	1,157,206	29,766	3%	101%	101%	100%
Minor shelf rockfish south of 40°10' N.	189,598	4,953	3%	179,897	4,711	3%	95%	95%	100%
Minor slope rockfish north of 40°10' N.	1,828,779	298,443	16%	1,715,196	280,348	16%	94%	94%	100%
Minor slope rockfish south of 40°10' N.	831,958	91,797	11%	831,143	92,694	11%	100%	101%	101%
Other flatfish	9,253,683	1,528,418	17%	9,237,369	1,528,820	17%	100%	100%	100%
Pacific cod	2,502,247	576,976	23%	2,495,633	575,494	23%	100%	100%	100%

IFQ species category	Allocation No action	Catch No action	Attainment No action	Allocation Alt. 7, 2014	Catch Alt. 7, 2014	Attainment Alt. 7, 2014	Allocation comparison	Catch comparison	Attainment comparison
Pacific halibut (IBQ) north of 40°10' N.	257,524	68,872	27%	257,524	69,121	27%	100%	100%	100%
Pacific whiting	204,628,442	201,597,130	99%	204,628,442	201,720,185	99%	100%	100%	100%
Sablefish north of 36° N.	5,438,804	4,836,978	89%	4,376,176	3,906,708	89%	80%	81%	100%
Sablefish south of 36° N.	1,133,352	812,079	72%	1,439,619	1,032,130	72%	127%	127%	100%
Shortspine thornyheads north of 34°27' N.	3,120,533	1,465,666	47%	3,053,402	1,440,089	47%	98%	98%	100%
Shortspine thornyheads south of 34°27' N.	110,231	15,346	14%	110,231	15,346	14%	100%	100%	100%
Splitnose rockfish south of 40°10' N.	3,206,513	58,185	2%	3,476,690	63,385	2%	108%	109%	100%
Starry flounder	1,480,404	28,135	2%	1,666,695	31,677	2%	113%	113%	100%
Widow rockfish	755,348	295,502	39%	2,204,623	291,132	13%	292%	99%	34%
Yellowtail rockfish north of 40°10' N.	6,850,556	1,324,649	19%	6,155,306	1,190,929	19%	90%	90%	100%

Predicted catch of canary rockfish under Alternative 7 was 90 percent of that under No Action. Predicted catch of POP under Alternative 7 was 85 percent of that under No Action. The same is true of predictions for Alternative 7 in 2014 (Table B-24).

Table B-24. Percentages of vessels in the shorebased IFQ fishery predicted to attain 100% of their QP, by species and alternative, for Alternative 7 for 2013 and 2014, and the No Action Alternative.

IFQ species category	No action	Alt. 7, 2013	Alt. 7, 2014	2013 dif.	2014 dif.
Bocaccio rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Canary rockfish	< 6%	< 6%	< 6%	-	-
Cowcod south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Darkblotched rockfish	< 6%	< 6%	< 6%	-	-
Pacific ocean perch north of 40°10' N.	< 6%	< 6%	< 6%	-	-
Petrale sole	< 6%	< 6%	< 6%	-	-
Yelloweye rockfish	< 6%	< 6%	< 6%	-	-
Arrowtooth flounder	10%	12%	12%	2%	2%
Chilipepper rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Dover sole	11%	12%	12%	1%	1%
English sole	< 6%	< 6%	< 6%	-	-
Lingcod	8%	10%	10%	2%	2%
Longspine thornyheads north of 34°27' N.	11%	13%	13%	2%	2%
Minor shelf rockfish north of 40°10' N.	7%	11%	11%	4%	4%
Minor shelf rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Minor slope rockfish north of 40°10' N.	6%	11%	11%	5%	5%
Minor slope rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Other flatfish	10%	11%	11%	1%	1%
Pacific cod	< 6%	8%	8%	-	-
Pacific halibut (IBQ) north of 40°10' N.	9%	13%	13%	4%	4%
Pacific whiting	28%	37%	37%	9%	9%
Sablefish north of 36° N.	41%	53%	53%	12%	12%
Sablefish south of 36° N.	< 6%	< 6%	< 6%	-	-
Shortspine thornyheads north of 34°27' N.	14%	16%	16%	2%	2%
Shortspine thornyheads south of 34°27' N.	< 6%	< 6%	< 6%	-	-
Splitnose rockfish south of 40°10' N.	< 6%	< 6%	< 6%	-	-
Starry flounder	< 6%	< 6%	< 6%	-	-
Widow rockfish	< 6%	< 6%	< 6%	-	-
Yellowtail rockfish north of 40°10' N.	< 6%	< 6%	< 6%	-	-

Distribution of IFQ catch by area, gear type and depth

Model-based predictions of distribution of catch among areas, gear types, or depth were not produced. Currently, the information most indicative of future catch distribution according to these factors is 2011 catch data. The most recent, detailed, total catch data available (for which depth and gear information was available) at the time of this analysis was from the WCGOP, dated October 4, 2011.

Within non-whiting trips, 4.4 percent of the catch at this time was taken with fixed gear, and 95.6 percent was taken with some type of trawl gear. The total non-whiting catch at this time was 25,945,928 pounds. The distribution of catch between gear types as of early October, 2011, followed a north to south cline, where north of 40°10’ N. lat., 98 percent of non-whiting catch was taken with trawl gear, from 36° to 40°10’ N. lat., trawl accounted for 95 percent, from 34°27’ to 36° N. lat., 86 percent was taken with trawl gear, and finally, south of 34°27’, all non-whiting catch was taken with fixed gear, although it was a small percentage of the overall non-whiting catch (Table B-25). At that time these data were recorded, 86.5 percent of total catch for the sector was from declared whiting trips, with the remainder, 13.5%, from non-whiting trips. The total catch for the sector at this time was 192,352,890 pounds.

Table B-25. Distribution of IFQ total catch among areas and depths, for non-whiting trips, as of October 4, 2011.

Gear type	North of 40°10’	36° to 40°10’	34°27’ to 36°	South of 34°27’	Total
Fixed gear	1.9%	4.8%	86.4%	100.0%	4.4%
Trawl	98.1%	95.2%	13.6%	0.0%	95.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Within each gear type (for non-whiting trips), most fixed gear catch was taken in the area from 34°27’ to 36° N. lat. (46%), followed by 37 percent north of 40°10’ N. lat. Another 12 percent of fixed gear catch was taken between 36° and 40°10’ N. lat., with the remaining 5 percent coming from south of 34°27’. Within trawl catch, 89 percent came from north of 40°10’ N. lat., approximately 11% was taken between 34°27’ to 36° (Table B-26).

Table B-26. Distribution of IFQ total catch among areas and gears, for non-whiting trips, as of October 4, 2011.

Area	Fixed gear	Trawl	Total
North of 40°10’	37.4%	88.9%	86.6%
36° to 40°10’	11.7%	10.7%	10.8%
34°27’ to 36°	45.9%	0.3%	2.4%
South of 34°27’	5.0%	0.0%	0.2%
Total	100.0%	100.0%	100.0%

For non-whiting trips, the vast majority of catch was taken deeper than 100 fm (84%). This was the distribution north of 36° N. lat., however, south of 36° N. lat., all catch was taken deeper than 100 fm (Table B-27). For whiting trips, 41.4 percent of catch was taken deeper than 100 fm, while 58.6% was taken at depths less than 100 fm (all mid-water trawls).

Table B-27. Distribution of IFQ total catch among areas and depths, for non-whiting trips, as of October 4, 2011.

Depth	North of 40°10’	36° to 40°10’	34°27’ to 36°	South of 34°27’	Total
> 100 fm	83.5%	84.1%	100.0%	100.0%	84.0%
< 100 fm	16.5%	15.9%	0.0%	0.0%	16.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

B.1.1 IFQ: Alternative 8 (2013)

Alternative 8 is the same as the Preferred Alternative except for a larger canary rockfish ACL (147 mt 116 mt) and a lower cowcod allocation. Model projections of total catch for IFQ species categories, shows that this small increase in the allocation of canary rockfish was not enough to free access to additional target species catch, under the conditions inherent in the model input data, from the first 11 months of this fishery. It also suggests that access to target species in the IFQ fishery under the Preferred Alternative, as viewed through this version of the model and set of conditions, would be limited more by quota pounds of POP than by canary rockfish.

Running the model with Alternative 8 yielded no difference from the Preferred Alternative in projected total catch across all IFQ species, at the fleet level, or for individual vessels. Within the confines of this analysis, and considering the assumptions inherent in this version of the IFQ model, increasing the canary allocation is not expected to yield additional target catch, compared with the Preferred Alternative.

The allocation structure of Alternative 8 is also very similar to Alternative 7, and making the comparison of projected catch between these two alternatives is informative. Alternative 7 differs from Alternative 8 only in that it has a higher allocation of POP (394,627 versus 249,122 pounds). Alternative 7 also yielded a higher projected catch of 21 IFQ species categories than Alternative 8 (and the Preferred Alternative, which has the same POP allocation as Alternative 8), including Pacific whiting (1,502,152 pounds) and 30,450 pounds of non-whiting catch, including 2,121 pounds of sablefish (north of 36° N. lat.). This is not an enormous difference, however. The difference in projected whiting catch between Alternative 7 and Alaternative 8 is 0.75 percent of the Alternative 8 projection; the difference in projected catch of all other IFQ species is 0.09 percent of the Alternative 8 sum of projections for those species.

In summary, increasing the allocation of POP over the Preferred Alternative while holding the canary allocation constant, resulted in increased projected harvests of target species. However, increasing the allocation of canary rockfish, while holding the POP allocation constant, resulted in no increase in projected harvest. This suggests that access to target species in the IFQ fishery, as interpreted through this model and set of conditions, would be limited under the Preferred Alternative relatively more by POP than by canary rockfish.

The lack of difference in projected catch between the Preferred Alternative and Alternative 8 is logical, given that the inputs to the model were from the most “conservative” 11 months of the new fishery, when fishermen were generally focusing on target species that could be accessed with low chance of encounter with those rebuilding stocks with the smallest allocations, typically shelf species.

However, interpretation within a larger context is needed. In December, when the risks were less, given the amount of time remaining in the season, catch of many rebuilding stocks rose dramatically, which was not captured in the input data for the EIS analyses. Furthermore, after fishermen have gained a year of experience with the new management system of the IFQ fishery, including experimentation by many in December, future behavior could be different than 2011. An increase in the diversity of catch among species categories is already evident from comparing the first three months of 2012 to that of 2011.

Although the total catch through March, 2012 differs little from that in early 2011, catches of some species do show differences, and it suggests that fishermen are more confident early this year in the IFQ fishery than the same time last year (see page 6 of http://www.pcouncil.org/wp-content/uploads/I7b_SUP_GMT_APR2012BB.pdf). Currently, the species with the highest attainment is petrale sole, which is reportedly at 34 percent of its allocation, versus 26 percent at the same time in 2011; a 61 percent increase. Darkblotched rockfish currently shows the second highest attainment among species categories, with approximately 10 percent of its allocation reached, versus five percent for the same time period in 2011, an increase of more than 100 percent.

There are notable increases in attainment for several other species as well, including bocaccio, canary, chilipepper, and minor slope rockfish north and south of 40°10’ N. lat., shortspine thornyheads, north of 34°27’ N. lat, and sablefish, south of 36° N. lat. Dover sole, lingcod and yelloweye rockfish showed slightly lower attainment rates versus the same time in 2011 (by one to two percent).

Among those stocks which normally show low attainment, and thus reporting catch differences as attainment diminishes comparisons of catch between years, chilipepper rockfish currently shows 33,883 pounds caught so far this year, versus 57 pounds this time last year (Table 3). Yellowtail rockfish currently shows nearly double the catch in early 2011 (51,366 pounds in 2012 versus 27,102 pounds in 2011, an increase of 190 percent), all of which was retained. Splitnose rockfish also showed a sharp increase in catch, from 2,565 pounds early in 2011, to 17,308 pounds so far in 2012, an increase of 675 percent. Thirty-four percent of the splitnose catch in early 2012 was retained, versus 20 percent early in 2011.

B.2 Non-Nearshore

B.2.1 Sablefish Trip Limits

The following section discusses catch projections and trip limit analyses for the four fixed gear, daily trip limit (DTL) fisheries, including both limited entry (LE) and open access (OA), north and south of 36° N. lat. for 2011. Hereafter, they will be referred to as follows: LE North, LE South, OA North, and OA South.

Proposed trip limits for 2013 and 2014 in the fixed gear, sablefish, DTL fisheries were produced through iteration using GMT catch projection models (models described briefly below, and in detail in the 2011-2012 EIS).

Proposed trip limits in the Preferred Alternative for 2013 and 2014 were reduced or increased to bring projected catch to within new management targets, resulting from changes to the sablefish ACLs for the areas north and south of 36° N. lat. Landings projections were approximately 91 percent of the landings target, in order to produce trip limits which are likely to result in full attainment of harvest guidelines, while providing sufficient catch buffer, appropriate for the uncertainty in accuracy of estimated landings data, and normal uncertainty associated with statistical model projections. This strategy was supported by the Council in establishing sablefish DTL trip limits for 2012, in the November, 2011 Council meeting.

For 2013, in the LE North fishery, proposed trip limits for 2013 were reduced to approximately 85 percent of No Action levels; for the OA North fishery, proposed trip limits were reduced to 68 percent of No Action. In the area south of 36° N. lat., harvest guidelines were higher than No Action (due to a slightly higher sablefish ACL for 2013 and 2014 in this area). For LE South, proposed trip limits were 104 percent of no action; for OA South, 108 percent. Trip limits for 2014 were slightly higher than for 2013 (2 to 5 percent higher) across all four sablefish DTL fisheries, due to higher ACLs in 2014.

Analytical description

The purposes of this analysis are to compare predicted landings between the No Action Alternative and the Preferred Alternative, under their resultant regional allocations, and fishery harvest guidelines, for the four fixed gear, sablefish daily trip limit (DTL) fisheries, including limited entry (LE) and open access (OA), both north and south of 36° N. lat.

The ACLs, regional allocations, and fishery LTs only vary between the No Action Alternative, versus the Preferred Alternative and all other alternatives, within each year. Levels of these three harvest control points vary only between years (2013-2014), and between No Action and all other alternatives. Within this analysis, “harvest guidelines” is defined as numerical management harvest objectives which are not quotas. These are either cited in regulation or calculated from other higher level numerical management objectives appearing in regulation. These harvest guidelines were reduced to account for discard mortality, the method and rationale for which is described below, to produce "landings targets", which were used in projection modeling to predict landings, and determine necessary trip limits.

Model description

The catch projection models used in this analysis are linear regression models that relate trip limits to monthly or bimonthly landings, separately for each fishery. Detailed descriptions of the models can be found in Appendix A. of the 2011-2012 harvest specifications EIS.

Limited entry models were specified as described in the 2011-2012 EIS. Minor differences in model specification were made in the open access models for 2013-2014. Sablefish ex-vessel revenue and fuel prices were removed as predictor variables in the open access North and South models. Although these variables present a meaningful picture in retrospect, when their historical values are known, they do not provide valuable information for making projections of future catch, since fuel prices and sablefish prices in the future are not known, are subject to substantial variability, and either assumptions or projections must be made about these would-be predictor variables themselves. Error in assumptions regarding future values of these variables introduces bias and significantly affects accuracy of projections; using them inflates apparent accuracy and precision, producing unrealistically high multiple-R^2 values and low standard errors for the regressions. Trip limits, on the other hand, are known (are set by the Council process), and their use for projecting catch into the future presents a realistic picture of uncertainty. Data from years 2004-2006, when there was extremely small variation in trip limits, and provided little information content for the model, were removed from the OA South model, and resulted in increased model fit.

Model input data

Landings and catch data were acquired from PacFIN using the query "slct_ves_sabl_arid_DTL_no_EFP.sql". As described in the GMT inseason statements from the April, June, September, and November 2011 Council meetings, data from this query were found this year to have two substantial problems, both of which were corrected before use in the analysis for these harvest specifications. First, historical landings of sablefish with fixed gear, in the LE North, DTL fishery were substantially underestimated from 2004 through 2011, as the software in the PacFIN database which estimates division of fixed gear sablefish landings between the primary tier fishery and DTL fisheries was malfunctioning. The software has since been modified to make the most accurate division of catch between the two fisheries which is currently possible, and the GMT and Council are working on a long-range solution that would provide direct catch accounting, which would replace the currently necessary computational estimation procedure. Second, gear-switching provisions under IFQ lead to misattribution of IFQ landings of sablefish using fixed gear, to the various sablefish DTL fisheries. This has also been corrected, and screening procedures have been put in place both in PacFIN and with the states to flag and remove IFQ fish tickets from the "slct_ves_sabl_arid_DTL_no_EFP.sql" query for the sablefish DTL projection models.

Accounting for discards and discard mortality

Landings targets which appear in this section have been reduced from harvest guidelines that would appear in regulation, where applicable, in order to account for discard mortality. The harvest guideline (a specified numerical harvest objective that is not a quota) was multiplied by 15.9% (discard rate estimate), and by 20% (discard mortality rate estimate), and then that product (estimated dead discarded sablefish) was subtracted from the harvest guideline, resulting in a "landings target", which projected landings should be beneath, in order to keep total catch within the harvest guideline. The estimated discard rate used by GMT was taken from the 2010 West Coast Groundfish Observer Program (WCGOP) Total

Mortality Report. In the 2009-10 management cycle, the discard rate estimate was the same, and was derived from data in the 2007 WCGOP Total Mortality Report, which was the most recent available data at that time. That discard mortality rate estimate was taken from information in Davis (2001, LTtp://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2001.tb00495.x/abstract), Shirrippa and Colbert (2005, LTtp://www.pcouncil.org/wp-content/uploads/Sable05_complete.pdf), and Shirrippa (2007, LTtp://www.pcouncil.org/wp-content/uploads/Sable07v3_0.pdf). Shirrippa (2005) used experimental data and sea surface temperature to predict varying release mortality by gear. The GMT considered that Davis (2001) demonstrated high sensitivity to temperature and deck time, along with high variability of predicted discard mortality in Shirrippa (2005) informed by sea surface temperature data, and adopted an estimate of 20%. This value was also adopted by Taylor 2011 in the current sablefish stock assessment.

No Action Alternative

Area restrictions
Under No Action, the following Rockfish Conservation Area boundaries for use of fixed gear, from 2012 regulations, would remain in place for 2013 and 2014 (Table B-28).

Table B-28. Rockfish Conservation Area (RCA) boundaries for fixed gear, under the No Action Alternative.

Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
North of 46° 16'	shore - 100 fm					
45° 03’ 83” - 46° 16’	30 - 100 fm					
43° - 45° 03’ 83”	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)					
42° - 43°	20 - 100 fm					
40° 10’ - 42°	20 fm depth contour - 100 fm					
34° 27’ - 40° 10’	30 fm - 150 fm line					
South of 34° 27’ (w/islands)	m - 150 fm line					

Projected Landings (No action)

Projected landings under the No Action Alternative are presented in Table B-29. The GMT and the Council considered, while constructing and adopting them, respectively, the uncertainty in the landings data seen during 2011 (in terms of correctly separating primary tier landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings) along with the normal uncertainty associated with projection models, the No Action trip limit structures for 2012 for each fishery presented here. The No Action Alternative resulted in projected attainments in the range of 91% to 93%, aiming to enable harvest of a high proportion of the HG, yet accommodating previously described uncertainty.

Table B-29. Model-projected landings under the No Action Alternative, for the fixed-gear, sablefish, DTL fisheries. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	LT	No act. projection	% of LT
LE N.	North of 36° N. lat.	265	242	91%
OA N.	North of 36° N. lat.	419	381	91%
LE S.	South of 36° N. lat.	380	353	93%
OA S.	South of 36° N. lat.	309	284	92%

These trip limits can be adjusted inseason as needed to influence higher or lower catch as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure (which was appreciated by the GAP, in their statement, in the November 2011 Council meeting), and to avoid starting the year with highly variable trip limits, such as resulted from the “rolling over” of 2010 trip limits into 2011, due to unforeseeable delays in implementation.

Table B-30. Trip limits for sablefish DTL fisheries under No Action.

<table>
<tr><th>Area</th><th>Fishery</th><th>Jan-Feb</th><th>Mar-Apr</th><th>May-Jun</th><th>July-Aug</th><th>Sept-Oct</th><th>Nov-Dec</th></tr>
<tr><td rowspan="2">North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)</td><td>LE N.</td><td colspan="6">1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.</td></tr>
<tr><td>OA N.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 900 lb., not to exceed 1,800 lb. per 2 mo.</td></tr>
<tr><td rowspan="2">South of 36° N. lat.</td><td>LE S.</td><td colspan="6">1,800 lb. per week</td></tr>
<tr><td>OA S.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 1,350 lb., not to exceed 2,700 lb. per 2 mo.</td></tr>
</table>

Preferred Alternatives and Alternatives 1-8

Preferred Alternative for 2013

Projected landings under the Preferred Alternative, and all action alternatives, are presented in Table B-31. As with the No Action Alternative, we considered the uncertainty in the landings data seen during 2011 (in terms of correctly separating primary tier landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The Preferred Alternative results in of projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for all action alternatives, within each year.

Table B-31. 2013 Model-projected landings for trip limits under the Preferred Alternative for the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	LT	Preferred Alternative Projection	% of LT
LE N.	North of 36° N. lat.	197	179	91%
OA N.	North of 36° N. lat.	291	266	91%
LE S.	South of 36° N. lat.	446	405	91%
OA S.	South of 36° N. lat.	362	330	91%

Projected landings under the Preferred Alternative were lower than No Action for the LE North and OA North fisheries (74 percent and 70 percent of No Action, respectively), and higher than No Action for the LE South and OA South (115 percent and 116 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table B-32 and Figure B-3.

Table B-32. 2013 Model-projected landings for trip limits under the Preferred Alternative (equal to alternatives other than No Action), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	Prefered Alternative Projection	No Action Projection	% of No Action
LE N.	North of 36° N. lat.	179	242	74%
OA N.	North of 36° N. lat.	266	381	70%
LE S.	South of 36° N. lat.	405	353	115%
OA S.	South of 36° N. lat.	330	284	116%

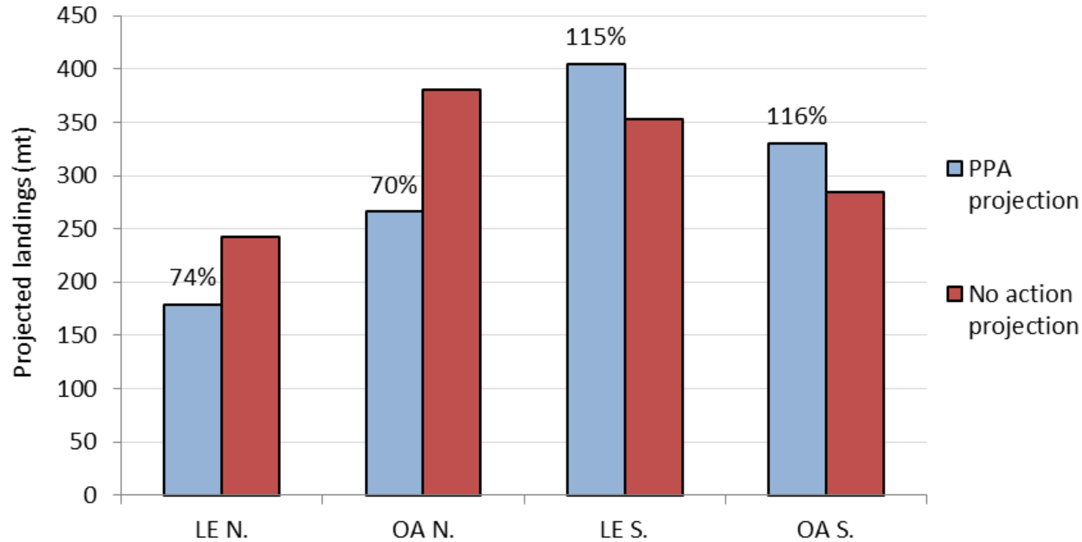

Figure B-3. Projected landings for 2013 under the Preferred Alternative and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show the Preferred Alternative projection as a percentage of No Action.

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table B-33), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 800 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 290 pounds per week and 580 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 80 pounds per week was possible in the LE South fishery, while an increase of 110 pounds per week and 220 pounds per bimonthly period was possible in the OA South fishery.

Table B-33. 2013 Proposed trip limits for 2013 in sablefish DTL fisheries under the Preferred Alternative, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,880 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.					

Preferred Alternative for 2014

Projected landings under the Preferred Alternative for 2014 are presented in Table B-34. As with the No Action Alternative, we considered uncertainty in the landings data seen during 2011 (in terms of correctly separating primary tier landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The Preferred Alternative for 2014 results in projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2014 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the Preferred Alternative and all alternatives other than No Action, within each year.

Table B-34. Model-projected landings for trip limits under the Preferred Alternative (PA), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	LT PA	PA projection	% of LT
LE N.	North of 36° N. lat.	214	194	91%
OA N.	North of 36° N. lat.	319	290	91%
LE S.	South of 36° N. lat.	483	441	91%
OA S.	South of 36° N. lat.	393	359	91%

Projected landings under the Preferred Alternative were lower than No Action for the LE North and OA North fisheries (80 percent and 76 percent of No Action, respectively), and higher than No Action for the LE South and OA South (125 percent and 126 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table B-35 and Figure B-4.

Table B-35. Model-projected landings for trip limits under the Preferred Alternative (PA), No Action Alternative, and comparison between them, in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	PA projection	No Action Projection	% of No Action
LE N.	North of 36° N. lat.	194	242	80%
OA N.	North of 36° N. lat.	290	381	76%
LE S.	South of 36° N. lat.	441	353	125%
OA S.	South of 36° N. lat.	359	284	126%

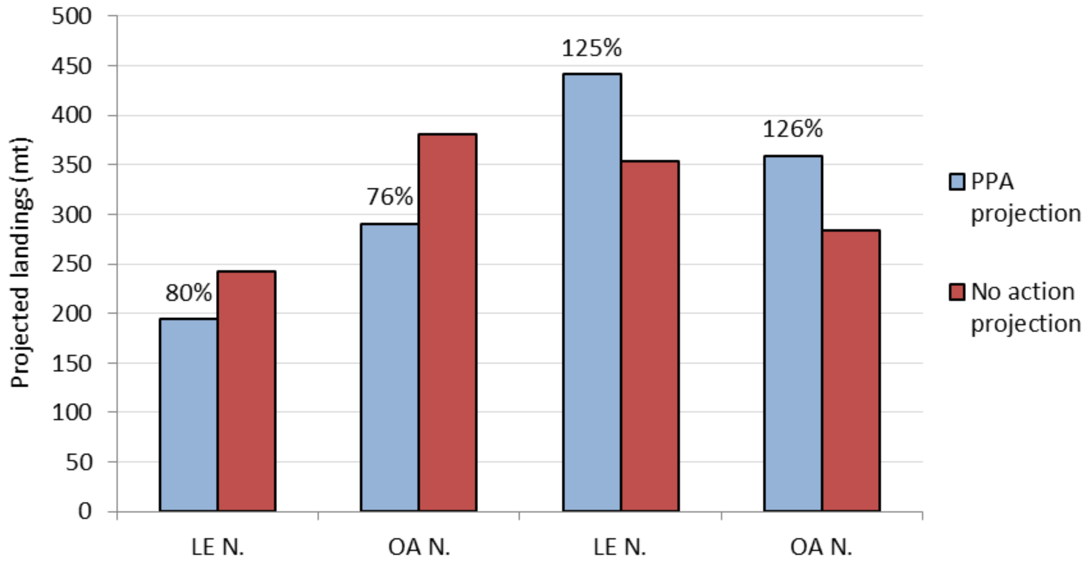

Figure B-4. Projected landings for 2014 under the Preferred Alternative and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show Preferred Alternative projection as a percentage of No Action.

Table B-36. Proposed trip limits for 2014, in sablefish DTL fisheries under the Preferred Alternative, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N	1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.					
	OA N	300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.					
South of 36° N. lat.	LE S	1,930 lb. per week					
	OA S	300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.					

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table B-36), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 600 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 225 pounds per week and 450 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 130 pounds per week was possible in the LE South fishery, while an increase of 175 pounds per week and 350 pounds per bimonthly period was possible in the OA South fishery.

B.2.2 Non-nearshore Fixed Gear

B.2.2.1 Non-Nearshore: No Action Alternative

The non-nearshore bycatch model projects overfished species mortality for both the limited entry fixed gear sector and the open access daily trip limit fishery fishing seaward of the non-trawl RCA in areas north of 36° N. latitude. Sablefish is the primary target and provides the main source of revenue in both sectors. Over the years 2005-2010, sablefish accounted for 95 percent of groundfish ex vessel revenue earned by the non-nearshore limited entry fixed gear sector in this area (Table B-37) and 93 percent of the non-nearshore open access sector (Table B-38). Other key target stocks in these sectors include Pacific halibut, shortspine and longspine thornyheads, blackgill rockfish, and for some vessels, dogfish.

Table B-37. Non-nearshore limited entry fixed gear sector ex-vessel revenues by top species, 2005-2010 (source: PacFIN).

	Total ex-vessel $ (2005-2010)	% of total
Sablefish	$63,304,213	94.9%
Pacific halibut	$1,116,932	1.7%
Shortspine thornyhead	$718,962	1.1%
Dogfish	$390,574	0.6%
Unspecificed slope rockfish	$212,770	0.3%
Longspine thornyhead	$192,545	0.3%
Other	$780,944	1.2%
Total	$66,716,940	--

Table B-38. Non-nearshore open access sector ex-vessel revenues by top species, 2005-2010 (source: PacFIN).

	Total ex-vessel $ (2005-2010)	% of total
Sablefish	$14,023,294	92.7%
Lingcod	$435,586	2.9%
Pacific halibut	$273,744	1.8%
Grenadier	$50,948	0.3%
Dogfish	$42,812	0.3%
Blackgill rockfish	$25,454	0.2%
Other	$272,933	1.8%
Total	$15,124,771	--

Yelloweye rockfish and canary rockfish are the two key rebuilding stocks affecting these sectors in that there is a small margin between recent catch and the sector’s allocations of these stocks. Other rebuilding stocks are caught by these sectors as well, yet the catch has so far remained sufficiently below their respective sector allocations.

The non-trawl RCA is the main management measure for mitigating bycatch of the rebuilding stocks. Seaward expansion of the RCA is the main option for additional reductions in catch of yelloweye and canary. As in past cycles and discussed below, the WCGOP data suggests that overall encounters with these stocks would decrease as the RCA is extended seaward (Table B-39).

Table B-39. WCGOP bycatch rates, by 25 fathom (fm) depth category, of canary rockfish and yelloweye rockfish (lbs. of catch per 1,000 lbs. of landed sablefish) in the non-nearshore fixed gear sectors for the years 2002-2009 in the area north of 40° 10' N. latitude.

	canary rockfish	yelloweye rockfish
>100 fm	1.6	0.7
>125 fm	1.2	0.4
>150 fm	1.2	0.2

The circumstances in these two sectors remain very similar to those analyzed in the 2011-12 FEIS. The analysis of the non-nearshore sectors and related effects on fishing communities in that FEIS remains generally applicable here. Bycatch projections have been updated with WCGOP data from 2009 and the model now incorporates data collected from 2002 to 2009. Data from 2009 was the most recently available data at the time of the analysis. The other main change from 2011-12 comes from the changed sablefish ACL. As highlighted above, sablefish provides the main source of revenue for these sectors. With bycatch rates remaining mostly stable in recent years, the revenue-based economic impact analysis used here are therefore most sensitive to changes in the sablefish ACL. In these 2013-14 integrated alternatives, the expected sablefish harvest only varies with the No Action alternative because of the different sablefish ACL value associated with that alternative. There will therefore be no contrast in the quantitative revenue projections between the action alternatives.

Table B-40. Sablefish harvest projections for the non-nearshore, limited entry fixed gear sector under the action alternatives based on the Preferred 2013-2014 sablefish ACLs for the area north of 36^0 N. latitude.

	Limited Entry (all catch estimates are expressed as metric tons (mt))					
Sablefish N. of 36	**Total Catch Share**	**Observed Discard Rate**	**Assumed Discard Mortality (20%)**	**Landed Catch Projection**	**Primary Season**	**LEFG DTL**
No Action	1,823	16%	58	1,764	1,500	264
2013	1,362	16%	43	1,318	1,121	198
2014	1,477	16%	47	1,430	1,216	215

Table B-41. Sablefish harvest projections for the non-nearshore open access sector under the action alternatives based on the Preferred 2013-2014 sablefish ACLs for the area north of 36^0 N. latitude.

		Open Access (all catch estimates are expressed as metric tons (mt))					
Sablefish N. of 36	**OA Share**	**Incidental OA removal**	**Directed OA Total Catch Share**	**Observed Discard Rate**	**Assumed Total Discards**	**Assumed Discard Mortality (20%)**	**Directed OA Landed Catch Share**
No Action	450	17	433	16%	69	14	419
2013	336	35	301	16%	48	10	292
2014	365	35	330	16%	52	10	319

Seaward RCA Boundary	**36°- 40° 10'**	**40°10'-Col/Eur 43°**	**Col/Eur 43°-Cascade Head 45.064°**	**Cascade Head 45.064°-Pt. Chehalis 46.888°**	**North of Pt. Chehalis 46.888°**
Shoreward boundary to 100 fm					
100 fm					
125 fm					
150 fm					
>150 fm					

Figure B-5. No Action Alternative: Non-trawl RCA seaward configuration. The shoreward configuration of the RCA is driven by the nearshore model. Grey shading indicates areas closed to fishing.

Table B-42. No Action Alternative: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013-14 Sector allocations (mt)
Canary rockfish	2.3
Yelloweye rockfish	1.3

Limited Entry North of 36° N. latitude

Under the No Action alternative and the corresponding carryover of the 2012 sablefish ACL, the limited entry fixed gear sector is projected to land 1,764 mt of sablefish (Table B-40). This amount is 3 percent less than the equivalent projection used for 2012 because of updated information on the proportion of the sablefish catch that is discarded at sea.

At this level of activity, the model projects overfished species mortality reported in Table B-43. These projections are lower than the values projected for these sectors in 2012 and remain below the allocation under the No Action alternative (Table B-42). Therefore, no changes to management measures would be required.

Table B-43. No Action Alternative: Modeled-overfished species projected mortality for the limited entry fixed gear sector north of 36° N. latitude.

Species	Projected Mortality (mt)
Bocaccio	0.0
Canary rockfish	1.7
Darkblotched rockfish	3.2
Pacific ocean perch	0.3
Yelloweye rockfish	0.7

Open Access Sablefish DTL north of 36° N. latitude

The projected mortality for the open access sector under the No Action alternative are also similar to the 2011-12 estimates. The No Action projection is that 419 mt of sablefish will be landed by this sector in the areas north of 36° N. latitude. At this level of landings, the projected mortality of yelloweye rockfish remains at 0.1 mt and the projection for canary rockfish increases by 0.1 mt compared to 2011-12 (Table

B-44). This slight increase in the canary impact would not exceed the allocation for this sector (Table B-42) and so no RCA adjustment would be needed under the No Action Alternative.

Table B-44. No Action Alternative: Modeled-overfished species projected mortality for the open access sablefish daily trip limit fishery north of 36° N. latitude.

Species	Projected Mortality (mt)
Bocaccio	0.0
Canary rockfish	0.3
Darkblotched rockfish	0.7
Pacific ocean perch	0.0
Yelloweye rockfish	0.1

B.2.2.2 Non-Nearshore: Preferred Alternative

Under the all action alternatives, the sablefish north of 36° N. latitude ACL decreases substantially relative to 2011-12. This decrease translates directly into lower expected mortality of rebuilding stocks in the two non-nearshore sectors. As to the two key rebuilding stocks in these sectors, the Preferred Alternative sector allocations would allow the non-nearshore sectors yelloweye mortality of 1.1 mt for both 2013 and 2014, and canary mortality of 3.6 mt and 3.7 mt for 2013 and 2014, respectively (Table B-45).

This expected decrease in yelloweye and canary rockfish mortality are not substantial enough to consider relaxation of the seaward boundary of the non-trawl RCA from its baseline configuration. Reducing the seaward extent of the RCA boundary would be expected to increase encounters with canary, yelloweye, and other shelf rockfish stocks like bocaccio. The RCA was established at 100 fathoms because the 100 fm depth contour marks the transition between shelf and slope habitats. If fishing areas are reopened on the shelf, catch of shelf rockfish stocks like canary and yelloweye could increase substantially. In addition, estimates of yelloweye catch in these sectors have shown variability in recent years with estimates of actual catch differing by more than 50 percent higher and lower than the bycatch projections from the non-nearshore model. Such volatility requires some caution when interpreting and planning based on projected mortality. The GMT and NWFSC will further evaluate this variability and the management uncertainty it creates in preparation for future cycles.

Table B-45. Preferred Alternative: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	3.6	3.7
Yelloweye rockfish	1.1	1.1

Limited Entry North of 36° N. latitude

The limited entry fixed gear sector are projected to land 1,315 mt and 1,427 mt of sablefish in 2013 in 2014, respectively, under the action alternatives. These amounts represent a 19-25 percent decrease relative to the No Action Alternative. The corresponding mortality projections for the rebuilding stocks are listed in Table B-46.

Table B-46. Preferred Alternative: Modeled-overfished species projected mortality for the limited entry fixed gear sector north of 36° N. latitude.

Species	Projected Mortality 2013 (mt)	Projected Mortality 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	1.3	1.4
Darkblotched rockfish	2.4	2.6
Pacific ocean perch	0.2	0.2
Yelloweye rockfish	0.5	0.6

Open Access Sablefish DTL north of 36° N. latitude

The open access DTL sector is projected to land 291 mt and 319 mt of sablefish in the area north of 36° N. latitude during 2013 and 2014, respectively, under this alternative. Landings at these levels correspond to the projected mortality shown in Table B-47.

Table B-47. Preferred Alternative: Open access fixed gear north of 36° N. latitude projected mortality of overfished species.

Species	Projected Mortality 2013 (mt)	Projected Mortality 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	0.2	0.2
Darkblotched rockfish	0.5	0.5
Pacific ocean perch	0.0	0.0
Yelloweye rockfish	0.1	0.1

B.2.2.1 Non-Nearshore: Alternative 1

Alternative 1 includes the same management measures for the non-nearshore fishery as the Preferred Alternative and has the same projected mortalities.

B.2.2.2 Non-Nearshore: Alternative 2

The two-year allocation of yelloweye rockfish under this alternative to the non-nearshore sectors is, again, 1.1 mt for 2013 and 2011; and the two-year allocations of canary rockfish proposed under this alternative are 3.0 mt and 3.1 mt for 2013 and 2014, respectively (Table B-45). The expected landings of sablefish and projected mortality of rebuilding stocks are identical to the Preferred Alternative (Table B-46 and Table B-47) and the current RCA configuration could be maintained.

Table B-48. Alternative 2: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	3.0	3.1
Yelloweye rockfish	1.1	1.1

B.2.2.3 Non-Nearshore: Alternative 3

The two-year allocation of yelloweye rockfish and canary rockfish—the two key bycatch stocks in the non-nearshore sectors—are identical to those under the Preferred Alternative (Table B-45). The expected sablefish landings and projected overfished species mortality is identical to those under the Preferred Alternative as well (Table B-46 and Table B-47).

B.2.2.4 Non-Nearshore: Alternative 4

Under this alternative, the proposed two year allocation of canary rockfish—1.1 mt in 2013 and 1.2 mt in 2014 (Table B-49) - is a substantial reduction compared to No Action and would require an adjustment to the seaward boundary of the non-trawl RCA to keep projected canary mortality within the sector allocations. The non-nearshore fixed gear sectors would need a two-year canary allocation of at least 1.5 mt in 2013 and 1.6 mt in 2014 to maintain the current RCA configuration. As under all other action alternatives, the two-year allocation of yelloweye rockfish to the non-nearshore sectors is 1.1 mt in both 2013 and 2014.

Table B-49. Alternative 4: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	1.1	1.2
Yelloweye rockfish	1.1	1.1

To reduce canary mortality to within the two year allocations proposed under this alternative, the seaward boundary would have to be pushed to 150 fathoms in all areas north of 40°10’ N. latitude (Figure B-6), which would extend the non-trawl RCA to its largest size yet. As in past cycles, it is assumed that the sectors will achieve full harvest of their sablefish allocations irrespective of where the RCA boundaries are established. Sablefish are highly valuable and still available at depths beyond 150 fathoms. Nonetheless, this assumption has not been tested in areas north of 40° 10’ N. latitude.

The RCA expansion would be expected to raise the cost of harvest and, in turn, to potentially lower profits. However, without data from logbooks and other economic information from these sectors, the potential effects of a seaward expansion of the non-trawl RCA are not well understood. In general, the expansion could push vessels into less productive fishing grounds and lower catch rates. As highlighted in the 2011-12 FEIS, increased gear conflicts both within the sector and with the bottom trawl sector is another concern involved with seaward RCA expansion. The expansion would create longer-distance runs to fishing grounds that could also increase costs and reduce profits. In addition, if catch rates are indeed lowered then overall time on the water could increase. These longer travel distances could especially affect the open access sector where trip limits generally allow less sablefish harvest opportunity per vessel. The longer distance to and time spent on the fishing grounds could also cause safety concerns for smaller vessels.

Dogfish targeting by fixed gear vessels is another factor the Council has considered over the last few cycles when evaluating a seaward expansion of the non-trawl RCA. The level of income provided by this stock is small relative to the overall coastwide revenue provided by sablefish (Table B-37 and Table B-38), and so the loss of dogfish opportunity may not register in the revenue projections among these integrated alternatives. Yet dogfish have provided an important source of income to certain vessels operating off northern Washington both before and after implementation of the RCA. The current RCA configuration already covers significant dogfish fishing grounds and an expansion to 150 fathoms would likely eliminate fishing opportunity for this stock completely.

In 2009, concerns over yelloweye bycatch caused the Council to move the RCA boundary out to 125 fathoms in the area between 43° N. latitude and Cascade Head. The Council exempted the directed halibut fishery, which is only open a few days per year, from this change and only held vessels participating in that fishery to the 100 fathom seaward RCA boundary. If the Council took the same approach here, the directed halibut fishery would not be affected by the RCA expansion. A deeper RCA reduces access to halibut and would be expected to increase gear conflicts. The directed Pacific halibut fishery is a derby-style fishery where a vessel's harvest is limited to what can be taken during the limited opening of the fishery.

Seaward RCA Boundary	**36°- 40° 10'**	**40°10'- Col/Eur 43°**	**Col/Eur 43°- Cascade Head 45.064°**	**Cascade Head 45.064°- Pt. Chehalis 46.888°**	**North of Pt. Chehalis 46.888°**
Shoreward boundary to 100 fm					
100 fm					
125 fm					
150 fm					
>150 fm					

Figure B-6. Alternative 4, Non-trawl RCA seaward configuration. Grey shading indicates areas closed to fishing.

Limited Entry North of 36° N. latitude
With the seaward boundary of the RCA north of 40° 10' N. latitude extend from 100 fathoms to 150 fathoms, the projected mortality for the limited entry fixed gear sector are those shown in Figure B-6. As in the other action alternatives, these projected mortalities are based on the assumption that the limited entry fixed gear sector will land 1,315 mt of sablefish in 2013 in the area north of 36° N. latitude with that number increasing to 1,427 mt in 2014.

Table B-50. Alternative 4. Modeled-overfished species projected mortality for the limited entry fixed gear sector north of 36° N. latitude.

Species	Projected Mortality 2013 (mt)	Projected Mortality 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	0.9	1.0
Darkblotched rockfish	3.4	3.7
Pacific ocean perch	0.2	0.2
Yelloweye rockfish	0.2	0.2

Open Access Sablefish DTL north of 36° N. latitude
Table B-51 shows projected mortality in the open access fixed gear north of 36° N. latitude with the seaward boundary of the RCA north of 40° 10' N. latitude extend from 100 fathoms to 150 fathoms. As in the other action alternatives, the projected mortality is based on the assumption that the limited entry fixed gear sector will land 1,315 mt of sablefish in 2013 in the area north of 36° N. latitude with that number increasing to 1,427 mt in 2014.

Table B-51. Alternative 4. Open access fixed gear north of 36° N. latitude projected mortality of overfished species.

Species	Projected Impacts 2013 (mt)	Projected Impacts 2014 (mt)
Bocaccio	0.0	0.0
Canary rockfish	0.1	0.1
Darkblotched rockfish	0.6	0.7
Pacific ocean perch	0.0	0.0
Yelloweye rockfish	0.0	0.0

B.2.2.5 Non-Nearshore: Alternative 5

As described under the No Action alternative, canary rockfish and yelloweye rockfish are the two key bycatch stocks in the non-nearshore sectors. The two year allocations for canary rockfish are 7.2 mt and 7.3 mt, respectively, under Alternative 5 (Table B-52). The expected sablefish landings and projected mortality of rebuilding stocks under this alternative are identical to those under the Preferred Alternative (Table B-46 and Table B-47). The RCA configuration in place for 2011 and 2012 could be maintained under this alternative. As highlighted in the discussion under the Preferred Alternative, the 1.1 mt of yelloweye mortality allowed to this sector are too low to consider any liberalization of the seaward boundary of the RCA.

Table B-52. Alternative 5: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	1.1	1.2
Yelloweye rockfish	1.1	1.1

B.2.2.6 Non-Nearshore: Alternative 6

The two year allocations proposed under this alternative are identical to those under Alternative 2 for the key rebuilding stocks—yelloweye rockfish and canary rockfish (Table B-48)—as are the expected landings of sablefish and projected mortality of rebuilding stocks (Table B-46 and Table B-47). As under Alternative 2, the current RCA configuration could be maintained under this alternative.

B.2.2.7 Non-Nearshore: Alternative 7

As discussed under the other alternatives, canary rockfish and yelloweye rockfish are the two key bycatch stocks in the non-nearshore sectors. The two year allocations for canary rockfish proposed under this alternative are 4.7 mt and 4.8 mt, respectively. The two-year allocation of yelloweye rockfish, as under all other action alternatives, is 1.1 mt in both 2013 and 2014 (Table B-53).

The expected sablefish landings and projected mortality of rebuilding stocks under this alternative are identical to those under the Preferred Alternative (Table B-46 and Table B-47). The RCA configuration in place for 2011 and 2012 can be maintained. As highlighted in the discussion under the Preferred Alternative, the 1.1 mt of yelloweye allocation for this sector is too low to consider any liberalization of the seaward boundary of the RCA.

Table B-53. Alternative 7: Two-year sector allocation of yelloweye and canary rockfish to the non-nearshore fixed gear sectors.

Species	2013	2014
Canary rockfish	4.7	4.8
Yelloweye rockfish	1.1	1.1

B.2.2.8 Non-Nearshore: Alternative 8

Alternative 8 includes the same management measures for the non-nearshore fishery as the Preferred Alternative and has the same projected mortalities.

B.3 Nearshore

B.3.1 Nearshore: No Action Alternative

Under the No Action alternative, landing projections for 2013-14 would be based on final inseason action taken in September 2011 (Table B-54). Those projections were originally calculated in March 2011 using average landings for each species from the three highest years from 2007 to 2010. Overfished species impact projections would be stratified into three areas[1]: (1) north of 42° N. latitude; (2) between 42° N. latitude and 40° 10' N. latitude; and (3) south of 40° 10' N. latitude. The overfished species allocations would be divided between Oregon and California[2] based on the result from the final preferred alternative in 2011-12 (2011-2012 FEIS).

Under the No Action alternative, depth restrictions would remain unchanged (30 fm north of 43° N. latitude; 20 fm[3] between 43° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N. latitude and 34° 27' N. latitude; 60 fm south of 34° 27' N. latitude) (Figure B-7).

Some Oregon and California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, destroyed vessels, and limited the fishermen's ability to access and/or sell catches. Crescent City, which typically provides some of the highest historical nearshore landings in northern California, was hit hard by this disaster. As a result, the landings originally projected for this fishery, particularly between 42° N latitude and 40° 10' N. latitude, are not likely to materialize and actual overfished species mortality will likely be lower than projected. Although Brookings was also heavily impacted by this tsunami, and provides much of the southern Oregon nearshore landings, damage to Port Orford and other Oregon ports was light or nonexistent. Oregon nearshore fisheries therefore were uninterrupted by the tsunami north of Brookings, and actual landings by the Oregon nearshore fishery will approximate the projected landings shown in Table B-54. The 2011 landings in Oregon may have exceeded projected landings had the tsunami not occurred.

As discussed in the 2011-12 FEIS, the nearshore fishery is not modeled based upon full attainment of non-overfished species allocations and this fishery will continue to be held at reduced levels compared to historic harvests due to restrictions imposed by overfished species caps and restrictive RCAs. Indeed, historical state landing caps are, in many cases, unattainable under the No Action alternative, resulting in

[1] Prior to 2011, the nearshore model was stratified north and south of 40° 10' N latitude. In 2011, the model was modified to incorporate a finer area stratification to allow each state to manage their fishery independently
[2] Washington does not have a commercial nearshore fishery.
[3] The 20 fm RCA is defined by depth, not waypoints.

lost economic opportunities. Public testimony and advisory body comments summarized in the 2011-12 FEIS speak to the hardships faced by the nearshore fisheries in both states as a result of the low allocation of yelloweye rockfish and the restrictive RCAs under the No Action alternative. In particular, the ports of Port Orford, Brookings, Eureka, and Crescent City have been negatively impacted by the reduced trip limits and restricted access to productive fishing grounds as a result of the non-trawl RCA closures implemented to reduce mortality of overfished species, particularly yelloweye. These ports would produce substantially higher landings of target species under the less restrictive RCAs and/or landing caps that were available prior to 2009.

Increased competition for space, gear conflicts, reduced access to productive fishing grounds, and potentially increased local depletions of some fish stocks may have resulted from the more restrictive management measures first implemented in 2009. These measures forced individuals to shift their historical fishing effort from deeper to shallow depths (see above). The most recent data on proportion of catch by depth from West Coat Groundfish Observer Program reveal that substantial fishing effort occurred deeper than 20 fm prior to 2009, especially off northern California. Fishing effort at 20 – 30 fm depths was significant in some cases, reaching as much as 40 percent of the fishing effort for some nearshore species in northern California and 6 percent of the fishing effort off Oregon (Table B-55). Competition for space and the potential for local depletion become even more problematic when the recreational fishery is open because it operates in similar depths to the nearshore fishery.

The No Action alternative is modeled assuming the bycatch rates, weather, and market conditions applied or experienced in 2011 and 2012 will be the same in 2013 and 2014. Under the No Action alternative, this fishery would be held to the projected yelloweye allocation, 1.1 mt, which is equal to the yelloweye allocation imposed for the 2011 and 2012 fisheries. Although overfished species mortality in 2011 may be lower than projected, the projected mortality in 2013 and 2014 could be higher due to some unforeseen event or to natural variation in annual catches. Few management measures remain available to further reduce yelloweye mortality in this fishery (if needed); drastic reductions to landed catch or total fishery closure between 43° N. latitude and 40° 10' N. latitude would be required to further reduce yelloweye mortality. Depth restrictions shallower than 10 fm are ill advised because fishing would occur in very shallow waters. Modifications to depth restrictions or reductions in landed catch south of 40° 10' N. latitude could provide some savings for canary rockfish but would provide little (if any) savings of yelloweye rockfish because this is an area of low bycatch for that species.

Projected mortality of overfished species under the No Action alternative is summarized in Table B-56.

Table B-54. No Action: Nearshore fishery projected total landings by area for 2013-14.

Area	Projected Total Landings (mt) 2013-14
Grand Total	**499**
Black rockfish	197
Blue rockfish	17
Cabezon	95
Deeper nearshore rockfish	36
Kelp greenling	22
Lingcod	52
Other minor nearshore rockfish	21
Shallow nearshore rockfish	59
North of 42º N. lat.	
Black rockfish	111

Blue rockfish	3
Cabezon	25
Kelp greenling	20
Lingcod	28
Other minor nearshore rockfish	11
42º - 40º10' N. lat.	
Black rockfish	82
Blue rockfish	11
Cabezon	7
Kelp greenling	0
Lingcod	8
Other minor nearshore rockfish	10
South of 40º10' N. lat.	
Black rockfish	4
Blue rockfish	3
Cabezon	63
Deeper nearshore rockfish	36
Kelp greenling	1
Lingcod	16
Shallow nearshore rockfish	59

Table B-55. Summary of observed nearshore landings by area and depth from 2003 through 2010 (source: West Coast Groundfish Observer Program, 2010).

	% of observed landings by depth		
NORTH of 42° N. lat.	**0-10 fm**	**11-20 fm**	**> 20 fm**
Black rockfish	49.8%	48.5%	1.7%
Blue rockfish	38.5%	56.0%	5.4%
Cabezon	28.3%	68.7%	3.0%
Kelp greenling	50.3%	47.7%	1.9%
Lingcod	30.8%	64.0%	5.3%
Other minor nearshore rockfish	27.8%	66.4%	5.7%
42° to 40°10' N. lat.	0-10 fm	11-20 fm	> 20 fm
Black rockfish	44.5%	52.3%	3.2%
Blue rockfish	18.1%	70.7%	11.2%
Cabezon	46.6%	39.7%	13.8%
Kelp greenling	37.7%	61.4%	0.9%
Lingcod	30.4%	47.9%	21.7%
Other minor nearshore rockfish	18.9%	41.5%	39.7%
SOUTH of 40°10' N. lat.	0-10 fm	11-20 fm	> 20 fm
Black rockfish	46.3%	48.4%	5.3%
Blue rockfish	52.7%	40.4%	6.9%
Cabezon	94.6%	3.9%	1.4%
Deeper nearshore rockfish	30.7%	61.3%	8.0%
Kelp greenling	91.5%	6.8%	1.7%
Lingcod	54.4%	41.8%	3.9%
Shallow nearshore rockfish	69.1%	24.1%	6.8%

Shoreward RCA Boundary	**South of 34°27'**	**34°27' - 40°10'**	**40°10' - 42°**	**42°- 43°**	**43° - 46°16'**	**North of 46°16'**
Shore						
20 fm						
30 fm						
60 fm						

Figure B-7. No Action: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing.

Table B-56. No Action: Overfished species bycatch projections for the nearshore fixed gear fisheries for 2013-2014.

Species	Area	Projected Total Impacts (mt) 2013-14	Allocation (mt) 2013-14[a/]
Bocaccio	Total	0.5	
	OR: North of 42º	0	n/a
	CA: 42º - 40º10'	0	
	CA: South of 40º10'	0.5	0.7
Canary	Total	3.2	4.0
	OR: North of 42º	0.8	
	CA: 42º - 40º10'	0.8	
	CA: South of 40º10'	1.6	
Cowcod	Total	0	
	OR: North of 42º	0	n/a
	CA: 42º - 40º10'	0	
	CA: South of 40º10'	0	0.9[b/]
Darkblotched	Total	0.2	n/a
	OR: North of 42º	0.2	
	CA: 42º - 40º10'	0	
	CA: South of 40º10'	0	
Yelloweye	Total	1.0	1.1
	OR: North of 42º	0.7	0.8
	CA: 42º - 40º10'	0.2	0.3
	CA: South of 40º10'	0.1	

[a/]represents nearshore share of non-trawl allocation
[b/]non-trawl allocation

B.3.2 Nearshore: Preferred Alternative

The Preferred Alternative is the same as Alternative 1, which is described in the next section. The preferred RCA structure is 30 fm in Oregon and maintaining the status quo structure in California (described as Alternative 1b in the next section).

B.3.3 Nearshore: Alternative 1

Under the Alternative 1, the allocations of canary and yelloweye rockfish to the nearshore fishery are higher than the No Action alternative. Although both states will have some increased opportunity compared to No Action, management measures will continue to be more restrictive and landings lower than years prior to 2009 (2009-2010 FEIS). As such, nearshore fishermen continue to be negatively impacted by the reduced trip limits and restricted access to productive fishing grounds, as a result of the non-trawl RCA closures, implemented to reduce mortality of overfished species, particularly yelloweye.

Similar to the No Action alternative, Alternative 1 is modeled assuming the bycatch rates, weather, and market conditions experienced in 2011 and 2012 will be the same in 2013 and 2014, and assumes no variation in landings and mortality. If overfished species mortality is higher than projected, then few management measures are available to further reduce yelloweye bycatch in this fishery (if needed). Further reductions in yelloweye bycatch would require drastic reductions to landed catch or total fishery closure between 43° N. latitude and 40° 10' N. latitude. Depth restrictions shallower than 10 fm are ill advised because of vessel safety concerns.

Based on Council direction, the No Action catch sharing for canary (OR = 26.7%; CA = 73.3%) and yelloweye rockfish (OR = 72.7%; CA = 27.3%) was analyzed in the integrated alternatives. Under this alternative, the tradeoffs between more restrictive depth restrictions and higher reductions in landed catch were explored (Alternatives 1a and 1b). In Oregon, overfished species mortality is projected assuming the same RCA under No Action (20 fm depth restriction between 42° N. latitude to 43° N. latitude) (Alternative 1a) and a 30 fm depth restriction statewide (Alternative 1b). In California overfished species mortality is projected assuming the same RCA under No Action for both sub-alternatives (20 fm between 42° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N latitude and 34° 27' N. latitude; 60 fm south of 34° 27' N. latitude).

North of 42° N. latitude – under Alternative 1a, the RCA configuration (Figure B-7) would be the same as No Action and landings would be increased 8 to 29 percent (depending on the species) relative to No Action (Table B-58) to reflect state landing caps. Lingcod could also be increased by 40 percent relative to the No Action. Under Alternative 1b, a 30 fm RCA configuration would be implemented statewide (Figure B-9) and landings increased 7 percent relative to No Action (Table B-58).

Under Alternative 1a, current state landing caps could be reached, assuming overfished species bycatch rates, weather, and other unforeseen circumstances are similar to 2011 – 2012. However, the shoreward RCA in southern Oregon would still be restricted to 20 fm. As described for the No Action alternative, this narrow fishing depth distribution (< 20 fm) may result in increased gear conflicts, increased probability of local depletions for certain populations, and reduced access to productive fishing grounds. The result is reduced economic efficiency in attaining landing caps. The negative impacts of this 20 fm RCA is most realized by the communities of Brookings and Port Orford.

Pre-2009 fishing grounds would be reopened under Alternative 1b, where the RCA would be returned to 30 fm statewide (Figure B-9). Alternative 1b would reduce gear conflicts, reduce the potential for local depletions, and increase opportunities to fish in productive areas that have been closed for four years. However, under this alternative, landings would be restricted to levels well below historical landing caps for the state of Oregon.

South of 42° N. latitude – under Alternatives 1a and 1b, the RCA configuration and landings would be the same as No Action, except for greenling and lingcod (Table B-58; Figure B-8). Landings of greenling would be increased but are projected to be within the greenling contribution to the Other Fish complex. A small increase in lingcod landings could also be afforded statewide while staying within overfished species allocations.

Under the Alternative 1, the communities of Eureka and Crescent City will continue to be negatively impacted by the 20 fm depth restriction to reduce yelloweye mortality. Gear conflicts and competition for space as described under the No Action alternative will continue without an increase in the yelloweye rockfish allocation to the state. Also as discussed under the No Action alternative, this fishery has historically operated at deeper depths and almost 40 percent of the minor nearshore rockfish and over 20 percent of the lingcod landings were observed in depths greater than 20 fm from 2003 to 2010. Forcing this fishery into shallower depths has made it difficult for the fishermen to prosecute their fishery. Although the area south of 40° 10' N. latitude has lower yelloweye rockfish bycatch, they still do occur and the ability to implement more restrictive management measures on a finer geographic scale is limited. Therefore, if needed, more restrictive management measures (e.g., trip limit reductions and a more restrictive non-trawl RCA) would more than likely be applied to areas where catch did not occur simply due to management limitations.

In addition, the California Fish and Game Commission (Commission) is in the process of implementing marine protected areas (MPAs) in this region. At this time, a total of 20 MPAs, covering approximately 137 sq mi of state waters or about 13 percent of the area north of 40° 10' N. latitude, are included in the Commission's preferred alternative (CDFG 2011). Since these MPAs occur in state waters, many in 20 fm or less, this further limits the available fishing areas for nearshore fishermen and would further exacerbate crowding issues.

Projected landings under Alternative 1 are summarized by area and alternative in Table B-58 and overfished species mortality is summarized in Table B-59**.**

Table B-57. Nearshore apportionment of the non-trawl allocation for canary and yelloweye rockfish for 2013-14.

	No Action (mt)	Alt 1 (mt)	Alt 2 (mt)	Alt 3 (mt)	Alt 4 (mt)	Alt 5 (mt)	Alt 6 (mt)	Alt 7 (mt)
Canary	4.0	6.2/6.4	5.3/5.5	6.2/6.4	2	12.5/12.7	5.3/5.5	8.2/8.4
Yelloweye	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2

Table B-58. Alternative 1: Nearshore target species landings by area and alternative for 2013-2014.

Area	Projected Total Landings (mt) 2013-14	
	Alternative 1a	**Alternative 1b**
Grand Total	**590**	**555**
Black rockfish	224	205
Blue rockfish	18	18
Cabezon	100	97
Deeper nearshore rockfish	36	36
Kelp greenling	49	48
Lingcod	80	70
Other minor nearshore rockfish	24	22
Shallow nearshore rockfish	59	59
North of 42º N. lat.		
Black rockfish	138	119
Blue rockfish	4	4
Cabezon	30	27
Kelp greenling	23	22
Lingcod	40	30
Other minor nearshore rockfish	14	12
42º - 40º10' N. lat.		
Black rockfish	82	82
Blue rockfish	11	11
Cabezon	7	7
Kelp greenling	5	5
Lingcod	20	20
Other minor nearshore rockfish	10	10
South of 40º10' N. lat.		
Black rockfish	4	4
Blue rockfish	3	3
Cabezon	63	63
Deeper nearshore rockfish	36	36
Kelp greenling	21	21
Lingcod	20	20
Shallow nearshore rockfish	59	59

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-8. Alternative 1a: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing.

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-9. Alternative 1b: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing. Diagonal lines represent the latitudinal area where an RCA change was made relative to the No Action configuration.

Table B-59. Alternative 1: Overfished species bycatch projections for the nearshore fixed gear fisheries by area and alternative for 2013-2014.

Species	Area	Projected Total Mortality (mt) 2013-2014		Allocation (mt) 2013-14[a/]
		Alternative 1a	Alternative 1b	
Bocaccio	Total	0.5	0.5	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0.5	0.5	0.9
Canary	Total	3.8	3.7	6.2/6.4
	OR: North of 42º	1.1	1	1.7/1.7
	CA: 42º - 40º10'	0.9	0.9	4.5/4.7
	CA: South of 40º10'	1.8	1.8	
Cowcod	Total	0	0	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	1.0[b/]
Darkblotched	Total	0.3	0.2	n/a
	OR: North of 42º	0.3	0.2	
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	
Yelloweye	Total	1.2	1.2	1.2
	OR: North of 42º	0.87	0.87	0.87
	CA: 42º - 40º10'	0.24	0.24	0.33
	CA: South of 40º10'	0.09	0.09	

[a/]represents nearshore share of non-trawl allocation
[b/]non-trawl allocation

Similar to analyses conducted in the 2011-12 FEIS, two alternate catch sharing relationships to demonstrate the tradeoffs of varying overfished species allocations compared to No Action were examined (Table B-60). An equal catch sharing (50:50) and a reverse of the No Action allocations were used analyzed to bracket the upper and lower ranges of landings and corresponding management measures (Table B-60).

Under the equal catch sharing scenario (Table B-61), Oregon would receive more canary and less yelloweye compared to the No Action catch sharing. Since less catch has historically originated from depths deeper than 20 fm, little yelloweye savings is afforded by implementing a shallower (20 fm) depth restriction. As a result, landed catch would need to be reduced by 14 percent relative to No Action alternative to stay within overfished species allocations under this scenario. Under this same scenario, California would be afforded less canary rockfish compared to No Action, but more yelloweye rockfish. A 30 fm depth restriction could be implemented between 42° N. latitude and 40° 10' N. latitude, yet a 35 percent reduction in landed catch would be needed to stay within overfished species allocations. Liberating the depth to 30 fm would reduce gear conflicts, reduce the potential for localized depletion, and increase opportunities to fish in productive areas that have been closed for four years. It would also reduce competition for space when the recreational fishery is open. For the area south of 40° 10' N. latitude, the RCA configuration and landings under No Action could be afforded (including an increase for lingcod and greenling) and stay within overfished species allocations.

Under the reverse No Action scenario, Oregon would receive more canary rockfish, yet substantially less yelloweye rockfish, compared to the No Action catch sharing (Table B-61). As described above, little savings of yelloweye rockfish is afforded by restricting the fishery to 20 fm, therefore, drastic reductions in landed catch of up to 53 percent would be necessary to stay within the yelloweye allocation. Because the fishery is constrained by yelloweye rockfish under this scenario, the higher amount of canary rockfish would go unutilized.

Under this same scenario, California would receive substantially more yelloweye rockfish and less canary rockfish compared to No Action. The small allocation of canary rockfish under this scenario would require increased management measures, which limit access to target species, due to areas of high canary bycatch in all areas of the state except for south of 34º 27' N. latitude, which is an area of low bycatch. As a result, a 20 fm depth restriction would need to be implemented for all areas, except south of 34º 27' N. latitude to stay within the canary allocation in addition to a 10 percent reduction in landed catch. The higher amount of yelloweye afforded under this scenario would not be utilized due to canary rockfish constrains.

Table B-60. Alternative 1: Allocations of canary and yelloweye rockfish for 2013-14 under alternate nearshore catch sharing scenarios.

		No Action	**Equal Sharing**	**Reverse No Action**
OR	Canary	1.7	3.1/3.2	4.5/4.7
	Yelloweye	0.87	0.6	0.33
CA	Canary	4.5/4.7	3.1/3.2	1.7
	Yelloweye	0.33	0.6	0.87

Table B-61. Alternative 1: Description of management measures under alternate nearshore catch sharing scenarios.

		Catch Sharing		
	AREA	**No Action**	**Equal Sharing**	**Reverse No Action**
OR	north of 43º	(Alt 1a): RCA=30 fm; Landings=8%-40% increase (Alt 1b): RCA = 30 fm; Landings=7% increase	RCA=30fm; Landings=14% reduction	RCA=30 fm; Landings=53% reduction
	42º-43º	(Alt 1a): RCA=20 fm; Landings=8%-40% increase (Alt 1b): RCA = 30 fm; Landings=7% increase	RCA=20 fm; Landings=14% reduction	RCA=20 fm; Landings=53% reduction
CA	42º - 40º10'	(Alt 1a): RCA=20 fm; Landings=No Action with higher greenling and lingcod (Alt 1b): same as Alt a	RCA=30 fm; Landings=35% reduction	RCA=20 fm; Landings=10% reduction
	40º10' to 34º27'	(Alt 1a): RCA=30 fm; Landings=No Action with higher greenling and lingcod (Alt 1b): same as Alt a	RCA=30 fm; Landings=No Action with higher greenling and lingcod	RCA=20 fm; Landings=10% reduction
	south of 34º27'	(Alt 1a) RCA=60 fm; Landings=No Action with higher greenling and lingcod (Alt 1b) same as Alt a	RCA=60 fm; Landings=No Action with higher greenling and lingcod	RCA=60 fm; Landings=10% reduction

In summary, the nearshore fishery is primarily constricted by yelloweye rockfish under the Preferred Alternative. An additional increase in the yelloweye rockfish allocation to the nearshore fishery may allow for a liberalization of the RCA back to 30 fm for the area between 42º N. latitude and 40º 10' N. latitude and may allow landings that are closer or equal to historic state landing caps. Increased landings may improve economic opportunities to some of the most economically depressed communities in the states of Oregon and California, and liberalized shoreward RCA boundaries. This could help alleviate gear conflicts and reduce pressure on other nearshore stocks.

B.3.4 Nearshore: Alternative 2

Under Alternative 2 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.5 Nearshore: Alternative 3

Under Alternative 3 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.6 Nearshore: Alternative 4

Under Alternative 4, while the allocation of yelloweye rockfish is higher compared to No Action, the allocation of canary rockfish is 50% lower (Table B-57). Both states are severely restricted by the low amount of canary rockfish due to areas of high bycatch; therefore, nearshore landings would have to be reduced between 20 and 45 percent compared to No Action depending on the area and RCA configuration. As such, nearshore fishermen continue to be negatively impacted by the reduced trip limits and restricted access to productive fishing grounds, as a result of the non-trawl RCA closures, implemented to reduce mortality of overfished species, particularly yelloweye.

Based on Council direction, the No Action sharing for canary (OR = 26.7%; CA = 73.3%) and yelloweye rockfish (OR = 72.7%; CA = 27.3%) was analyzed in the integrated alternatives. Under this alternative, the tradeoffs between more restrictive depth restrictions and higher reductions in landed catch (Alternatives 4a and 4b) were analyzed. In Oregon, overfished species mortality is modeled assuming a 20 fm depth restriction statewide for both alternatives. In California, overfished species morality is modeled assuming a 20 fm depth restriction statewide (Alternative 4a) and the same RCA under No Action (20 fm between 42° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N. latitude and 34° 27' N. latitude; 60 fm south of 34° 27' N. latitude) (Alternative 4b).

North of 42° N. latitude – under Alternative 4a and 4b, a 20 fm depth restriction would be implemented statewide and landings would have to be reduced by 40 percent relative to the No Action Alternative (Table B-62; Figure B-10).

It was pointed out earlier that the No Action alternative was already restrictive for the Oregon nearshore fisheries in that historical landing caps were not attainable due to the management measures required to maintain yelloweye rockfish catch below the imposed caps. Under Alternatives 4a and 4b, restricting landings by an additional 40 percent may force fish buyers to leave certain ports, such as Port Orford and Gold Beach, which have no fish processing plants, and Brookings port group (i.e., Port Orford, Brookings, and Gold Beach), which provides the most live fish landings of any other port group along the U.S. west coast). This, coupled with drastic catch restrictions to fishermen, would likely result in many nearshore fishermen leaving the fishery entirely. Coastal communities that would be most impacted by this additional economic hardship have previously been identified as most vulnerable in the 2011-12 FEIS (e.g., Port Orford and Brookings). Furthermore, not only would landings be drastically reduced, but fishing area would be reduced; the RCA north of 43^{o} N. latitude may have to be moved from 30 fm to 20 fm. This additional action may eliminate fishing opportunities for the northern Oregon nearshore fishery because many of the fishing areas and reefs are deeper than 20 fm. Hence, this action would result in disproportionate impacts along the Oregon coast. In addition, the 20 fm depth restriction state-wide may cause crowding issues, competition for space, result in more gear conflicts, and increase the likelihood of local depletions of certain fish stocks.

South of 42° N. latitude – under Alternative 4a, a 20 fm depth restriction would be implemented statewide in addition to a 20 percent reduction in landed catch for all species compared to No Action (Table B-62; Figure B-10). The restrictive RCA statewide is necessary to reduce canary bycatch that occurs south of 40°10' N latitude. The 20 fm depth restriction in addition to the anticipated MPAs discussed under Alternative 1 is likely to cause crowding issues, create competition for space, and result in more gear conflicts. The tsunami damage sustained by the port of Crescent City has not been repaired and this port continues to struggle under current low landings. Further reducing landings as would be required under this alternative will only cause further negative economic impacts to this city. Other ports in the area that did not sustain tsunami damage will still be negatively impacted by the loss of revenue as a result of the reduced landings.

Although few canary catches have been documented south of 34°27' N. latitude, the overfished species impact projection model for the nearshore fishery is unable to differentiate canary rockfish mortality occurring north and south of 34° 27' N. latitude. As a result, the entire RCA south of 40°10' N. latitude would have to be restricted to 20 fm. Since the fishery south of 34°27' N. latitude is allowed to operate out to depths of 60 fm, this would represent a tremendous loss of fishing grounds and could effectively eliminate the fishery in this area because many of the species tend to be found at the deeper depths in this area.

Access to fishing grounds has also been restricted in this area due to the implementation of MPAs. Fifty-four MPAs, encompassing 356 square miles of state waters have been implemented since 2007 in the area between 40° 10' N. latitude and 34° 27' N. latitude (CDFG 2011). An additional 50 MPAs, covering 356 sq mi of state waters, will go into effect on January 1, 2012 for the area south of 34° 27' N. latitude. In total, 104 MPAs covering 711 square miles of state waters will be implemented in this entire area south of 40° 10’ N latitude. Similar to the area north of 40° 10' N. latitude, the fishing grounds available to nearshore fishermen has reduced due to the implementation of MPAs and implementing further shallow depth restrictions as would be required under Alternative a would only further exacerbate the crowding issues similar to those for the area north of 40° 10’ N latitude.

Under Alternative 4b, maintaining the No Action RCA configuration would require reductions in landed catch of 45 percent and would effectively eliminate this fishery because the operational costs would be greater than any potential profits (Table B-62; Figure B-10).

Although the nearshore fishery may not necessarily be a high volume fishery, it is valuable so small changes to landings can have a large effect on profits. Since many fishermen rely on the nearshore fishery as either a full time source of income, or as part of their fishing portfolio, reductions to landed catch could severely impact not only the individual fishermen, but the coastal communities who rely on upon them.

Projected mortality of overfished species under Alternative 4 are summarized by area and alternative in Table B-63.

Table B-62. Alternative 4: Nearshore fishery projected landings by area and alternative for 2013-2014.

Area	Projected Landings (mt) 2013-14	
	Alternative 4a	Alternative 4b
Grand Total	**393**	**309**
Black rockfish	136	114
Blue rockfish	13	10
Cabezon	71	54
Deeper nearshore rockfish	29	20
Kelp greenling	33	27
Lingcod	49	39
Other minor nearshore rockfish	15	13
Shallow nearshore rockfish	47	32
North of 42º N. lat.		
Black rockfish	67	67
Blue rockfish	2	2
Cabezon	15	15
Kelp greenling	12	12
Lingcod	17	17
Other minor nearshore rockfish	7	7
42º - 40º10' N. lat.		
Black rockfish	66	45
Blue rockfish	9	6
Cabezon	6	4
Kelp greenling	4	3
Lingcod	16	11
Other minor nearshore rockfish	8	6
South of 40º10' N. lat.		
Black rockfish	3	2
Blue rockfish	2	2
Cabezon	50	35
Deeper nearshore rockfish	29	20
Kelp greenling	17	12
Lingcod	16	11
Shallow nearshore rockfish	47	32

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-10. Alternative 4a: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing. Diagonal lines represent the latitudinal area where an RCA change was made relative to the No Action configuration.

Shoreward RCA Boundary	South of 34º27'	34º27' - 40º10'	40º10' - 42º	42º - 43º	43º - 46º16'	North of 46º16'
Shore						
20 fm						
30 fm						
60 fm						

Figure B-11. Alternative 4b: Nearshore shoreward RCA configuration. Grey shading indicates areas closed to fishing. Diagonal lines represent the latitudinal area where an RCA change was made relative to the No Action configuration.

Table B-63. Alternative 4: Overfished species bycatch projections for the nearshore fixed gear fisheries by area and alternative for 2013-2014.

Species	Area	Projected Mortality (mt) 2013-14		Allocation (mt) 2013-14[a/]
		Alternative a	Alternative b	
Bocaccio	Total	0	0.3	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0.3	0.9
Canary	Total	2	2	2
	OR: North of 42º	0.5	0.5	0.5
	CA: 42º - 40º10'	0.7	0.5	1.5
	CA: South of 40º10'	0.8	1	
Cowcod	Total	0	0	
	OR: North of 42º	0	0	n/a
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	1.0[b/]
Darkblotched	Total	0.12	0.1	n/a
	OR: North of 42º	0.12	0.1	
	CA: 42º - 40º10'	0	0	
	CA: South of 40º10'	0	0	
Yelloweye	Total	0.64	0.62	1.2
	OR: North of 42º	0.42	0.42	0.87
	CA: 42º - 40º10'	0.19	0.10	0.33
	CA: South of 40º10'	0.03	0.10	

[a/]represents nearshore share of non-trawl allocation
[b/]non-trawl allocation

Similar to analyses conducted in the 2011-12 FEIS, two alternate catch sharing relationships were analyzed to demonstrate the tradeoffs of varying overfished species allocations compared to No Action (Table B-64). An equal catch sharing (50:50) and a reverse No Action (i.e., reverse the percentages for each species) were analyzed to bracket the upper and lower ranges of landings and corresponding management measures.

Under the equal sharing scenario (Table B-65), Oregon would receive more canary and less yelloweye compared to No Action catch sharing. The RCA configuration and landings under this scenario would be the same as discussed under Alternative 1. Under this same scenario, California would be afforded less canary rockfish compared to No Action, but more yelloweye rockfish. The RCA configuration and landings under this scenario would be the same as discussed under Alternative 1.

Under the reverse No Action (Table B-65), Oregon would receive more canary rockfish, yet substantially less yelloweye rockfish, compared to No Action and California would receive substantially more yelloweye rockfish and less canary rockfish. The RCA configuration and landings for Oregon would be the same as Alternative 1.

Under this same scenario, California would receive substantially more yelloweye rockfish and less canary rockfish compared to No Action. The RCA configuration would be similar to No Action, except that the area between 40º 10' N. latitude to 34º 27' N. latitude would be modified to 20 fm. In addition, a 70 percent reduction in landed catch would be necessary to stay within the canary allocation.

Table B-64. Alternative 4: Allocations of canary and yelloweye rockfish for 2013-14 under alternate nearshore catch sharing scenarios.

		No Action	Equal Sharing	Reverse No Action
OR	Canary	0.5	1.0	1.5
	Yelloweye	0.87	0.6	0.33
CA	Canary	1.5	1.0	0.5
	Yelloweye	0.33	0.6	0.87

Table B-65. Alternative 4: Description of management measures by area under alternate catch sharing scenarios.

		Catch Sharing		
	AREA	**No Action**	**Equal Sharing**	**Reverse No Action**
OR	north of 43º 42º-43º	(Alt a): RCA=20 fm; Landings=40% reduction (Alt b): same as Alt a	same as Alt 1	same as Alt 1
CA	42º - 40º10'	(Alt a): Landings=45% reduction (Alt b): Landings=20% reduction	RCA=20 fm; Landings=50% reduction	RCA=20 fm; Landings=70% reduction
	40º10' to 34º27'	(Alt a): Landings=45% reduction (Alt b): RCA=20 fm; Landings=20% reduction	RCA=20 fm; Landings=50% reduction	RCA=20 fm; Landings=70% reduction
	south of 34º27'	(Alt a): Landings=45% reduction (Alt b): RCA=20 fm; Landings=20% reduction	RCA=60 fm; Landings=50% reduction	RCA=60 fm; Landings=70% reduction

B.3.7 Nearshore: Alternative 5

Under Alternative 5 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.8 Nearshore: Alternative 6

Under Alternative 6 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.9 Nearshore: Alternative 7

Under Alternative 7 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.3.1 Nearshore: Alternative 8

Under Alternative 8 the nearshore fixed gear fishery could operate under management measures described under Alternative 1A or 1B and would have the same projected mortalities.

B.4 Washington Recreational

B.4.1 Washington Recreational: No Action Alternative

Under the No Action Alternative, Washington recreational fisheries would operate under the 2012 annual catch limits (ACL) for yelloweye rockfish of 17 mt and canary rockfish of 107 mt and the associated Washington recreational harvest guidelines of 2.6 mt for yelloweye rockfish and 2.0 mt for canary rockfish in 2013 and 2014 (Table B-66).

Table B-66. Washington Recreational Allocations under the No Action Alternative.

Species	2013-2014 Recreational Allocation (mt)
Canary rockfish	2.0
Yelloweye rockfish	2.6

Groundfish Seasons and Area Restrictions

Under the No Action Alternative, the Washington recreational fishery would be open year round for groundfish except lingcod. Washington would continue to prohibit the retention of canary and yelloweye rockfish in all areas.

Depth restrictions are the primary tool used to keep recreational mortality of yelloweye and canary rockfish within specified harvest guidelines. Restrictions limiting the depth where groundfish fisheries are permitted are more severe in the area north of the Queets River (Washington management areas 3 and 4) where yelloweye and canary rockfish abundance is higher and therefore caught incidentally at a higher rate. Depth restrictions are less restrictive as you move south along the coast where incidental catch of yelloweye and canary becomes progressively less.

<u>North Coast (Marine Areas 3 and 4)</u>

The retention of bottomfish would be prohibited seaward of a line approximating 20 fathoms from June 1- September 30, except on days that halibut fishing would be open. Fishing for, retention or possession of groundfish and halibut would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) (Figure B-12).

<u>South Coast (Marine Area 2)</u>

The retention of bottomfish, except rockfish, would be prohibited seaward of 30 fathoms from March 15 through June 15, except sablefish and Pacific cod retention would be allowed May 1 through June 15; retention of lingcod would be allowed on days open to the primary halibut season; the retention of lingcod would be prohibited south of 46 deg. 58’ and seaward of 30 fathoms on Fridays and Saturdays from July 1 through August 31; fishing for, retention or possession of lingcod would be prohibited in deepwater areas seaward of a line extending from 47°31.70’ N. lat., 124°45.00’ W. long., to 46°38.17’ N. lat., 124°30.00’ W. long. year round except as allowed on days open to the Pacific halibut fishery (figure 3);

fishing for, retention or possession of bottomfish or halibut would be prohibited in the South Coast YRCA and Westport Offshore YRCA (Figure B-13).

<u>Columbia River (Marine Area 1)</u>

The retention of bottomfish, except sablefish and Pacific cod, would be prohibited with halibut onboard from May 1 through September 30 and; fishing for, retention or possession of lingcod in deepwater areas seaward of a line extending from 46°38.17’ N. lat., 124°21.00’ W. long. to 46°25.00’ N. lat., 124°21.00’ W. long would be prohibited year round (Figure B-14).

Table B-67. Washington Recreational Seasons and Groundfish Retention Restrictions under the No Action Alternative.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>3 & 4 (N. Coast)</td><td colspan="5">Open all depths</td><td colspan="4">Open <20 fm June 1-Sep 30 a/</td><td colspan="3">Open all depths</td></tr>
<tr><td>2 (S. Coast)</td><td colspan="2">Open all depths</td><td colspan="3">Open <30 fm Mar 15 - June 15 b/, c/, d/, g/</td><td colspan="3">Open all depths except lingcod prohibited on Fri. and Sat. >30 fm e/,g</td><td colspan="4">Open all depths g/</td></tr>
<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths g/</td><td colspan="5">Open all depths f/, g/</td><td colspan="3">Open all depths g/</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut would be open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of rockfish allowed seaward of 30 fm.
d/ Retention of lingcod allowed seaward of 30 fm on days that the primary halibut season would be open.
e/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 – August 31.
f/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.
g/ Retention of lingcod prohibited in deepwater areas at all times.</td></tr>
</table>

Area Restrictions

Under the No Action Alternative, fishing for, retention or possession of groundfish and halibut during the Washington recreational groundfish and Pacific halibut fisheries would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) in the north coast (Figure B-12), and the South Coast and Westport YRCAs in the south coast (Figure B-13) as they were during the 2011 and 2012 seasons.

Fishing for, retention or possession of lingcod would be prohibited seaward of a line connecting the following coordinates from the Queets River (47°31.70’ N. lat., 124° 45.00’ W. long.) to 46°25.00’ N. lat, 124°21.00’ W. long., year round except as allowed in Washington Marine Area 2 on days open to the primary halibut fishery (Figure B-14) as was in place in 2012:

47°31.70’ N. lat 124°45.00’ W. long.
46°38.17’ N. lat 124°30.00’ W. long.
46°38.17’ N. lat 124°21.00’ W. long.
46°25.00’ N. lat 124°21.00’ W. long.

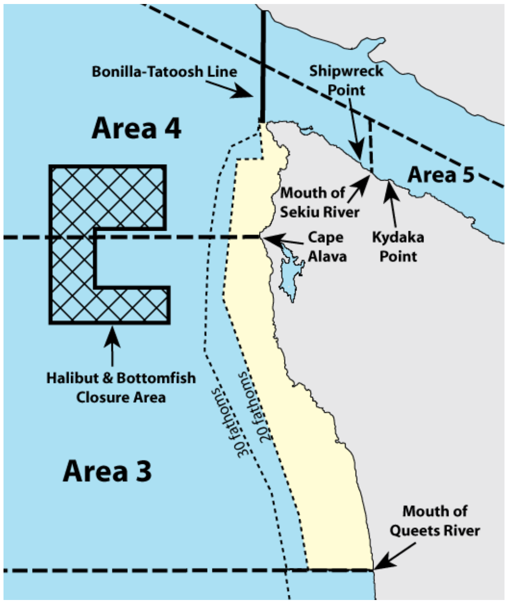

Figure B-12. Washington North Coast C-Shaped YRCA

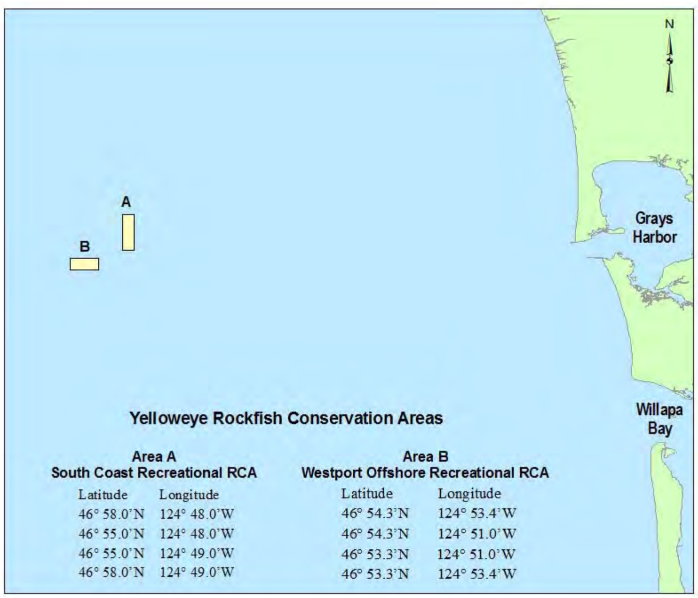

Figure B-13. Washington South Coast and Westport YRCAs

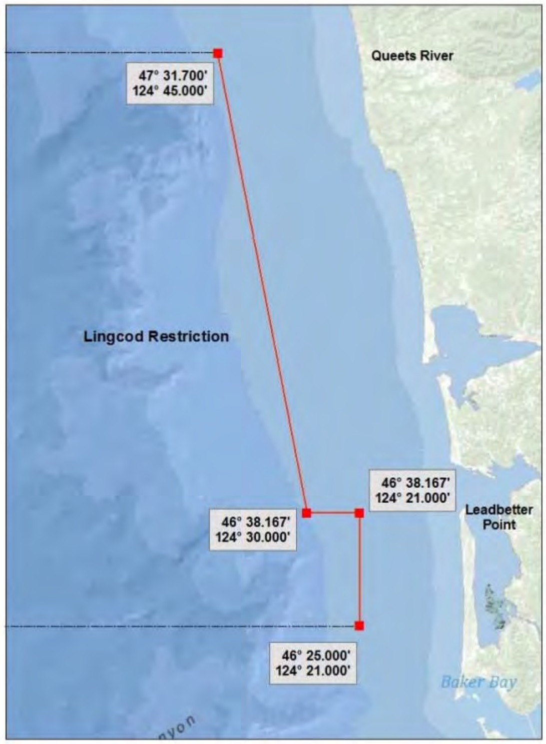

Figure B-14. Washington Lingcod Restricted Area

Groundfish Bag Limits

Under the No Action Alternative the recreational groundfish bag limit would be 12 fish per day including rockfish and lingcod. Of the 12 recreational groundfish allowed to be landed per day, sub limits of 10 rockfish, 2 lingcod and 2 cabezon would apply.

Lingcod Seasons and Size Limits

The lingcod season in Marine Areas 1 through 3 (Washington-Oregon border at 46°16' N Latitude to Cape Alava at 48° 10' N Latitude) would be open from the Saturday closest to March 15 through the Saturday closest to October 15, which was March 12 through October 15 in 2011 and March 17 through October 13 in 2012. Marine Area 4 (Cape Alava to the U.S. Canadian border) was open from April 16 through the Saturday closest to October 15, or October 15, whichever is earlier, which was April 16 through October 15 in 2011 and April 16 through October 13 in 2012.

Under the No Action Alternative there would be no changes to the lingcod seasons and size limits in 2013 and 2014, the season would be as follows:

- Marine Areas 1-3: March 16 through October 12 in 2013 and March 15 through October 18 in 2014. Minimum size, 22 inches.
- Marine Area 4: April 16 through October 12 in 2013 and April 16 to October 15 in 2014. Minimum size, 24 inches.

Pacific Halibut Seasons

It is expected that the Pacific halibut seasons in 2013 and 2014 will be similar to the halibut seasons in 2011 and 2012. There are no changes to the restrictions on groundfish retention during the Pacific halibut season proposed under the No Action Alternative.

Additional Management Measures Analyzed

No additional management measures were analyzed for the No Action Alternative. Management measures outlined under the No Action Alternative will be used to keep recreational harvests of overfished species within specified harvest guidelines for 2013 and 2014.

Projected Impacts and Inseason Management Response

Projected mortality for Washington's recreational fishery are based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in RecFIN. It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons will continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

Washington's Ocean Sampling Program is able to produce estimates of groundfish catch with a one month lag time. Management measures such as more restrictive depth closures, area closures, groundfish retention restrictions or changes to seasons can be implemented immediately through emergency changes to state regulations if inseason catch reports indicate that recreational harvests of overfished species are exceeding pre-season projections to the point where harvest guidelines are at risk of being exceeded.

Table B-68 outlines the projected mortality for overfished species in the groundfish fishery for 2013 and 2014 under the No Action Alternative.

Table B-68. Washington Recreational Harvest Guidelines and Projected Mortality under the No Action Alternative.

No Action Alternative	WA Recreational Harvest Guideline (mt)	Projected Mortality (mt)
Canary rockfish	2.0	1.0
Yelloweye rockfish	2.6	2.4

Community Impacts

Under the No Action Alternative, management measures necessary to keep recreational harvest of yelloweye rockfish within harvest guidelines require closure or significant restriction of the groundfish fishery in areas deeper than 20 and 30 fathoms along a substantial portion of the Washington coast, restrictions on groundfish retention during peak recreational fishing periods, and closed areas. While these restrictions have been effective at keeping recreational catch of overfished species under specified harvest guidelines in the past they are limiting to recreational fishing opportunity since areas are closed, season length is restricted, bag limits are reduced, and retention for some species is prohibited.

Projected mortality of overfished species and angler effort in 2013 and 2014 under No Action management measures are expected to be similar to previous seasons however, if anger effort and fishing success result in catch estimates higher than what is projected, additional fishing restrictions may be needed to ensure that harvest of overfished species do not exceed harvest guidelines.

B.4.2 Washington Recreational: Preferred Alternative

Under the Council's Preferred Alternative, Washington recreational fisheries would operate under ACL's for yelloweye rockfish of 18 mt and canary rockfish of 116 and 119 mt, and the associated Washington recreational harvest guidelines of 2.9 mt for yelloweye rockfish and 3.1 and 3.2 mt for canary rockfish in 2013 and 2014 (Table B-69).

Table B-69. Washington Recreational Allocations under the Preferred Alternative.

Species	2013 Recreational Allocation (mt)	2014 Recreational Allocation (mt)
Canary rockfish	3.1	3.2
Yelloweye rockfish	2.9	2.9

Groundfish Seasons and Area Restrictions

Under the Preferred Alternative, the Washington recreational fishery would operate under the same management measures as the No Action Alternative. The recreational fishery would be open year round for groundfish except lingcod. Washington would continue to prohibit the retention of canary and yelloweye rockfish in all areas.

Depth restrictions are the primary tool used to keep recreational mortality of yelloweye and canary rockfish within specified harvest guidelines. Restrictions limiting the depth where groundfish fisheries are permitted are more severe in the area north of the Queets River (Washington management areas 3 and 4) where yelloweye and canary rockfish abundance is higher and therefore caught incidentally at a higher rate. Depth restrictions are less restrictive as you move south along the coast where incidental catch of yelloweye and canary becomes progressively less.

There is little flexibility to consider less restrictive management measure options that would allow access to higher recreational harvest guidelines under higher canary rockfish ACL alternatives because less restrictive depth restrictions or other management measures that allow access to canary rockfish have the potential to increase yelloweye rockfish mortality.

<u>North Coast (Marine Areas 3 and 4)</u>

The retention of bottomfish would be prohibited seaward of a line approximating 20 fathoms from June 1- September 30, except on days that halibut fishing would be open. Fishing for, retention or possession of groundfish and halibut would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) (Figure B-12).

<u>South Coast (Marine Area 2)</u>

The retention of bottomfish, except rockfish, would be prohibited seaward of 30 fathoms from March 15 through June 15, except sablefish and Pacific cod retention would be allowed May 1 through June 15; retention of lingcod would be allowed on days open to the primary halibut season; the retention of lingcod would be prohibited south of 46 deg. 58' and seaward of 30 fathoms on Fridays and Saturdays from July 1 through August 31; fishing for, retention or possession of lingcod would be prohibited in deepwater areas seaward of a line extending from 47°31.70' N. lat., 124°45.00' W. long., to 46°38.17' N. lat., 124°30.00' W. long. year round except as allowed on days open to the Pacific halibut fishery (figure 3); fishing for, retention or possession of bottomfish or halibut would be prohibited in the South Coast YRCA and Westport Offshore YRCA (Figure B-13).

Columbia River (Marine Area 1)

The retention of bottomfish, except sablefish and Pacific cod, would be prohibited with halibut onboard from May 1 through September 30 and; fishing for, retention or possession of lingcod in deepwater areas seaward of a line extending from 46°38.17’ N. lat., 124°21.00’ W. long. to 46°25.00’ N. lat., 124°21.00’ W. long would be prohibited year round (Figure B-14).

Table B-70. Washington Recreational Seasons and Groundfish Retention Restrictions under the Preferred Alternative.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
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<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths g/</td><td colspan="5">Open all depths f/, g/</td><td colspan="3">Open all depths g/</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut would be open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of rockfish allowed seaward of 30 fm.
d/ Retention of lingcod allowed seaward of 30 fm on days that the primary halibut season would be open.
e/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 – August 31.
f/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.
g/ Retention of lingcod prohibited in deepwater areas at all times.</td></tr>
</table>

Area Restrictions

The same area restrictions that were in place under the No Action Alternative would be implemented under the Preferred Alternative. Fishing for, retention or possession of groundfish and halibut during the Washington recreational groundfish and Pacific halibut fisheries would be prohibited in the C-shaped yelloweye rockfish conservation area (YRCA) in the north coast (Figure B-12), and the South Coast and Westport YRCAs in the south coast (Figure B-13) as they were during the 2011 and 2012 seasons.

Fishing for, retention or possession of lingcod would be prohibited seaward of a line extending from the Queets River (47°31.70’ N. lat., 124° 45.00’ W. long.) to 46°25.00’ N. lat, 124°21.00’ W. long., year round except as allowed in Washington Marine Area 2 on days open to the primary halibut fishery (Figure B-14) as was in place in 2012.

Groundfish Bag Limits

No changes to groundfish bag limits would be made under the Preferred Alternative, the recreational groundfish bag limit would be 12 fish per day including rockfish and lingcod. Of the 12 recreational groundfish allowed to be landed per day, sub limits of 10 rockfish, 2 lingcod and 2 cabezon would apply.

Lingcod Seasons and Size Limits

No changes to the lingcod seasons would be made under the Preferred Alternative compared to the No Action Alternative, the lingcod seasons and size limits in 2013 and 2014 would be as follows:

- Marine Areas 1-3: March 16 through October 12 in 2013 and March 15 through October 18 in 2014. Minimum size, 22 inches.
- Marine Area 4: April 16 through October 12 in 2013 and April 16 to October 15 in 2014. Minimum size, 24 inches.

Pacific Halibut Seasons

It is expected that the Pacific halibut seasons in 2013 and 2014 will be similar to the halibut seasons in 2011 and 2012. There are no changes to the restrictions on groundfish retention during the Pacific halibut season proposed under the Preferred Alternative.

Additional Management Measures Analyzed

Washington recreational harvest guidelines for yelloweye and canary rockfish under the Preferred Alternative are similar to what was in place for 2011 and 2012 and as such no additional management measures were analyzed. No Action management measures will be used to keep recreational harvests of overfished species within specified harvest guidelines for 2013 and 2014.

Projected Impacts and Inseason Management Response

Projected mortality for Washington's recreational fishery are based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in RecFIN. It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons will continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

Washington's Ocean Sampling Program is able to produce estimates of groundfish catch with a one month lag time. Management measures such as more restrictive depth closures, area closures, groundfish retention restrictions or changes to seasons can be implemented immediately through emergency changes to state regulations if inseason catch reports indicate that recreational harvests of overfished species are exceeding pre-season projections to the point where harvest guidelines are at risk of being exceeded.

Table B-71 contains the projected mortality for overfished species in the groundfish fishery for 2013 and 2014 under the Preferred Alternative.

Table B-71. Washington Recreational Harvest Guidelines and Projected Impacts under the Preferred Alternative.

	WA Recreational Harvest Guideline (mt) 2013/2014	**Projected Mortality (mt)**
Canary rockfish	3.1 / 3.2	1.0
Yelloweye rockfish	2.9	2.4

Community Impacts

Under the Preferred Alternative, management measures necessary to keep recreational harvest of yelloweye rockfish within harvest guidelines, which are the same as the No Action Alternative, require closure or significant restriction of the groundfish fishery in areas deeper than 20 and 30 fathoms along the majority of the Washington coast, restrictions to groundfish retention during peak recreational fishing periods, and closed areas. While these restrictions have been effective at keeping recreational catch of overfished species under specified harvest guidelines in the past they are limiting to recreational fishing opportunity since areas are closed, season length is restricted, bag limits are reduced, and retention for some species is prohibited.

Projected mortality of overfished species and angler effort in 2013 and 2014 under No Action management measures are expected to be similar to previous seasons however, if anger effort and fishing success result in catch estimates higher than what is projected, additional fishing restrictions may be needed to ensure that harvest of overfished species do not exceed harvest guidelines.

B.4.3 Washington Recreational: Alternative 1

Washington recreational management measures under Alternative 1 are the same as the Preferred Alternative and have the same impacts.

B.4.4 Washington Recreational: Alternative 2

Washington recreational management measures under Alternative 2 are the same as the Preferred Alternative and have the same impacts.

B.4.5 Washington Recreational: Alternative 3

Washington recreational management measures under Alternative 3 are the same as the Preferred Alternative and have the same impacts.

B.4.6 Washington Recreational: Alternative 4

Washington recreational management measures under Alternative 4 are the same as the Preferred Alternative and have the same impacts.

B.4.7 Washington Recreational: Alternative 5

Washington recreational management measures under Alternative 5 are the same as the Preferred Alternative and have the same impacts.

B.4.8 Washington Recreational: Alternative 6

Washington recreational management measures under Alternative 6 are the same as the Preferred Alternative and have the same impacts.

B.4.9 Washington Recreational: Alternative 7

Washington recreational management measures under Alternative 7 are the same as the Preferred Alternative and have the same impacts.

B.4.1 Washington Recreational: Alternative 8

Washington recreational management measures under Alternative 8 are the same as the Preferred Alternative and have the same impacts.

B.4.2 Washington Recreational: Summary of the Integrated Alternatives

Management measures considered for the Washington recreational fishery in 2013 and 2014 are designed to keep overfished species mortality within harvest guidelines based on allocation of the various annual catch limit (ACL) alternatives approved by the Pacific Fishery Management Council for public review.

Yelloweye and canary rockfish are the two overfished species encountered in the Washington recreational fisheries. Management measures analyzed for 2011 and 2012 under the No Action Alternative were designed to keep yelloweye rockfish mortality within the Washington recreational yelloweye harvest guideline of 2.6 mt, and canary harvest guideline of 2.0 mt while allowing access to healthy groundfish stocks. For 2013 and 2014 the Council is only considering one yelloweye rockfish ACL alternative (18 mt), which represents the No Action rebuilding time throughout all of the integrated alternatives. Based on allocations adopted by the Council, the Washington recreational harvest guideline for yelloweye rockfish in 2013 and 2014 under the 18 mt ACL is 2.9 mt. This harvest guideline is very close to the 2.6 mt harvest guideline in place for 2011 and 2012.

Although the integrated alternatives represent a wider range of ACL options for canary rockfish with some recreational harvest guidelines for the Washington recreational fishery higher than was in place for 2011 and 2012, there is no flexibility to analyze less restrictive management measures that would utilize higher canary allocations because they would result in yelloweye rockfish mortality that is higher than the allowed harvest guideline.

Because the Washington recreational harvest guideline for yelloweye rockfish under all of the integrated alternatives is similar to what was in place for 2011 and 2012 and because management measure alternatives that would allow access to higher canary rockfish harvest guidelines would compromise the ability to keep yelloweye mortality to specified levels, Washington is proposing No Action management measures (No Action Alternative) under all of the ACL options presented in the Integrated Alternatives.

With the Washington recreational fishery operating under the same management measures that were in place in 2011 and 2012 for each of the Integrated Alternatives in 2013 and 2014, the projected mortality of overfished species and the number of angler trips in the recreational bottomfish fishery are expected to be the same under each of the Integrated Alternatives.

Table B-72. Washington Recreational Seasons Structure and Groundfish Retention Restrictions by Area for all of the Integrated Alternatives.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>3 & 4 (N. Coast)</td><td colspan="5">Open all depths</td><td colspan="4">Open <20 fm June 1-Sep 30 a/</td><td colspan="3">Open all depths</td></tr>
<tr><td>2 (S. Coast)</td><td colspan="2">Open all depths</td><td colspan="4">Open <30 fm Mar 15 - June 15 b/, c/, d/, g/</td><td colspan="2">Open all depths except lingcod prohibited on Fri. and Sat. >30 fm e/,g</td><td colspan="4">Open all depths g/</td></tr>
<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths g/</td><td colspan="5">Open all depths f/, g/</td><td colspan="3">Open all depths g/</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of rockfish allowed seaward of 30 fm.
d/ Retention of lingcod allowed seaward of 30 fm on days that the primary halibut season is open.
e/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 – August 31.
f/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.
g/ Retention of lingcod prohibited in deepwater areas at all times.</td></tr>
</table>

Table B-73. Washington Recreational Harvest Guidelines and Projected Impacts (mt) under the Integrated Alternatives.

Integrated Alternative	Canary Rockfish		Yelloweye Rockfish	
	Harvest Guideline 2013 / 2014	Projected Impacts 2013 / 2014	Harvest Guideline 2013 / 2014	Projected Impacts 2013 / 2014
No Action	2.0	1.0	2.6	2.4
Alternative 1	3.1 / 3.2	1.0	2.9	2.4
Alternative 2	2.6 / 2.7	1.0	2.9	2.4
Alternative 3	3.1 / 3.2	1.0	2.9	2.4
Alternative 4	1.0	1.0	2.9	2.4
Alternative 5	6.2 / 6.4	1.0	2.9	2.4
Alternative 6	2.6 / 2.7	1.0	2.9	2.4
Alternative 7	4.1 / 4.2	1.0	2.9	2.4

Table B-74. Estimated Effort in the Washington Recreational Bottomfish Fishery (angler trips) under the Integrated Alternatives by Management Area.

Management Area	No Action Alternative	Alternatives 1-8
North Coast		
Charter	781	781
Private	6035	6035
South Coast		
Charter	9788	9788
Private	1483	1483
Columbia River		
Charter	655	655
Private	781	781

B.5 Oregon Recreational

Table B-75. The Integrated Alternatives of overfished species annual catch limits for 2013.

Species	No Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Bocaccio	274	320	320	320	320	320	320	320
Canary	107	116	101	116	48	216	101	147
Cowcod	3	3	3	3	3	3	3	3
Darkblotched	296	317	317	317	317	317	317	317
POP a/	183	150	150	74	247	74	222	222
Petrale	1,160	2,592	2,592	2,592	2,592	2,592	2,592	2,592
Yelloweye	17	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt ACT is implemented.

Table B-76. The Integrated Alternatives of overfished species annual catch limits for 2014.

Species	No Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Bocaccio	274	337	337	337	337	337	337	337
Canary	107	119	104	119	49	220	104	151
Cowcod	3	3	3	3	3	3	3	3
Darkblotched	296	330	330	330	330	330	330	330
POP a/	183	153	153	76	251	76	226	226
Petrale	1,160	2,652	2,652	2,652	2,652	2,652	2,652	2,652
Yelloweye	17	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt ACT is implemented.

B.5.1 Oregon Recreational: No-Action Alternative

The No-Action Alternative analyzes the annual catch limits (ACLs) in place for 2012 (107 mt for canary rockfish and 17 mt for yelloweye rockfish; Table B-75 and Table B-76) and sector specific allocations. Table B-77 shows the allocations, or model targets, for black, canary and yelloweye rockfish (species with a federal harvest guideline) for the Oregon recreational fisheries under the No-Action Alternative.

Table B-77. Oregon recreational allocations or model targets under the No-Action Alternative.

Species	2013 Recreational Allocation or Model Target (mt)	2014 Recreational Allocation or Model Target (mt)
Black rockfish	440.8	440.8
Canary rockfish	7.0	7.0
Yelloweye rockfish	2.4	2.4

Groundfish Seasons and Area Restrictions

Under the No-Action Alternative, the Oregon recreational groundfish fishery will be open offshore year-round, except from April 1 to September 30 when fishing is only allowed shoreward of 40 fm, (Figure B-15), as defined by waypoints, the same as in 2011-2012. Closing the fishery outside of 40 fm from April 1 to September 30, months when angler effort and yelloweye rockfish encounters are greatest, mitigate catches of yelloweye rockfish. The shore-based fishery will be open year-round as depleted canary and yelloweye rockfish are not impacted.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Groundfish Season	Open all depths			Open < 40 fm						Open all depths		
Marine Bag Limit [1]	Ten (10)			1 Fish Cabezon Sub-Bag [2]						Ten (10)		
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

[1] *Marine 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.*
[2] *From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon.*
[3] *Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut*

Figure B-15. Oregon recreational groundfish season structure and bag limits in 2013-14 under the No-Action Alternative.

Area Closures

A yelloweye rockfish conservation area (YRCA) has been in place on Stonewall Bank since 2006 and would also remain under the No Action alternative (Figure B-16). The YRCA is located approximately 15 miles west of the Port of Newport and consists of the high-relief area of Stonewall Bank, an area of high yelloweye rockfish encounters. No recreational fishing for groundfish and Pacific halibut can occur within this YRCA, which is bounded by the following waypoints:

44°37.458’ N lat.	124°24.918’ W long.
44°37.458’ N lat.	124°23.628’ W long.
44°28.710’ N lat.	124°21.798’ W long.
44°28.710’ N lat.	124°24.102’ W long.
44°31.422’ N lat.	124°25.500’ W long.

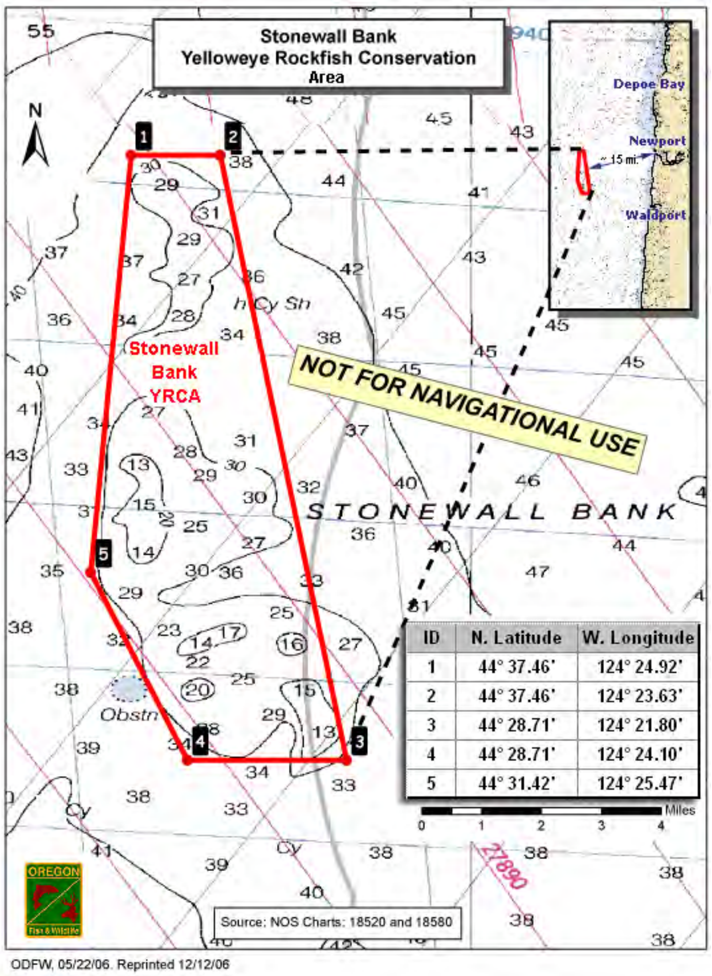

Figure B-16. The Stonewall Bank Yelloweye Rockfish Conservation Area where recreational fishing for groundfish and Pacific halibut is prohibited. Under the No Action alternative, the area would remain closed.

Groundfish Bag Limits and Size Limits

Under the No Action alternative, the marine fish daily bag limit of ten fish in aggregate that was allowed in 2011-2012 Oregon recreational fisheries would carry forward for 2013-2014 (Figure B-15). The 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. During April through September, there was a one fish sub-bag limit for cabezon (of the 10 fish marine bag limit no more than one could be cabezon). This cabezon sub-bag limit would also carry forward for 2013-2014. A flatfish daily bag limit of 25, which includes all soles and flounders except Pacific halibut, was allowed in addition to the marine fish daily bag limit. Additionally a three fish bag limit was allowed for lingcod. Retention of canary and yelloweye rockfish was prohibited in 2011-2012 and would continue to be prohibited under the No Action alternative.

The following minimum size limits applied to 2011-2012 Oregon recreational fisheries and would be carried forward under the No Action alternative:

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

Pacific Halibut Seasons

Under the No-Action Alternative, the recreational Pacific halibut fisheries should be able to proceed as in 2011 and 2012, in regards to days and areas open, etc., depending on the halibut quota. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly limited in 2013 and 2014.

Additional Management Measures Analyzed

Under the No Action Alternative, no additional management measures were analyzed for the Oregon recreational fisheries. Since projected mortality is within the limits for the No Action Alternative, the No Action season structure and regulations should be sufficient, no additional management measures were analyzed.

Projected Impacts and Inseason Management Response

Under the No Action Alternative, and associated season structure and bag limits detailed above, the annual projected mortality of black, canary and yelloweye rockfish are in Table B-78. Table **B-79** shows the recent mortality of the ten most landed species in the Oregon recreational fishery, including black rockfish. Species in Table B-79, other than black rockfish, are not modeled; therefore a projected mortality for 2013-2014 is unavailable. This table represents recent mortality under similar season structure and bag limits to what will be in place under the No Action Alternative and may serve as a proxy for projections.

Table B-78. Projected Mortality of species with Oregon recreational specific allocations under the No-Action Alternative.

Species	Impacts (mt)
Black rockfish	297.7
Canary rockfish	4.7
Yelloweye rockfish	2.5

Table B-79. Recent mortality (mt) of the ten most landed species in the Oregon recreational fishery under the season structure, bag limits, area restrictions, etc. in the No-Action Alternative.

Species	2008	2009	2010	Average
Black rockfish	227.5	267.6	284.1	259.7
Lingcod	75.6	63.2	76.6	71.8
Blue rockfish	14.7	14.4	2.5	10.5
Cabezon	16.0	14.2	15.3	15.2
Yellowtail rockfish	4.8	8.3	6.7	6.6
Kelp greenling	3.5	3.6	6.2	4.4
Vermilion rockfish	5.5	3.6	4.4	4.5
Quillback rockfish	3.9	3.3	4.0	3.7
Copper rockfish	3.6	2.6	3.5	3.2
China rockfish	2.6	2.1	2.4	2.4

Inseason Management Tools

Oregon has a responsive port based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2013 (or 2014) fishery does not proceed as expected.

Inseason management tools, designed to mitigate catches, include bag limit adjustments (including non-retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish mortality, since retention of this species is prohibited. If catch rates indicate that the HGs for yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduced mortality. ODFW will monitor inseason progress toward HGs for canary rockfish and yelloweye rockfish. Regulations will depend upon the timing of the determination for their need.

Adjustments to the marine fish daily-bag limit to no more than 10 fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than 3 fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2011 levels. Season and/or area closures may also be considered if harvest targets or HGs are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit mortality for any managed species. Closing certain days each week would help lengthen the duration of a fishery approaching a harvest guideline.

Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce mortality of nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2013-2014, testing the effectiveness and selectivity of various gears and the survivability of rockfish released at depth.

Directed yellowtail rockfish and/or flatfish fisheries may be implemented inseason, as were implemented in 2004, in the event of a closure of the recreational groundfish fishery due to attainment federal or state HGs or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are within the harvest targets or HGs.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2011 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that yelloweye and canary rockfish mortality is not in excess of the harvest guidelines.

Community Impacts

Depth restrictions for the recreational groundfish fishery are the primary management method used to keep overfished yelloweye and canary rockfish mortality within their respective harvest guidelines (HG) in the Oregon recreational fisheries. Depth restrictions reduce mortality of overfished species because catch rates and discard mortality rates of overfished species are lesser in shallower depths. The depth restrictions under the No Action Alternative are all-depths from Jan-Feb, 40 fm from Apr-Sep, and all-depths Oct-Dec (Figure B-15).

Although depth restrictions reduce mortality of overfished species, they can also decrease angler trips by reducing the quantity and quality of fishable bottomfish grounds. Ports are disproportionately affected by depth restrictions due to varying amounts of fishing grounds by depth (PFMC 2011). For example, Newport is relatively unaffected by a 40 fm depth restriction because the majority (98%) of bottomfish grounds are shallower than 20 fm (Figure B-17). In contrast, Winchester Bay and Florence are greatly impacted by depth restrictions because nearly all bottomfish grounds are deeper than 40 fm. Other ports, such as Garibaldi and Gold Beach, where the majority of bottomfish grounds are between 20-40 fm, are relatively unaffected by 40 fm depth restrictions, but are greatly affected by 20 fm depth restrictions.

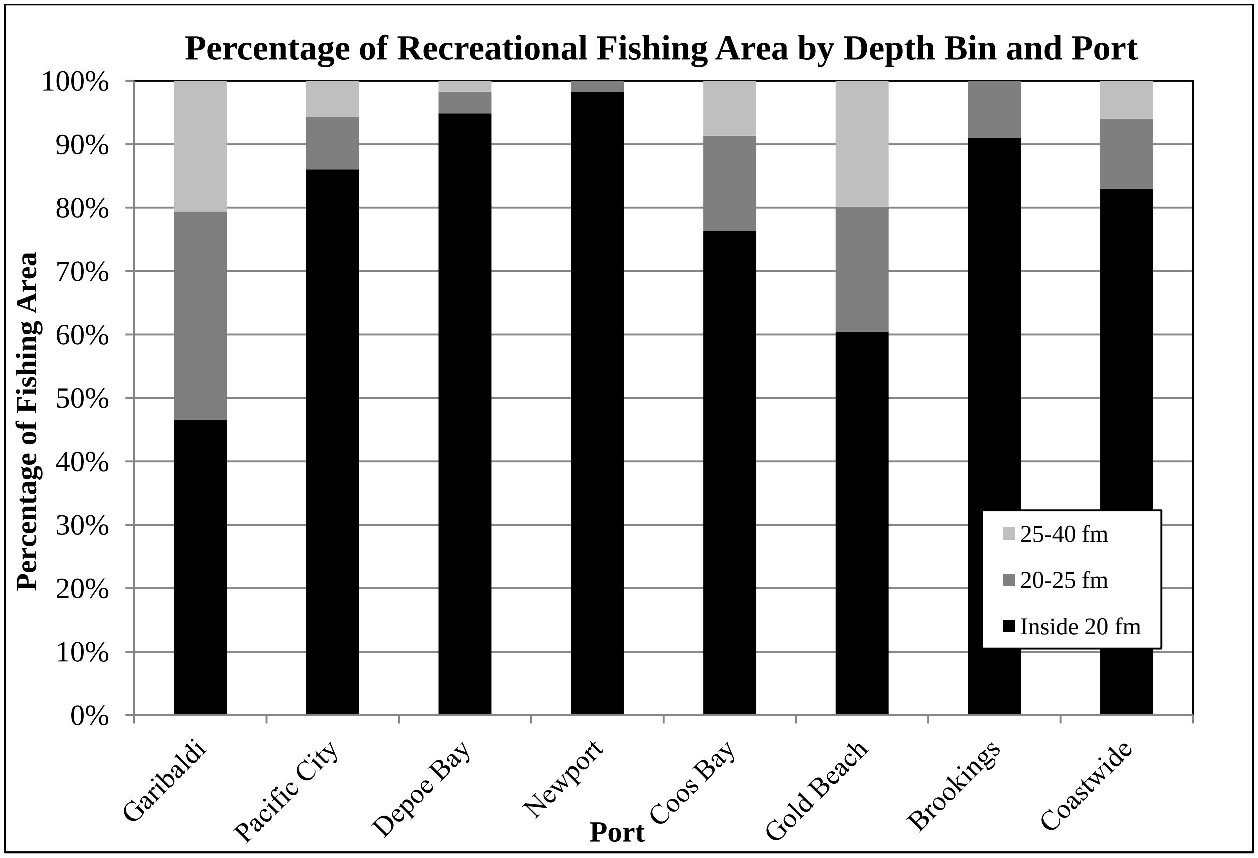

Figure B-17. Percentage of Marine Area by Depth Bin and Port for the Oregon Coast.

Under the No-Acton Alternative, mortality of canary and yelloweye rockfish in the groundfish fishery and the Pacific halibut fishery are projected to be within allocations (Table B-77) and expected angler trips are anticipated to be similar to what has been seen in recent years (Table B-80 andTable **B-81**). However, projections are based on past catch rates and angler trips, and greater than expected values for these parameters could necessitate more conservative inseason depth restrictions and/or closures of the fisheries.

Table B-80. Average bottomfish angler trips per month by port and boat type for months without depth restrictions (all-depth), 2007-2010.

Port	Charter						Private						Total					
	Jan	Feb	Mar	Oct	Nov	Dec	Jan	Feb	Mar	Oct	Nov	Dec	Jan	Feb	Mar	Oct	Nov	Dec
Astoria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Garibaldi	46	125	101	120	17	19	52	63	39	2,225	64	20	98	187	140	2,345	81	39
Pacific City	5	13	24	16	2	2	71	85	126	111	30	26	76	98	150	127	32	28
Depoe Bay	54	191	389	423	57	15	51	75	63	102	23	17	105	266	452	525	80	32
Newport	156	399	870	618	190	78	98	179	193	292	36	66	254	578	1,063	909	226	144
Winchester	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charleston	31	84	125	158	13	14	98	124	189	315	16	40	129	208	314	473	29	54
Bandon	3	5	17	40	14	5	20	23	37	39	10	9	23	27	54	79	24	14
Port Orford	0	0	0	0	0	0	6	7	9	10	2	3	6	7	9	10	2	3
Gold Beach	6	16	30	16	10	3	41	54	72	47	19	18	47	70	102	63	29	21
Brookings	34	66	162	135	81	13	441	393	592	1,939	192	96	475	459	754	2,074	273	109
Total	334	898	1,718	1,525	382	148	878	1,002	1,320	5,079	391	295	1,213	1,900	3,038	6,604	773	443

Table B-81. Average bottomfish angler trips per month by port and boat type for months with 40 fm depth restrictions, 2007-2010.

Port	Charter						Private						Total					
	Apr	May	Jun	Jul	Aug	Sep	Apr	May	Jun	Jul	Aug	Sep	Apr	May	Jun	Jul	Aug	Sep
Astoria	0	8	22	1	6	0	1	113	105	15	6	3	1	121	127	16	12	3
Garibaldi	133	399	761	667	761	400	97	382	454	161	165	92	230	782	1,216	828	925	491
Pacific City	34	51	54	62	55	22	289	650	511	416	325	112	323	701	565	478	380	133
Depoe Bay	602	1,008	1,683	1,687	2,098	1,002	157	362	432	180	159	93	759	1,370	2,115	1,867	2,256	1,095
Newport	991	1,063	1,807	1,612	1,960	1,243	572	1,066	985	616	610	377	1,563	2,129	2,792	2,228	2,570	1,620
Winchester	0	0	4	1	0	0	0	9	7	2	13	0	0	9	11	3	13	0
Charleston	270	436	598	492	620	380	390	902	1,220	626	1,214	661	661	1,339	1,818	1,118	1,833	1,041
Bandon	59	75	193	200	284	39	87	195	184	159	247	84	146	271	377	359	531	122
Port Orford	0	11	19	0	0	0	25	65	57	132	83	33	25	76	76	132	83	33
Gold Beach	63	75	105	137	210	61	126	318	282	362	627	407	189	392	387	499	837	468
Brookings	274	364	504	491	703	320	1,121	2,311	2,499	2,302	2,293	1,294	1,395	2,675	3,003	2,793	2,996	1,614
Total	2,426	3,490	5,749	5,350	6,695	3,465	2,864	6,374	6,737	4,970	5,739	3,154	5,290	9,865	12,487	10,320	12,434	6,619

B.5.2 Oregon Recreational: Preferred

The Preferred Alternative analyzes the Council’s preferred ACLs (116/118 mt for canary rockfish and 18 mt for yelloweye rockfish; Table B-75and Table B-76) and allocations.

Table B-82 shows the allocations, or model targets, for black, canary and yelloweye rockfish for the Oregon recreational fisheries under the Preferred Alternative.

Table B-82. Oregon recreational allocations or model targets under the Preferred Alternative.

Species	2013 Recreational Allocation or Model Target (mt)	2014 Recreational Allocation or Model Target (mt)
Black rockfish	440.8	440.8
Canary rockfish	10.9	11.2
Yelloweye rockfish	2.6	2.6

Groundfish Seasons and Area Restrictions

Under the Preferred Alternative, the Oregon recreational groundfish fishery will be open offshore year-round, except from April 1 to September 30 when fishing is only allowed shoreward of 40 fm, the same as under the No-Action Alternative (Figure B-15). Closing the fishery outside of 40 fm from April 1 to September 30, months when yelloweye rockfish bycatch is the highest, mitigates the impacts to depleted yelloweye rockfish. The shore-based fishery will be open year-round as depleted canary and yelloweye rockfish are not impacted.

Area Closures

Under the Preferred Alternative, as in the No-Action Alternative, targeting and retaining groundfish and Pacific halibut will be prohibited year-round in the Stonewall Bank YRCA, a high relief rocky habitat approximately 15 miles offshore from Newport, Oregon (Figure B-16). Targeting and retaining Pacific halibut and groundfish within the Stonewall Bank YRCA was prohibited to reduce yelloweye rockfish bycatch.

Groundfish Bag Limits and Size Limits

Under the Preferred Alternative, the Oregon recreational groundfish fishery will have a marine fish daily-bag-limit of ten fish in aggregate (Figure B-15), the same as the No-Action Alternative. The marine fish daily-bag-limit includes all species other than lingcod, salmon, steelhead, Pacific halibut, flatfish, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine and smelt. This daily-bag-limit provides the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year’s fishery. The state process will likely reduce the marine fish daily-bag-limit from ten fish in aggregate to manage the harvest of the “other nearshore” rockfish complex within the recreational fishery state ocean boat landing cap, which is adopted in the yearly state process. Reducing the marine fish daily-bag-limit will also affect black rockfish harvest rates and may prevent the fishery from harvesting its total allocation. The status of black rockfish was assessed in 2007 as healthy and the Council adopted preferred OY was 1,000 mt for the area off Oregon and California with an Oregon harvest guideline of 580 mt, which has been in place since 2009. Assuming the recreational share continues to be seventy-six percent as determined through the state process, the Oregon recreational fishery harvest guideline for black rockfish would be 440.8 mt. Reductions in the marine fish daily bag limit are not expected to reduce yelloweye rockfish bycatch, since catch rates (per angler day) were similar for 10, 8, 6, or 5 marine fish bag limits.

Under the Preferred Alternative, the Oregon recreational fishery will have a cabezon seasonal sub-bag limit of 1 fish (Figure B-15), concurrent with the seasonal depth restrictions, the same as the No-Action Alternative. This seasonal sub-bag limit is intended to reduce cabezon mortality, while still allowing for at least some retention.

Under the Preferred Alternative, the Oregon recreational fishery will have a lingcod daily-bag-limit of three fish (Figure B-15), the same as the No-Action Alternative. This daily bag-limit provides the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year’s fishery. The state process will likely reduce the lingcod bag limit to two fish for the opening of the 2013 season. In the event the Pacific halibut catch allocation is reduced significantly from 2011 levels or the marine bag limit is further reduced inseason, the lingcod daily bag limit could be increased to three fish so long as the harvest guidelines for depleted canary and yelloweye rockfish are not exceeded.

Under the Preferred Alternative, the Oregon recreational fishery will have a flatfish daily-bag-limit of 25 fish in aggregate (Figure B-15), consistent with the No Action management measures effective since 2007. The flatfish daily-bag limit consists of all soles and flounders except Pacific halibut. Adoption of the flatfish daily-bag-limit of 25 fish in aggregate promotes simplicity in regulations and provides the flexibility to create additional regulations specific to flatfish (i.e. allowed retention of flatfish in the Pacific halibut fishery, or allowed targeting of flatfish in the event of a closure due to rockfish harvest guideline attainment).

The Preferred Alternative includes minimum length limits:

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

These length limits are consistent with the No Action management measures effective since 2007. These length limits are effective tools in reducing harvest of these species, primarily in the shore and estuary fishery.

Pacific Halibut Seasons

Under the Preferred Alternative, the recreational Pacific halibut fisheries should be able to proceed as in 2011 and 2012, in regards to days and areas open, etc., depending on the annual halibut quota. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly limited in 2013 and 2014.

Additional Management Measures Analyzed

In keeping with the Council's intent of limiting the scope and number of changes to the No Action harvest specifications and management measures during the 2013-2014 cycle, no additional management measures were analyzed for the Oregon recreational fisheries. The No Action management measures (bag limits, depth restrictions, etc.) will provide the basis for keeping recreational impacts of overfished species within sector specific harvest guidelines for 2013-2014.

Projected Impacts and Inseason Management Response

Under the Preferred Alternative, and associated season structure and bag limits detailed above, the annual projected mortality of black, canary and yelloweye rockfish are in Table B-83. Table B-79 shows recent mortality of the ten most landed species in the Oregon recreational fishery, including black rockfish. Species in Table B-79, other than black rockfish, are not modeled; therefore a projection for 2013-2014 is unavailable. This table represents recent mortality under similar season structure and bag limits to what will be in place under the No Action Alternative and may serve as a proxy for projections.

Table B-83. Projected mortality of species with Oregon recreational specific allocations under the Preferred Alternative.

Species	Impacts (mt)
Black rockfish	297.7
Canary rockfish	4.7
Yelloweye rockfish	2.5

Inseason Management Tools

Oregon has a responsive port based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2013 (or 2014) fishery does not proceed as expected.

Inseason management action may be implemented in 2013 or 2014 to reduce the mortality in the Oregon recreational groundfish fishery. Inseason management tools, designed to mitigate mortality, include bag limit adjustments (including non-retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish mortality, since retention of this species is prohibited. If catch rates indicate that the HGs for yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduce mortality. ODFW will monitor inseason progress toward recreational harvest guidelines for canary rockfish and yelloweye rockfish. Regulations will depend upon the timing of the determination for their need.

Adjustments to the marine fish daily-bag limit to no more than ten fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than three fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2011 levels. Season and/or area closures may also be considered if harvest targets or HGs are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit mortality of any managed species. Closing certain days each week would help lengthen the duration of a fishery approaching a harvest guideline.

Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce mortality of nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2013-2014, testing the effectiveness and selectivity of various gears and the survivability of rockfish released at depth.

Directed yellowtail rockfish and/or flatfish fisheries may be implemented inseason, as were implemented in 2004, in the event of a closure of the recreational groundfish fishery due to attainment federal or state HGs or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are within the harvest guidelines.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2011 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are not in excess of the harvest guidelines.

Community Impacts

Depth restrictions for the recreational bottomfish fishery are the primary management method used to keep mortality of yelloweye and canary rockfish within their respective harvest guidelines (HG) in the Oregon recreational fisheries. Depth restrictions reduce overfished mortality because catch rates and discard mortality rates of overfished species are lesser in shallower depths. The No Action depth restrictions are all-depths from Jan-Feb, 40 fm from Apr-Sep, and all-depths Oct-Dec.

Although depth restrictions reduce overfished species mortality, they can also decrease angler trips by reducing the quantity and quality of fishable bottomfish grounds. Ports are disproportionately affected by depth restrictions due to varying amounts of fishing grounds by depth (PFMC 2011). For example, Newport is relatively unaffected by a 40 fm depth restriction because the majority (98%) of bottomfish grounds are shallower than 20 fm (Figure B-17). In contrast, Winchester Bay and Florence are greatly impacted by depth restrictions because nearly all bottomfish grounds are deeper than 40 fm. Other ports, such as Garibaldi and Gold Beach, where the majority of bottomfish grounds are between 20-40 fm, are relatively unaffected by 40 fm depth restrictions, but are greatly affected by 20 fm depth restrictions.

Under the Preferred Alternative mortality of yelloweye and canary rockfish in the groundfish fishery (under the No Action depth restrictions) and the Pacific halibut fishery are projected to be within the allocations (Table B-83) and expected angler trips are anticipated to be similar to what has been seen in recent years (Table B-80 and Table B-81). However, projections are based on past catch rates and angler trips, and greater than expected values for these parameters could necessitate more conservative inseason depth restrictions and/or closures of the fisheries.

B.5.1 Oregon Recreational: Alternative 1

Oregon recreational management measures under Alternative 1 are the same as the Preferred Alternative and have the same impacts.

B.5.2 Oregon Recreational: Alternative 2

Oregon recreational management measures under Alternative 2 are the same as the Preferred Alternative and have the same impacts.

B.5.3 Oregon Recreational: Alternative 3

Oregon recreational management measures under Alternative 3 are the same as the Preferred Alternative and have the same impacts.

B.5.4 Oregon Recreational: Alternative 4

Alternative 4 analyzes ACLs of 48/49 mt for canary rockfish and 18 met for yelloweye rockfish (Table B-75 and Table B-76) and sector specific allocations. Table B-84 shows the allocations, or model targets, for black, canary and yelloweye rockfish for the Oregon recreational fisheries. Under Integrated Alternative 4 canary rockfish will be the most restrictive species; therefore all management measures will be designed to reduce canary rockfish mortality from the No-Action Alternative.

Table B-84. Oregon Recreational Allocations or Model Targets under Alternative 4.

Species	2013 Recreational Allocation or Model Target (mt)	2014 Recreational Allocation or Model Target (mt)
Black rockfish	440.8	440.8
Canary rockfish	3.5	3.6
Yelloweye rockfish	2.6	2.6

Groundfish Seasons and Area Restrictions

Under Alternative 4, the Oregon recreational groundfish fishery should able to operate a year round fishery with further depth restrictions (25 or 20 fathoms) than are in place under No Action. The groundfish fishery could be somewhat less restricted (30 fathoms instead of 25 or 20 fathoms) if the recreational Pacific halibut fishery were cancelled (Figure B-18).

Depth management is the main tool used for controlling canary and yelloweye rockfish catch in the Oregon recreational fishery. Two options are shown under Alternative 4: a year round groundfish fishery restricted to inside of 20 fm for the entire year and a year round groundfish fishery restricted to inside of 30 fm year round but with the Pacific halibut fishery cancelled. Both alternatives (4A and 4B) are more restrictive than the 2011-2012 Oregon recreational groundfish season under the No Action alternative. The options in the figure below will be refined for the Final EIS, once the council and public have had the opportunity to discuss the options.

Alt.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SQ	All depth			40 fm						All depth		
4A	20 fm											
4B	30 fm --No Halibut											

Figure B-18. Alternatives for the Oregon recreational fishery season in 2013-14 under Alternative 4.

Area Restriction Alternatives

No changes to the boundary of the Stonewall Bank YRCA would occur from those listed in the No-Action Alternative under Alternative 4, as the YRCA is a yelloweye rockfish savings area and has little effect on canary rockfish bycatch.

Groundfish Bag Limits and Size Limits

Under Alternative 4, the No-Action alternative bag limits for marine fish, lingcod, and flatfish would remain in place (Figure B-19) including no retention of yelloweye or canary rockfish at any time or depth. These daily-bag-limits provide the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process will likely start off each season with reduced marine and lingcod daily bag limits and may increase or further reduced them inseason depending on the progression of the fishery relative to the impact on species with harvest targets/guidelines and state landing caps.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine Bag Limit [1]	Ten (10)			1 Fish Cabezon Sub-Bag [2]						Ten (10)		
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

Marine 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
From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon
Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut

Figure B-19. Oregon recreational groundfish season in 2013-14 under Integrate Alternative 4.

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

Pacific Halibut Seasons

Under Alternative 4A (Figure B-18), the Pacific halibut fishery would be able to proceed as under the No-Action alternative, however the groundfish fishery would have further depth restrictions than the No-Action Alternative. Under Alternative 4B, the groundfish fishery would be somewhat less restricted than under Alternative 4A; however the Pacific halibut fishery would not be allowed. Since 2009, only sablefish and Pacific cod may be retained in the Pacific halibut fishery at any depth in the area north of Humbug Mountain, Oregon. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly limited in 2013 and 2014, if the halibut fishery were allowed to proceed.

Additional Management Measures Analyzed

In keeping with the Council’s intent of limiting the scope and number of changes to the No Action harvest specifications and management measures during the 2013-2014 cycle, no additional management measures were analyzed for the Oregon recreational fisheries. The No Action management measures (bag limits, depth restrictions, etc.) will provide the basis for keeping mortality of overfished species within the HGs for 2013-2014.

Projected Impacts and Inseason Management Response

Under Alternative 4, and associated season structure (Alternatives 4A and 4B) and bag limits detailed above, the annual projected mortality of black, canary and yelloweye rockfish are in Table B-85. Table B-79 shows mortality for the ten most landed species in the Oregon recreational fishery, including black rockfish. Species in Table B-79, other than black rockfish, are not modeled; therefore projections for 2013-2014 is unavailable. However it is anticipated that the further depth restrictions may increase catches of nearshore species, such as rockfish in the “other nearshore” group from what has occurred under the No Action regulations.

Table B-85. Projected Impacts of species with Oregon recreational specific allocations under Alternative 4.

Species	Allocation	SQ	Alt. 4A	Alt. 4B
Black rockfish	440.8	297.7	311.1	304.4
Canary rockfish	3.5/3.6	4.7	3.5	3.5
Yelloweye rockfish	2.6	2.5	1.5	1.6

Inseason Management Tools

Oregon has a responsive port based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2013 (or 2014) fishery does not proceed as expected.

Inseason management action may be implemented in 2013 or 2014 to reduce the impacts of the Oregon recreational groundfish fishery. Inseason management tools, designed to mitigate mortality, include bag limit adjustments (including non-retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish mortality, since retention of this species is prohibited. If catch rates indicate that the HGs for yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduce mortality. ODFW will monitor inseason progress toward the HG for canary rockfish and yelloweye rockfish. Regulations will depend upon the timing of the determination for their need.

Adjustments to the marine fish daily-bag limit to no more than 10 fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than 3 fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2011 levels. Season and/or area closures may also be considered if harvest targets are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit mortality of any managed species. Closing certain days each week would help lengthen the duration of a fishery approaching a harvest guideline.

Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce mortality of nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2013-2014, 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 federal or state harvest guidelines or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are within the HGs.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2011 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that mortality of yelloweye and canary rockfish are not in excess of the HGs.

Community Impacts

Canary rockfish mortality from the bottomfish fishery under the No Action groundfish depth restrictions and the Pacific halibut fishery (4.68 mt) are projected to exceed the HG under Alternative 4 (Table B-84). If the 48 mt canary rockfish ACL is adopted, then much more restrictive bottomfish depth restrictions than No Action and/or closures of the Pacific halibut will be needed to keep projected mortality within the HG (Alternatives 4A and 4B; Figure B-18). As for yelloweye rockfish, greater than expected catch rates of canary rockfish and/or angler trips could result in even more restrictive depths restrictions and/or closures of the fisheries.

Decreases in angler trips from the No Action Alternative are expected for Alternatives 4A and 4B (Figure B-19) if Alternative 4 is adopted. Projections of decreases in groundfish angler trips were calculated by multiplying average groundfish angler trips during months with No Action depth restrictions (Table B-80 and Table B-81) by the percentage of these trips that occurred deeper than the proposed depth restrictions during months with No Action depth restrictions (Table B-86 and Table B-87). This calculation removes angler trips that happened under No Action depth restrictions but would have been illegal under the proposed depth restrictions.

These projections represent the maximum number of angler trips that would have been expected to have been eliminated since anglers would have had the option of fishing shallower (permissible) depths, if possible or desired.

Table B-86. Percentage of bottomfish angler trips by depth bin (column labels) and port during months without depth restrictions (all-depth), 2009-2011. Data is unavailable prior to 2009 because anglers were not asked depth at which they fished.

Port	Charter				Private				Total			
	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30
Astoria	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Garibaldi	19.1	0.0	2.4	78.5	15.8	9.4	0.0	74.8	18.1	3.0	1.6	77.3
Pacific City	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Depoe Bay	69.3	9.0	1.8	19.9	84.1	2.7	0.0	13.2	71.4	8.1	1.5	19.0
Newport	89.6	0.0	0.0	10.4	92.2	0.0	0.5	7.2	90.0	0.0	0.1	9.9
Winchester	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Charleston	76.1	22.2	1.7	0.0	50.7	6.0	2.3	40.9	67.4	16.7	1.9	14.0
Bandon	100.0	0.0	0.0	0.0	79.1	20.9	0.0	0.0	82.0	18.0	0.0	0.0
Port Orford	53.8	0.0	0.0	46.2	85.2	14.8	0.0	0.0	75.0	10.0	0.0	15.0
Gold Beach	0.0	0.0	0.0	0.0	88.0	8.0	4.0	0.0	88.0	8.0	4.0	0.0
Brookings	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0

Table B-87. Percentage of bottomfish angler trips by depth bin (column labels) and port during months with 40 fm depth restrictions, 2009-2011.

Port	Charter				Private				Total			
	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30	< 20	20-25	25-30	> 30
Astoria	66.9	0.0	0.0	33.1	96.5	0.0	0.0	3.5	88.2	0.0	0.0	11.8
Garibaldi	53.7	39.7	4.3	2.3	66.5	23.5	8.5	1.5	57.3	35.3	5.4	2.1
Pacific City	98.1	1.9	0.0	0.0	99.0	1.0	0.0	0.0	98.8	1.2	0.0	0.0
Depoe Bay	92.3	5.6	1.4	0.7	94.4	4.9	0.2	0.4	92.6	5.5	1.2	0.6
Newport	96.5	1.8	0.1	1.6	98.4	0.5	0.3	0.8	97.0	1.4	0.2	1.4
Winchester	0.0	0.0	0.0	0.0	76.1	0.0	0.0	23.9	76.1	0.0	0.0	23.9
Charleston	90.6	7.4	0.3	1.7	89.4	7.8	2.0	0.8	89.9	7.6	1.2	1.3
Bandon	83.4	13.9	2.7	0.0	79.1	15.0	5.2	0.8	81.7	14.3	3.7	0.3
Port Orford	76.5	11.8	11.8	0.0	85.5	10.9	3.6	0.0	83.1	11.1	5.8	0.0
Gold Beach	90.0	7.8	0.0	2.2	92.5	6.3	1.2	0.0	91.6	6.8	0.8	0.8
Brookings	92.8	3.0	3.7	0.6	99.2	0.4	0.2	0.2	97.8	1.0	1.0	0.3

The number of 2011 Pacific halibut angler trips (22,884) was used to project the number of trips that would be expected with cancelation of the fishery. Pacific halibut angler trips are related to the quota, and 2011 data was used because 2013-2014 quotas are unknown, but are expected to be similar to 2011.

Table B-88. Projected decreases in angler trips by boat type, port, and fishery for Alternatives 4A and 4B of Figure B-18. The number of trips and percent decrease from No Action regulations is shown for reference.

Port	Decline in trips with Alternative A									Status quo trips					% decrease
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	
Astoria	12	9	21	0	0	0	12	9	21	37	243	159	148	587	3.5
Garibaldi	1,789	2,525	4,314	0	0	0	1,789	2,525	4,314	3,548	3,812	574	2,457	10,392	41.5
Pacific City	5	24	29	0	0	0	5	24	29	337	2,753	6	705	3,801	0.8
Depoe Bay	970	129	1,099	0	0	0	970	129	1,099	9,208	1,713	1,211	552	12,684	8.7
Newport	546	135	680	0	0	0	546	135	680	10,984	5,089	1,781	9,505	27,359	2.5
Florence	0	0	0	0	0	0	0	0	0	0	0	0	241	241	0.0
Winchester	5	7	13	0	0	0	5	7	13	5	31	0	265	302	4.2
Charleston	365	917	1,282	0	0	0	365	917	1,282	3,221	5,794	325	969	10,309	12.4
Bandon	141	229	370	0	0	0	141	229	370	932	1,094	79	423	2,527	14.6
Port Orford	7	62	70	0	0	0	7	62	70	30	430	147	104	711	9.8
Gold Beach	145	190	335	0	0	0	145	190	335	731	2,372	9	106	3,218	10.4
Brookings	191	89	281	0	0	0	191	89	281	3,146	15,472	19	3,127	21,764	1.3
Total	4,178	4,315	8,493	0	0	0	4,178	4,315	8,493	32,181	38,804	4,310	18,602	93,896	9.0

Port	Decline in trips with Alternative B									Status quo trips					% decrease
	Bottomfish			Pacific halibut			Combined			Bottomfish		Pacific halibut			
	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total	Charter	Private	Charter	Private	Total	
Astoria	12	9	21	159	148	307	171	156	328	37	243	159	148	587	55.8
Garibaldi	407	1,863	2,269	574	2,457	3,031	981	4,320	5,300	3,548	3,812	574	2,457	10,392	51.0
Pacific City	0	0	0	6	705	711	6	705	711	337	2,753	6	705	3,801	18.7
Depoe Bay	279	49	329	1,211	552	1,763	1,490	601	2,091	9,208	1,713	1,211	552	12,684	16.5
Newport	380	97	477	1,781	9,505	11,286	2,161	9,602	11,763	10,984	5,089	1,781	9,505	27,359	43.0
Florence	0	0	0	0	241	241	0	241	241	0	0	0	241	241	100.0
Winchester	5	7	13	0	265	265	5	273	278	5	31	0	265	302	92.2
Charleston	49	362	411	325	969	1,294	374	1,332	1,705	3,221	5,794	325	969	10,309	16.5
Bandon	0	7	7	79	423	502	79	430	509	932	1,094	79	423	2,527	20.1
Port Orford	0	0	0	147	104	251	147	104	251	30	430	147	104	711	35.3
Gold Beach	95	0	95	9	106	115	104	106	209	731	2,372	9	106	3,218	6.5
Brookings	15	19	34	19	3,127	3,146	34	3,146	3,180	3,146	15,472	19	3,127	21,764	14.6
Total	1,242	2,413	3,655	4,310	18,602	22,912	5,552	21,015	26,567	32,181	38,804	4,310	18,602	93,896	28.3

If the 48 mt Canary rockfish ACL alternative is adopted, Alternative 4A would be the preferred management measure alternative to keep mortality within the HG because fewer declines in angler trips are expected with Alternative 4A (8,493) than with Alternative 4B (26,567; Table B-88). With Alternative 4A, percent decreases of angler trips would be expected to be similar for the charter and private fleets (13% and 11% respectively). Declines would be expected for all ports, except for Florence, which has very few reefs. Garibaldi (41.5% reduction) would be impacted much greater than the other ports because there are few shallow water reefs in depths less than 20 fm (<15%).

Alternative 4A is projected to reduce annual saltwater angler expenditures (i.e., gas, lodging, food, charter tickets, tackle, bait, licenses, etc.) by $5.160 million, and more than half of this loss would be expected from Tillamook County ($3.626 million; Table B-89). Alternative 4B is projected to reduce annual saltwater angler expenditures by $14.265 million (nearly three times that of Alternative A).

Decreases in saltwater angler expenditures by county were calculated by multiplying saltwater angler expenditures (Dean Runyan Associates 2009) by the percent reduction in expected bottomfish angler trips due to the Alternative 4A and 4B depth restrictions and Alternative 4B cancellation of the Pacific halibut fishery.

Table B-89. Expected decreases in saltwater angler expenditures (all costs related to fishing trip) by county if the 48 mt canary rockfish ACL alternative is adopted and Alternatives A or B management measures (Figure B-18) are consequently implemented to keep mortality within the harvest guideline.

County	No Action $ (millions)	No Action Trips	Option 1 Δ Trips	Option 1 % Decrease	Option 1 Δ $	Option 2 Δ Trips	Option 2 % Decrease	Option 2 Δ $
Clatsop	5.766	5,545	-21	0.38	-0.022	-328	5.92	-0.342
Tillamook	21.235	24,026	-4,103	17.08	-3.626	-6,011	25.02	-5.313
Lincoln	21.466	51,353	-1,645	3.20	-0.687	-13,854	26.98	-5.791
Lane	2.628	814	0	0.00	0	-241	29.61	-0.778
Douglas	6.998	6,386	-13	0.20	-0.014	-278	4.35	-0.305
Coos	8.365	17,722	-1,456	8.22	-0.687	-2,214	12.49	-1.045
Curry	5.183	27,273	-650	2.38	-0.124	-3,640	13.35	-0.692
Total	71.641	133,119	-7,888	5.93	-5.16	-26,566	19.96	-14.266

$= millions of dollars of angler expenditures; trips = angler trips for all target species (e.g., tuna, salmon, bottomfish, halibut); Δ trips = projected decline in angler trips; Δ $ = projected decrease in angler expenditures. Clatsop= Astoria; Tillamook= Garibaldi and Pacific City; Lincoln= Depoe Bay and Newport; Lane= Florence; Douglas= Winchester Bay; Coos= Charleston and Bandon; Curry= Port Orford, Gold Beach, and Brookings.

Projected decreases in angler trips and angler expenditures are upper range projections because the model assumes that angler trips that occurred deeper than proposed depth restriction options would be eliminated; however, these anglers could have either fished shallower depths, targeted other species (i.e., salmon, Pacific halibut, or tuna), or moved to ports with greater quantities of groundfish reefs within the proposed depth restrictions. Therefore, it is possible, although unlikely, that there could be minimal declines in angler trips due to Alternatives 4A and 4B (lower range projection No Action trips). The most probable decrease in angler trips is between the upper and lower ranges because it would be assumed that a portion of anglers would not fish given the new regulations and the other portion would find substitute opportunities; however, only range projections can be made given current data. Better predictions of decreases in angler trips and expenditures due to new regulations could be made if data existed regarding potential changes in angler behaviors in response to regulatory changes. This data could be obtained via consultations with anglers or through a socio-economic survey.

B.5.5 Oregon Recreational: Alternative 5

Oregon recreational management measures under Alternative 5 are the same as the Preferred Alternative and have the same impacts.

B.5.6 Oregon Recreational: Alternative 6

Oregon recreational management measures under Alternative 6 are the same as the Preferred Alternative and have the same impacts.

B.5.7 Oregon Recreational: Alternative 7

Oregon recreational management measures under Alternative 7 are the same as the Preferred Alternative and have the same impacts.

B.5.1 Oregon Recreational: Alternative 8

Oregon recreational management measures under Alternative 8 are the same as the Preferred Alternative and have the same impacts.

B.5.2 Oregon Recreational: Summary of the Alternatives

This section summarizes the key effects of the No Action Alternative and the alternative for the Oregon recreational fishery. The alternatives are affected by the alternative ACLs for the overfished species, which are affected by the rebuilding alternatives for these stocks. For the Oregon recreational fishery, canary or yelloweye rockfish are the driving stock, depending on the alternative. This summary focuses on the effects of rebuilding the canary rockfish under alternative rebuilding plans (yelloweye rockfish ACL is held constant under all alternatives), expressed as alternative ACLs, including the time to rebuild the stocks; the corresponding economic implications to groundfish sectors, port groups, and fishing communities; the interaction of overfished species within the marine ecosystem; and the effects on non-groundfish species and the marine ecosystem. Alternative 2013-2014 groundfish management measures are designed to provide fishing opportunities to harvest healthy species within the constraints of alternative overfished species' ACLs. The following tables and figures provide an estimate of the bottom line biological and socioeconomic effects of the alternatives on the Oregon recreational fishery:

Table B-90. Change in Oregon Recreational Fishing Seasons and RCAs by Month under the Integrate Alternatives for 2013.

Alternative	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Action	all depth				40 fm				all depth			
1 (116 mt)	all depth				40 fm				all depth			
2 (101 mt)	all depth				40 fm				all depth			
3 (116 mt)	all depth				40 fm				all depth			
4A (48 mt)	20 fm											
4B (48 mt)	30 fm --No Halibut											
5 (516 mt)	all depth				40 fm				all depth			
6 (101 mt)	all depth				40 fm				all depth			
7 (147 mt)	all depth				40 fm				all depth			

Table B-91. Oregon recreational fishery bag limits under all Alternatives (no differences between the alternatives).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine Bag Limit [1]	Ten (10)				1 Fish Cabezon Sub-Bag [2]				Ten (10)			
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [3]	Twenty Five (25)											

[1] *Marine 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*
[2] *From April 1 through September 30, the marine bag limit is Ten (10) fish per day, of which no more than one (1) may be cabezon*
[3] *Flounders, soles, sanddabs, turbots and halibuts except Pacific halibut*

Table B-92. Oregon recreational fishery mortality (in mt) of yelloweye (YE), canary (CAN) and black (BLK) rockfish under the alternatives and associated season structures (Table B-90).

Integrated Alternative	YE	CAN	BLK
No Action	2.5	4.7	297.7
1 (116 mt)	2.5	4.7	297.7
2 (101 mt)	2.5	4.7	297.7
3 (116 mt)	2.5	4.7	297.7
4A (48 mt)	1.5	3.5	311.1
4B (48 mt)	1.6	3.5	304.4
5 (216 mt)	2.5	4.7	297.7
6 (101 mt)	2.5	4.7	297.7
7 (147 mt)	2.5	4.7	297.7

Table B-93. Estimated annual number of charter and private angler trips in the Oregon recreational bottomfish and halibut fisheries under the integrated alternatives and associated season structure.

Alternative	Bottomfish			Halibut			Combined		
	Charter	Private	Total	Charter	Private	Total	Charter	Private	Total
No Action	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
1 (116 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
2 (101 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
3 (116 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
4A (48 mt)	28,003	34,489	62,492	4,310	18,602	22,912	32,313	53,091	85,404
4B (48 mt)	30,939	36,391	67,330	0	0	0	30,939	36,391	67,330
5 (216 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
6 (101 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897
7 (147 mt)	32,181	38,804	70,985	4,310	18,602	22,912	36,491	57,406	93,897

No Action

If no action were taken by the Council, the 2012 ACLs (17 mt for yelloweye rockfish and 107 mt for canary rockfish) and management measures (season structure, Table B-90; and bag limits Table B-91) currently in place for the Oregon recreational fishery would remain in place for 2013-2014. The season structures, including depth restrictions, are intended to allow for a year round recreational bottomfish fishery, along with the recreational Pacific halibut fishery. Restricting the fishery to inside of 40 fm from April through September is designed to reduce yelloweye rockfish bycatch during months of high angler effort and yelloweye rockfish encounters. The projected mortality of black (297.7 mt), canary (4.7 mt) and yelloweye rockfish (2.5 mt) under this alternative are in Table B-92. The projected numbers of charter and private angler trips (bottomfish, halibut and total) are included in Table B-93 and are similar to what has been seen in recent years under similar season structure. Angler expenditures are also expected to be similar to what has been seen in recent years.

Alternatives 1, 2, 3, 5, 6, and 7

Under Alternatives 1, 2, 3, 5, 6, and 7 the canary rockfish ACL is roughly equivalent to or higher than the No Action Alternative. The yelloweye rockfish ACL under all alternatives is 18 mt (compared to 17 mt under No Action) and will be the most limiting species to Oregon recreational fisheries, similar to the No Action Alternative. Based on this, no changes to the Oregon recreational fishery management measures (bag limit, season structure, size limits, etc.) are proposed. Therefore projected mortality (Table B-92), angler trips (Table B-93), and angler expenditures are expected to be the same as with the No Action Alternative.

Alternative 4

Under Alternative 4, canary rockfish will be the most limiting species to the Oregon recreational fisheries. Management measures will need to be put in place to reduce mortality of canary rockfish compared to No Action. Depth management is the main tool for controlling canary and yelloweye rockfish mortality in the Oregon recreational fishery. Two alternatives (A and B) of season/depth restrictions were considered under Alternative 4 (Table B-90). Alternative A has a year round season open only shoreward of 20 fathoms, with the Pacific halibut fishery proceeding as under the No Action Alternative. Alternative B has a year round season open only shoreward of 30 fm, with the Pacific halibut fishery cancelled. Catch projections for both alternatives A and B under Alternatives 4 are in Table B-92. Projected mortality of canary and yelloweye rockfish are reduced from the No Action Alternative under alternatives A and B. Mortality of black rockfish increases from the No Action Alternative (311.1 mt for alternative A and 304.4 mt for alternative B, Table B-92), however is still below the 440.8 mt harvest guideline. Bag limits for marine fish, lingcod and flatfish under the No Action Alternative would remain in place under both options under Alternative 4. In the Oregon recreational fishery model, changes to the bag limit do not have an effect on the projected mortality of canary or yelloweye rockfish. The seasonal cabezon 1 fish sub-bag limit (of the 7 fish marine bag limit, no more than one can be cabezon; April-September) will also remain in effect under these alternatives, as well as the No Action Alternative. The shore fishery would be a year round fishery as canary and yelloweye rockfish are not impacted. Fishing for sanddabs and "other flatfishes", excluding Pacific halibut, would be legal year round without depth restrictions, except that fishing would be restricted to shoreward of 40 fathoms during any period the groundfish fishery has any depth restrictions. Extensions of the Stonewall Bank YRCA would not be necessary as it is not an area of high canary rockfish encounters.

The depth restrictions and possible cancellation of the Pacific halibut fishery necessary to reduce canary rockfish mortality under Alternative 4 will cause a reduction in the number of angler trips, both charter and private (Table B-93). The reduction in angler trips under alternative A (8,493 or 9% coastwide; Table

B-88) is due to the depth restrictions in the bottomfish fishery. By restricting the bottomfish fishery to inside of 20 fathoms, the quantity and quality of fishing areas is greatly reduced from the 40 fm restriction under the No Action Alternative. The port of Garibaldi is expected to see the greatest decrease, 41.5 percent, as there are few fishable areas inside of 20 fathoms near that port. Additionally, the ports of Charleston/Coos Bay, Bandon, and Gold Beach are projected to have greater than a ten percent reduction in the number of angler trips, while the port of Newport is only projected to have a 2.5 percent decrease in the number of angler trips. The projected decrease in angler expenditures under alternative A is $5.6 million coastwide, the majority ($3.6 million) coming from Tillamook County (port of Garibaldi; Table B-89).

The reduction in angler trips under alternative B (26,657 or 28.3 percent coastwide; Table B-88) is due to a combination of the depth restrictions in the bottomfish fishery (3,655 angler trips) and the cancellation of the Pacific halibut fishery (22,912 angler trips). By restricting the bottomfish fishery to inside of 30 fathoms, the quantity and quality of fishing areas is reduced from the 40 fm restriction under the No Action Alternative, but not as severely as under alternative A. However, cancelling the Pacific halibut fishery causes an even greater reduction in the number of angler trips. The ports of Astoria (5.8%), Garibaldi (51.0%), Newport (43.0%), Florence (100%), Winchester Bay (92.2%), and Port Orford (35.3%) are expected to see the number of angler trips decrease by greater than one third (Table B-88) from the No Action Alternative. The projected decrease in angler expenditures under alternative B is $14.3 million coastwide, with $5.3 million from Tillamook County (port of Garibaldi) and $5.8 million coming from Lincoln County (ports of Depoe Bay and Newport; Table B-89). The decrease in angler expenditures is primarily due to the cancellation of the Pacific halibut fishery.

B.6 California Recreational

B.6.1 California Recreational: No Action

Projected mortality and season structures for 2013-2014 under the No Action alternative are based on CDFG's updated RecFISH model. Model projections were calculated for the five recreational groundfish management areas using updated 2008, 2009, and 2010 RecFIN estimates; overfished species mortality are reported statewide. Recreational harvest guidelines for the No Action Alternative are reported in Table B-94. Under the No Action alternative, depth constraints and season length remain unchanged statewide (PFMC and NMFS. 2009).

Table B-94. No Action: California recreational allocations/harvest guidelines

Species	Harvest Guideline (mt)
Bocaccio	131
Canary Rockfish	14.5
Cowcod*	0.9
Yelloweye Rockfish	3.1

*Non-trawl allocation

Groundfish Seasons and Area Restrictions

The following recreational season applied in 2012 would remain in place under the No Action alternative (Figure B-20). All divers and shore-based anglers are exempt from the seasonal closures for rockfish, cabezon, greenlings, lingcod, and California scorpionfish.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>Northern</td><td colspan="4">Closed</td><td colspan="6">May 12–Oct 31 <20fm</td><td colspan="2">Closed</td></tr>
<tr><td>Mendocino</td><td colspan="4">Closed</td><td colspan="4">May 12–Aug 15<20fm</td><td colspan="4">Closed</td></tr>
<tr><td>San Francisco</td><td colspan="5">Closed</td><td colspan="7">Jun 1 – Dec 31 <30fm</td></tr>
<tr><td>Central</td><td colspan="4">Closed</td><td colspan="8">May 1 – Dec 31 <40fm</td></tr>
<tr><td>Southern</td><td colspan="2">Closed</td><td colspan="10">Mar 1 – Dec 31 <60fm</td></tr>
</table>

Figure B-20. No Action: California recreational groundfish season structure for 2013-2014.

In 2009, four yelloweye rockfish conservation areas (YRCA) were adopted in the Northern and Mendocino Management Areas for use in management. The YRCAs include habitat in both state and federal waters and can be implemented inseason (if needed) to reduce yelloweye rockfish mortality. To date, these YRCAs have not been implemented but would remain available under the No Action Alternative.

The California Fish and Game Commission (Commission) has implemented or is currently in the process of implementing marine protected areas (MPAs) throughout the entire state. When MPA implementation is complete, more than of 124 MPAs covering approximately 848 square miles (16 percent) of state waters will be in effect (CDFG 2011). Since most of these MPAs occur in state waters, many in 20 fathom or less, the available fishing areas, particularly in the Northern and Mendocino Management Areas, will be reduced.

Groundfish Bag Limits and Size Limits

Under the No Action Alternative, a statewide 10 fish rockfish, cabezon, and greenling bag limit with a sub-bag limit of 2 fish for bocaccio and greenlings and a 3 fish sub-bag limit for cabezon would remain in place. Retention of bronzespotted, canary, cowcod, and yelloweye rockfish was prohibited in 2011-2012 and would continue to be prohibited under the No Action alternative. The following bag limits would also apply:

- California scorpionfish – 5 fish
- Leopard shark – 3 fish
- Lingcod – 2 fish
- Sanddabs – None
- Soupfin shark – 1 fish

There is no bag limit for Pacific sanddab, petrale sole and starry flounder. A bag limit of 10 fish of any one species within the 20 finfish maximum bag limit would apply to the remaining species in the groundfish FMP.

The following minimum size limits applied to 2011-2012 California recreational fisheries would be carried forward under the No Action alternative:

- Bocaccio – 10 inches
- California scorpionfish – 10 inches
- Cabezon – 15 inches
- Kelp greenling – 12 inches
- Leopard shark – 36 inches
- Lingcod – 22 inches

Projected Impacts and Inseason Management Response

Based on the updated model all overfished species, except yelloweye rockfish, are projected to be within allowable limits under the No Action (Table B-95). CDFG's RecFISH projection model was updated with 2010 data from RecFIN. These values are just pre-season projections and actual mortality may be different.

CDFG closely monitors yelloweye rockfish and cowcod – performing weekly tracking using preliminary CRFS field reports. These preliminary CFRS reports are converted into an anticipated catch value (ACV) in metric tons using catch and effort data from previous years. This weekly "proxy" value is then used to approximate catch during the five to eight week lag time in CRFS catch estimates. If angler effort or bycatch of overfished groundfish species changes dramatically from prior years, actual mortality can be higher or lower than projected. Based on the inseason tracking, if any of the overfished species harvest guidelines are projected to be attained inseason, CDFG could enact emergency management actions to slow and/or reduce catches. Management measures include closing one or more recreational groundfish management areas for boat based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

Projections for non-overfished species are provided in Table B-96.

Table B-95. No Action: California recreational projected mortality of overfished species for 2013-2014.

Species	Projected Impacts (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

Table B-96. No Action: California recreational projected mortality of non-overfished species for 2013-2014.

Species	Projected Impacts (mt)
Black Rockfish	161.2
Blue Rockfish	56.7
Cabezon	23.9
California Scorpionfish	77.0
Greenlings	14.4
Lingcod	117.4
Minor Nearshore Rockfish North	7.8
Minor Nearshore Rockfish South	245.7
Widow Rockfish	2.2

Community Impacts

Under the No Action alternative, California communities will continue to be negatively impacted by existing shallow depth restrictions and shorten seasons. The California recreational groundfish fishery has historically operated in deeper depths with longer seasons (PFMC 2003); however, with more restrictive recreational harvest guidelines for overfished groundfish species, communities in all the management areas coast wide have seen drastic reductions in season length and considerable increases in depth restrictions. Management areas north of Point Arena have seen the most restrictive season and depth constraints. Due to these restrictions placed on the groundfish fishery and other marine fisheries in the region (e.g., salmon), many communities along the North Coast have seen a decrease in angler effort. In particular, the northern California ports of Crescent City, Humboldt Bay, Shelter Cove, and Fort Bragg have seen their season length slowly reduced over the past decade.

In addition to reduced season lengths and shallower depth restrictions, California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, and destroyed vessels. Crescent City and Santa Cruz were both highly impacted by the disaster. As a result, boat launch ramps and gas stations were closed for evaluation, and private boat slips were repaired or completely rebuilt in both these communities.

B.6.2 California Recreational: Preferred

The 2013-2014 California recreational groundfish season projected mortality and season structure under Alternative 1 are based on CDFG's updated RecFISH model. Model projections were calculated for the five recreational groundfish management areas using updated 2008, 2009, and 2010 RecFIN estimates; overfished species mortality are reported statewide. Table B-97 depicts Alternative 1 harvest guidelines for the 2013-2014 California recreational groundfish seasons under the preferred and one alternate allocation scheme (option 1, see Appendix C, Section C.3 for more information). The proposed groundfish season structure and depth constraints listed out by recreational management area can be seen in Figure B-22.

Under the Alternative 1 preferred allocation, overfished species allocations to the California recreational fishery are higher than the No Action alternative (Table B-97). Under option 1(alternate allocation), the allocation of cowcod to the non-trawl fishery is higher than under the preferred alternative which contains the No Action allocation percentages. Although there will be some increased opportunity compared to No Action, management measures will still have to be more restrictive than in previous years (PFMC. 2003). Communities such as Shelter Cove will continue to be adversely impacted by the low yelloweye rockfish harvest guideline based on the Council's preferred catch sharing. The recreational fishery will not be able to fully utilize the available canary rockfish allocation under this alternative due to the low amount of yelloweye rockfish.

Table B-97. Alternative 1: California recreational allocations/harvest guidelines for 2013-2014 under the preferred and alternate cowcod allocation.

Species	Harvest Guideline (mt)	
	Preferred Allocation	Option 1
Bocaccio	167.9/174.2	167.9/174.2
Canary Rockfish	22.6/23.3	22.6/23.3
Cowcod*	1.0	1.9
Yelloweye Rockfish	3.4	3.4

*The preferred allocation reflects the percentages under the No Action Alternative (66% trawl; 34% non-trawl). Under option a, the allocations are reversed (34% trawl; 66% non-trawl)

Under the Alternative 1, the tradeoffs between depth restrictions in the Southern Management Area were explored to reduce cowcod encounters (Option 60 fm, Preferred 50 fm, Option 40 fm). These depth restrictions could be applied under either the preferred allocation scheme or under the alternative allocation (option 1). Under the 60 fm option, the season structure would be similar to the No Action alternative except for an increase in the season length for the Mendocino Management Area is increased by 18 days compared to No Action (Figure B-21). Under the Council's preferred depth option, the season structures would be similar to the No Action except that the season length in the Mendocino Management areas is increased and the depth restriction in the Southern Management Area would be 50 fm instead of 60 fm (No Action) (Figure B-22). Under the 40 fm option, the season structure would be similar to No Action except that the season length in the Mendocino Management areas is increased and the depth restriction in the Southern Management Area would be 40 fm instead of 60 fm (Figure B-23). All divers and shore-based anglers are exempt from the seasonal closures for rockfish, cabezon, greenlings, lingcod, and California scorpionfish.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 15 – Oct 30 <20fm						Closed	
Mendocino	Closed				May 15 –Sept 2*<20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 <**60fm**									

* Sept 1 in 2014

Figure B-21. Alternative 1 (Option 60 fm): California recreational groundfish season structure and depth constraints for 2013-2014.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 15 – Oct 30 <20fm						Closed	
Mendocino	Closed				May 15 –Sept 2*<20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 **<50fm**									

* Sept 1 in 2014

Figure B-22. Alternative 1 (Preferred 50 fm): California recreational groundfish season structure and depth constraints for 2013-2014.

Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 15 – Oct 30 <20fm						Closed	
Mendocino	Closed				May 15 –Sept 2*<20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 **<40fm**									

* Sept 1 in 2014

Figure B-23. Alternative 1 (Option 40 fm): California recreational groundfish season structure and depth constraints for 2013-2014.

Similar to No Action, yelloweye rockfish conservation areas (YRCA) would be available under this alternative and could be implemented inseason if catches are projected to exceed harvest guidelines.

The Commission has implemented or is currently in the process of implementing MPAs throughout the entire state. When MPA implementation is complete, more than of 124 MPAs covering approximately 848 square miles (16 percent) of state waters will be in effect (CDFG 2011). Since most of these MPAs occur in state waters, many in 20 fathom or less, the available fishing areas, particularly in the Northern and Mendocino Management Areas, will be reduced.

Groundfish Bag Limits and Size Limits

Under Alternative 1 (including the allocation and depth management options), there are no changes to the groundfish bag limits or size limits except for the following:

Bocaccio – The No Action sub-bag limit for bocaccio is two fish, with a minimum size limit of 10 inches. The Council is proposing to increase the sub-bag limit from two fish to three fish under Alternative 1 (including all depth and allocation options). The increase in the sub-bag limit is expected to increase total bocaccio mortality by 11.5 percent (Table B-98, Table B-99, and Table B-100). The Council is also proposing to remove the bocaccio minimum size limit of ten inches under Alternative 1 (all depth and allocation options). Removing the size limit is expected to increase total bocaccio mortality by 0.4 percent (Table B-98, Table B-99, and Table B-100). The proposed changes are not mutually exclusive and the impacts are additive. Currently bocaccio is the only rockfish species in the recreational sector that has a size limit and removing the size limit would reduce regulatory complexity. There are no expected increases to mortality for other overfished species as a result of these management measures.

Greenlings –The No Action sub-bag limit for greenlings is two fish. The Council is proposing to increase the sub-bag limit to 10 fish to maintain consistency with state regulations, which were modified attain the greenling contribution to the Other Fish Complex. The increased bag limit would apply under Alternative 1 (including all depth and allocation options). By increasing the sub-bag limit, the estimated take would be approximately 15 mt (Table B-101). The Council is not proposing any changes to the greenling minimum size restriction. There are no expected increases to other overfished species as a result of this increase.

Additional Management Measures Analyzed

<u>Shelf Rockfish Retention in Cowcod Conservation Area (CCA)</u>

The Council is requesting a modification to existing regulations governing recreational groundfish fishing within the Cowcod Conservation Areas (CCA) to allow retention of shelf rockfish taken during the open season for groundfish within the existing depth constraint of 20 fm. Removing the prohibition on shelf rockfish retention in depths of 20 fm or less in the CCA when fishing for rockfish is open will reduce discard mortality that currently occurs while in pursuit of other species within the 10 fish RCG bag limit. Under the proposed action, recreational anglers will meet their RCG bag limit sooner and with less discarding; reducing the chances of encounters with overfished species. Also, this change will make regulations more consistent with those in other management areas and other fisheries.

Increased mortality of shelf rockfish is expected to be minimal and can easily be accommodated within the recreational harvest guideline with a minimal risk of exceeding the ACLs. No ACLs for target or overfished species are expected to be exceeded as a result of this action.

Projected Impacts and Inseason Management Response

Under Alternative 1 (including all depth and allocation options) the projected mortality of yelloweye rockfish increases by 0.2 mt compared to the No Action alternative, due to the increased season length in the Mendocino Management Area (Table B-98, Table B-99 and Table B-100). No increases to other overfished species are expected. The number of angler trips is expected to increase under this alternative for both private/rental boats (PR) and the commercial passenger fishing vessels (CPFV). CDFG estimates that an increase of approximately 1,600 angler trips on PR boats and 300 angler trips on CPFVs could occur in the Mendocino Management Area.

The projected mortality under the preferred 50 fm depth option includes a decrease of 0.9 mt for bocaccio, 0.1 mt for canary rockfish, and 0.1 mt of cowcod compared to the No Action Alternative (Table B-99 compared to Table B-95).

The projected mortality under the 40 fm depth option includes a decrease of 19.8 mt of bocaccio, 0.3 mt of canary rockfish, and 0.3 mt of cowcod compared to the No Action Alternative (Table B-100 compared to Table B-95).

Projections for non-overfished species for Alternative 1 under all depth options are provided in (Table B-101).

Table B-98. Alternative 1 (Option 60 fm): California recreational projected mortality of overfished species for 2013-2014, including mortality from proposed changes to management measure.

Species	Projected Mortality (mt)	
Bocaccio	Two fish sub-bag limit (No Action)	50.7
	Three fish sub-bag limit	5.8
	Removing 10' minimum size length	0.2
	Total	56.7
Canary Rockfish	11.3	
Cowcod	0.3	
Yelloweye Rockfish	3.4	

Table B-99. Alternative 1 (Preferred 50 fm): California recreational projected impacts to overfished species for 2013-2014, including impacts from proposed changes to management measures.

Species	Projected Impacts (mt)	
Bocaccio	Two fish sub-bag limit (status quo)	44.5
	Three fish sub-bag limit	5.1
	Removing 10' minimum size length	0.2
	Total	49.8
Canary Rockfish	11	
Cowcod	0.2	
Yelloweye Rockfish	3.4	

Table B-100. Alternative 1 (Option 40 fm): California recreational projected impacts to overfished species for 2013-2014, including impacts from proposed changes to management measures.

Species	Projected Impacts (mt)	
Bocaccio	Two fish sub-bag limit (status quo)	27.6
	Three fish sub-bag limit	3.2
	Removing 10' minimum size length	0.1
	Total	30.9
Canary Rockfish	10.8	
Cowcod	0.0	
Yelloweye Rockfish	3.4	

Table B-101. Alternative 1 including Depth Options: California recreational projected mortality of non-overfished species for 2013-2014. Results in parenthesis reflect changes to management measures other than season and depth.

Species	Projected Mortality (mt)		
	Option 60 fm	**Preferred 50 fm**	**Option 40 fm**
Black Rockfish	164.2	164	164.0
Blue Rockfish	57.1	57	56.7
Cabezon	24.2	24.2	24.2
California scorpionfish	77.0	74.4	69.7
Greenlings	14.4 (15.5)	14.4 (15.5)	14.4 (15.5)
Lingcod	119.3	118.9	116.9
Minor Nearshore Rockfish North	7.8	7.8	7.8
Minor Nearshore Rockfish South	248.0	247.1	244.9
Widow Rockfish	2.2	1.9	1.6

Similar to the No Action alternative, inseason management response would include closing one or more recreational groundfish management areas for boat based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions. The preferred depth restriction in the Southern Management Area is 50 fm. If cowcod encounters are tracking higher or lower than projected, inseason action could be taken to modify the depth restrictions accordingly.

Community Impacts

Under the preferred yelloweye rockfish ACL, the California recreational harvest guideline is 3.4 metric tons. This will allow the Mendocino Management Area season length to extend through the Labor Day holiday weekend (September 2 in 2013 and Sept 1 in 2014). Under this scenario, the season length in the Mendocino Management Area would be increased by 18 days relative to No Action, which is a 19.5 percent increase in angler days. Extending the season through Labor Day is critical for this area as it has one of the highest effort and profit potentials because it is the prime camping and fishing season. Extending the season to September 2nd is expected to result in increased profits to business, benefiting local communities. Other California recreational groundfish management areas would not see an extension to the season length or reduction of the depth constraints under this alternative.

Under Alternative 1 (including all depth and allocation options), California communities, particularly in the northern management areas, will continue to be negatively impacted by reduced season lengths and increased depth restrictions. Under Alternative 1, the Northern Management Area would have a five and a half month season length and a depth restriction of 20 fathoms where as the South region in Oregon, which is adjacent to this area, has an unrestricted depth constraint and a year-round season. One would theoretically expect management in both areas to be the same since they are located adjacent to one another – but that is not the case.

Under the preferred depth option (50 fm) and the 40 fm depth option, California communities in the Southern Management Area will be negatively impacted by the shallow depth restrictions compared to the 60 fm depth option (No Action). Although the season length would remain the same, this area would see the shallowest depth restrictions that region has seen since 2003. Redistribution of effort to the remaining fishing grounds and the potential for localized depletion could become more problematic. The higher cowcod allocation afforded under the alternate allocation scenario may alleviate the need to implement shallow depth restrictions.

The California recreational groundfish fishery has historically operated in deeper depths with longer seasons (PFMC. 2003); however, with more restrictive recreational harvest guidelines for the overfished groundfish species, communities in all the management areas coast wide have seen drastic reductions in season length and considerable increases in depth restrictions. Management areas north of Point Arena have been subject to the most restrictive season and depth constraints. Due to these restrictions to the groundfish fishery and other marine fisheries in the region (e.g., salmon), many communities along the north coast have seen a decrease in angler effort. The port of Crescent City often competes with the Oregon ports of Brookings and Gold Beach, where fewer restrictions and lower fuel prices have attracted many anglers who used to fish out of Crescent City (Pomeroy et al. 2010).

In addition to reduced season lengths and shallower depth restrictions, California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, and destroyed vessels. Crescent City and Santa Cruz were both highly impacted by the disaster. As a result, boat launch ramps and gas stations were closed for evaluation, and private boat slips were repaired or completely rebuilt in both these communities.

B.6.1 California Recreational: Alternative 1

California recreational management measures under Alternative 1 are the same as the Preferred Alternative, except for the cowcod allocation. The non-trawl cowcod allocation, which includes the California recreational fishery, is higher under Alternative 1 compared to the Preferred Alternative (1.9 mt compared to 1 mt). The projected mortality under Alternative 1 is the same as described under the Preferred Alternative.

B.6.2 California Recreational: Alternative 2

California recreational management measures under Alternative 2 are the same as Alternative 1 and have the same projected mortality.

B.6.3 California Recreational: Alternative 3

California recreational management measures under Alternative 3 are the same as Alternative 1 and have the same projected mortality.

B.6.4 California Recreational: Alternative 4

The 2013-2014 California recreational groundfish season projected mortality and season structure under Alternative 4 are based on CDFG's updated RecFISH model. Model projections were calculated for the five recreational groundfish management areas using updated 2008, 2009, and 2010 RecFIN estimates; overfished species mortality are reported statewide. Table B-102 depicts the recreational harvest guidelines for the 2013-2014 California recreational groundfish seasons under this alternative including the cowcod allocation option (see Appendix C, section C.3). The proposed groundfish season structure and depth constraints listed out by recreational management area can be seen in Figure B-24, Figure B-25, Figure B-26 and Figure B-27.

Under Alternative 4, the allocations to the California recreational fishery are the same or higher than the No Action alternative except for canary rockfish, which is drastically reduced. As a result, the low canary rockfish allocation based on the Council's catch sharing plan will adversely impact communities statewide. These impacts on communities vary depending on which alternative is being evaluated. The recreational fishery will not be able to fully utilize the available yelloweye rockfish allocation under this alternative due to the low allocation of canary rockfish.

Table B-102. Alternative 4: California allocations/recreational harvest guidelines for 2013-2014 under the preferred and alternate cowcod allocations.

Species	Harvest Guideline (mt)	
	Preferred Allocation	Option 1
Bocaccio	167.9/174.2	167.9/174.2
Canary Rockfish	7.1/7.4	7.1/7.4
Cowcod*	1.0	1.9
Yelloweye Rockfish	3.4	3.4

*The preferred allocation reflects the percentages under the No Action alternative (66% trawl; 34% non-trawl). Under option 1, the allocations are reversed (34% trawl; 66% non-trawl).

Groundfish Seasons and Area Restrictions

Under this alternative, the tradeoffs between different season lengths and depth restrictions were explored (option 4a and 4b). Under option 4a, longer seasons and more restrictive depth constraints were examined; whereas option 4b explored shorter seasons and less restrictive depths.

Under option 4a, the depth restrictions would be more constraining in most management areas compared to the No Action alternative, except for the northern management areas (Figure B-24 and Figure B-25). Due to the low canary rockfish encounter rates, the season length in the Northern and Mendocino Management Areas could be extended under this alternative; the depth restrictions would be shallower as well. The San Francisco and Central Management Areas will see a decrease in season length and a significant increase in the depth restriction compared to the No Action Alternative. The San Francisco and Central Management Areas have historically seen the highest canary rockfish encounters. The Southern Management will see an increase in the depth restriction.

Competition for space with the commercial nearshore fishery and the potential for localized depletion become even more problematic when the recreational fishery is open in the northern management areas because the two fisheries operate in similar depths.

2013												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 1 – Oct 31 < 20fm						Closed	
Mendocino	Closed				May 1 – Oct 31 < 20fm						Closed	
San Francisco	Closed					June 1 – Nov 30 < 20fm						C
Central	Closed					June 1 – Nov 30 < 20fm						C
Southern	Closed		Mar 1 – Dec 31 <40fm									

Figure B-24. Alternative 4 (option 4a): California recreational groundfish season structure and depth constraints for 2013.

2014												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed				May 1 – Nov 30 <20fm							C
Mendocino	Closed				May 1 – Nov 30 <20fm							C
San Francisco	Closed					June 1 – Nov 30 < 20fm						C
Central	Closed					June 1 – Dec 31 < 20fm						
Southern	Closed		March 1 – Dec 31 < 40fm									

Figure B-25. Alternative 4 (option 4a): California recreational groundfish season structure and depth constraints for 2014.

Under option 4b, the season lengths would be more constraining in most management areas compared to the No Action alternative, except for the Southern Management Area (Figure B-26 and Figure B-27). In addition to season length, the Southern and Central Management Areas will see shallower depth restrictions as well. Due to the low canary encounter rates, the depth restrictions would be deeper in the Northern and Mendocino Management Areas under this alternative. The San Francisco and Central Management Areas will see a significant decrease in season length compared to the No Action Alternative. The San Francisco and Central Management Areas have historically seen the highest canary rockfish encounters. The Southern Management will have a shallower depth restriction.

2013												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed					Jun 1-Aug 31 <30fm			Closed			
Mendocino	Closed					Jun 1-Aug 31 <30fm			Closed			
San Francisco	Closed				May 15 - Aug 31 <30fm				Closed			
Central	Closed				May 15 - Aug 31 <30fm				Closed			
Southern	Closed		Mar 1 – Dec 31 < 40fm									

Figure B-26. Alternative 4 (option 4b): California recreational groundfish season structure and depth constraints for 2013.

2014												
Management Area	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Northern	Closed					Jun 1-Aug 31<30fm			Closed			
Mendocino	Closed					Jun 1-Aug 31<30fm			Closed			
San Francisco	Closed				May 1-Aug 31<30fm				Closed			
Central	Closed				May 1-Aug 31<30fm				Closed			
Southern	Closed		March 1 – Dec 31 <40fm									

Figure B-27. Alternative 4 (option 4b): California recreational groundfish season structure and depth constraints for 2014.

Similar to No Action alternative, the YRCAs would be available under this alternative and could be implemented inseason if catches are projected to exceed harvest guidelines.

The Commission has implemented or is currently in the process of implementing MPAs throughout the entire state. When MPA implementation is complete, more than of 124 MPAs covering approximately

848 square miles (16 percent) of state waters will be in effect (CDFG 2011). Since most of these MPAs occur in state waters, many in 20 fathom or less, the available fishing areas, particularly in the Northern and Mendocino Management Areas, will be reduced.

Groundfish Bag Limits and Size Limits

Under Alternative 4, there are no changes to the groundfish bag limits or size limits except for the following:

Bocaccio – Under option 4a and 4b, the No Action sub-bag limit for bocaccio is two fish, with a minimum size of ten inches. The Council is proposing to increase the sub-bag limit from two fish to three fish. The increase in the sub-bag limit is only expected to increase total bocaccio mortality by 11.5 percent (2.3 mt under option 4a and 2.6 under option 4b; Table B-103, Table B-104). The Council is also proposing to remove the minimum size limit of ten inches. Removing the size limit is expected to increase total bocaccio mortality by 0.1 mt (Table B-103, Table B-104). The proposed changes are not mutually exclusive, and the impacts are additive. The proposed changes are not mutually exclusive and the impacts are additive. Currently bocaccio is the only rockfish species in the recreational sector that has a size limit and removing the size limit would reduce regulatory complexity. There are no expected increases to other overfished species mortality as a result of these management measures.

Greenlings – Under option 4a and 4b, the No Action sub-bag limit for greenlings is two fish. The Council is proposing to increase the sub-bag limit to 10 fish to maintain consistency with state regulations, which were modified to reflect the increased contribution to the "other fish" complex analyzed in the 2011-12 FEIS. By increasing the sub-bag limit, the estimated take under option 4a would be approximately 16.9 mt and 17.7 mt (in 2013 and 2014); under option 4b the estimated take would be 10.1 mt and 10.7 mt (Table B-105; Table B-106).

The Department is not proposing any changes to the minimum size restriction. There are no expected increases to overfished species mortality as a result of this increase.

Additional Management Measures Analyzed

Shelf Rockfish Retention in Cowcod Conservation Area (CCA)

Under option 4a and 4b, the Council is requesting a modification to existing regulations governing recreational groundfish fishing within the Cowcod Conservation Areas (CCA) to allow retention of shelf rockfish taken during the open season for groundfish within the existing depth constraint of 20 fm. Removing the prohibition on shelf rockfish retention in depths of 20 fm or less in the CCA when fishing for rockfish is open will reduce discard mortality that currently occurs while in pursuit of other species within the 10 fish RCG bag limit. Under the proposed action, recreational anglers will meet their RCG bag limit sooner and with less discarding; reducing the chances of encounters with overfished species. Also, this change will make regulations more consistent with those in other management areas and other fisheries.

Increased mortality of shelf rockfish are expected to be minimal and can easily be accommodated within the recreational harvest guideline with a minimal risk of exceeding the ACLs. No ACLs for target or overfished species are expected to be exceeded as a result of this action.

Projected Impacts and Inseason Management Response

The projected mortality under option 4a and 4b, compared to the No Action alternative, includes a decrease of 0.1 metric ton of yelloweye rockfish, a decrease of 28 metric tons of bocaccio, a decrease of 4.0 metric tons of canary rockfish and a decrease of 0.3 metric ton of cowcod. The projected mortality for all overfished species under this alternative are anticipated to stay below the harvest recreational guideline (Table B-103; Table B-104).

Projected mortality of non-overfished species is provided in Table B-105 and Table B-106.

Table B-103. Alternative 4 (option 4a and 4b): California recreational projected mortality of overfished species for 2013, including impacts from proposed changes to management measures.

Species	Projected Mortality (mt)	
Bocaccio	Two fish sub-bag limit (No Action)	20.0/22.5
	Three fish sub-bag limit	2.3/2.6
	Removing 10' minimum size length	0.1/0.1
	Total	22.4/22.5
Canary Rockfish	7.1/7.1	
Cowcod	0/0	
Yelloweye Rockfish	2.8/3.1	

Table B-104. Alternative 4 (option 4a and 4b): California recreational projected mortality of overfished species for 2014, including impacts from proposed changes to management measures.

Species	Projected Mortality (mt)	
Bocaccio	Two fish sub-bag limit (No Action)	20.1/22.8
	Three fish sub-bag limit	2.3/2.6
	Removing 10' minimum size length	0.1/0.3
	Total	22.5/25.5
Canary Rockfish	7.4/7.4	
Cowcod	0/0	
Yelloweye Rockfish	2.8/3.0	

Table B-105. Alternative 4 (option 4a and 4b): California recreational projected mortality of non-overfished species for 2013. Results in parenthesis reflect changes to management measures other than season and depth.

Species	Projected Mortality (mt)	
	Option 4a	Option 4b
Black Rockfish	178.0	119.7
Blue Rockfish	36.2	27.9
Cabezon	24.8	17.4
California scorpionfish	77.0	69.7
Greenlings	15.7 (16.9)	9.4(10.1)
Lingcod	112.5	74.7
Minor Nearshore Rockfish North	8.4	4.6
Minor Nearshore Rockfish South	195	142.5
Widow Rockfish	0.4	0.6

Table B-106. Alternative 4 (option 4a and 4b): California recreational projected mortality of non-overfished species for 2014. Results in parenthesis reflect changes to management measures other than season and depth.

Species	Projected Impacts (mt)	
	Option 4a	Option 4b
Black Rockfish	180.4	123.4
Blue Rockfish	37.7	30.1
Cabezon	25.4	18.1
California scorpionfish	69.7	69.7
Greenlings	16.5 (17.7)	10.0 (10.7)
Lingcod	115.9	78.3
Minor Nearshore Rockfish North	8.9	4.6
Minor Nearshore Rockfish South	202.9	152.5
Widow Rockfish	0.4	0.6

Similar to the No Action alternative, inseason management response would include closing one or more recreational groundfish management areas for boat based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

Community Impacts

Under option 4a and 4b, the California recreational harvest guideline for canary rockfish is 7.1 metric ton in 2013 and 7.4 metric ton in 2014. These harvest guidelines make canary rockfish the most constraining species for the recreational sector. The recreational fishery will not be able to fully utilize the available yelloweye rockfish allocation under this alternative due to the low allocation of canary rockfish.

Under the option 4a, the total season length in all the management areas will have been increased by 46 angler days in 2013 (4.6 percent increase) and 137 angler days in 2014 (13.8 percent increase) relative to the No Action alternative. However, due to projected high encounter rates of canary rockfish in deeper water, particularly in the San Francisco, Central and Southern Management Areas, the depth restrictions are increased significantly.

Under option 4a, California communities, particularly in the northern management areas, will continue to be negatively impacted by reduced season lengths and increased depth restrictions. Under this alternative, the Northern Management Area would have a five and a half month season length and a depth restriction of 20 fathoms where as the South region in Oregon, which is adjacent to this area, has an unrestricted depth constraint and a year-round season. One would theoretically expect management in both areas to be the same since they are located adjacent to one another – but that is not the case.

The California recreational groundfish fishery has historically operated in deeper depths with longer seasons (PFMC. 2003); however, with more restrictive recreational harvest guidelines for the overfished groundfish species, communities in all the management areas coast wide have seen drastic reductions in season length and considerable increases in depth restrictions. Management areas north of Point Arena have been subject to the most restrictive season and depth constraints. Due to these restrictions to the groundfish fishery and other marine fisheries in the region (e.g., salmon), many communities along the north coast have seen a decrease in angler effort. The port of Crescent City often competes with the Oregon ports of Brookings and Gold Beach, where fewer restrictions and lower fuel prices have attracted many anglers who used to fish out of Crescent City (Pomeroy et al. 2010).

Under option 4b, the total season length in all the management areas will have been decreased by approximately 300 angler days in 2013 (30 percent decrease) and 254 angler days in 2014 (26 percent decrease) relative to the No Action alternative. However, due to projected high encounter rates of canary rockfish in deeper water, particularly in the San Francisco, Central and Southern Management Areas, the depth restrictions are increased significantly along with a sharp decrease in season length.

Under option 4b, California communities, particularly in the northern management areas, will continue to be negatively impacted by reduced season lengths and increased depth restrictions as described under Alternative a. Management areas north of Point Arena will see the most restrictive season length that region has ever seen.

In addition to reduced season lengths and increased depth restrictions, California coastal communities were impacted by a tsunami in March 2011, which temporarily closed some ports, damaged infrastructure, and destroyed vessels. Crescent City and Santa Cruz were both highly impacted by the disaster. As a result, boat launch ramps and gas stations were closed for evaluation, and private boat slips were repaired or completely rebuilt in both these communities.

B.6.5 California Recreational: Alternative 5

California recreational management measures under Alternative 5 are the same as Alternative 1 and have the same projected mortality.

B.6.6 California Recreational: Alternative 6

California recreational management measures under Alternative 6 are the same as Alternative 1 and have the same projected mortality.

B.6.7 California Recreational: Alternative 7

California recreational management measures under Alternative 7 are the same as Alternative 1 and have the same projected mortality.

B.6.1 California Recreational: Alternative 8

California recreational management measures under Alternative 8 are the same as Alternative 1 and have the same projected mortality.

B.7 References

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Appendix C DETAILED MANAGEMENT MEASURES ANALYSIS

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

September 2012

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This appendix provides detailed information about the new management measures (i.e., management measures that have not previously been analyzed or implemented) being proposed and analysis of modifications to existing management measures.

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C.1 Modifications to the Boundaries Defining the Rockfish Conservation Areas

The following proposed modifications to current Rockfish Conservation Area (RCA) boundary waypoints were adopted for analysis:

- Adjustments of waypoints on the 200 fm RCA boundary requested by the Oregon Department of Fish and Wildlife (ODFW).
- Adjustments to waypoints on the 150 fm RCA boundary where it crosses the modified 200 fm RCA boundary (Agenda Item E.9.b, Supp GAP Report November 2011) and 200 fm RCA boundary (Agenda Item G.9.b, Supplemental GMT Report, September 2011)
- Adjustments to the 150 fm RCA boundary waypoints at Usal and Noyo Canyons (Agenda Item E.9.b, Supp GAP Report November 2011);

Overview of Accountability Measures

RCAs are one type of measure used to keep catches within annual catch limits (ACLs). RCAs affect the collective behavior of harvesters by preventing fishing in areas where bycatch of overfished species is particularly high. Their extent varies by season and gear type to target fishing activities associated with higher bycatch. The boundaries of RCAs are defined by depth contours since a correlation between depth and the distribution (or catch) of overfished species has been demonstrated through an analysis of trawl logbook and survey data. The boundary depth contours defined by waypoints in Federal regulations (at 50 CFR 660.391-660.394) only approximate actual isobaths for two reasons. First, the waypoints defining the lines were defined using available bathymetry, which may have limited accuracy. Second, for enforcement purposes the lines defined by the waypoints are a more generalized, or simplified, representation of isobaths.

Other measures more directly constrain catch on an individual vessel level. These are:

- Individual fishing quota (IFQ) management for the shoreside trawl fleet (with cumulative landing limits for some non-target, non-overfished management units)
- Co-op allocations to the at-sea whiting fleets (catcher vessels delivering to at-sea processors and catcher-processors)
- Permit based sablefish allocations to vessels in the limited entry fixed gear fleet during the primary season
- Daily and cumulative landing limits for the open access fixed gear sectors and limited entry fixed gear outside the primary season

Only catch share management directly controls total catch of most management unit species (including all overfished species) in the trawl sectors with all catch monitored by observers. Daily trip limits and 2-month limits in other sectors only control landings; overfished species total catch (mostly bycatch) must be imputed based on partial observer coverage. RCAs add another layer of precaution by affecting collective behavior and their use is more important in managing those sectors not under catch shares since overfished species bycatch cannot be directly controlled.

"Inseason" management allows measures to be periodically adjusted during the biennial period based on new information and catch projections. These management measures are described in more detail in section 3.3 of the EIS.

Modifications of the 200 fm Depth Contour Described by Waypoints Listed at 50 CFR 660.394

Description of the 200 fm Depth Contour

During the 2011-12 biennial cycle the 200 fm depth contour was used as the seaward boundary of the trawl RCA (which applies to the shoreside sector) January to April and September to December north of 40° N. latitude. The depth contours defining the boundaries of RCAs are listed in trip limit tables published in Federal regulations and in periodic Public Notices announcing changes to groundfish management measures (http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Public-Notices/Index.cfm). This boundary is intended to reduce bycatch of darkblotched rockfish, POP, and petrale sole, although a modified line is applied during the winter months to allow access to areas of higher abundance of petrale sole, an important target species that is currently managed under a rebuilding plan.

Management Issue

The current 200 fm depth contour specified in regulation at 50 CFR 660.74 approximates the 200 fm isobath. To allow greater access to trawl fishing areas for Dover sole, thornyheads, and sablefish (DTS species) while maintaining the intent of the 200 fm line, better alignment of the 200 fm line with the 200 fm isobath is necessary for waters off Oregon.

Management Options

Under **No Action** (described in section 2.2 of the EIS) the 200 fm depth contour created by the waypoints currently listed at 50 CFR 660.74 would be retained in 2013-14.

Under the **Action Alternatives** (Alternatives 1-8 described in section 2.2 of the EIS) the 200 fm depth contour would more closely align with actual bathymetry. This change is based on a proposal submitted by ODFW to modify the 200 fm RCA boundary by adding two waypoints between current waypoints #86 and #88. Current waypoint #87 would be deleted and replaced with the proposed waypoint #2. This change would open an estimated 7.6 square miles to fishing by moving the boundary line shoreward and closer to the 200 fm isobath. Table C-1 lists the waypoint coordinates and Figure C-1 shows the proposed change relative to the existing depth contour under Option 1 (No Action).

As seen in Figure C-1, the depth contour is highly generalized with areas and depths both greater and less than 200 fm on the shoreward side of the line in this region. Visual inspection suggests that this change would open more area in depths greater than 200 fm than shallower areas.

Table C-1. Coordinate list for proposed modification to 200 fm boundary.

		Coordinates	
ID	Name	Degrees, decimal minutes	Decimal degrees
86	Current waypoint	44°38.52’ N, 124°49.11 W	44.642, -124.819
1	OR proposed modification	44°21.73’ N, 124°49.82’ W	44.362, -124.830
2	OR proposed modification	44°17.57’ N, 124°55.04’W	44.293, -124.917
87	Current waypoint (deleted)	44°23.30′ N., 124°50.17′ W.	
88	Current waypoint	44°13.19′ N., 124°58.66′ W.	

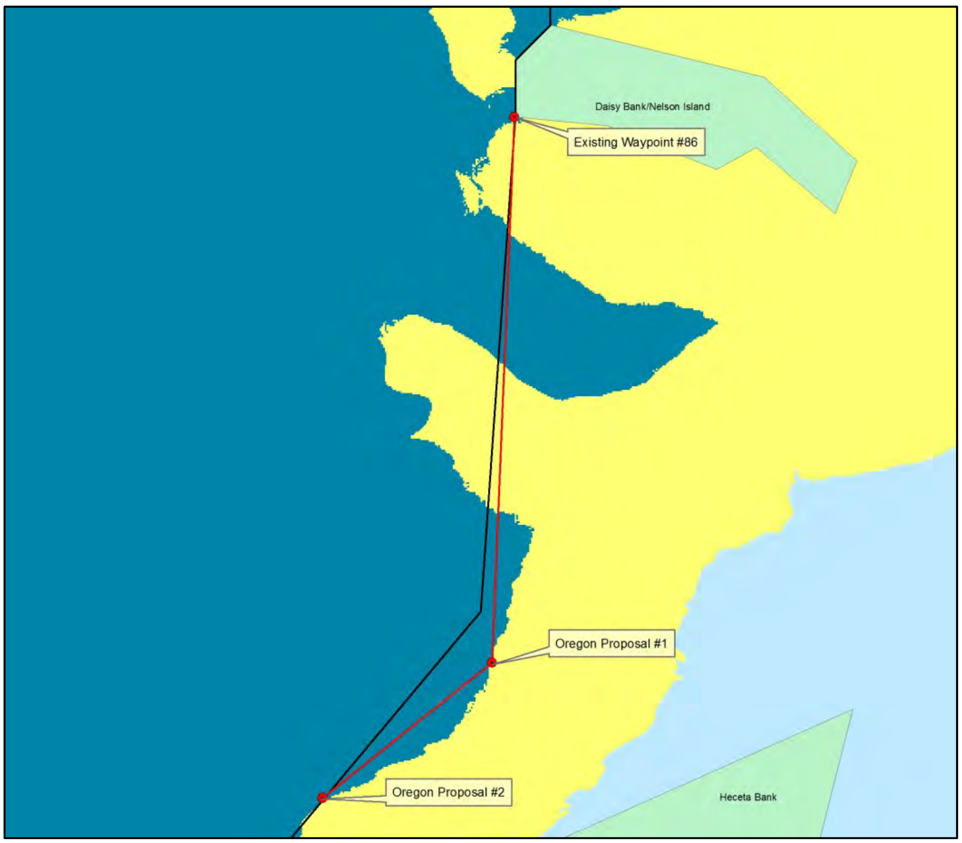


Figure C-1. Modification to the 200 fm depth contour proposed by Oregon. Dark blue: depths greater than 150 fm; yellow: depths between 150 and 75 fm; light blue: depths less than 75 fm. Bathymetry based on *NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11.* *http://www.ngdc.noaa.gov/mgg/coastal/crm.html*

Comparison of the Management Options

Biological Impacts: The delineation of RCAs was based on an analysis of trawl logbook and survey data to determine the relative abundance and bycatch rates of overfished species according to bottom depth.[1] To the degree that there is a precise correlation between depth and catch rates, under action alternatives there could be a marginal increase in the catch of overfished species, other fish species, and the potential

[1] Pacific Fishery Management Council. 2003. Final environmental impact statement for the proposed groundfish acceptable biological catch and optimum yield specifications and management measures for the 2003 Pacific coast groundfish fishery. Portland, OR. January 2003.

take of protected species occurring in the opened area. But this rationale also supports the presumption that catch rates in the newly opened area would be comparable to rates in the currently open areas greater than 200 fathoms in depth. There is not enough information to quantify such changes, however. By more closely aligning the depth contour with the actual bathymetry in the area this option is intended to meet the objective of RCA management of reducing bycatch rates of overfished species while having a beneficial impact in terms of fishing opportunity. In that sense impacts are within the scope described in previous groundfish harvest specifications EISs, which evaluated the application of this RCA boundary. Depth-based management was first introduced in 2003 to control bycatch of overfished species. Dr. James Hastie of the NWFSC analyzed trawl logbook and other data to correlate overfished species bycatch rates by depth zones. These data were subsequently integrated into a catch projection model he developed for the trawl fishery. Depth-based management has been implemented by defining waypoints for lines approximating various isobaths. Subsequent adjustments to these waypoints are intended to make them more accurately correspond to depth contours. RCA configurations have been evaluated in the harvest specifications EISs since 2003 with respect to their likely performance in mitigating overfished species bycatch. The accountability measures described above and in section 2.2 of the main EIS document provide additional layers of precaution with respect to the catch of groundfish. The risk of exceeding an ACL in the trawl fishery should be no greater than under the current line (No Action) if bycatch rates are not different in the open area than in other areas deeper than 200 fathoms. This inference is based on the same premise used in the original development of depth-based management to control bycatch overfished species, which is that bycatch rates for a given overfished species varies by depth.

Socioeconomic Impacts: The change proposed under the action alternative may have a marginal socioeconomic benefit for the shoreside trawl fishery managed under an RCA with a 200 fathom contour as its seaward boundary, because harvesters could access more area deeper than 200 fathoms where target species occur. Since the 200 fathom contour has not been used, and is not being proposed for use in 2013-14, for managing other commercial and recreational fisheries no socioeconomic effects are expected for these groups. The change in management cost, primarily those associated with enforcement of the RCA boundaries, would be minimal under the proposal. The compliance with the depth contours are monitored with vessel monitoring systems (VMS) that are currently required on all groundfish vessels.

Modifications of the 150 fm Depth Contour Described by Waypoints Listed at 50 CFR 660.393

Description of 150 fm Depth Contour

The 150 fm depth contour was used in the 2011-12 biennial cycle to define the seaward boundary of the trawl RCA north of 45°46’ N. latitude from May to August and between 45°46’ N. latitude and 48°10’ N. latitude in March-April and September to December. It also defined the seaward boundary of the trawl and non-trawl RCA in all bimonthly periods south of 40°10’ N. latitude and around offshore islands in Southern California.

During the 2013-14 biennial period the current configuration of the non-trawl RCA is proposed to remain in place. However, the Council is considering potential changes to the configuration of the trawl RCA which could involve more widespread use of the 150 fathom line as the seaward boundary.

The 150 depth contour is used to reduce the catch of overfished species that are found on the continental shelf including canary rockfish, yelloweye rockfish, and bocaccio.

Management Issue

Changes to the 150 fathom depth contour are proposed to better align it with actual bathymetry in three areas: adjacent to Westport, Washington; at Noyo Canyon, and at Usal Canyon, located off Central

California. As discussed below, the change adjacent to Westport was prompted because the 150 line crosses the 200 fathom depth contour in this area. Depths greater than 150 fathoms at the heads of the two canyons are currently shoreward of the 150 fathom line.

Management Options

Under **No Action** (described in section 2.2 of the EIS) the 150 fathom depth contour defined by waypoints currently listed at 50 CFR 660.73 would remain in effect.

Under the **Action Alternatives** (Alternatives 1-8 in section 2.2 of the EIS) four sets of changes to the 150 fathom depth contour are proposed to better align it with actual bathymetry:

- Modify the 150 fathom depth contour between waypoint #57 and #60 where it currently crosses the 200 fathom depth contour (in waters adjacent to Westport, WA) as requested by the Washington Department of Fish and Wildlife (WDFW)
- Modify waypoints at 50 CFR 660.73 between #191 and #192 and to better align the 150 fm depth contour with actual bathymetry at Noyo Canyon as proposed by the Groundfish Advisory Subpanel (GAP) (Agenda Item E.9.b, Supplemental GAP Report, November 2011)
- Modify waypoints at 50 CFR 660.73 between #186 and #187 and to better align the 150 fm depth contour with actual bathymetry at Usal Canyon as proposed by the GAP (Agenda Item E.9.b, Supplemental GAP Report, November 2011)

Table C-2 shows the revised coordinates for the proposed change between waypoints #57 and #60. As shown in Figure C-2, waypoints #58 and #59 on the 150 fm line would be removed; two new waypoints would be substituted for these where the current 150 fm line intersects with the 200 fm RCA boundary. As shown in Figure C-3 there is a discrepancy between the gridded 3 arc-second Coastal Relief Model (CRM) data developed by the NOAA National Geophysical Data Center and Electronic Navigational Chart (ENC) data for the area in question. The ENC data show a 200 fm depth contour extending into the area encompassed by the 150 fm RCA boundary waypoints 57-60. However, the 200 fm and 150 fm lines were devised independently of one another and having the shallower line crossing the deeper line is inconsistent.

At the November 2011 Council meeting the GAP recommended two adjustments to the 150 fm RCA boundary to enable access to waters greater than 150 fm in Usal and Noyo Submarine Canyons. Based on the 3 arc-second coastal relief model developed by the NOAA National Geophysical Data Center a modification of the gap proposal has been developed that better approximates the 150 fm isobaths in these two submarine canyons. The coordinates for 8 new waypoints for each of these alternative modifications are shown in Table C-3 and Figure C-4 shows the boundaries graphically in relation to the 150 fm isobaths. This proposal would increase the area open to fishing by 1.54 sq. mi. In examining the GAP proposed change against more detailed bathymetry Council staff developed an alternative set of changes intended to better meet the objective of matching lines to actual bathymetry. These waypoint changes are listed in Table C-4. This alternative configuration would increase the open area by 1.95 sq. mi. At the April 2012 Council meeting, the GAP recommended using the revised set of waypoint proposed by Council staff (Agenda Item I.3.b, Supplemental GAP Report, April 2012). This alternative set of waypoints is considered the management proposal included in the action alternatives.

Table C-2. Waypoints for proposed change to 150 fm RCA boundary near Westport, WA.

ID	Name	Degrees, Decimal minutes	Decimal Degrees
57	150-fm (274-m) Contour - Coastwide	46°58.471' N, 124°59.082' W	124.98470, 46.97452
	Computed line intersection	46°58.36' N, 124°59.816' W	124.99693, 46.97266
55	200-fm (366-m) Contour - Coastwide	46°56.8' N, 125°0' W	125.00000, 46.94667
	Computed line intersection	46°56.615' N, 125°0' W	125.00000, 46.94358
60	150-fm (274-m) Contour - Coastwide	46°57.092' N, 124°58.86' W	124.98100, 46.95153

Table C-3. Coordinates for proposed modifications to the 150 fm RCA boundary at Usal and Noyo Submarine Canyons proposed by the GAP.

Name	ID	Coordinates	
		Degrees, decimal minutes	Decimal degrees
Usal Canyon	1	39°49.099 N, 124°6.028 W	39.818, -124.1
Usal Canyon	2	39°48.913 N, 124°4.599 W	39.815, -124.077
Usal Canyon	3	39°48.599 N, 124°4.512 W	39.81, -124.075
Usal Canyon	4	39°48.171 N, 124°5.355 W	39.803, -124.089
Noyo Canyon	1	39°32.98 N, 123°56.43 W	39.55, -123.941
Noyo Canyon	2	39°31.918 N, 123°56.489 W	39.532, -123.941
Noyo Canyon	3	39°31.816 N, 123°56.762 W	39.53, -123.946
Noyo Canyon	4	39°32.275 N, 123°57.354 W	39.538, -123.956

Table C-4. A variation on the GAP proposed changes at Usal and Noyo Canyons developed by Council staff.

Name	ID	Coordinates	
		Degrees, decimal minutes	Decimal degrees
Usal Canyon	1	39°49.098 N, 124°6 W	39.818, -124.1
Usal Canyon	2	39°48.936 N, 124°4.74 W	39.816, -124.079
Usal Canyon	3	39°48.6 N, 124°4.5 W	39.81, -124.075
Usal Canyon	4	39°47.952 N, 124°5.22 W	39.799, -124.087
Noyo Canyon	1	39°32.982 N, 123°56.4 W	39.55, -123.94
Noyo Canyon	2	39°31.644 N, 123°56.16 W	39.527, -123.936
Noyo Canyon	3	39°31.398 N, 123°56.7 W	39.523, -123.945
Noyo Canyon	4	39°32.346 N, 123°57.42 W	39.539, -123.957

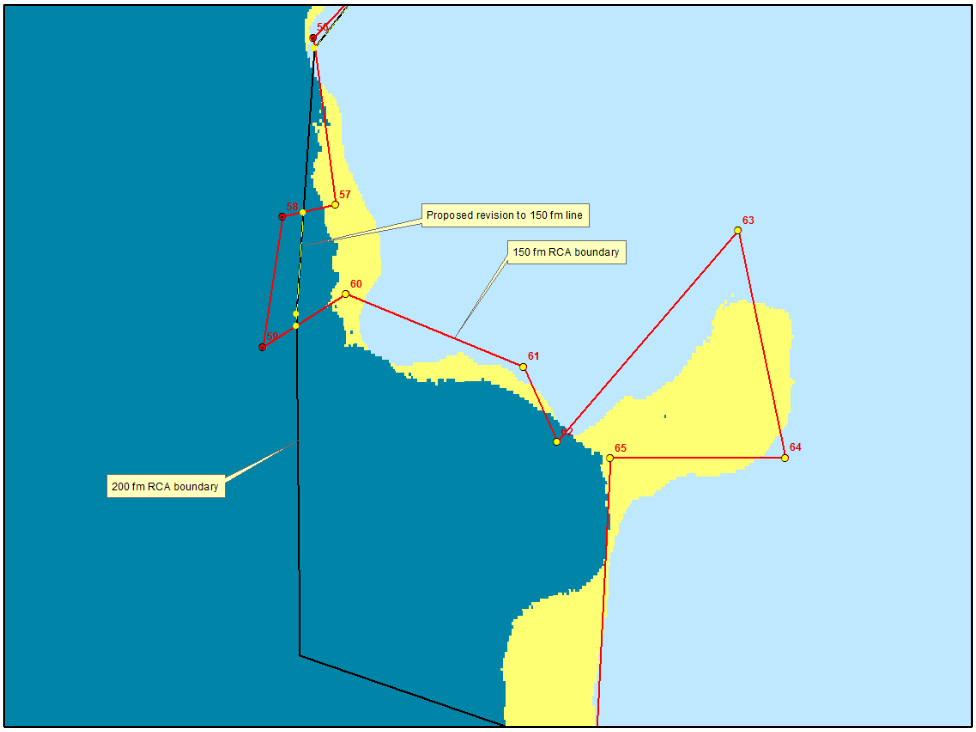


Figure C-2. Change to 150 fm RCA boundary proposed by WDFW. Dark blue fill: depths greater than 200 fm; yellow fill: depths between 200 and 150 fm; light blue fill: depths less than 150 fm. Bathymetry based on *NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11, http://www.ngdc.noaa.gov/mgg/coastal/crm.html.*

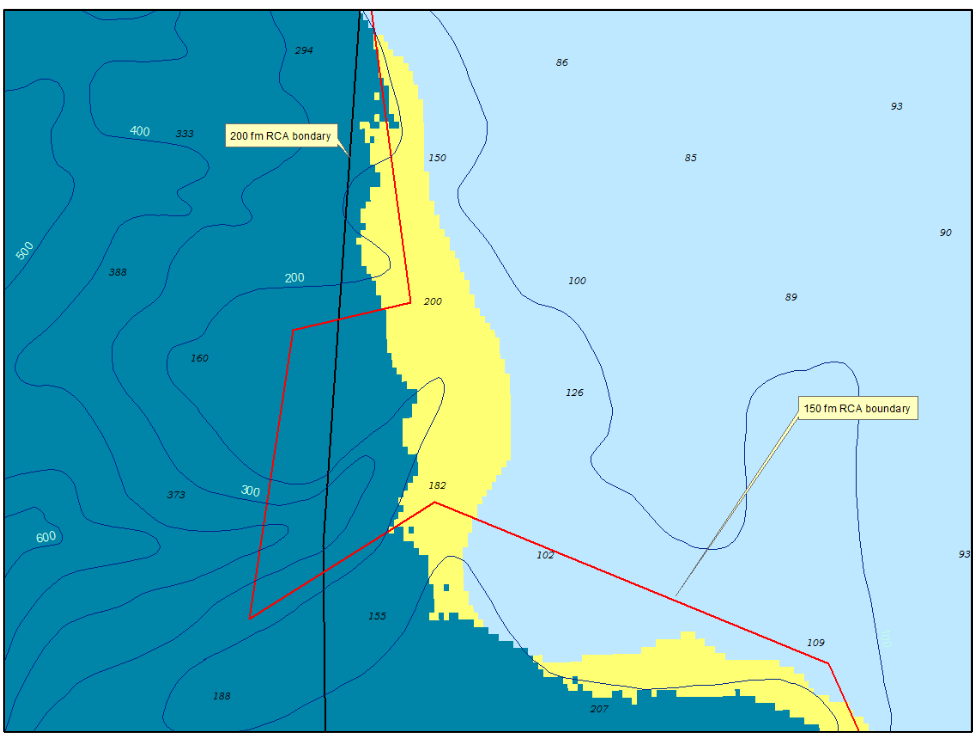


Figure C-3. ENC depths and depth contours shown on CRM gridded depths for area of WDFW proposed revision. ENC data from NOAA ENC®Direct to GIS Coastal data series, obtained 1/25/08, http://www.nauticalcharts.noaa.gov/csdl/ctp/encdirect_new.htm.

a. Usal Canyon

b. Noyo Canyon

Figure C-4. Proposed modifications to the 150 fm RCA boundary at (a.) Usal and (b.) Noyo Submarine Canyons. Dark blue: depths greater than 150 fm; yellow: depths between 150 and 100 fm; light blue: depths less than 100 fm. Bathymetry based on: ***NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11, http://www.ngdc.noaa.gov/mgg/coastal/crm.html***

Comparison of the Management Options

Biological Impacts: As with the proposed modification to the 200 fathom depth contour described above, under the action alternatives the changes to the 150 fathom depth contour adjacent to Westport, Washington, Noyo Canyon, and Usal Canyon are intended to better match it to actual bathymetry. For the reasons discussed above in relation to modification of the 150 fm line, it is reasonable to conclude that a more precise and accurate specification of the line would better conform to the objective of depth-based management. Although the impacts cannot be quantified, the analytical basis for specifying these lines is the correlation between depth and the occurrence of overfished species. To the degree that there is a similar correlation between depth and occurrence for other species, then catch rates in the area opened by this modification should be comparable to other areas greater than 150 fathoms in depth that are already open to groundfish fisheries. Furthermore, the management program includes a variety of other accountability measures, described above and in section 2.2 of the main EIS document, used to constrain catch within ACLs.

Socioeconomic Impacts: The change proposed under the action alternatives may have a marginal socioeconomic benefit for the shoreside trawl fishery and nontrawl fisheries managed using the 150 fathom line as a seaward RCA boundary by allowing access to a small amount of additional fishing area. This management line is not used to manage recreational fisheries. The change in management cost, primarily those associated with enforcement of the RCA boundaries, would be minimal under the proposal. The compliance with the depth contours are monitored with vessel monitoring systems (VMS) that are currently required on all groundfish vessels.

Create a New, Modified 150 fm Depth Contour to Use for the Trawl RCA North of 40°10’ N. Latitude

The background and use of the 150 fathom depth contour is explained above.

Management Issue

With implementation of IFQ management for the shoreside trawl fishery the Council is considering a trawl RCA that would have a 150 fathom seaward boundary year round, because accountability for catch at the vessel level decreases the risk that ACLs will be exceeded. In past biennial cycles a modified 200 fathom depth contour has been applied in the winter months (November-February) north of 40°10’ N. latitude to allow access to specific areas where petrale sole, an important target species during the winter fishery, are more abundant. There are instances where these cutouts encompass depths less than 150 fathoms; if a 150 fathom depth contour is applied year round then some of these more productive cutout areas would be closed to fishing in the winter months. This proposal would create a modified 150 fathom depth contour that could be applied during the winter fishery to keep the cutout areas defined by the modified 200 fathom depth contour open. For the purpose of publication in Federal regulations this new depth contour would include the waypoints for the existing 150 fathom line except for any of the proposed changes described in this section and section 2.3 and incorporated in the Preferred Alternative.

Management Options

Under **No Action** (described in section 2.2 of the EIS) the 150 fathom depth contour defined by waypoints currently listed at 50 CFR 660.393 would continue to be used seasonally (September to April) as the seaward boundary of the trawl RCA.

Under the **Action Alternatives** (Alternatives 1-8 in section 2.2 of the EIS) a new, modified 150 fathom depth contour would be created north of 40°10’ N. latitude for use during the periods when the modified 200 fathom depth contour is currently used as the seaward boundary of the RCA.

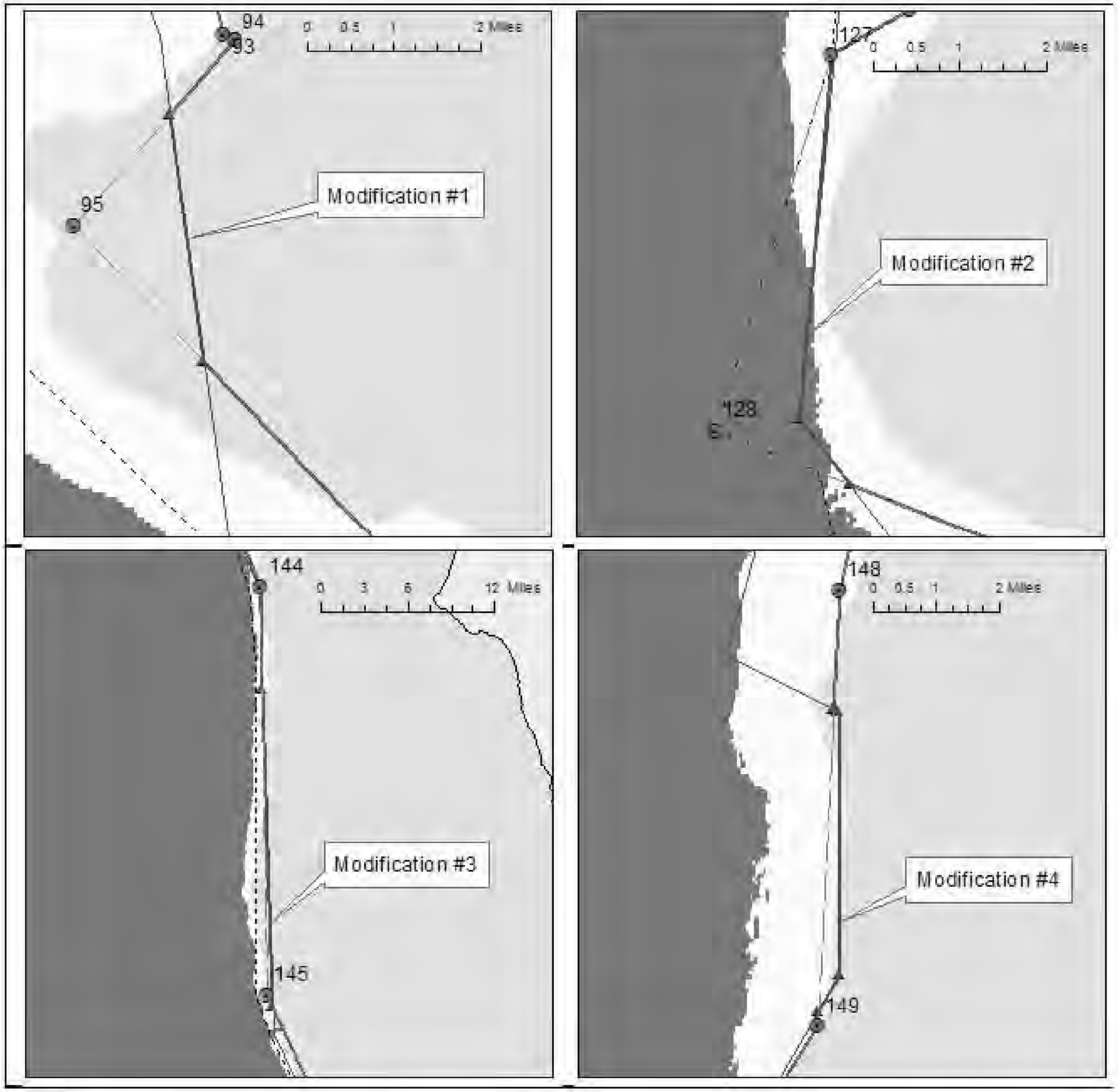
The 150 fm boundary was compared analytically with the modified 200 fm boundary to identify instances where the two lines intersect north of 40°10’ N. latitude. A total of 23 instances were identified. Of these, six changes would be made under this option based on two criteria. First, these changes apply only in areas where the modified 200 fm RCA boundary differs in location from the 200 fm RCA boundary (i.e., in the “cutout” areas). Second, a breakpoint in the distribution of the size of the resulting cutout areas was used to eliminate changes smaller than 0.537 sq. mi. (1,389,933 sq. m) in area. [2] Table C-5 shows the coordinates for potential modifications and the area within the RCA that would be eliminated by such a change. (Where the starting and ending waypoints on the existing 150 fathom line are not consecutive the intermediate existing waypoints are deleted and replaced by the proposed changes.) Figure C-5 illustrates these modifications in relation to the 200 and 150 fm isobaths.

If the proposed modified 150 fathom line is implemented an additional 12.8 square miles would be accessible to fishing in the shorebased IFQ fishery compared to a seaward boundary using the unmodified 150 fm RCA depth contour.

[2] ArcMap’s feature classification dialog computes breakpoints in distributions for display purposes. The default Jenk’s natural breaks algorithm was used to determine the breakpoints and the 0.537 sq. mi. breakpoint was chosen, because of the small areas involved.

Table C-5. Summary of proposed changes to the 150 fm RCA boundary where it intersects the modified 200 fm RCA boundary.

Map Ref.	Waypoint ID	Source	latitude	longitude	Area Affected (sq. miles)
1	94	150-fm (274-m) Contour	45.7658	-124.679	1.855
	57	Computed line intersection	45.75345	-124.695	
	56	Computed line intersection	45.71201	-124.687	
	96	150-fm (274-m) Contour	45.575	-124.505	
2	127	150-fm (274-m) Contour	42.9593	-124.902	3.491
	96	200-fm (366-m) Contour - Petrale	42.89881	-124.91	
	50	Computed line intersection	42.88773	-124.899	
	129	150-fm (274-m) Contour	42.8718	-124.846	
3	144	150-fm (274-m) Contour	41.79667	-124.49	3.900
	49	Computed line intersection	41.69442	-124.491	
	48	Computed line intersection	41.38004	-124.485	
	146	150-fm (274-m) Contour	41.2215	-124.389	
4	148	150-fm (274-m) Contour	40.92667	-124.434	0.885
	45	Computed line intersection	40.89948	-124.436	
	119	200-fm (366-m) Contour - Petrale	40.899	-124.435	
	120	200-fm (366-m) Contour - Petrale	40.8385	-124.436	
	44	Computed line intersection	40.83026	-124.443	
	149	150-fm (274-m) Contour	40.827	-124.443	0.112
5	151	150-fm (274-m) Contour	40.676	-124.535	0.537
	123	200-fm (366-m) Contour - Petrale	40.64783	-124.503	
	40	Computed line intersection	40.63966	-124.503	
	152	150-fm (274-m) Contour	40.62217	-124.488	
6	170	150-fm (274-m) Contour	40.266	-124.434	1.980
	35	Computed line intersection	40.28172	-124.57	
	132	200-fm (366-m) Contour - Petrale	40.2715	-124.575	
	34	Computed line intersection	40.24857	-124.56	
	173	150-fm (274-m) Contour	40.16667	-124.383	


94
93
95
0 0.5 1 2 Miles
Modification #1
127
0 0.5 1 2 Miles
Modification #2
128
144
0 3 6 12 Miles
Modification #3
145
148
0 0.5 1 2 Miles
Modification #4
149

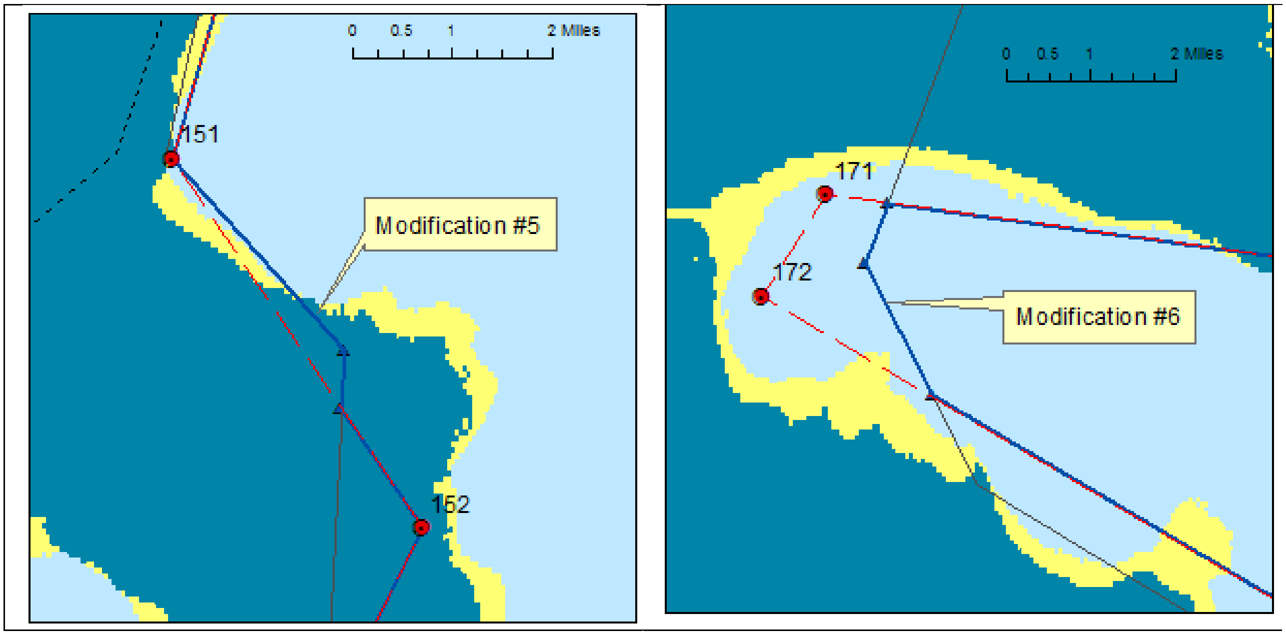


Figure C-5. Proposed modifications mapped with depth interval. Blue line: 150 fm depth contour modification; dashed red line: existing 150 fm depth contour; grey line: modified 200 fm depth contour; dotted grey line: 200 fm depth contour. Dark blue fill: depths greater than 200 fm; yellow fill: depths between 200 and 150 fm; light blue fill: depths less than 150 fm. Bathymetry based on *NOAA National Geophysical Data Center, U.S. Coastal Relief Model, Retrieved 11/30/11, http://www.ngdc.noaa.gov/mgg/coastal/crm.html*.

Comparison of the Management Options

Biological Impacts

The biological impacts of inserting the "petrale cutouts" in the 150 fm depth line are not expected to differ substantially from No Action. Areas now open when the modified 200 fm line is in place would remain open if the 150 fm line were substituted during those periods. (Note that as a routine measure RCA boundaries can be adjusted at any time during the management period. But the purpose of the modified line is to increase fishing opportunity for petrale sole during the winter months, November to February.) Biological impacts resulting from these areas being open to fishing, in comparison to areas closed to fishing, include the removal of fish and other species by fishing gear and adverse impacts to EFH as a result of the interaction of fishing gear with EFH. As discussed above and in section 2.2 of the main EIS document, a variety of other accountability measures are included in the management program to mitigate these impacts.

Socioeconomic impacts

Changes in management costs, primarily those associated with enforcement of the RCA boundaries, are expected to be negligible because of existing requirements. The compliance with the depth contours are monitored with vessel monitoring systems (VMS) that are currently required on all groundfish vessels. Implementing a modified 150 fm line instead of a modified 200 fm would increase fishing opportunity for vessels targeting petrale sole, a beneficial socioeconomic impact.

C.2 Management of ACL Set-Asides

Overview

Harvest set-asides are yields taken off the top of a stock's ACL to accommodate catch in tribal fisheries, exempted fishing permit (EFP) activities, research activities, and incidental bycatch in non-groundfish fisheries. Such yields are set aside, or taken off the top of an ACL, before allocating to directed groundfish fisheries in the biennial harvest specifications and management measures process. Specification of set-asides to accommodate these sources of fishing-related mortality are AMs that reduce the risk of exceeding ACLs.

Management Issue

The proposed action is to further clarify the management of "off-the-top" yields set aside for research catches, exempted fishing permit (EFP) activities, and groundfish mortality in non-groundfish fisheries (i.e., incidental open access (OA) fisheries) when deciding harvest specifications and management measures. The proposed action does not contemplate inseason management or reapportionment of set-asides specified to accommodate tribal fisheries[3]. The proposed action would allow flexibility in the management of these "off-the-top" set-asides, including the ability to take inseason action to make changes and redistribute the set asides to other sectors.

Currently the regulations at 660.55(j) state:

(j) Fishery set-asides. Annual set-asides are not formal allocations but they are amounts which are not available to the other fisheries during the fishing year. For the catcher/processor and mothership sectors of the at-sea Pacific whiting fishery, set-asides will be deducted from the limited entry trawl fishery allocation. Set-aside amounts will be specified in Tables la through 2d of this subpart and may be adjusted through the biennial harvest specifications and management measures process.

The purpose of the proposed action is to create a formal process to redistribute unused set-asides amounts inseason to other sectors in the groundfish fishery. The need for the proposed action is to provide an opportunity for full attainment of the annual available harvest for the groundfish fishery in accordance with the requirements of the Magnuson Stevens Act.

Some fishing-related activities where catch is counted against harvest set-asides can be completed inseason (e.g., research and EFPs) and yield that was set aside to cover these activities is then released for other uses. Those uses can include buffers to reduce the risk of exceeding ACLs and reallocation to fishing sectors. The options analyzed contemplate increasingly more flexible use of these set-asides inseason when they are released.

Management Options

Option 1: No Action

Set-asides are established to account for management uncertainty relative to the tribal fisheries, research, EFP and non-groundfish fisheries catch. Under this option, the specification for "fishery harvest guideline" would be derived by subtracting amounts for the following from the annual catch limit (ACL) or fishery-wide annual catch target (ACT), if specified: projected catch for Pacific Coast treaty Indian Tribes (whiting will be addressed through a separate rulemaking), projected scientific research conducted under letters of authorization and scientific research permits issued by NMFS, projected mortality in EFPs, and projected fishing mortality in non-groundfish fisheries (including but not limited to the incidental OA fishery). Under Option 1, unused portions of the set-aside would not be allocated to other

[3] A system to reapportion unused whiting quota from tribal fisheries to non-tribal whiting fisheries is under consideration in a separate rulemaking process.

fisheries during the calendar year. However, if unused portions of the set-aside are identified inseason, they would reduce the risk of exceeding the ACL and allow management measures to be adjusted so they more closely approach or slightly exceed a fisheries HG.

Option 2: Real Time Catch Accounting; Reallocation According to Prescribed Sector Allocations

For activities that are completed before a Council meeting and where data derived from "accurate catch accounting methodology" was used to estimate the total catch, the unused portion of the set-aside may be reapportioned back to the groundfish fishery. As with the No Action Option, set-asides are established to account for projected mortalities relative to the tribal, research, EFP, and bycatch in non-groundfish fisheries. "Accurate catch accounting methodology" means data gathered from sources such as that used by the West Coast Groundfish Observer Program (WCGOP), the Northwest Fisheries Science Center (NWFSC) survey biologists, and tribal co-manager observer programs. When total catch data are available from accurate catch accounting methodologies, the unused portions of the set-asides can be accurately determined shortly after the completion of the activity. When data gathered by using accurate catch accounting methodology are summarized, the uncertainty relative to the total catch from the completed activities no longer exists. The unused proportions of the catch associated with the completed activities would be reapportioned back to the fishery.

The process to reapportion would be structured to be done through an inseason action published in the Federal Register following a Council meeting. At a Council meeting, the Council would review set-asides and recommend any adjustments to be reapportioned. The specified amount of groundfish would be reapportioned back to the "fishery harvest guideline" and out to the sectors in proportion to the original allocations for the calendar year. Because the set-aside amount that is getting reapportioned must be completed before reapportionment occurs, reapportionment would likely only occur later in the year after the September or November Council meetings. For sectors that are already closed for the year, or in the case of the Shorebased IFQ Program, after September 1 where QS accounts are no longer open or able to transfer QP, the Council must determine whether to reopen those sectors or, for the Shorebased IFQ Program, whether to reactivate those accounts.

Option 3: Projected Catch Accounting; Reallocation According to Prescribed Sector Allocations

For activities that are completed before a Council meeting, the "best available information" would be used to estimate the amount of set-asides that would not be used in the calendar year and that amount would be reapportioned back to the groundfish fishery. As with the No Action Option, set-asides are established to account for management uncertainty relative to the tribal, research, EFP, and fishing mortality in non-groundfish fisheries. The "best available information" could include data collected using "accurate catch accounting methodologies" as specified under Option 2 as well as estimates based on more uncertain information, such as those derived from OA fishery models where no- or limited catch data are available. Such projected commercial catches are reported in the PacFIN database in the Quota Species Monitoring (QSM) reports. Projected recreational catches are reported in the RecFIN database.

The process to reapportion is the same as described under Options 2.

Option 4: Projected Catch Accounting; Reallocation According to Sector Needs (Preferred Option)

The process for inseason catch accounting and the ability to use projected catch data as the best available information is the same as described under Option 3.

The process to reapportion is the same as described under Options 2, except that the Council may recommend no reapportionment or a more limited overall amount be reapportioned. Any amount available for reapportionment would be reapportioned to the sectors in proportion to the original allocations for the calendar year, modified to account for Council recommendations with respect to reapportionment to: 1) sectors that are closed; 2) for reapportionments after September 1 in the IFQ sector; and 3) sectors for which catch of the species to be reapportioned would not be projected to be reached.

Comparison of the Options

The primary difference between the No Action option (Option 1) and the alternative options for managing harvest set-asides is the alternative options consider some form of inseason allocation of released set-asides to directed groundfish fisheries, whereas the current system under Option 1 does not. The distinguishing elements informing the alternative options that do consider inseason allocation of released set-asides to directed fisheries are 1) the quality of inseason catch data (i.e., real-time catch accounting vs. projected catch accounting) and 2) reallocation rules (reallocate based on prescribed sector allocations vs. reallocate based on a judgment of sector needs). The discussion that follows explains the tradeoffs between these options and defines the practical limits of inseason action when there are surplus yields available from released set-asides.

Quality of Inseason Catch Data

The quality of inseason catch data and inseason catch tracking systems by fishing sector is a consideration in any reallocation of unused harvest set-asides in any sector since there is less risk of exceeding an ACL if catch monitoring is timely and accurate. The element of catch data quality in the analysis of options is distinguished by real-time catch accounting of landings and discards versus projecting inseason catch based on delayed provision of estimated landings and discards. Catch is currently monitored inseason using real-time catch accounting for the trawl sectors and catch projections for the non-trawl sectors.

Current Catch Accounting by Sector

Trawl catches are tracked inseason using real-time reporting of shorebased IFQ catches (landings plus discards) in the IFQ database managed by the NMFS Northwest Region and real-time reporting of total catches for the at-sea whiting trawl sectors in the NorPAC database. Projections of annual trawl catches based on catches reported to date inseason are not needed in the trawl fishery since the catch is tightly regulated to prescribed quotas. Catch accounting is accurate given that the rationalized trawl fishery requires 100 percent at-sea monitoring of all trawl efforts.

Non-trawl commercial catches and shorebased trawl catches of non-IFQ species are tracked inseason using delayed catch accounting and projections of annual mortalities based on inseason catches to date. Non-trawl commercial catches are updated every other week and reported in the PacFIN Quota Species Monitoring (QSM) reports. Non-trawl catch updates are based on fish ticket landings and estimated discards are based on average historical discard rates observed in the WCGOP program applied to landings of target species. Discard rates and final total annual catches by sector (landings plus discard mortalities) are provided annually by the WCGOP program approximately a year after the end of the season.

Recreational catches are tracked inseason and reported on the RecFIN web site. Recreational catches (landings plus discard mortalities) are updated every other month[4] based on a census of marine anglers conducted in state fishery sampling programs. Inseason recreational catch projections for the year are less certain than those for commercial trawl and non-trawl fisheries.

[4] The state monitors their recreational fisheries closely and can take independent action to manage those fisheries to specified harvest guidelines.

Potential Routine Actions Under the Options Analyzed Based on the Quality of Inseason Catch Data

Under the options considered for routinely reallocating unused harvest set-asides inseason, set-asides for all fishing sectors could be considered for reallocation based on the data quality standard under options 3 and 4. Routine reallocation of unused harvest set-asides can only be considered for set-asides specified for the trawl and tribal sectors under option 2, which imposes a higher data quality standard of real-time and accurate catch accounting. Option 1 (No Action) does not allow routine reallocation of any set-asides.

All options other than the No Action Option 1 would allow routine consideration of reallocation of unused harvest set-asides specified for EFP and research activities since there is real-time and accurate catch accounting for these activities. EFP proposals must contain a mechanism, such as at-sea fishery monitoring, to ensure that the harvest limits for targeted and incidental species are not exceeded and are accurately accounted. Research activities also are controlled activities where catch accounting mechanisms are accurate and reported in a timely manner. Most west coast research activities that affect groundfish are conducted by NMFS (e.g., the annual NWFSC trawl survey) and accurate catch reports are provided routinely in the Council process. Those research activities not conducted by NMFS are only allowed through state and Federal scientific research permits and accurate and timely catch reporting is a condition of these permits.

One consideration in reallocating unused set-asides are that the activities supported by the set-asides need to have been completed or canceled to ensure the set-aside is not still needed. For instance, the set-asides specified to accommodate the incidental bycatch of groundfish species in non-groundfish fisheries (i.e., set-asides for incidental open access) are really not considered in this potential reallocation process since many of those fisheries are outside the jurisdiction and authority of the Council and NMFS; and some of those fisheries tend to occur year round. Since the timing and magnitude of bycatch events in non-groundfish and tribal fisheries is unpredictable, it is not likely that the need to maintain such set-asides can be dismissed inseason until these fisheries are done for the year. Therefore, the contemplated action to routinely reallocate set-asides inseason should be limited to those specified for fisheries that do not continue year-round or set-asides for EFPs and research activities since these activities typically do not continue through the full year. Approved EFPs can also be canceled before implementation and the bycatch caps or total catch limits specified for the EFP activity that define the EFP set-asides can then become available for other uses.

Reallocation Rules

A reallocation of unused set-asides would have to meet certain criteria, such as those allocation principles specified in the FMP allocation framework (FMP section 6.3.1), the FMP socioeconomic framework (FMP section 6.2.3), and practical considerations for managing the risk of exceeding an ACL. These criteria attempt to ensure fair and equitable distribution of harvestable surpluses that reflect dependence on the fishery and provide optimal economic benefits to fishing communities. The objective to extend fishing and marketing opportunities as long as practicable during the fishing year is an especially important criterion in this proposed action.

The dimension of this proposed action needs to be kept in perspective. The amount of yield associated with harvest set-asides are typically low, especially if the set-asides considered for reallocation are limited to those fisheries that do not continue year-round or to EFP or research activities that are completed prior to the end of the year (e.g., see Table 2-46). However, the yield for some species (e.g., canary and yelloweye rockfish) is especially limited and inseason availability of such yield inseason can make the difference between early closure of a fishery when a harvest guideline or allocation is attained and the ability to extend the fishery by reallocating unused harvest set-asides inseason. Therefore, despite the low yields considered for inseason reallocation, the importance of the process for considering a reallocation of these yields is not trivial.

Option 1 (No Action) does not allow a direct reallocation of unused harvest set-asides routinely as an inseason adjustment. Instead, unused set-asides remain as a “buffer” between the ACL and the inseason projection of annual fishing-related mortalities (i.e., landings plus discard mortalities) given management measures in place. The amount of this yield buffer is taken into account when considering the risk of exceeding an ACL under proposed inseason adjustments to the fishery. While this process may work for adjusting management measures for species where there is no prescribed allocation, it provides limited benefit to some sectors that rely on an allocation to maintain a fishing strategy. For instance, the trawl IFQ fishery would not receive a “top off” or provision of additional yield to vessel accounts under Option 1. Benefits could also accrue for the at-sea whiting sectors if additional whiting quota or quota of bycatch species that can limit their ability to attain the whiting quota (i.e., canary, darkblotched, POP, and widow) were able to be added inseason to their annual allocations. While Option 1 may be more responsive to conservation objectives by providing another layer of precaution by maintaining a higher buffer mitigating the risk of exceeding an ACL, it is less responsive to socioeconomic objectives in that it will not allow a process to add unused yield if needed to keep a fishery open.

Options 2, 3, and 4 consider the ability to reallocate unused harvest set-asides as a routine inseason action and in that regard are more responsive to socioeconomic objectives. These options are also adaptive in that there is a deliberate inseason process to weigh the risk of exceeding an ACL versus providing socioeconomic benefits. If the risk of exceeding an ACL is considered too high to reallocate unused yield, then the Council and NMFS can decide not to reallocate to the fishery. If the judgment is that the risk of exceeding an ACL is low and there is a need for additional yield, then all or a portion of the released set-aside can be reallocated to the fishery.

Options 2 and 3 would only allow reallocation according to prescribed allocations, such as those long-term allocations specified in the FMP or the short-term allocations decided in the biennial specifications process. If there is a decision to reallocate some or all of the unused set-aside to the fishery, then all sectors would receive some of that yield. In some cases, not all sectors would need additional yield to maintain fishing opportunities. For instance, an unused set-aside of yelloweye could be reallocated to all sectors, yet only one recreational sector may need that yield to keep the fishery open. The rest of the yield may go unused by the other sectors that received an inseason allocation. While this is not necessarily a bad outcome in that this yield is effectively a buffer against exceeding an ACL, it may not provide enough yield to the sector or sectors that need it to keep a fishing a season open or achieve other socioeconomic objectives. Alternatively, Option 4 allows a reallocation of unused harvest set-asides different from prescribed allocations according to need. For example, using the hypothetical yelloweye case above, if 1 mt of yelloweye yield became available and one sector needed the entire ton to maintain that sector’s fishery and no other sectors needed additional yelloweye yield to maintain their fisheries, then an Option 4 process would be the only one considered in this analysis that would achieve the socioeconomic objectives outlined in the FMP. In all cases, conservation objectives need to be considered by evaluating the risk of exceeding an ACL before any inseason reallocation of unused harvest set-aside is contemplated.

The Council selected Option 4 as their Preferred Alternative.

Biological Impacts: There are no biological impacts associated with the proposed action as long as future inseason decisions to reallocate unused harvest set-asides are precautionary enough to keep total catches within specified ACLs. The biological impacts projected in assessments and analyses presented in this EIS assume the entire ACL is taken but not exceeded; therefore, changing the process to routinely consider reallocation of set-asides adds no additional biological impact.

Socioeconomic Impacts: The preferred Option 4 provides the highest positive socioeconomic impacts relative to the other options analyzed. Reallocating unused harvest set-asides inseason to those sectors that most need it has the greatest potential of the options analyzed to maintain fishing opportunities and provide benefits to fishing-dependent communities.

C.3 Two Year Trawl and Non-Trawl Cowcod Allocation

Background

The 2011-12 trawl and non-trawl allocation for cowcod south of 40°10' N. latitude (66 percent trawl and 34 percent non-trawl) was originally set to align the needs of the trawl fishery with historic catches and accommodate the fleet as it transitioned into a rationalized fishery. Projected impacts in the non-trawl sectors had been estimated at lower levels, and it was thought that the current allocation to this sector would be sufficient to cover the needs of all non-trawl fisheries.

The Council requested that an additional allocation alternative (34 percent trawl and 66 percent non-trawl) be analyzed for cowcod south of 40°10' N. latitude. The change is being requested because recent fishery information reveals that while cowcod encounters have increased in the recreational fishery, the impacts in the trawl sector post-rationalization are lower and suggest the needs of this sector may be different than previously thought.

Summary of Options

No Action - maintain the No Action two-year trawl and non-trawl allocation for cowcod south of 40°10' N. latitude of 66 percent trawl and 34 percent non-trawl.

Option 1, Preferred: Modify two-year allocation - Modify the two-year trawl and non-trawl sector allocation south of 40°10' N. latitude to 34 percent trawl and 66 percent non-trawl.

Comparison of Options

No Action

Under No Action, West Coast Groundfish Observer Program (WCGOP) data indicate that cowcod mortality has been variable between sectors and among years from 2004 to 2011 (Table C-6). A summary of 2011 WCGOP IFQ data south of 40°10' N. latitude revealed that 29 vessels participated in the entire area south of 40°10' N. latitude and 4 vessels made landings south of 34°27' N. latitude (note - these do not represent unique vessels). Only 39 lbs of cowcod were encountered in the IFQ fishery by 4 vessels operating in the area between 40°10' N. latitude and 34°27' N. latitude; zero cowcod were encountered south of 34°27' N. latitude. These data would suggest a transition in the location of fishing activities to more northern areas compared to previous years.

Table C-6. Summary of cowcod mortality in metric tons by sector (trawl: non-trawl) from 2004-2011 summarized from West Coast Groundfish Observer Program (WCGOP) data. Non trawl is comprised of both the commercial fixed gear and recreational fleets.

Year	Trawl	Non-Trawl
2004	0.9	1.1
2005	1.4	0.5
2006	0.9	0.2
2007	2.9	0.3

2008	0.2	0.3
2009	0.5	0.3
2010	0.6	0.4
2011	39 lbs	0.8*

*commercial fixed gear data are not included

Under No Action, cowcod impacts increased in the non-trawl fishery compared to previous years. Although 2011 data is not finalized, preliminary estimates using only recreational data suggest higher impacts based on the increased number of encounters in the recreational fishery south of 34° 27' N. latitude. Impacts in the fixed gear fisheries are largely unknown because few data are available from WCGOP.

<u>Biological Impacts under No Action</u>

Under No Action, total mortality of the trawl and non-trawl sectors is expected to stay within the preferred ACL of 3.0 mt in 2013-14.

Results of the 2009 data report indicate that cowcod are rebuilding slowly. Under No Action, no changes to stock status or rebuilding progress are expected.

<u>Community Impacts under No Action</u>

Under No Action, it is difficult to characterize community impacts in part because of the new trawl rationalization program which was implemented in January 2011. Prior to rationalization when there was no individual accountability, historical impacts in the trawl sector were unpredictable and ranged from 0.2 mt to 2.9 mt. Lower recent trawl cowcod landings for 2011 and the first few months of 2012 indicate that far less encounters are occurring than in the past. If trawl impacts remain the same as they were in 2011, then no changes to community impacts resulting from the trawl sector would be expected. Under the current trawl allocation (1.9 mt), there is still a possibility that the trawl fishery could exceed their allocation if impacts become more unpredictable and more reflective of the pre-rationalized fishery. If fishermen exhaust their individual quota allocations and are unable to obtain additional pounds from the quota share market, it could result in a loss of access to target species and resulting revenues into local communities such as San Francisco, Monterey, and Morro Bay. Since the intent of the rationalization program is to promote individual responsibility, impacts as high as those in 2007 are not expected to recur as the activity resulting in the high encounters is unlikely to be repeated in a rationalized fishery.

Under No Action, opportunities and resulting revenues in the non-trawl fishery could be decreased due to the low allocation of cowcod. Recent fishery information reveals that cowcod encounters have increased in the recreational fishery south of 34° 27' N. latitude. Depending upon the magnitude of this increase, action to implement shallower depth restrictions may be necessary. The number of trips that will be lost due to reduced access to fishing grounds with a 40 fm and 50 fm depth restriction cannot be quantified although public testimony may provide anecdotal insight. Additionally, the current needs of the fixed gear fisheries are largely unknown because few data are available from WCGOP to adequately characterize the needs of this sector. If cowcod interactions increase in this sector, trip limit reductions and/or RCA modifications may be required, which would be very disruptive to the fisheries and communities in southern California.

Option 1, Preferred: Modify the two-year trawl and non-trawl sector allocation to 34 percent trawl and 66 percent non-trawl.

Under option 1, the Preferred Option, the two-year cowcod allocation would be reversed between the trawl and non-trawl sectors. The trawl sector allocation would be 1.0 mt and the non-trawl sector, 1.9 mt.

Biological Impacts compared to No Action

Under option 1, no changes to stock status or rebuilding progress are expected compared to No Action.

Community Impacts compared to No Action

Under option 1, no change to communities would be expected compared to No Action if impacts in the trawl fishery remain similar to those from 2008 to 2011. If impacts are higher than projected, some impacts to the communities of San Francisco, Monterey, and Morro Bay would be expected but the extent is unknown.

Communities south of 34° 27' N. latitude are expected to benefit under option 1 because they are more influenced by changes to management measures in the non-trawl fishery. If cowcod mortality does increase in the non-trawl sector either as a result of increased encounters in the recreational fishery or increased data from WCGOP, the higher non-trawl allocation would likely prevent the need to take inseason action (or lessen the severity of the action) and would be less disruptive to the fisheries.

C.4 Sorting Requirements for Aurora, Shortraker, and Rougheye North of 40°10 N. latitude

Overview

The Council continues to improve methodologies to estimate harvest specifications for species without stock assessments (i.e., data-poor species) and evaluate the performance of the existing stock complexes relative to the revised National Standard 1 Guidelines. In April 2011, a workshop was held to explore assessment methods for data-poor stocks.[5] The SSC reviewed the proceedings and several methods were approved for general use without extensive review of the input data (e.g., historical landings, assumed depletion, assumed apportionment north and south of 40°10’ N. latitude) for use in the 2013-2014 cycle (see Section 2.1).[6] The SSC endorsed the OFL estimates for the component stocks for use in calculating the OFLs for the complexes (i.e., Minor Nearshore, Shelf, Slope Rockfish North and South; Other Flatfish; and Other Fish); however, the SSC noted the methods are dependent upon accurate historical mortality estimates and further investigation of the best possible estimates is a high priority. Further, the SSC said uncertainty in the catch history should be included in evaluating and implementing these data-poor methods.

Also in April 2011, the Council recommended the analysis to evaluate the performance of stock complexes and any necessary management measure alternatives be developed in time to inform decision-making for the 2013-2014 cycle. In August 2011, a PSA analysis conducted by Cope et. al {, 2011 #367} indicated three species in the Minor Nearshore Rockfish complexes (i.e., China, copper, and quillback rockfish) and the Minor Slope Rockfish complexes (i.e., aurora, shortraker, and rougheye rockfish) may be vulnerable to overfishing based on recent estimates of the OFL contributions to the complex as well as the historical landings. The Council received reports from the GMT that outlined the process for conducting a thorough stock complex analysis, provided estimates of mortality for the species identified by Cope et. al {, 2011 #367}, and provided a range of mitigative management measures for consideration.[7] However, given difficulties reconciling historical data, the comprehensive analysis and

[5] Agenda Item E.2.a, Attachment 6, June 2011.
[6] Agenda Item E.2.b, Supplemental SSC Report, June 2011
[7] Agenda Item E.4.a, Supplemental Attachment 7, June 2011; Agenda Item E.4.b, Supplemental GMT Report 2, Agenda Item G.5.a, Attachment 5, September 2011, Agenda Item E.9.b, Supplemental GMT Report 3, November 2011

evaluation is still ongoing. As recommended by the SSC, there is a high priority on reconciling the historical data that informs the OFL estimates.

For the 2013-2014 cycle, the Council explored measures to increase the accuracy of reporting for these stocks to better inform future OFL estimates, estimated from either data-poor methodologies or formal stock assessments, and to better inform the larger stock complex restructuring analysis. Accuracy in reporting is essential to determine if mortality of the component stocks approaches unsustainable levels which could result in a biological impact in the long term. The SSC recommended against using OFL contribution values to evaluate whether overfishing is occurring for component stocks since OFLs are set for stock complexes rather than for individual stocks within a complex.[8] The SSC recommended a comparison of recent catches of the component stocks to the OFL contributions to identify whether stock complexes are working as they were intended. The SSC noted that if catches regularly exceed OFL contribution values, this could indicate a problem with how the stock complexes are structured and justify action in the next management cycle which could include removing the stocks concerned from the complex and prioritizing them for a full assessment.

Background

In recent years (2007-2010), mortality of the Minor Slope Rockfish North complex was between 42 to 48 percent of the optimal yield (OY)[9] and mortality of the Minor Slope Rockfish South was between 24 and 37 percent of the OY (Table C-7). Mortality of the Minor Nearshore Rockfish North complex was between 41 to 94 percent of the OY and Minor Nearshore Rockfish South was between 59 and 71 percent of the OY (Table C-7). Estimates of mortality from 2004 to 2010 indicate that three component stocks within the Minor Slope Rockfish (aurora, shortraker, and rougheye rockfish) and two component species within the Minor Nearshore Rockfish (quillback and China rockfish) complexes have been higher than the estimated OFL contributions for 2013 and 2014 (Table C-8). Reconciliation of the data states provide to Pacfin was occurring at the same time that this analysis was being developed. The reconciled data could impact estimates of the OFL and change the understanding of whether historical mortality exceeded the OFL contributions of these stocks to the minor slope rockfish complex. Rougheye and aurora rockfish have been selected for stock assessments in 2013 to inform the 2015-2016 management cycle. The productivity and susceptibility analysis (Section 4.1.1.2) also indicates that aurora, shortraker, rougheye, China, copper, and quillback rockfish may be vulnerable to overfishing {Cope, 2011 #367}. For 2013-2014, projected mortality for the Minor Nearshore and Minor Slope Rockfish complexes are below the ACL; however, given the estimates of historical mortality, it is possible that mortality of the component stocks could exceed the component OFLs and ABCs.

Table C-9 shows the geographic and depth distribution for the five species in the Minor Slope and Nearshore Rockfish complexes with estimates of historical mortality that are higher than the estimated OFL contributions for 2013-2014. Mortality of aurora, shortraker, and rougheye rockfish primarily occurs in the trawl sector with bottom trawl gear (Table C-10). In contrast, mortality of China and quillback primarily occurs in the non-trawl sectors in the commercial nearshore fixed gear fisheries (limited entry and open access) and recreational fisheries (Table C-11).

[8] Agenda Item I.3.b, Supplemental SSC Report, April 2012
[9] Starting in 2011, annual catch limits were implemented.

Table C-7. Total estimated mortality of the Minor Slope Rockfish complexes north and south relative to annual OYs, 2007-2010 (source: annual NWFSC groundfish mortality reports).

Minor Slope Rockfish Complexes North and South			
	North	South	Sum of North and South OYs
2007-2010 annual OY	1,160 mt	626 mt	1,786 mt
2007 total mortality	522 mt	149 mt	671 mt
% of OY	*45%*	*24%*	*38%*
2008 total mortality	484 mt	189 mt	673 mt
% of OY	*42%*	*30%*	*38%*
2009 total mortality	517 mt	231 mt	750 mt
% of OY	*45%*	*37%*	*42%*
2010 total mortality	562 mt	183 mt	745 mt
% of OY	*48%*	*29%*	*42%*
Minor Nearshore Rockfish Complexes North and South			
	North	South	Sum of North and South OYs
2007-2008 annual OY	142 mt	654 mt	796 mt
2009-2010 annual OY	155 mt	650 mt	805 mt
2007 total mortality	133 mt	466 mt	599 mt
% of OY	*94%*	*71%*	*75%*
2008 total mortality	97 mt	394 mt	491 mt
% of OY	*68%*	*60%*	*62%*
2009 total mortality	63 mt	388 mt	451 mt
% of OY	*41%*	*60%*	*56%*
2010 total mortality	75 mt	384 mt	459 mt
% of OY	*48%*	59%	57%

Table C-8. Mortality Estimates for Vulnerable Species in the Minor Slope Rockfish and Minor Nearshore Rockfish Complex, North and South combined. (Tables 3 and 4, Agenda Item E.9.b; Supplemental GMT Report 3, November 2011).

Minor Slope Rockfish Complexes North and South								
Stock	Coastwide 2013 & 2014 OFL	Mortality Estimates a/						
		2004	2005	2006	2007	2008	2009	2010
Aurora rockfish	41.5	82	53	63	64	50	59	30
Rougheye rockfish	71.5	81	96	79	142	176	158	268
Shortraker rockfish	18.8	14	13	9	32	32	27	30

Minor Nearshore Rockfish Complexes North and South								
Stock	Coastwide 2013 & 2014 OFL	Mortality Estimates a/						
		2004	2005	2006	2007	2008	2009	2010
China rockfish	9.8	22	26	25	30	33	37	33
Quillback rockfish	7.4	12	16	25	28	19	14	10

a/ The commercial values in these columns were derived by summing together WCGOP mortality estimates (landings + discard estimates) from the following commercial fisheries: LE non-whiting trawl, LEFG primary sablefish and DTL, LEFG nearshore, OA directed fisheries, pink shrimp, California halibut, Tribal at-sea, and Tribal Shore-based. The recreational estimates include landings and discard from RecFIN.

Table C-9. Latitudinal and depth distributions of Minor Slope and Minor Nearshore Rockfish complex stocks of highest concern.

Common name	Latitudinal Distribution		Depth Distribution (fm)	
	Overall	Highest Density	Overall	Highest Density
Aurora rockfish	Coastwide	Coastwide	100-420	82-270
China rockfish	N. 34º N. lat.	N. 35º N. lat.	0-70	2-50
Quillback rockfish	N. 36º20' N. lat.	N. 40º N. lat.	0-150	22-33
Rougheye rockfish	Coastwide	N. 40º N. lat.	27-400	27-250
Shortraker rockfish	N. 39º30' N. lat.	N. 44º N. lat.	110-220	110-220

Table C-10. Annual mortality estimates by sector of select component slope rockfish (revised from Table 3, Agenda Item E.9.b; Supplemental GMT Report 3, November 2011).

Species	Fishery	2002	2003	2004	2005	2006	2007	2008	2009	2010
Aurora Rockfish	LE Trawl- North	8.11	27.09	28.78	11.83	14.30	28.76	37.91	50.62	25.11
	LE Trawl- South	48.14	46.47	51.73	41.16	47.88	32.61	11.29	5.66	4.06
	At-sea whiting	N/A	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shoreside whiting	0.01	0.02	0.04	0.02	0.01	0.29	0.03	0.03	0.08
	Pink Shrimp	0.00	0.00	0.02	0.00	0.00	2.42	0.32	0.29	0.07
	California Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LE Primary	0.07	0.15	0.07	0.05	0.03	0.02	0.03	0.05	0.06
	LE Non-Primary	0.85	1.31	0.91	0.29	0.28	0.24	0.28	1.29	0.56
	Fixed Gear Open Access	0.11	0.40	0.33	0.08	0.04	0.06	0.13	0.67	0.23
	Nearshore	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals		**57.29**	**75.45**	**81.88**	**53.43**	**62.53**	**64.41**	**49.99**	**58.61**	**30.17**
Rougheye Rockfish	LE Trawl- North	49.38	57.35	57.17	45.75	61.68	88.77	85.30	122.34	146.48
	LE Trawl- South	0.37	0.05	0.08	0.00	0.00	0.00	0.00	0.00	0.00
	At-sea whiting	N/A	N/A	13.72	35.91	6.57	28.87	72.01	8.56	21.09
	Shoreside whiting	0.00	0.01	0.43	0.00	0.00	2.54	0.62	1.44	5.87
	Pink Shrimp	0.00	0.00	1.67	0.20	0.00	0.11	0.01	0.00	0.02
	California Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LE Primary	4.59	5.73	7.35	10.72	6.58	19.02	9.58	16.69	57.95
	LE Non-Primary	0.10	0.09	0.00	0.68	0.58	0.17	2.69	5.17	14.76
	Fixed Gear Open Access	0.10	0.13	0.00	1.82	0.61	0.51	1.69	2.81	2.98
	Nearshore	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.02	0.00
	Tribal-Shoresd & At-Sea	N/A	N/A	0.40	1.10	2.80	2.30	4.10	1.10	18.40
Totals		**54.54**	**63.36**	**80.82**	**96.17**	**78.84**	**142.29**	**175.99**	**158.13**	**267.54**
Shortraker Rockfish	LE Trawl- North	17.97	24.03	13.76	9.68	8.14	26.29	27.41	23.20	22.30
	LE Trawl- South	0.00	0.00	0.01	0.00	0.00	3.10	0.74	1.75	0.63
	At-sea whiting	N/A	N/A	0.52	0.34	0.41	0.31	0.29	0.17	0.22
	Shoreside whiting	0.00	0.00	0.08	0.00	0.00	1.37	0.21	0.07	1.67
	Pink Shrimp	0.00	0.00	0.00	0.18	0.00	0.02	0.07	0.00	0.00
	California Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LE Primary	0.16	0.65	0.08	2.77	0.29	0.33	2.44	1.36	3.39
	LE Non-Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.57
	Fixed Gear Open Access	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.23
	Nearshore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tribal-Shoresd & At-Sea	N/A	N/A	0.00	0.00	0.00	0.30	0.40	0.00	1.10
Total		**18.14**	**24.70**	**14.45**	**12.96**	**8.83**	**31.73**	**31.55**	**26.56**	**30.11**

Table C-11. Annual mortality estimates by sector of select component nearshore rockfish (from Table 3, Agenda Item E.9.b; Supplemental GMT Report 3, November 2011).

Species		Fishery	2002	2003	2004	2005	2006	2007	2008	2009	2010
			Year								
China Rockfish	Commercial	LE Trawl- North	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		LE Trawl- South	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Pink Shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		California Halibut	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
		LE Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		LE Non-Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Fixed Gear Opan Access	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Nearshore	NA	11.82	9.71	7.46	8.15	10.78	12.66	11.47	8.35
		Commercial Total	0.02	11.82	9.71	7.46	8.15	10.79	12.66	11.47	8.35
	Rec.	WA	NA	NA	1.79	2.05	2.16	2.18	2.30	1.26	3.49
		OR	NA	NA	1.78	1.89	2.44	2.89	2.89	2.25	2.49
		CA	NA	NA	9.07	14.96	12.24	13.92	15.04	22.21	18.98
		Recreational Total	0.00	0.00	12.64	18.90	16.85	16.99	20.23	25.71	24.95
		Combined Total	**0.02**	**11.82**	**22.35**	**26.36**	**25.00**	**29.78**	**32.89**	**37.18**	**33.30**
Quillback Rockfish	Commercial	LE Trawl- North	0.30	0.12	1.50	0.08	2.13	0.07	0.07	0.08	0.01
		LE Trawl- South	0.03	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00
		Pink Shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		California Halibut									
		LE Primary									
		LE Non-Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
		Fixed Gear Opan Access	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
		Nearshore	NA	2.41	2.65	5.20	5.32	7.67	7.84	2.92	1.62
		Commercial Total	0.33	2.53	4.15	5.28	7.45	8.22	7.91	3.12	1.63
	Rec.	WA	NA	NA	2.31	2.33	2.26	2.81	2.28	1.25	1.57
		OR	NA	NA	2.00	2.85	4.51	4.37	3.92	3.38	4.08
		CA	NA	NA	3.39	5.60	10.50	12.44	4.84	5.93	2.91
		Recreational Total	0.00	0.00	7.69	10.78	17.27	19.61	11.05	10.56	8.56
		Combined Total	**0.33**	**2.53**	**11.84**	**16.06**	**24.72**	**27.83**	**18.96**	**13.67**	**10.19**

Management Options

No Action

Harvest specifications (i.e., OFLs, ABCs, and ACLs) for the stock complexes are established in regulation and are calculated by summing the individual contributions of the component stocks.

Regulatory Requirements

Federal regulations (50 CFR 660.55) and the FMP (Section 6.3.2.3) specify Minor Slope Rockfish allocations north and south of 40°10’ N. latitude. For Minor Slope Rockfish North, 81 percent of the fishery harvest guideline (HG)[10] is allocated to the trawl sector and 18 percent to the non-trawl sector. For Minor Slope Rockfish South, 63 percent of the fishery HG is allocated to the trawl sectors, and 37 percent to the non-trawl sectors. Management measures that control slope rockfish mortality in the trawl sectors include individual fishing quota (IFQ) for the shorebased IFQ fishery and co-op management for the at-sea sectors (catcher-processors and motherships). In the non-trawl sectors, the primary management measure that controls slope rockfish landings are bimonthly cumulative limits (hereinafter trip limits) for the limited entry and open access fixed gear fleets. RCAs are also available

[10] Deductions from most groundfish ACLs are made to account for groundfish mortality in the West Coast treaty Indian tribal fisheries, scientific research, non-groundfish target fisheries (hereinafter incidental open access fisheries) and, as necessary, EFPs. The resulting value is called the fishery harvest guideline.

for both sectors which would be effective at controlling slope rockfish mortality. WCGOP data also indicate that movements of the trawl RCA would be effective at reducing aurora, shortraker, and rougheye catch (Table C-12, Table C-13, and Table C-14, respectively). Slope rockfish are also included in the recreational bag limits for the three states; however, they are not the most common target in recreational fisheries.

The limited entry and open access FMP allocations[11] for Minor Nearshore Rockfish are suspended due to overfished species constraints. The Minor Nearshore Rockfish complexes are managed by the West Coast states.[12] California and Oregon implement commercial and recreational allocations through state regulations. Management measures that control nearshore rockfish landings in the trawl sector include trip limits for the shorebased IFQ fishery. Additionally, Oregon and California state regulations limit the amount of nearshore rockfish that can be landed without a state-issued nearshore permit. Generally, vessels with a limited entry trawl permit do not also have a state nearshore permit. Additionally, few nearshore rockfish have been historically landed by the trawl sector (see Table C-11 for China and quillback data). The at-sea sector typically does not encounter nearshore species therefore no management measures are designed for this sector (Table C-11).

In the non-trawl sectors, the primary management measure that controls slope rockfish mortality are trip limits for the limited entry and open access fixed gear fleets. RCAs are also available and may be effective at controlling slope rockfish mortality; however, the shoreward adjustments may need to be extensive which could potentially close entire areas to fishing. Groundfish conservation areas (i.e., local area closures) may also be effective for reducing slope rockfish catch though none have currently been identified.

Data Collection

The WCGOP places observers on vessels at sea to sample the discarded portion of the catch at the species, not complex, level. Coverage rates vary by fishery, year, and area and are described by sector below. Species identification is not always possible due to the dynamic fishing environment. For example, rockfish may fall off a longline prior to observer sampling, in which case reporting would be aggregated to include several species (e.g., shortraker/rougheye) or the entire complex (e.g., slope rockfish).

Federal regulations require sorting prior to first weighing for all species with trip limits, HGs, or ACLs/OYs. All commercial landings are recorded on state fish landing receipts (hereinafter fish tickets). Additionally, vessels that participate in the shorebased IFQ fishery must also submit an electronic fish ticket. Landings in the shorebased IFQ fishery are recorded at the IFQ management unit level, not at the species level (see regulations at 660.140(c)(1)). Landings are sorted and reported on electronic (shorebased IFQ only) or state fish tickets to the Minor Rockfish complex levels (i.e., Minor Nearshore, Minor Shelf, and Minor Slope Rockfish north and south) with a few exceptions. Federal regulations require all commercial landings in California of blue rockfish, which is managed in the Minor Nearshore Rockfish complexes north and south, to be sorted to species. Also, south of 40°10 N. latitude, Federal limited entry and open access trip limits are specified for minor shallow and deeper nearshore rockfish. Therefore, nearshore rockfish landings must be reported to this level.

[11] Nearshore species were not subject to trawl and non-trawl allocations since the majority of catch is in the non-trawl sector (i.e., trawl sector catches were low enough that formal allocations and issuance of IFQ was unnecessary).
[12] Washington does not allow commercial fishing in its territorial waters.

In some instances, state regulations may include additional reporting requirements. In California state regulations require the species, not the complex, be reported on the fish ticket (CDFG Code sections 8043 and 8045). In Oregon, state law requires sorting and reporting of the nearshore species, not the complex (see ORS 635-004-0033).

State port biologists sample commercial landings with coverage levels varying by state, port, month, etc. Port biologists collect biological data (e.g., length, weight, and age) as well as species composition of the market categories (i.e., which species comprise the complex or market category). Species composition samples are generally stratified by gear, port, quarter, market category, and area (INPFC areas).

State regulations also require logbooks for limited entry groundfish trawl vessels which include data on the start and haul locations, time of tow, duration of trawl tow, as well as the total catch for the species and complexes that have Federal sorting requirements. Additionally, Oregon state law requires fixed gear logbooks for vessels participating in the fixed gear fisheries (i.e., nearshore, non-nearshore, and shorebased IFQ under the gear switching provisions). These data are maintained in a state agency database and are available for use in management.

Landings (recorded on fish tickets), logbook data, and port sampling data are reported inseason to the PacFIN database, managed by the Pacific States Marine Fisheries Commission. QSM and GMT reports, which are publically available, are produced twice a month and provide information on landings for all species with ACLs, including stock complexes and the species included in the complexes.[13] Reports can be modified to include species of particular interest to managers. Historically, QSM reports provided estimates of discard; however, due to changes in the fishery, the current QSM reports do not estimate discard. The reports are currently being modified to include discards, which will allow for tracking catch in the commercial fisheries. Five times a year at Council meetings, the GMT reviews the QSM reports and recommends management measures (e.g., trip limits, RCA adjustments, etc.) to the Council which are intended to attain, but not exceed, the ACLs.

In the recreational fisheries, data on released and landed fish are provided at the species level (not complex level). Coverage (or observation) levels vary by state, port, month, etc. Recreational samplers collect biological data (e.g., length, weight, age) on landed catch as well as record angler reported estimates of discard. These data are reported to the Recreational Fisheries Information Network (RecFIN) on a two month lag. Additionally, publically available reports are available on the RecFIN website to enable tracking of species with an ACL as well as component species of the stock complexes.[14] That is, inseason mortality estimates for component species of complexes are available inseason.

Inseason Reporting by Fishery

Shorebased IFQ Fishery

WCGOP observers collect species level discard data at sea from all vessels in the shorebased IFQ fishery. Currently, discard data is available inseason at the IFQ management unit level. Since quotas are issued at the stock complex level, inseason information on discards of the complexes are available, but not for the component stocks. Once data from 2011 are finalized, discard data from 2011 and landed catch from the 2012 year could be used inseason to estimate mortality.

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[13] Reports are available at http://pacfin.psmfc.org/pacfin_pub/qsm.php and http://pacfin.psmfc.org/pacfin_pub/pfmc.php.

[14] Reports are available at http://www.recfin.org/data/estimates/groundfish-management-status-reports.

When the catch is offloaded, catch monitors verify the sorting and weighing of IFQ species at the IFQ management unit level. Since quotas are issued at the stock complex level, no information on the component stocks is provided on the electronic fish ticket. Landings data are reported via electronic fish ticket and are available 24 hours after offload.

State fish tickets are also completed and are uploaded to PacFIN monthly (Washington and Oregon) or bimonthly (California) approximately 2-3 months after the landing date. Generally, species are reported at the complex level unless state law dictates otherwise (see above discussion) or if there is a noteworthy difference in price.

State port biologists sample commercial landings with coverage levels varying by state, port, month, etc. Port biologists collect information that informs the species composition of the complexes (i.e., which species comprise the complex and in what proportion). The species composition data collected by port biologists are submitted to PacFIN as proportions that are used to distribute pounds of fish ticket market category landings to actual species. The proportions are derived as monthly or quarterly aggregates by area, gear, and port and are applied to the fish ticket market category landings in the PacFIN database.

In 2012, landings estimates for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) are available through the PacFIN database for inseason reporting, even though the estimates are not currently reported on the publically available QSM reports. These estimates are derived from the species composition samples collected by the state port biologists. Species-specific discard data from WCGOP are publically available on a one year lag and could be used to estimate discard inseason. For 2013-2014 coastwide estimates of landings and discard for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) could be included in the QSM report or GMT inseason reports and could be considered at Council meetings five times a year. These estimates would be derived from the species composition samples collected by the state port biologists.

At-Sea Whiting Fisheries

At-sea whiting vessels (motherships and catcher-processors) operate north of 40°10 N. latitude and have 100 percent observer coverage. Observers sample unsorted catch to determine species composition of the individual hauls (in contrast to WCGOP observers who sample sorted catch and focus on the discarded portion). Some observations are whole-haul samples (a census) while others are partial-haul samples (i.e., a portion of the haul is randomly sub-sampled). Generally, the samples are a large proportion of each haul (30 percent or more of an individual haul) with nearly 100 percent of all hauls being sampled. For 2012, the data are aggregated at the complex level for inseason reporting; however species level data at the haul level are available in the NORPAC database. An effort is currently underway to provide tow level data from the NORPAC database to the PacFIN database for use in inseason reporting. For 2013-2014 estimates of aurora, shortraker, and rougheye north of 40°10’ N. latitude could be included in QSM or GMT inseason reports and could be considered at Council meetings five times a year.

Non-Trawl Commercial Fisheries

A portion of the non-trawl commercial fisheries are observed at sea by the WCGOP. Between 2006 and 2012, 9-43 percent of all limited entry sablefish fixed gear landings, 4 -15 percent of all non-sablefish limited entry fixed gear landings, and 1-4 percent of all open access landings were observed by the WCGOP (see data at http://www.nwfsc.noaa.gov/research/divisions/fram/observer/sector_products.cfm). The WCGOP sampling priority is on the discarded portion of the catch and data is reported at the species level, when possible.

Federal regulations require landings to be sorted and reported on state fish tickets to the Minor Rockfish complex levels (i.e., Minor Nearshore, Shelf, and Slope Rockfish complexes north and south) with the few exceptions mentioned above. Fish tickets are submitted to the state and are uploaded to PacFIN monthly (Washington and Oregon) or bimonthly (California) approximately 2-3 months after the landing date. Species composition data collected by port biologists are submitted to PacFIN as proportions that are used to distribute pounds of fish ticket market category landings to actual species. The proportions are derived as monthly or quarterly aggregates by area, gear and port and are applied to the fish ticket market category catch values in the PacFIN database.

Fleetwide discard estimates are not available inseason; therefore, discard data from previous years and landed catch from the current year are used inseason to estimate mortality. In 2012, landings estimates for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) are available through the PacFIN database for inseason reporting, even though the estimates are not currently reported on the publically available QSM reports. These estimates are derived from the species composition samples collected by the state port biologists. Species-specific discard data from WCGOP are publically available on a one year lag and could be used inseason to estimate the discarded portion of the catch. For 2013-2014 estimates of landings and discard for aurora, shortraker, and rougheye rockfish (coastwide or stratified north and south of 40°10 N. latitude) could be included in the QSM report or GMT inseason reports and could be considered at Council meetings five times a year. These estimates would be derived from the species composition samples collected by the state port biologists.

Recreational Fisheries

In the recreational fisheries, data on released and landed fish are provided at the species, not complex level by state (Washington and California) or PSMFC (Oregon) samplers. These data are reported to the Recreational Fisheries Information Network (RecFIN) on a two month lag. Inseason mortality estimates for the all component species for the nearshore complex and some species in the slope complex are available inseason for Council consideration.

Inseason Response

Commercial

AMs to reduce catch of slope and nearshore rockfish include adjustments to the trawl and non-trawl RCAs and modifications to limited entry and open access fixed gear trip limits. A seaward boundary adjustment of the trawl and non-trawl RCAs from 150 fm to 200 fm would reduce total catch of Minor Slope Rockfish species, including aurora, shortraker, and rougheye rockfish (Table C-12, Table C-13, and Table C-14). RCAs are also available and may be effective at controlling nearshore rockfish mortality; however, the shoreward adjustments may need to be extensive which could potentially close entire areas to fishing. Groundfish conservation areas (i.e., local area closures) may also be effective for reducing nearshore rockfish catch though none have currently been identified.

Trip limits that can be routinely adjusted through inseason action include the Minor Nearshore, Shelf, and Slope Rockfish complexes as well as blue rockfish in California, and for limited entry and open access fixed gears, minor shallow nearshore rockfish and minor deeper nearshore rockfish.

Recreational

Routine management measures to control catch of slope and nearshore rockfish include adjustments to bag limits, season lengths, and depth-based closures.

Table C-12. WCGOP observed trawl catch of aurora rockfish in the area north 40°10’ N. latitude from hauls where the slope rockfish catch was sampled, 2002-2010.

Depth (m)	Depth (fm)	Catch (lb)	Avg Catch/haul (lb)	Catch/effort (hrs)	% of Catch
0-50	0-27	0	0.00	0.00	0.0%
50-100	27-55	84	7.64	2.62	0.1%
100-150	55-82	558	15.51	6.50	0.9%
150-200	82-109	5209	85.40	28.98	8.1%
200-250	**109-137**	19438	19.67	4.23	30.2%
250-300	**137-164**	29404	15.77	3.27	45.7%
300-350	**164-191**	7998	8.82	1.63	12.4%
350-400	191-219	1218	8.77	1.51	1.9%
400-450	219-246	284	9.79	1.37	0.4%
450-500	246-273	33	5.54	0.83	0.1%
500+	273+	80	9.99	1.30	0.1%

Table C-13. WCGOP observed trawl catch of rougheye rockfish in the area north 40°10’ N. latitude from hauls where the slope rockfish catch was sampled, 2002-2010.

Depth (m)	Depth (fm)	Catch (lb)	Catch/haul	Catch/effort (hrs)	% of Catch
0-50	0-27	0	0.00	0.00	0.0%
50-100	27-55	251	7.37	7.37	0.2%
100-150	55-82	972	11.17	11.17	0.9%
150-200	82-109	8614	107.67	107.67	7.9%
200-250	**109-137**	59954	102.84	102.84	54.6%
250-300	**137-164**	30743	69.24	69.24	28.0%
300-350	164-191	7931	51.83	51.83	7.2%
350-400	191-219	808	23.76	23.76	0.7%
400-450	219-246	374	74.78	74.78	0.3%
450+	246+	79	15.72	15.72	0.1%

Table C-14. WCGOP observed trawl catch of shortraker rockfish in the area north 40°10' N. latitude from hauls where the slope rockfish catch was sampled, 2002-2010.

Depth (m)	0-27	Catch (lb)	Catch/haul	Catch/effort (hrs)	% of Catch
0-50	27-55	0	0.00	0.00	0.0%
50-150	55-82	282	35.25	13.42	0.9%
150-200	**82-109**	5237	158.69	45.70	16.8%
200-250	**109-137**	12900	80.12	16.88	41.4%
250-300	**137-164**	9443	48.18	10.95	30.3%
300-350	164-191	2457	23.17	4.61	7.9%
350-400	191-219	444	27.74	4.79	1.4%
400+	219+	416	103.95	12.38	1.3%

Option 1 Establish Federal sorting and reporting requirements for species within the Minor Slope Rockfish complex that are potentially vulnerable to overfishing

Harvest specifications are established at the complex level, which is the same as under No Action. In addition to the existing AMs, a Federal sorting and reporting requirement for aurora, shortraker, and rougheye rockfish north of 40°10' N. latitude would be established. This measure would require processors to sort these species prior to first weighing, after offloading. Reporting would occur on electronic fish tickets (shorebased IFQ only) and state fish tickets. Similar to No Action, 2013-2014 estimates of landings and discard for aurora, shortraker, and rougheye rockfish north of 40'10 N. latitude would be available and could be considered at Council meetings five times a year. The difference between option 1 and No Action is the methodology for estimating the landings of aurora, shortraker, and rougheye north of 40'10 N. latitude. Under No Action, port biologists would sub-sample landings to determine the species composition of the complex and those estimates would be expanded to the rest of the landed catch as well as unsampled landed catch. Under option 1, processors would be required to sort and report these species for all landings north of 40'10 N. latitude and no expansion would be necessary. In the shorebased IFQ fishery, catch monitors would also verify sorting conducted by the processor.

The Council considered but rejected a Federal sorting requirement for three nearshore species (China, copper, and quillback rockfish) considered vulnerable to overfishing in the productivity and susceptibility analysis since existing regulations in Oregon and California already require sorting (there is no nearshore commercial fishery in Washington). The Council's primary objective for the sorting requirement was to increase the accuracy of reporting for these species to better inform future OFL estimates, estimated from either data-poor methodologies or formal stock assessments, and to better inform the larger stock complex restructuring analysis. Accuracy in reporting was also considered essential to determine if mortality of the component species approaches unsustainable levels, which could result in a biological impact in the long term. Additionally, the Council considered that recreational fishery data from Washington, Oregon, and California is already collected and reported at the species level. The RecFIN reports already include estimates of landed and released catches of China, copper, and quillback rockfish which could be considered at Council meetings five times a year. Commercial QSM reports could be modified to report these species as well. Since implementing a sorting requirement for China, copper, and quillback rockfish was not expected to improve the existing data quality, the measure was rejected from more detailed analysis.

Regulation Requirements

Under option 1, regulations would be the same as No Action, except that for the commercial landings where processors and fishermen would be required to sort and report aurora, shortraker and rougheye rockfish north of 40’10 N. latitude prior to first weighing, after offloading. Reporting at the species level, not the complex, would occur on electronic fish tickets (shorebased IFQ only) and state fish tickets.

Inseason Reporting

Shorebased IFQ Fishery

Same as No Action, except that catch monitors would verify that aurora, shortraker and rougheye rockfish north of 40’10 N. latitude are sorted by processors and reported on electronic fish tickets. State fish tickets would also report the three species. Port biologists would sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora rockfish) were present in the species categories.

At-Sea Whiting Fisheries

Same as No Action.

Non-Trawl Fisheries

Same as No Action, except state fish tickets would report aurora, shortraker and rougheye rockfish north of 40’10 N. latitude. Port biologists would sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora) were present in the species categories.

Recreational Fishery

Same as No Action.

Inseason Response

Commercial

Same as No Action.

Recreational

Same as No Action.

Comparison of the Management Options

Biological Impacts

The productivity and susceptibility analysis indicated three species in the Minor Nearshore Rockfish (China, copper, and quillback rockfish) and Minor Slope Rockfish (aurora, shortraker, and rougheye rockfish) complexes may be vulnerable to overfishing based on recent estimates of the OFL contributions to the respective complexes and the historical landings. The proposed option is evaluated to determine if implementation would increase the accuracy of reporting for these species to help inform the OFL estimates to the complex, future assessments, and the larger restructuring analysis. Accuracy in reporting is also essential to determine if mortality approaches unsustainable levels which could result in a biological impact. The following discussion reviews the quality of data collected under the No Action alternative and option 1 to inform which method provides the greatest level of reporting accuracy.

It should be noted that identifying some rockfish to species can be difficult even for trained port biologists, observers, and catch monitors. For instance, within the Minor Slope Rockfish complexes, aurora rockfish is similar in appearance to splitnose, stripetail, rougheye, shortraker, and chameleon rockfishes (Orr et al. 2000). Rougheye is likewise similar to shortraker, blackgill, Pacific ocean perch, sharpchin, and yelloweye rockfish. There is a recent finding that fish historically identified as rougheye consist of a second species as well, blackspotted rockfish (*Sebastes melanostictus*), a situation that is not unprecedented in recent years and that underscores the identification challenge involved with closely related rockfish (Orr and Hawkins 2008).[15] Shortraker rockfish are similar in appearance to rougheye, blackgill, Pacific ocean perch, sharpchin, and redbanded rockfishes. Within the Minor Nearshore Rockfish complexes, quillback is similar to brown rockfish, copper rockfish, and China rockfish (Orr et al. 2000). China is similar to black and yellow rockfish, quillback, and brown rockfish. Differentiating between these similar appearing species can require the counting of head spines and/or gill rakers, inspection of the color of the membrane lining the abdomen (i.e., the peritoneum); or close examination of skin coloration, although coloration can fade substantially after capture and make identification more difficult.

The No Action alternative and option 1 include reporting by observers, catch monitors, and port biologists which have training in rockfish identification. It is assumed that the accuracy of data collected by all three samplers is the same.

Shorebased IFQ Fishery

The sorting requirement does not impact WCGOP discard data collection procedures; therefore, the discard data under both No Action and option 1 is considered equally accurate.

Under No Action, the port biologists' estimates of the species composition of the complex are considered accurate for use in management. Within each stratum, estimates of species composition are expanded to landings based on a weighted average composition of the sampled landings (i.e., species composition samples from landings with larger weights have more influence on the estimated composition of the total landings for that stratum). The weight of a species landed in each stratum is calculated, and the calculated weights are summed across strata to derive the fleetwide estimate for landings of that species. The expansion process can result in statistical errors as a result of factors such as variable sampling coverage, small sample sizes, and the large number of strata. Strata vary by state, but are generally combinations of gear, port, quarter, market category, and INPFC area. Port biologists strive to sample all strata, yet given the diversity in fishing operations, competing sampling priorities (e.g., collecting biological data for upcoming stock assessments), and limited sampling resources, this goal is not always met, and species composition data must sometimes be borrowed from similar strata to inform unsampled strata. For example, in 2011 in Oregon, there were slope rockfish landings in 87 strata, of which 71 were sampled at least once, an 82% sampling coverage rate. Borrowing occurred in 16 (18%) of the landed strata, with most of the borrowing occurring in quarters 3 and 4. Of the 71 strata sampled, 26 had only a single sample, and 14 had two. When strata contain only one sample, variance around the estimates cannot be calculated. In addition, borrowing species composition data adds uncertainty (how well do the borrowed data represent the unsampled strata?) that is not accounted for in traditional error estimates. A detailed exploration of the sampling rates, stratifications, and expansions is ongoing and all three west coast states are committed to providing the most robust data for use in management.

Under option 1, processors north of 40'10 N. latitude would be required to sort and report these species for all landings (i.e., no expansion is necessary) on electronic (shorebased IFQ only) and state fish

[15] Blackspotted rockfish continue to be treated as rougheye rockfish for management purposes because, in part, harvest specifications were calculated using historical catch data that treated the two as a single species.

tickets. Catch monitors would verify that the three species were correctly sorted on fish tickets. Under option 1, the data could be considered more accurate than under No Action, if catch monitors are able to verify sorting by the processors was done correctly.

Port biologists would also sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora rockfish) were present in the species categories. Option 1 could be modified to have either the WCGOP observers or catch monitors conduct species composition sampling of the landed portion of the catch, instead of the sorting requirement. Since WCGOP observers are onboard all shorebased IFQ vessels and catch monitors observe all landings, the expansion would be completed at the trip level instead of expanding all unsampled landings, as is the case with the port biologist data. The rule to implement the catch monitoring program noted that catch monitors provide a role more similar to enforcement than that of the WCGOP observers (75 FR 53360). In 2012, there is only one catch monitor who is not trained as a WCGOP observer; therefore, the ability to accurately identify rockfish species should be the same between catch monitors and WCGOP observers. The option to modify WCGOP or catch monitor duties has not been thoroughly evaluated at this time and it is unclear if it is feasible given existing sampling priorities.

If there are challenges identifying, sorting, and reporting aurora, shortraker, and rougheye to species option 1 could be modified to group the three species together for reporting purposes. Port biologists would still sample the slope rockfish complexes and the category containing aurora, shortraker, and rougheye north of 40°10 N. latitude, which would provide information on the species composition proportions in the categories.

Under both No Action and option 1, the species compositions of the complexes are publically available and could be considered five times a year by the Council.

At-Sea Fishery

The accuracy of the data are the same as under the No Action alternative.

Non-Trawl Commercial Fisheries

Under No Action, the species composition of the slope rockfish landed catch is determined by a sub-sample of landings conducted by port biologists and is available inseason from PacFIN. Under option 1, processors would be required to sort and report aurora, shortraker, and rougheye rockfish for all landings north of 40’10 N. latitude (i.e., no expansion is necessary) on state fish tickets. Port biologists would also sub-sample landings to determine if contamination (i.e., species other than rougheye, shortraker, and aurora rockfish) were present in the species categories. Fleetwide estimates of discard are not available inseason under both No Action and option 1; therefore, the estimates from the previous year would be used.

Similar to the discussion under the shorebased IFQ fishery section, the port biologists’ species composition estimates are expanded under No Action. At this time, it is not possible to distinguish between the accuracy of the estimates between the expanded data provided by port biologists and the data collected under the proposed sorting requirement.

Under both No Action and option 1, data for the non-trawl commercial fisheries are publically available and could be considered five times a year by the Council.

Recreational Fisheries

The accuracy of the data are the same as under the No Action alternative.

Socioeconomic Impacts

Fisherman and Processors

Under option 1, processors (and most likely fishermen) north of 40’10 N. latitude would be required to sort and report aurora, shortraker and rougheye rockfish prior to first weighing, after offloading. Failure to sort these species correctly is subject to enforcement under both Federal and state regulations. The requirement “prior to the first weighing after offloading” allows vessels and buyers some flexibility in whether fish are sorted onboard the vessel or during offloading. Despite this flexibility, the sorting requirement would be expected to increase the existing workload and reporting requirements for fishery participants. Circumstances differ between vessels and buying and processing facilities and so would affect individuals and businesses to different degrees. Some vessels may have more ability to sort and store fish into more categories onboard than others. Many vessels will not sort the catch completely until the time of delivery.

Operations at most processing facilities involve sorting based on visual inspection of large volumes of fish on a fast moving sorting belt. As discussed above, accurate rockfish identification can require the handling and deliberate examination of individual fish. Adding three additional stocks to the sorting requirement would be expected to increase the number of fish needing examination and increase the overall time needed for sorting. Such increased handling may result in decreased product value and delays in processing operations could reduce the overall profitability of the offload. These potential impacts to fish buyers and processors cannot be quantified with available information.

Management Agencies

There is no impact to the WCGOP since observers currently strive to identify all discarded catch to the species and not complex level. The impact of a sorting requirement to the catch monitor program is anticipated to be minimal under option 1. Catch monitor and program staff duties would include outreach to processors (i.e., first receivers) and enhanced species identification training to enable species identification of aurora, shortraker, and rougheye rockfish.

Under option 1, Federal and state groundfish programs may need to invest time and money into outreach programs to increase the accuracy of species identification within the processing community. Increased enforcement may also be necessary to ensure accurate sorting for use in management. For example, current state regulations in California require landings to be reported at the species, not complex level. However, from 2005-2011, an average of 13 percent of the fish tickets reported data at the complex level, instead of the species level. In recent years (2009-2011), the average has declined to 9 percent. From 2005-2011, an average of 40 percent of dealers reported data at the complex level, instead of the species level. In recent years (2009-2011), that average has declined to 31 percent. However, the most commonly reported category is slope rockfish. Historically, given the large number of species landed, the priority was to enforce sorting at the Federal level (i.e., species with an ACL or trip limit) with a secondary priority for enforcing the state sorting requirements (i.e., all species). Enforcement priorities could be modified under both the No Action and option 1. The costs of outreach and enforcement efforts are expected to be minimal to moderate.

Modifications to the electronic fish ticket and the state landing receipt databases would need to accommodate species-specific reporting for the slope species under option 1. Currently, Oregon is the only state that has species codes for aurora, shortraker, and rougheye rockfish north of 40°10 N. latitude. California would need to add codes for rougheye and shortraker and Washington would need to add codes for all three species. Codes for these species are used in each state already as part of the port sampling programs and the species composition data that is uploaded to the PacFIN database. The burden of adding new codes should be minimal.

The Council rejected a Federal sorting requirement for three nearshore species (china, copper, and quillback) since existing regulations in Oregon and California already require sorting (there is no nearshore commercial fishery in Washington). The Council's primary objective for the sorting requirement was to improve the quality of data for use in management. Since this measure would not improve the data quality it was rejected. These three species were identified in the Cope et. al paper as vulnerable and the historical estimates of mortality for china and quillback were higher than the estimated ABC and OFL contributions to the slope rockfish north complex proposed for 2013-2014 (Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). Additionally, the Council considered that recreational fishery data from Washington, Oregon, and California is already collected and reported at the species level.

Considered but Rejected

The Council considered but rejected a coastwide sorting requirement since historical estimates of mortality indicate that mortality of these species south of 40°10' N. latitude has been low in recent years (2008-2010). Further, existing regulations in California (i.e., south of 42° N. latitude) require the species, not the complex, be reported on fish tickets (CDFG Code sections 8043 and 8045). The Council's primary objective for the sorting requirement was to improve the quality of data for use in management. Since this measure would not improve the data quality, it was rejected.

The Council rejected removing the three species from the Minor Slope Rockfish North complex, establishing a new complex or species-specific harvest specifications, and establishing IFQ as the primary catch control until the comprehensive analysis of stock complexes is completed and the historical estimates of mortality are finalized.[16] Methodologies to estimate the species-specific historical mortality estimates by sector need to be finalized, reviewed, and accepted by the Council and its advisory bodies. This step is necessary to inform the OFL and ABC estimates, evaluate the existing allocation structure, and inform any potential modifications to the allocations between the trawl and non-trawl sectors as well as within the trawl sectors (i.e., allocations between the shorebased IFQ, mothership, and catcher-processor sectors).

Current regulations provide a formula for issuing QS in the shorebased IFQ fishery in the event species are removed from an IFQ management unit. For example, if a person holds one percent of a species group (e.g., Minor Slope Rockfish North) before the subdivision, that person will hold one percent of the QS for each IFQ species resulting from the subdivision (e.g., aurora, shortraker, and rougheye rockfish). However, now that species-specific estimates of landings are available, additional options for initial issuance may need to be considered. For example, it is anticipated that individual catch histories of the component species (e.g., aurora, shortraker, and rougheye rockfish) are different than the aggregate Minor Slope Rockfish North landings used in the initial issuance of QS.

Historically, there were no concerns identified for individual species within the complex. Slope rockfish trip limits were routinely increased to attain the OYs for the Minor Slope Rockfish complexes (e.g., trip limits ranged from 1,500 lbs/2 months to a high of 8,000 lbs/2 months in the north). Participants in the shorebased IFQ fishery now have an incentive to voluntarily reduce catch of these species since there is an acknowledgement that historical mortality may have been higher than the estimated OFL and ABC contributions to the complex. Establishing IFQ at the species level would add complexity to the existing program and could result in thinly traded markets, which could negatively impact the performance of the program and the communities involved in the fishery. A thin market results in assets that cannot easily be sold or exchanged without a substantial change in price. There is

[16] Historical data indicate that aurora, shortraker, and rougheye are primarily caught with trawl gears. Further, the FMP allocates 81 percent of the slope rockfish complex to the trawl sector.

potential for gear modifications to avoid certain slope species. For example, recent research demonstrated that selective flatfish trawl gear deployed seaward of the RCA had reduced catches of rougheye rockfishes (59 percent) compared to those hauls with a more typical design for deep water trawling (Hannah et. al, 2011). However, some reductions to target species were also experienced so further work to develop gear modifications is necessary. Ensuring the health and sustainability of the aurora, shortraker, and rougheye stocks is important to industry for maintaining the slope rockfish target strategy as well as providing access to other valuable slope target species (e.g., Dover sole, thornyheads, and sablefish). The Council and NMFS have previously asked industry to voluntarily avoid species with some success, which may be a viable option until the historical estimates are resolved and long term solutions identified.

The Council rejected the option to adopt a species-specific HG along with limited entry and open access trip limits for aurora, shortraker, and rougheye rockfish since estimates of mortality for these species with fixed gears is low (Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). Routine adjustments could be made to the existing slope rockfish fixed gear trip limits, which could reduce mortality of these species.

C.5 Catch Accounting between Limited Entry and Open Access

This action concerns a policy that was inadvertently deleted from the FMP when Amendment 21 was implemented, and clarifies the application of that policy with respect to catch accounting[17] for set-asides. The policy that was inadvertently deleted specified the decision rules for determining the allocation against which a vessel's catch would count, i.e. whether it would count against the limited entry allocation or the open access allocation. As it was specified, the policy also set up the situation in which catch might be deducted from both the ACL as an "off the top" set-aside before sector allocations are made and deducted from an open access or limited entry sector allocation. In this regard, this amendment adds a clarification to eliminate the possibility of a duplicate deduction.

The language at issue specified catch accounting for the division of allocation between the commercial limited entry and open access sectors and was originally contained Section 11.2.2, paragraph 4. Prior to Amendment 21 Section 11.2.2, Paragraph 4 read as follows.

> Any groundfish catch by vessels with an LE permit will be counted against the quota for the limited entry gears while the fishery for the limited entry gear for which its permit is endorsed is open. A vessel may not carry or deploy limited entry gear for which its permit is endorsed when the limited entry fishery for that gear is closed. Once the limited entry fishery for the gear for which the permit is endorsed has closed, any landings by the vessel with exempted gear, or limited entry gears for which no endorsement is held, will count toward the open access quota. The catch of vessels fishing without LE permits will count toward the open access quota regardless of what open access gear is used.

[17] The terms "catch accounting" and "catch," as used in this section, cover the application of a vessel's harvest against a sector allocation. Depending on how the allocations and management measures are specified, harvest may be measured as landings (catch minus discards), catch (including discards), or total mortality (catch minus discard survival). Regardless of the measure used in a particular situation, the management objective is to maintain total mortality within the ACLs.

Amendment 21 created a new division in the commercial allocation of groundfish by splitting it into trawl and non-trawl gears[18,19] and deducting open access incidental catch from the "off the top set aside". FMP language to implement Amendment 21 addressed catch accounting between the trawl and non-trawl sectors. This new division together with Amendment 20 gear switching provisions created complications for vessels with permits endorsed for limited entry trawl gears. The resolution was to specify that the allocation against which a vessel would be fishing will be determined by the fishery declaration made by the vessel.[20] Amendment 21 revised the language of section 11.2.2, paragraph 4 read as follows:

> Amendment 21 Version of Section 11.2.2, Paragraph 4: Groundfish catch will be counted against the allocation to the fishery or sector into which the vessel has declared or is otherwise participating.

While this language substantially simplified paragraph 4, it inadvertently deleted the only place in the FMP where it was clearly specified that if a vessel with limited entry permit landed groundfish that groundfish would count against the limited entry allocation regardless of the gear used, and similarly that any landing by a vessel without a limited entry permit would count against the open access allocation.

The other issue to be addressed is the potential for double counting. Under the current management system prior to the allocation of the groundfish ACLs among the various groundfish sectors, the ACLs are reduced to account for groundfish catch mortality in non-groundfish fisheries (i.e., incidental open access fisheries), EFPs, research catch, and the tribal fisheries. However, the old Section 11.2.2, paragraph 4 language specified that <u>any</u> catch by limited entry vessels would be deducted against a limited entry allocation (with certain exceptions when a fisheries closed) in that <u>any</u> catch by open access vessels would count against the open access allocation. This FMP language was in place prior to the implementation of ACLs which include "off the top" deductions for non-groundfish activity including incidental open access fisheries. When the pre-Amendment 21 FMP catch accounting language in Section 11.2.2, paragraph 4 was combined with the new ACL structure a vessel fishing in the incidental open access fishery would have catch deducted from the ACL as part of the set-aside for the incidental open access fishery and as well as deducted from allocation covering the open access fishery given the vessels specific catch.

Finally, the declaration program referenced in the Amendment 21 language and the associated data system is not necessarily the best available data to determine which fishery vessels are operating in for inseason catch accounting. The key piece of information for which the declaration system was to serve as the source, whether or not a particular landing is being made as part of the trawl IFQ program, is available through other elements of the fishery monitoring program (e.g. landing receipts). Therefore it

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[18] The division between the limited entry and open access allocations remains a key component of the license limitation program. For groundfish for which there is not a division between the limited entry and open access allocations and regulations the longline and pot limited entry endorsements become relatively meaningless, since longline and pot gear can be used both in the limited entry and open access fisheries. Limited entry/open access allocations are determined for most species during the biennial specifications process.

[19] Assuming that a limited entry/open access allocational split is maintained, the trawl/nontrawl split creates the need for separate accounting for limited entry trawl catch and limited entry fixed gear catch (previously aggregated accounted for as limited entry landings for all groundfish other than sablefish), as well as directed open access catch.

[20] Under the Pacific Coast groundfish program, prior to leaving port of vessel must have filed with the NMFS a declaration report stating the gear type they will be using. The gear declarations are specified such that they categorize trips by sector.

is being suggested that the references to declarations be eliminated from this paragraph so the best available information can to be used.

Management Issue

There is a catch accounting need to reinstate FMP language that specifies how catch will be accounted for between the trawl and non-trawl sectors and the open access and limited entry sectors. The language needs to be updated to address the change in allocation structure since the implementation of Amendments 20 and 21.

Management Options

No Action: Maintain the following language in section 11.2.2, paragraph 4 of the FMP:

> "Groundfish catch will be counted against the allocation to the fishery or sector into which the vessel has declared or is otherwise participating."

The Action Alternative, Preferred: The following language is proposed for section 11.2.2, paragraph 4, to reinstate the language specifying the accounting rules between limited entry and open access vessels; provide the rules for catch accounting between trawl and non-trawl sectors; and provide clarification to ensure that catch is not deducted twice from an ACL.

> Any groundfish catch by a vessel registered to an LE permit will be counted against the allocation for the limited entry gear(s) that the permit is endorsed for when the fishery for the limited entry gear is allowed, except when the vessel is fishing in a fishery for which the catch has already been accounted for in the preseason set-asides deducted from the ACLs. A vessel may not carry or deploy limited entry gear for which its permit is endorsed when the limited entry fishery for that gear is closed or otherwise prohibited. Once the limited entry fishery for the gear for which the permit is endorsed has closed, any groundfish landings by the vessel with open access gear will count toward the allocation covering the open access fishery. The catch of vessels fishing without LE permits will count toward the allocation covering the open access fishery regardless of what open access gear is used, except when the vessel is participating in a fishery for which the catch has already been accounted for in the preseason set-asides deducted from the ACLs.

Biological Impacts

The Action Alternative, which is preferred for 2013-2014, addresses catch accounting issues and affects the tracking of catch relative to sector allocations. The risk of exceeding an ACL, ABC or OFL would not result in a considerable difference relative to No Action. No other biological impacts were identified relative to the Action Alternative.

Socioeconomic Impacts

The Preferred Action Alternative benefits trawl and non-trawl fishermen by allowing for more accurate catch accounting while maintaining flexibility to move between gears and sectors. The Action Alternative further benefits non-trawl fishermen by eliminating duplicate catch accounting. When the pre-Amendment 21 FM catch accounting language in Section 11.2.2, paragraph 4 was combined with the new ACL structure a vessel fishing in the incidental open access fishery would have catch deducted from the ACL as part of the set-aside for the incidental open access fishery and as well as deducted from the allocation covering the open access fishery given the vessels specific catch.

C.6 Related Regulatory and FMP Language Clarifications

Complete Offloading (Regulatory Language Clarification)

Overview

As part of the trawl rationalization program regulations were adjusted for the trawl sector to clarify that once the transfer of fish begins all fish on board a vessel count toward a landing and that the offload must be completed prior to the start of a subsequent trip. A similar clarification is needed for other segments of the fishery for accurate catch accounting between sector allocations. It is proposed that as part of implementing this FMP amendment on catch accounting, regulatory language be adjusted to parallel the requirements for complete offloading which apply for the trawl sector.

Management Issue

For the purpose of catch accounting it is important that all fish harvested on a trip are clearly associated with the landings receipts and permit status. Action is needed to require that all fish from a particular trip be offloaded prior to the commencement of a subsequent trip.

Management Options

No Action Option: Require that all fish from an IFQ trip be offloaded prior to the commencement of a subsequent trip.

Action Alternative, Preferred: Require that all fish from any trip be offloaded prior to the commencement of a subsequent trip.

Comparison of the Management Options

<u>Biological Impacts</u>

The Preferred Action Alternative affects tracking of catch and catch limits. Requiring that all catch be offloaded is expected to improve catch accounting between sectors. The risk of exceeding an ACL, ABC or OFL would not result in considerable difference relative to No Action. No other biological impacts were identified relative to the Action Alternative.

<u>Socioeconomic Impacts</u>

For the purpose of catch accounting it is important that all fish harvested on a trip are clearly associated with the landings receipts and permit status. Because all catch from a trip is generally offloaded prior to leaving port on a new trip under the No Action Option, the Preferred Action Alternative is expected to result in no considerable change in impacts to the affected fishermen.

Clarification in how the Open Access Sector Regulations Apply to IFQ participants (FMP Language Clarification)

Overview

As part of the trawl rationalization program Section 11.2.5 paragraphs a and b of the FMP were expanded to specify the regulations which would apply when vessels with trawl endorsed limited entry permits use longline or fishpot gear with (paragraph a) or without (paragraph b) endorsements for those gears. Paragraph b states that when LE trawl vessels are using longline or fishpot gear without an endorsement for the gear being used, landings must be covered with trawl IFQ and that the vessel must comply with the provisions of the trawl IFQ program. A sentence at the end of the section states that under such circumstances open access regulations would not apply, i.e., even though a trawl vessel is using open access gear (using longline or fishpot gear without an LE permit) the open access sector regulations will not apply. This sentence needs to be modified to clarify that it is only the open access trip limits which will not apply, unless explicitly stated elsewhere (e.g. the catch accounting rules for limited entry trawl vessels using an open access gear are different than for an open access sector vessel using open access gear).

Management Issue

Clarifications of the FMP language are needed to specify that language in section 11.2.5 relative to the open access regulations that only the trip limit regulations for limited entry trawl vessels using longline or fish pot gear do not apply. Gear and other regulations having to do with the open access fishery may continue to apply, however, this adjustment will not prevent NMFS and the Council from providing exceptions to other open access regulations as necessary and appropriate in the future through a rulemaking.

Management Options

No Action Option: Maintain language at 11.2.2 of the FMP that reads….."longline and fishpot gears used by IFQ vessels endorsements are termed OA"

Action Alternative, Preferred: Revise Gear Endorsement language at 11.2.5 of the FMP to read as follows:

6. Gear endorsements are required for LE-permitted vessels to use LE gear types (see Section 11.2.1, paragraph 1) to catch groundfish under the regulations governing the LE fishery.
   b. Exception for Longline and Fishpot Gear Usage for Vessels with a LE Permit not Endorsed for the Gear Being Used:
      . . .
      iii. As specified in the trawl rationalization program (Section 6.9.3.1 and Appendix E) vessels registered to a trawl-endorsed LE permit and using longline or fishpot gear without a LE endorsement for those gears must cover their landings with trawl IFQ and comply with the provisions of the trawl IFQ program. Open access sector ~~regulations~~ trip limits will not apply to vessels participating under the IFQ program.

Comparison of the Management Options

Biological Impacts

The Preferred Action Alternative is an FMP housekeeping measure that is not expected to result in any biological impacts.

Socioeconomic Impacts

The Preferred Action Alternative is an FMP housekeeping measure that is not expected to result in any socioeconomic impacts.

C.7 Widow Rockfish Within-Trawl Allocations

Overview

The harvestable surplus of widow rockfish is formally allocated as specified in the FMP allocations with 91 percent of the fishery HG allocated to trawl sectors after yield is set aside to accommodate Tribal fisheries, research activities, bycatch in non-groundfish fisheries, and total catch limits for exempted fishing permits (EFPs). Allocations of widow rockfish are also specified for the various trawl sectors under Amendment 21 rules. Amendment 21 specifies that 500 mt of widow rockfish or 10 percent of the trawl allocation of widow rockfish is allocated to the trawl whiting sectors once the stock is rebuilt. Of that amount, widow yield is allocated to the whiting sectors according to the pro-rata allocation of whiting (42 percent to shoreside whiting, 34 percent to catcher-processors, and 24 percent to motherships). Since the shoreside whiting and non-whiting sectors were combined into one sector managed in an IFQ system starting in 2011 when Amendment 20 was implemented, the amount allocated to the shoreside whiting sector is combined with the remaining trawl sector allocation after allocating to the at-sea sectors (i.e., catcher-processors and motherships) to determine the shoreside trawl allocation.

Management Issue

The Council is contemplating a change to the widow rockfish allocation to the trawl sectors specified under Amendment 21 to provide more widow to the shoreside sector to allow greater opportunity to target widow and yellowtail rockfish. The needs of the shoreside trawl sector would best be met by allocating as much of the trawl allocation of widow rockfish as possible since a healthy widow rockfish stock is a valuable target for that sector. The needs of the at-sea sectors would best be met by allocating enough widow rockfish to prevent impeding the ability of these sectors to target Pacific whiting. While widow rockfish are not a target species in the at-sea whiting fisheries, the amount of widow rockfish allocated to the at-sea sectors has the potential to limit their ability to attain whiting allocations. If the total catch of widow rockfish hits the allocation for an at-sea sector, the season ends for that sector even if they have not attained their allocation of whiting. The analysis of sector needs for widow therefore compares the recent historical catches and catch rates of widow with respect to whiting by the at-sea sectors to understand whether the widow allocation options meet the needs of the at-sea sectors.

Management Options

Option 1 is the No Action widow allocation option and would allocate 290 mt to the at-sea sectors. Widow allocation option 2 would allocate 147.9 mt of widow to the at-sea sectors (147.9 mt is the amount of widow allocated to at-sea sectors in 2012) to be allocated to catcher-processors and motherships using the same apportionment used to allocate Pacific whiting (i.e., 41.4 percent and 58.6 percent of the at-sea allocation to motherships and catcher-processors, respectively) (
Table C-15). Widow allocation options 3-5 would allocate 200, 250, and 300 mt of widow to the at-sea sectors, respectively to be allocated to catcher-processors and motherships using the same apportionment used to allocate Pacific whiting. Option 1, where the Amendment 21 sector allocation of widow rockfish does not change, is the Preferred Alternative.

Comparison of Management Options

Given the widow rockfish ACL alternatives analyzed for 2013-2014 and the finding that the widow rockfish stock is successfully rebuilt, the status quo Amendment 21 allocation to whiting sectors is 500 mt, of which 290 mt is allocated to the at-sea sectors (i.e., Option 1), which is close to the maximum allocation of 300 mt analyzed (Table C-15). The range of at-sea whiting sector allocation options of 147.9 mt to 300 mt results in a range of widow allocations to catcher-processors of 86.7-175.9 mt and to motherships of 61.2-124.1 mt (Table C-16). Recent bycatch of widow rockfish since 2005 has ranged from 1-73 mt in the catcher-processor sector and from 13-73 mt in the mothership sector (Table C-15). Table C-18 depicts the projected sector whiting catch for the at-sea sectors under each of the widow allocation options assuming the recent year average and maximum widow bycatch rates observed in the fishery. The two options with lowest widow allocations to the at-sea sectors (Options 2 and 3) have the potential of limiting access to whiting in the mothership sector assuming the average rates occur in the future. Both sectors, especially the catcher-processor sector, have concentrated their fishing efforts later in the year when bycatch rates are reduced. If this pattern continues, the sectors may be able to access substantially larger allocations of whiting with lower widow allocation.

In 2005, a widow total catch limit was first implemented for the whiting sectors. The 2005 limit of 200 mt of widow bycatch was shared by the three trawl sectors that targeted whiting (shoreside whiting, catcher-processors, and motherships). In the event the widow limit was reached before sectors attained their whiting quotas, the fishery was closed until such time an inseason action provided more widow yield to the bycatch limit if yield was available, or for the rest of the year if yield was not available. Therefore, there was a great incentive to avoid widow rockfish bycatch and any other species where there was a specified bycatch limit[21]. Prior to 2005, when the whiting fleets were not actively avoiding widow rockfish, the widow bycatch was much higher than the allocations considered for 2013-2014 (Table C-17). The mothership sector had annual widow catches in that period that were higher than any of the 2013-2014 allocations considered and the catcher-processor sector had catches higher than some of the considered 2013-2014 allocations. Table C-17 also shows the catch percentage of widow was much higher in the shoreside non-whiting sector prior to 2003 when the target widow/yellowtail rockfish midwinter trawl fishery was eliminated (there was a partial year of widow/yellowtail targeting in 2002). Resumption of this target midwinter fishery in 2013 is the reason the widow sector allocation was being reconsidered. Testimony from participants in the at-sea whiting fishery at the April 2012 Council meeting that a higher widow allocation is needed as an insurance policy to prevent early closure of their fishery convinced the Council to prefer the No Action Option 1 allocation scenario. The Council did not reallocate widow rockfish as part of their preferred alternative for 2013-2014 fisheries.

Biological Impacts

It is possible that a greater amount of the widow rockfish ACL will be attained if the shorebased sector receives a higher allocation and is able to successfully target widow rockfish within the overfished species allocation constraints.

Socioeconomic Impacts

The socioeconomic impacts that could result from the range of widow rockfish allocation options are discussed in Section 4.2.2.5. In sum, using the average widow bycatch rate, the shoreside whiting sector may not be limited by the widow rockfish allocation under the options and ACLs analyzed (Table 4-62). That is, the widow rockfish allocation does not appear to limit access to the target stock, whiting. Under all the widow ACL alternatives the mothership sector may not be limited by the widow rockfish allocations under options 2 and 3. Further, under the 600 mt ACL, the mothership sector may be limited by the No Action widow rockfish allocation. The catcher-processer sector may only be limited under the 600 mt ACL and the No Action allocation. Under the highest widow bycatch rate scenario, the shoreside sector may be limited under allocation options 1, 4, and 5 under the 600 mt ACL. For the mothership sector, every allocation option under the alternative ACLs may be limiting, except the No Action allocation option under the 1,500 mt and 2,500 mt ACLs. For the catcher-processor sector, every allocation option under the alternative ACLs, may be limiting, except under the option 5 allocation under all ACLs and the No Action allocation under the 1,500 and 2,500 mt ACLs. The estimated change in revenue for the shorebased IFQ sector as a result of the widow rockfish allocations and subsequent increased access to a targeted widow and yellowtail fishery is in Table 4-63. Assuming the average 2001 widow-yellowtail encounter (landing) rate and 2011 ex-vessel prices, combined landings of widow and yellowtail rockfish in a directed fishery may have an ex-vessel value between $1.2 million and $2.2 million under the 1,500 mt widow ACL alternative and between $2.7 million and

[21] The first bycatch limit was implemented for canary rockfish late in the 2004 season by emergency regulation. Currently, there are sector-specific bycatch limits specified for canary rockfish, darkblotched rockfish, POP, and widow rockfish.

$4.2 million under the 2,500 mt widow ACL alternative, depending on the assumed bycatch rate and interjector allocation.

Table C-15. Bycatch of widow rockfish by non-tribal whiting trawl sectors, 2005-2011.

Year	Sector								
	Shoreside a/			Catcher-processors			Motherships		
	Widow Catch (mt)	Whiting Catch (mt)	Widow Catch Rate (Widow/Whiting)	Widow Catch (mt)	Whiting Catch (mt)	Widow Catch Rate (Widow/Whiting)	Widow Catch (mt)	Whiting Catch (mt)	Widow Catch Rate (Widow/Whiting)
2011	123.84	90,988	0.001361010	24.41	71,679	0.000340584	12.85	50,051	0.000256646
2010	54.97	62,319	0.000882075	5.01	54,285	9.22907E-05	34.02	35,714	0.000952568
2009	108.64	40,801	0.002662680	0.96	34,620	2.77296E-05	24.90	24,091	0.001033581
2008	99.09	50,423	0.001965175	52.37	108,121	0.000484365	60.75	57,432	0.001057773
2007	88.97	73,280	0.001214110	72.77	73,263	0.000993271	72.99	47,809	0.001526700
2006	49.38	97,297	0.000507518	67.00	78,864	0.000849564	71.80	55,355	0.001297082
2005	77.15	97,381	0.000792249	43.14	78,890	0.000546837	35.50	48,571	0.000730889
05-11 avgas	86.01	73,213	0.001340688	37.95	71,389	0.000476377	44.69	45,575	0.000979320
05-11 max	123.84	97,381	0.002662680	72.77	108,121	0.000993271	72.99	57,432	0.001526700
05-11 min (year)	49.38	40,801	0.000507518 2006	0.96	34,620	0.000027730 2009	12.85	24,091	0.000256646 2011

a/ Beginning in 2011 the shoreside whiting and non-whiting sectors were combined into a single sector and managed with IFQs. For this table, the 2011 data were analyzed at the trip level to determine trips that targeted whiting vs. those that targeted other groundfish species. The 2011 catch data presented in the table are the sum of catches from all whiting target trips to make these data comparable with previous years.

Table C-16. Trawl sector allocation options, including No Action (Option 1), of widow rockfish in mt.

ACL Alt.	Yield Set-Aside	Tribal Set-Aside	Inc. OA Set-Aside	Research Set-Aside	EFP Set-Aside	Fishery HG a/	Trawl Allot.	Widow Allot. Option	SB IFQ Allot. b/	At-sea Trawl Allot.	MS Allot.	CP Allot.
Max. 2005-11 widow catch									124		73	73
600	86.6	60.0	3.3	5.3	18.0	513.4	467.2	Option 1 c/	177.2	290.0	120.0	170.0
								Option 2	319.3	147.9	**61.2**	86.7
								Option 3	267.2	200.0	82.8	117.2
								Option 4	217.2	250.0	103.4	146.6
								Option 5	167.2	300.0	124.1	175.9
1,500						1,413.4	1,286.2	Option 1 c/	996.2	290.0	120.0	170.0
								Option 2	1,138.3	147.9	**61.2**	86.7
								Option 3	1,086.2	200.0	82.8	117.2
								Option 4	1,036.2	250.0	103.4	146.6
								Option 5	986.2	300.0	124.1	175.9
2,500						2,413.4	2,196.2	Option 1 c/	1,906.2	290.0	120.0	170.0
								Option 2	2,048.3	147.9	**61.2**	86.7
								Option 3	1,996.2	200.0	82.8	117.2
								Option 4	1,946.2	250.0	103.4	146.6
								Option 5	1,896.2	300.0	124.1	175.9

a/ The ACL is reduced by 86.6 mt to accommodate groundfish mortality in the tribal fisheries (60 mt), non-groundfish fisheries (3.3 mt), research (5.3 mt), and EFPs (18 mt). The resulting value is the fishery HG.

b/ The shorebased IFQ sector includes vessels that target whiting and non-whiting.

c/ Option 1 is the preferred No Action option, which applies the FMP allocation assuming the stock is rebuilt.

Table C-17. Trawl sector catches and catch percentages of widow rockfish by year, 1995-2004.

Year	Widow Rockfish Catch by Sector												
	Shoreside Non-whiting			Shoreside Whiting				Catcher-Processors			Motherships		
	mt	% Total shoreside sectors catch	% Total trawl sectors catch	mt	% Total shoreside sectors catch	% Total whiting trawl sectors catch	% Total trawl sectors catch	mt	% Total whiting trawl sectors catch	% Total trawl sectors catch	mt	% Total whiting trawl sectors catch	% Total trawl sectors catch
1995	6,165.3	96.3%	93.6%	236.1	3.7%	56.4%	3.6%	87.0	20.8%	1.3%	95.3	22.8%	1.4%
1996	5,403.2	90.4%	87.0%	571.5	9.6%	70.7%	9.2%	119.9	14.8%	1.9%	117.3	14.5%	1.9%
1997	6,213.3	97.4%	94.6%	163.3	2.6%	45.6%	2.5%	72.6	20.3%	1.1%	122.0	34.1%	1.9%
1998	3,346.7	90.5%	83.9%	349.6	9.5%	54.3%	8.8%	120.9	18.8%	3.0%	173.7	27.0%	4.4%
1999	3,691.1	95.0%	91.2%	194.4	5.0%	54.5%	4.8%	104.1	29.2%	2.6%	58.1	16.3%	1.4%
2000	3,718.5	97.8%	92.7%	83.3	2.2%	28.3%	2.1%	69.8	23.7%	1.7%	141.2	48.0%	3.5%
2001	1,729.6	97.5%	89.1%	44.3	2.5%	20.9%	2.3%	139.7	66.0%	7.2%	27.7	13.1%	1.4%
2002	254.9	98.0%	64.5%	5.1	2.0%	3.6%	1.3%	114.8	81.8%	29.0%	20.4	14.6%	5.2%
2003	4.1	24.7%	14.2%	12.5	75.3%	50.5%	43.3%	11.6	46.7%	40.1%	0.7	2.8%	2.4%
2004	13.8	28.7%	20.4%	34.3	71.3%	63.6%	50.6%	8.2	15.2%	12.1%	11.4	21.2%	16.9%

Table C-18. Projected potential whiting catch at the average and maximum widow bycatch rates for whiting sectors during 2005-2011. Highlighted cells show projected potential whiting catch levels that are below the "Highest plus 50%" whiting harvest guideline, indicating a potential widow rockfish bycatch constraint under that scenario.

Widow ACL Alt.	Widow Allot. Option	Projected potential whiting catch (mt) at the average widow bycatch rate			Projected potential whiting catch (mt) at the highest widow bycatch rate		
		Shoreside	MS	CP	Shoreside	MS	CP
600	Option 1 (No Action)	180,936	122,534	356,860	116,063	78,601	171,152
	Option 2	326,037	62,492	181,999	209,140	40,086	87,287
	Option 3	272,836	84,506	246,110	175,014	54,208	118,036
	Option 4	221,780	105,633	307,638	142,264	67,759	147,545
	Option 5	170,725	126,759	369,166	109,513	81,311	177,053
1,500	Option 1 (No Action)	1,017,231	122,534	356,860	652,515	78,601	171,152
	Option 2	1,162,331	62,492	181,999	745,591	40,086	87,287
	Option 3	1,109,131	84,506	246,110	711,465	54,208	118,036
	Option 4	1,058,075	105,633	307,638	678,715	67,759	147,545
	Option 5	1,007,019	126,759	369,166	645,965	81,311	177,053
2,500	Option 1 (No Action)	1,946,447	122,534	356,860	1,248,571	78,601	171,152
	Option 2	2,091,548	62,492	181,999	1,341,648	40,086	87,287
	Option 3	2,038,348	84,506	246,110	1,307,522	54,208	118,036
	Option 4	1,987,292	105,633	307,638	1,274,772	67,759	147,545
	Option 5	1,936,236	126,759	369,166	1,242,021	81,311	177,053

*Highlighted cells show projected potential whiting catch levels that are below the “Highest plus 50%” whiting HG, indicating a potential widow rockfish bycatch constraint under that scenario.

C.8 Remove or Modify the Minimum Lingcod Length Limit for Commercial and Recreational Fisheries

Overview

Minimum lingcod length limits have been in place since the late 1990s and were implemented to minimize harvest of immature lingcod while maintaining the reproductive potential of the stock. Since the length of 50 percent maturity of female lingcod is about 25 inches (63.6 cm) {Hamel, 2009 #77}, length restrictions established near these lengths may allow fish to spawn at least once prior to harvest. Current commercial length limits vary north and south of 42° N. latitude, and are 22 inches and 24 inches, respectively. Recreational lingcod length limits vary by state and region. In Washington, the recreational lingcod length limit is 24 inches in Marine Area 4, which is consistent with the state managed fisheries in adjacent Puget Sound management areas. The limit is 22 inches in the rest of Washington, Oregon, and California.

Lingcod caught by trawl gears and discarded are assumed to have a 50 percent survival rate {Hamel, 2009 #77}. Lingcod caught with fixed gears and discarded are assumed to have a 7 percent discard mortality rate {PFMC, 2008 #7}.

Management Issue

In November 2011, the Council requested analysis for removing or reducing to 20 inches the lingcod size limits in the shorebased IFQ fishery because all catch in the IFQ fishery count against quota and lingcod less than 24 inches length are considered marketable. In June 2012, the Council recommended maintaining the minimum lingcod length limit in the shorebased IFQ fishery for the start of the biennium in response to concerns expressed by the Council's Enforcement Committee about differential length limits between sectors (Agenda Item D.5.b, Supplemental EC Report). The Council requested additional analysis for removing and reducing the minimum lingcod length limits for all sectors (commercial and recreational) to address the Enforcement Committee's concerns. Such adjustments could be implemented inseason, if desired.

Management Options

No Action, Preferred: The minimum lingcod length limit in the shorebased IFQ fishery and the limited entry and open access fixed gear fisheries (except pink shrimp) vary north and south of 42° N. latitude and are 22 and 24 inches, respectively. In Washington, the recreational lingcod length limit is 24 inches in Marine Area 4, which is consistent with the state managed fisheries in adjacent Puget Sound management areas. The limit is 22 inches in the rest of Washington, Oregon, and California.

Option 1: The minimum length limit for lingcod would be 18 inches for all commercial or recreational fisheries.

Option 2: The minimum length limit for lingcod would be 20 inches for all commercial or recreational fisheries.

Option 3: No minimum lingcod length limit for all commercial or recreational fisheries.

Comparison of Biological Impacts between the Options

Lingcod are a productive stock and estimated abundance is high coastwide (see Section 2.1.3.2). Projected biomass and depletion in the 2009 assessment are high and above target levels at higher catches than realized recently on the west coast (Table C-19).

Lingcod mortality from 2007-2010 has been well below the optimum yield (OY; Table C-19). The RCAs and other management strategies implemented to reduce mortality of overfished species have effectively reduced lingcod mortality. It is unlikely that the proposed lingcod ACL for 2013-2014 would be exceeded as a result of modifications to the minimum length limit, given the low levels of mortality historically.

Table C-19. Percent attainment of the OY from 2007-2010 for lingcod.

Year	Percent of OY
2007	11
2008	4
2009	11
2010	9

Gear selectivity curves for commercial fisheries from the 2009 lingcod stock assessment indicate that lingcod 18 inches and larger are vulnerable to commercial gears {Hamel, 2009 #77}. Therefore, if the minimum length limit were changed to 18 or 20 inches, some increased mortality of lingcod at these sizes would be anticipated. It is difficult to ascertain selectivity less than 18 inches, should the minimum length limit be removed. It is anticipated that at some point smaller fish would not be desired by the market.

Data from charter boats observed in Oregon and California from 2007-2011 were examined to inform recreational selectivity (there are no observations available from Washington). On average, approximately 70 percent of lingcod discarded on observed trips Oregon and California were between 18 and 24 inches; 30 percent were less than 18 inches. In Oregon, all lingcod greater than 22 inches (current minimum length limit) were retained on the observed charter trips; however, in California, on average 29 percent of lingcod greater than 22 inches were discarded even though they were legal to be retained.

Given the estimated natural mortality rate (M) of female lingcod (0.32) and male lingcod (0.18), estimated growth rates of female and male lingcod, and an assumed 50 percent trawl discard survival rate {Hamel, 2009 #77}, for every kg of 18 inch females discarded in the trawl fishery, about 0.8 kg of 22 inch females could be expected to survive a year later (about 0.65 kg and 1.3 years for males). For every 1 kg of 13.5 inch females in the trawl fishery is estimated to yield 1.1 kg of 18 inch females a year later and only about 0.9 kg of 22 inch females two years later (even less for males). For recreational and fixed gear fisheries with only a 7 percent discard mortality rate, for every kg of 18 inch females discarded would yield 1.5 kg of 22 inch females a year later (1.2 kg of 22 inch males in 1.3 years). Therefore it is unlikely that significant biological effects would occur as a result of removing the minimum size limit in the commercial or recreational fisheries.

Comparison of Socioeconomic Impacts between the Options

Removing the lingcod length limit (Option 3) would simplify Federal regulations and eliminate regulatory discards in all fisheries, compared to No Action. Reducing the limit to either 18 (Option 1) or 20 inches (Option 2) would maintain regulatory discards but would allow smaller fish to be retained compared to No Action. All three options would provide consistent Federal regulations across all sectors, compared to No Action.

To the extent that lingcod less than the current size limits are processed, increased revenue would be anticipated. Feedback from processors indicate that lingcod smaller than 24 inches are marketable; however lingcod less than 20 inches are likely not marketable, except in the live fish fishery. The processors will likely establish market limits of the size of lingcod they are willing to buy.

The socioeconomic impacts of removing or reducing the lingcod length limit in the recreational fisheries are not well understood. It is possible that removing or reducing the lingcod size would allow fishermen to attain recreational bag limits quicker, which would enhance the recreational experience and potentially reduce costs (e.g., less fuel spent to fulfill the bag limit). However, as demonstrated in the observer data from California, some anglers may continue to fish for larger lingcod, reducing any potential socioeconomic impact.

Relationship between Lingcod Length Limits and Overfished Species
The shorebased IFQ fishery is rationalized and individual accountability is anticipated to resolve any overfished species implications related to removing or reducing the minimum lingcod length limit. Should increased catches of overfished species occur and become problematic, adjustments to the trawl or non-trawl RCA could be made to reduce catches.

It is uncertain how removing or reducing the lingcod length limit could change effort in the nearshore commercial fisheries, especially the open access component. Projected catches of overfished species in the nearshore fishery are based on target species landing limits. If an increase in participation is realized such that the target species landings exceed those currently in the nearshore model, overfished species projections will increase. Inseason action to reduce trip limits could be taken if landings are tracking higher than projected. Adjustments to the non-trawl RCA could also be used to reduce overfished species interactions. In some areas, the shoreward area of the non-trawl RCA is already at 20 fathoms; therefore, complete area closures would be necessary in these areas depending on the magnitude.

For the non-nearshore fishery, seaward adjustments to the non-trawl RCA or reductions to the lingcod trip limits may be necessary if removing or reducing the lingcod length limit results in increased overfished species interactions.

To the extent that removing or reducing the lingcod size allows fishermen to attain their recreational bag limits quicker, catches of overfished species would be reduced (i.e., less time on the water, less interaction with overfished species). If anglers continue to fish for larger lingcod, no reductions to overfished species catches would be anticipated.

C.9 Shorebased IFQ Accumulation Limits

The term “accumulation limits” applies to the maximum number of quota shares (QS) an entity can control, and the maximum number of quota pounds (QP) that can be assigned to a vessel account in the shorebased IFQ fishery (defined in regulation at 50 CFR 660.111). These limits vary according to the management unit for each relevant stock or stock complex. Objectives for the accumulation limits include preventing the consolidation of large blocks of quota holdings by a small number of controlling entities, and encouraging the distribution of quota among communities. The QS limits restrict the amount an individual or entity may control through ownership or other means. The vessel limits cap the maximum amount of QP that may be assigned to any one vessel during a given year. The annual vessel QP limits are larger than the QS control limits in order to allow several QS holders to work together on a single vessel. Additionally, there are daily vessel limits that regulate the amount of unused QP for Pacific halibut and overfished species residing in a vessel account. Performance of the accumulation limits was evaluated based on the conduct of the fishery in 2011 and the ACLs and trawl allocations that are proposed for 2013-2014.

Management Issue

Based on ownership information gathered in June 2009, the 167 limited entry trawl permits that received initial QS allocations in December 2010 under the trawl rationalization program are thought to be owned or controlled by a total of 114 identified business entities. Accumulation limits include an aggregate limit for all non-whiting species. In order to determine each individual's aggregate non-whiting QS (or vessel's QP) holdings, each IFQ species is weighted based on the percent it contributed to the aggregate non-whiting trawl sector allocation in 2010. A constant weighting is used (rather than changing each year) so that individuals who may be at or near the QS limit are not pushed over that limit any time there is a change in the sector allocations for the underlying species. Applying the species-quota weighting factors in the FMP, two of the 114 entities may have received initial quota share allocations that exceeded the aggregate non-whiting species accumulation limit of 2.7 percent (initial allocations in excess of 2.7 percent were grandfathered in for the duration of the divesture period). If, rather than holding the weighting constant, species weighting factors are adjusted based on the 2013 and 2014 preferred ACLs (and shoreside trawl allocations) for quota share species, these same two entities plus one additional entity (i.e., a total of 3) would apparently be in control of quota share amounts that exceed the aggregate non-whiting species accumulation limit of 2.7 percent.

Quota shares for lingcod were originally allocated as a single, coastwide stock. Splitting the formerly coastwide quota for lingcod into portions restricted to use north and south of 40º10' N. latitude may introduce unintended constraints on some participants.

The proposed 2013 lingcod ACLs are stratified north and south of 40°10 N. latitude, resulting in trawl sector allocations of 1,226 mt north of 40º10' N. latitude and 494 mt south of 40º10' N. latitude. Applying the 3.8 percent vessel use limit to each stock individually means that participating vessels would be limited to 46.6 mt of lingcod north of 40º10' N. latitude and 18.8 mt south of 40º10' N. latitude. In 2011, one vessel recorded lingcod landings of more than 46.6 mt north of 40º10' N. latitude (max was 59 mt, 2nd most was 42 mt, 3rd most was 36 mt), and no vessels landed more than 18.8 mt of lingcod south of 40º10' N. latitude (max was 3.4 mt). No vessels landed IFQ lingcod both north and south of 40º10' N. latitude.

Combining the proposed 2013 lingcod trawl sector allocations north and south of 40º10' N. latitude and applying the 3.8% vessel use limit would translate into an aggregated vessel use limit of 65.4 mt of lingcod in 2013. If the Council wishes to provide vessels an opportunity to harvest the same amount of lingcod north of 40º10' N. latitude that would have been available had the coastwide lingcod quota not been a split (i.e., 65.4 mt), a vessel use limit of at least 5.3 percent would be required. Similarly a vessel use limit of at least 13.2 percent would be required to allow a single vessel to catch 65.4 mt of lingcod south of 40º10' N. latitude.

The lingcod quota share control limits may also need to be adjusted accordingly. The coastwide lingcod quota share control limit of 2.5 percent was originally set as 2/3 of the vessel use limit (i.e., 2/3 x 3.8% ≈ 2.5%). Applying the same logic, in order to be consistent with the new vessel use limits, the lingcod quota share control limits would need to be reset to at least 3.6 percent north of 40º10' N. latitude, and 8.8 percent south of 40º10' N. latitude.

Management Options

No Action:

For the 2013-2014 management cycles, the maximum amount of aggregate non-whiting QS an entity can control and QP a vessel can use in the shorebased IFQ fishery would be limited by accumulation limits defined in regulation at 50 CFR 660.111. Specifically, the aggregate non-whiting QS accumulation limit would be 2.7 percent, the coastwide lingcod vessel QP limit would be 3.8 percent, and the lingcod QS control limit would be 2.5 percent. The weightings from the 2010 fishery, currently fixed in regulation, would continue to be used to evaluate each entity's accumulation of aggregate non-whiting quota.

Option 1, Preferred:

Leave in place the aggregate non-whiting QS accumulation limit of 2.5 percent.

Adjust the shorebased IFQ vessel QP use limits for lingcod for 2013-2014 as follows:

North of 40°10' N. latitude: increase vessel QP use limit from 3.8 percent to 5.3 percent
South of 40°10' N. latitude: increase vessel QP use limit from 3.8 percent to 13.2 percent.

Option 2:

Adjust the shorebased IFQ QS control limits for lingcod for 2013-2014 to be in line with the adjusted QP use limits as follows:

North of 40°10' N. latitude: increase QS control limit from 2.5 percent to 3.6 percent
South of 40°10' N. latitude: increase QS control limit from 2.5 percent to 8.8 percent.

Biological Impacts

Any adjustments to accumulation limits, either QS or QP, would be intended to improve economic efficiency thereby enhancing the ability of the fishery to harvest the ACL. If the ACL is attained, the biological impacts described in Section 2.1 would be realized.

Socioeconomic Impacts

The three business entities that control QS in excess of the aggregate non-whiting QS accumulation limit of 2.7 percent will still be required to divest excess QS by the end of 2014.

Increasing the lingcod accumulation limits to accommodate the division of the coastwide stock into two management units would restore the Council's original intent and provide greater revenue opportunity for entities controlling or harvesting lingcod quota within either of the two, new lingcod management units.

Since most vessels tend to concentrate in a particular geographic area rather than fishing coastwide, applying the No Action lingcod vessel use limit (3.8 percent coastwide) to the two new lingcod management units (north of 40°10 N. latitude; and south of 40°10 N. latitude) may limit some participants' harvest or force them to acquire additional lingcod QP for one area or the other. Analysis shows there is one vessel that would not be able to replicate its 2011 lingcod harvest level if the No Action vessel use limits for lingcod are maintained. Also, vessels needing to acquire additional lingcod QP to cover their catch may find it more difficult to procure available quota due to the relatively smaller, area-specific quota supplies.

There are four entities that currently exceed the lingcod QS control limit (2.5 percent coastwide). Under current regulations these entities would be required to divest excess lingcod QS by the end of 2014. Under option 2, two entities would exceed the 3.6 percent lingcod QS control limit north of 40º10' N. latitude (the control limit would need to be at least 5.54 percent to keep all entities under the limit). No entities would exceed the 8.8 percent lingcod QS control limit south of 40º10' N. latitude (the maximum QS allocation to an entity was 5.54 percent).

C.10 Shorebased IFQ Surplus Carry-Over

The shorebased IFQ carry-over provision, implemented in regulation at (660.140(e)(5), subpart D), allows up to a 10 percent quota pounds (QP) surplus in a vessel account to be carried over from one year to the next and allows up to a 10 percent deficit in a vessel account for one year to be covered with QP from a subsequent year. QP surpluses may not be carried over for more than one year. If there is a decline in the annual catch limit (ACL) from one year to the next, the amount of QP carried over as a surplus will be reduced in proportion to the reduction in the ACL. The carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve optimum yield (OY) while preserving the conservation of stocks. The Council is committed to designing the management system for all fisheries to attain but not exceed the ACL.

Absent a QP surplus carry-over provision, the fleet will likely attempt to maximize harvest of QPs and revenue annually (i.e., fish every last pound for maximum economic benefit) since the QP would not be available in the following year. Attempting to harvest all QPs may increase the risk of fishing into deficit since it is a multispecies fishery and there is limited precision in the harvesting activities.

Management Issue

At the September 2011 Council meeting, the National Marine Fisheries Service (NMFS) issued a report questioning whether the surplus carry-over provision was consistent with the Magnuson-Stevens Fishery Conservation Act (MSA) and National Standard 1 Guidelines (Agenda Item G.1.a, Supplemental Attachment 7). The report requested additional analyses and referenced Section 303(a)(15) of the MSA:

> "establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability."

The Council voted unanimously that NMFS issue the surplus carry-over for 2012 but on a delayed basis. In addition to considering the carry-over provision for 2012, NMFS also requested further exploration of the carryover provision for 2013-2014. The following management option and analysis is intended to ensure that issuance of surplus carry-over in 2013-2014 is consistent with the MSA and National Standard 1 Guidelines.

Management Options

No Action: Surplus carry-over would be implemented as specified in the current regulations, including:

a) 100 percent of the QP for most species are issued at the start of the year (except Pacific halibut, Pacific whiting, or when the harvest specifications are delayed)
b) Surplus carry-over QP from the previous year issued in the spring of the following year (e.g., 2012 surplus QP issued in spring 2013), to the extent allowed by the conservation requirements of the MSA
c) Accountability measures (AM) to ensure ACLs are not exceeded include
    (1) Automatic adjustments to the carry-over percentages based on changes in the ACL (660.140 (e)(5)(i))
    (2) Surplus QP must be harvested in the year issued, i.e., it cannot be carried-over for more than one year
    (3) Changes to the carry-over percentages can be implemented by NMFS under MSA authority (305d) or by the Council during the biennial process (660.140 (e)(5))

(4) Inseason data tracking against allocations and ACLs: Near-real time for IFQ fisheries, 2 month lag for non-IFQ commercial (limited entry fixed gear and open access) and recreational
(5) Routine management measures (660.60(c)) to keep mortality within the ACL include inseason trawl and non-trawl RCA adjustments (including area closures), inseason changes to the list of IFQ species documented on the observer forms, trawl trip limit reductions for non-IFQ species, adjustments to non-trawl management measures (trip limits, bag limits, season dates, etc.)
(6) Automatic actions (660.60(d)): includes automatic closure of the Pacific whiting sectors when that sector's whiting or non-whiting allocations are reached or projected to be reached and the ability to implement Pacific whiting bycatch reduction areas (660.131(c)(4) subpart D)
(7) Other: emergency action, two meeting regulatory process (e.g., trailing actions), biennial action

Greater detail on management measures as they relate to surplus carry-over can be found in Attachment 1.

Option 1, Preferred: The proposed action seeks to clarify regulations with regard to the current AMs outlined above, in the event it is necessary to address MSA conservation requirements. Clarifying regulations is largely a housekeeping measure that has no practical impact on the surplus carry-over provision. The proposed action also seeks to implement changes to the eligible surplus carry-over percentages through routine inseason actions based on recommendations generated at a Council meeting. Under this option, the Council would review the eligible surplus carry-over amounts from the previous year, projected impacts for the current year, and available AMs to determine whether the issuing the eligible surplus carry-over QPs results in a conservation concern. The Council will recommend surplus carry-over issuance when there is a reasonable expectation that ACLs will not be exceeded in light of the Council's ability to control catch inseason. This approach is consistent with the Council's commitment to manage all fisheries in such a manner that the Council does not expect ACLs to be exceeded. If a conservation concern is identified, the Council would make recommendations to NMFS to reduce or eliminate the provision for the species in question for that year. The ability to modify the surplus carry-over percentages through routine inseason action is different from the No Action option where adjustments are made by NMFS under MSA authority or by the Council through biennially cycle. Lastly, the proposed option would revise the current list of automatic actions that may be implemented by NMFS to include closing the shorebased IFQ fisheries, in addition to the at-sea whiting fishery (see regulations at 660.60 (d)).

Projected Impacts Analysis for 2013-2014

In the absence of any inseason action there is a theoretical calculation (mathematical possibility) whereby every sector achieves their allocation and the trawl sector achieves its maximum shorebased allocation, which could result in OFL, ABC, and ACL overages. In order to explore the likelihood of this scenario, the best available and most recent information on fisheries was considered to generate updated projected impacts for 2013-2014 fisheries. The projected mortalities scenario provides a more realistic expectation of mortality compared to the theoretical scenario; however the projected impact scenario may still overestimate mortality since it assumes maximum shorebased carry-over and historical maximum impacts in other sectors (see discussion below). The following analyses explore the projected harvest mortalities for 2013 and 2014 to evaluate whether implementing the surplus carry-over is consistent with the MSA conservation requirements.

Pacific halibut and Pacific whiting were not included in the analysis, since they are not subject to the ACL requirements. The IPHC reviewed the carryover policy and determined that it does not create a biological problem for Pacific halibut.

Projected Harvest Mortalities for 2013-2014

a. Projected Mortalities based on the 2011 Experience

There is only one year of data available for fishery performance under the trawl rationalization program. Therefore, the data for that year provides the best quantitative estimate for performance in future years (2013-2014).[22] Thus, if in aggregate the sector is 10 percent under its allocation in 2011 (i.e., a surplus is carried over to 2012), the best quantitative estimate currently available is that the trawl sector will likely be 10 percent under its allocation next year (i.e., a surplus will be carried over in 2013). Hence, for these situations where the projection is for the fishery to be 10% under in 2013 and 2014, carry-over of a surplus should not create a biological concern (i.e. if the fishery is under more than 90 percent, carrying over 10 percent is not projected result in the fishery exceeding its allocation and hence a conservation problem will not result). Further, for species where there is a 10 percent carry-over, it is unlikely that the deficit provision would be invoked in 2012. That is, fishery conditions would need to change substantially to move from less than 90 percent attainment in 2011 to 110 percent attainment in 2012. While this provides the best quantitative estimate, other factors need to be considered to take into account the degree of risk associated with that quantitative estimate. Those factors are twofold, first the ability to respond to an overage with a management adjustment (addressed in Sections 2.4 and 4.1) and second any qualitative indicators that industry performance will vary from 2011.

Table C-20 details the percent attainment of IFQ species in 2011. Attainment for only three IFQ species (sablefish north, petrale sole, and sablefish south) was greater than 80 percent. The eligible surplus carry-over percentage for whiting, petrale, sablefish north, and sablefish south is low (3.2, 3.4, and 3.8, respectively). However, since historical OY/ACL attainment for those species is high there is some risk of exceeding the ACL as a result of the carry-over (Table C-23).

The non-whiting species for which attainment was greater than 90 percent (sablefish north, sablefish south and petrale sole) are believed to be the stocks which constrained the harvest in 2011. The industry has indicated its strong intent to attempt to increase the proportion of the available harvest it takes. However, doing this will require emphasizing reducing the ratio of these three species in the catch in order to increase the amount of other species taken. For those other species attainment was below 50 percent and it appears very unlikely that the industry will be able to find a way to increase their attainment to 90 percent or higher (the level at which the possibility that the carryover provision might create a conservation concern arises) in the next year or two. Therefore, the qualitative information that informs an assessment of the likely the direction of deviation from the 2011 attainment indicates that fishermen are likely to try to conserve their attainment of the high attainment (constraining species) in favor of increasing their harvest of the low attainment species (the species for which there is the most room for taking their harvest). A higher percent of attainment of the high attainment species could ensue if the fishermen become more adept at trading QP to fully attain their quotas, or don't believe they will be allowed to carryover surplus from one year to the next. These appear to be the primary factors that need to be taken into account in evaluating the risk associated with authorizing full implementation of the surplus carryover allowance.

[22] A shorebased IFQ model was developed for estimating landings and the associated socioeconomic impacts of the harvest specifications decisions for 2013-2014. However, given model short-comings (see Appendix A), 2011 attainment was used in the carry-over projected impacts analysis is more conservative. If the shorebased IFQ model outputs were used, projected impacts would be lower.

For 2013-2014, IFQ fishery data could be evaluated on December 15th, the date at which QP transfers cease, to better evaluate the number of species where the carry-over provision is likely. On December 15, one could calculate the total used and unused QP for the year, eligible for the carry-over provision. The QP remaining in the vessel accounts on this date would represent the maximum carry-over for 2013 or 2014. That is, fishing could still occur between December 15 and 31, reducing the potential carry-over.

Table C-20. 2011 IFQ Allocation Attainment.

Species	Allocation (mt)	Catch (mt)	Attainment
Sablefish North of 36° N.	2,546	2,397	94%
Petrale sole	871	811	93%
Sablefish South of 36° N.	531	458	86%
Shortspine thornyheads North of 34°27' N.	1,432	713	50%
Longspine thornyheads North of 34°27' N.	1,966	960	49%
Widow rockfish	343	138	40%
Pacific ocean perch North of 40°10' N.	119	46	38%
Darkblotched rockfish	251	91	36%
Dover sole	22,235	7,826	35%
Pacific halibut (IBQ) North of 40°10' N.	117	30	25%
Non-whiting total	77,282	18,631	24%
Yellowtail rockfish North of 40°10' N.	3,094	739	24%
Pacific cod	1,135	253	22%
Chilipepper rockfish South of 40°10' N.	1,475	311	21%
Arrowtooth flounder	12,431	2,484	20%
Minor slope rockfish North of 40°10' N.	830	144	17%
Shortspine thornyheads South of 34°27' N.	50	8	17%
Other flatfish	4,197	685	16%
Lingcod	1,863	285	15%
Canary rockfish	26	4	14%
Minor slope rockfish South of 40°10' N.	377	51	14%
Yelloweye rockfish	1	0	10%
Bocaccio rockfish South of 40°10' N.	60	5	9%
Minor shelf rockfish North of 40°10' N.	522	15	3%
Minor shelf rockfish South of 40°10' N.	86	2	2%
Splitnose rockfish South of 40°10' N.	1,381	28	2%
Starry flounder	668	12	2%
Cowcod South of 40°10' N.	2	0	1%
English sole	18,673	135	1%

b. Updated Projections

The best available and most recent information on fisheries' impacts was considered to generate updated projected mortality for 2013-2014 fisheries to evaluate the risk of exceeding OFLs, ABCs, and ACLs. The recommended set-aside values for 2013-2014 were set higher than projected mortalities, typically at the maximum historical level, to increase the likelihood that mortality will remain within the ACL.

However, for some sectors, the maximum historical mortality does not represent the current best estimate of mortality. Yields set aside to accommodate tribal fisheries and bycatch in the at-sea whiting fisheries were updated with the maximum mortality from 2007-2010. Further, projected mortality for the non-trawl sectors represent the maximum mortality from 2007-2010, except in instances where the maximum value was higher than the 2013 or 2014 non-trawl allocation. That is, the management measures for the non-trawl sector are designed to keep catch within the 2013 and 2014 non-trawl allocations; therefore, it is unlikely that catches would reach the historical maximum.

The purpose of this scenario was to examine the projected impact for most sectors alongside the maximum surplus QP carryover scenario. Therefore, the shorebased trawl allocation was not updated with projected impacts; the values represent the maximum 10 percent carry-over for all species (see Section 2b). The results of this analysis are used to evaluate the likelihood of total mortality reaching the maximum 2012 shorebased allocation. However, it is noted that given the experience in 2011, this is an unlikely scenario since carry-over did not reach 10 percent for any species.

Updated Projections - Results

Table C-21 and Table C-22 represent the projected impacts and maximum shorebased allocation for 2013 and 2014. In 2013, no OFLs are projected to be exceeded under this scenario. ABCs for English sole, petrale sole, and splitnose could be exceeded. If there is no inseason action, the 2014 OFL for petrale sole could be exceeded along with the ABCs for English, petrale sole and splitnose. It is unlikely that the situations for English sole and splitnose rockfish would be realized based on historical data (Table 4-12). Further, English sole co-occurs with canary and yelloweye. It would be challenging to access such large amounts of English sole without first being constrained by QP availability for these species. Additionally, market demand is low for English sole and splitnose rockfish. Petrale is a highly marketable target species where the OY has been greater than 80 percent in recent years. Therefore, there may be some risk of exceeding the OFL and ABC.

In 2013 and 2014, the sums for eight species could exceed the ACL: darkblotched, English sole, longspine thornyheads north, petrale sole, sablefish and south, shortspine thornyheads north, and splitnose.

Table C-23 compares the historical maximum mortality for all sectors from 2007-2010 relative to the OY, the maximum historical trawl mortality and the maximum shorebased 2013-2014 allocation, for species where the ACL could be exceeded under this scenario. First, historical attainment of the OY was reviewed to determine the likelihood that the sum total sector morality would be greater than the 2013 and 2014 ACLs. Historical OY attainment for English sole (3 to 11 percent), longspine north of 34°27’ N. latitude (34 percent to 79 percent), and splitnose south of 40°10 N. latitude (30 to 44 percent) has been less than 80 percent. Co-occurring overfished species restrict access to English sole (co-occurs with yelloweye and canary) and minor slope rockfish north (co-occurs with darkblotched, POP, and petrale). There is low market demand for longspine thornyhead and splitnose rockfish; however, the species co-occur with valuable target species (e.g., slope rockfish, Dover sole, sablefish, and petrale). Therefore, it seems highly unlikely that such large increases in mortality would be realized for all sectors.

Historical OY attainment for the following species has been greater than 80 percent: darkblotched (77 to 106 percent), petrale (78 to 94 percent), sablefish north of 36° N. latitude (94 to 95 percent), sablefish south (57 to 83 percent) and shortspine thornyheads north of 34°27’ N. latitude (80 to 97 percent). Data from 2011 fisheries indicate that the maximum shorebased carry-over scenario for sablefish (north and south) and petrale is unlikely, since percent attainment in 2011 was 94 percent in the north and 86 percent in the south (Table C-20). There may be a risk of exceeding the ACL, assuming no inseason adjustment to management measures, for darkblotched and shortspine thornyhead north.

Biological Impacts

Impacts to a stock as a result of exceeding a harvest specification as a result of the carry-over provision depend on the biological characteristics of the species as well as the magnitude and frequency of the overage. The magnitude and frequency of the overages can be mitigated by the AMs mentioned above and in Attachment 1. If mortality averages to no higher what was expected (i.e., if the total amount of QP taken across several years is not greater than the total amount issues for those years) then the stock assessment forecasts will likely be unaffected. In April 2012, the SSC noted that relatively modest interannual departures from annual ACLs were not cause for concern from a biological perspective (Agenda Item I.3.b, Supplemental SSC Report, April 2012). The SSC stated that ensuring that OFLs are not exceeded is an adequate additional constraint to ensure that the annual departures from ACL do not have biological impacts. The SSC also believes that once the trawl rationalization system stabilizes, rollovers to the following year may act to balance rollovers from the previous year. The biological impacts associated with exceeding an OFL, ABC, or an ACL are further discussed in Chapter 4.1.

Socioeconomic Impacts

The surplus carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve OY while preserving the conservation of stocks. Absent a QP surplus carry-over provision, the fleet will likely attempt to maximize harvest of QPs and revenue annually (i.e., fish every last pound for maximum economic benefit) since the QP would not be available in the following year. Attempting to harvest all QPs may increase the risk of fishing into deficit, which results in a negative socioeconomic impact, since it is a multispecies fishery and there is limited precision in the harvesting activities.

Considered but Rejected for More Detailed Analysis

The following options were considered but rejected for more detailed analysis; option 1 was the only measure analyzed and considered in greater detail. Generally, these measures were rejected because they increased regulatory complexity and/or were not consistent with the Council's objectives for the surplus carry-over provision. However, additional consideration of these and other options may occur as part of a long term approach to the surplus carryover program.

Option 2 Enhanced AM Criteria Based on Moving Multi-year Average Approach

Surplus carry-over would be implemented as currently specified in regulation along with the enhanced accountability measures included in option 1. The need to invoke enhanced AMs (i.e., reductions or suspension of the eligible surplus carry-over) would be evaluated by calculating the average trawl mortality plus all other mortality compared to the average ACL over a four-year moving average period (two biennia). The evaluation of the moving average mortality to the average ACL would be conducted annually and the enhanced AMs would be considered in the event the average trawl mortality plus all other mortality for a given year results in an ACL overage more than once in four years. This option was consistent with the Council's objectives for the surplus carry-over program but was rejected since it required more detailed analysis than what could be accomplished in the timeframe for implementing the 2013-2014 harvest specifications and management measures.

Option 3 Enhanced AM, Modifications in the Following Year

Surplus carry-over would be implemented as currently specified in regulation along with the enhanced accountability measures included in option 1. Enhanced AMs (i.e., reductions or suspension of the eligible surplus carry-over) would be invoked in the following year instead of the current year. For example, eligible surplus carry-over from 2012 would be identified in 2013. Should a conservation concern arise, modifications to the eligible surplus carry-over would not occur until 2014. Under this option, there would be a 9 month notice that carry-over would not be issued for the following year, which would provide for better business planning.

Option 4 Holdback Approach

Under option 4, the trawl allocation would be reduced by 10 percent, reducing the start of the year QP. Part or all of the 10 percent holdback QP would be issued to vessel accounts for surplus carry-over in March/April after the previous year vessel accounts have been reconciled. After that, any remaining amounts of the 10 percent holdback QP would be issued to QS accounts according to percentages on QS permits.

Option 5 Buffer/Reserve Approach

Under option 5 an overall groundfish fishery ACT (all sectors) for all IFQ species at 10% below the ACL. The fishery HG and resulting trawl allocation would be calculated from this overall fishery ACT. The resulting affect is that the trawl allocation is reduced by 10 percent, affecting start of the year QP. The non-trawl fishery allocation would also be 10 percent less. The 10 percent holdback QP would be issued in March/April after the previous year accounts have been reconciled. Non-trawl allocation could also be increased after the evaluation in the previous step is completed.

Option 6 Suspend Surplus Carry-Over Pounds, Amend Deficit Provision

This option would suspend the issuance of surplus carry-over pounds but amend the deficit provisions such that deficit penalties would not be invoked until the deficit is greater than 10 percent. That is, overages in excess of 10 percent would need to be covered and could be covered by QP from the current year QP from the following year (current deficit provision). Under this alternative, QP are not issued, therefore the surplus pounds are not tradable.

Option 7 No Surplus Carry-Over Provision

This option would suspend the surplus carry-over provision, while maintaining the deficit carry-over provision.

Table C-21. 2013 Projected Impacts for Set-Asides and Non-Trawl Allocations Along with the Maximum 10 percent Shorebased Allocation.

Species category	Management area	2013 OFL (mt)	2013 ABC (mt)	2013 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Arrowtooth flounder	Coastwide	7,391	6,157	6,157.0	4,536.97	74%	74%	61%
BOCACCIO ROCKFISH	South of 40°10' N.	884	845	320.0	147.30	46%	17%	17%
CANARY ROCKFISH	Coastwide	752	719	116.0	96.86	84%	13%	13%
Chilipepper rockfish	South of 40°10' N.	1,768	1,690	1,690.0	1,458.46	86%	86%	82%
COWCOD	South of 40°10' N.	11	9	3.0	2.62	87%	30%	23%
DARKBLOTCHED ROCKFISH	Coastwide	541	517	317.0	343.83	108%	66%	64%
Dover sole	Coastwide	92,955	88,865	25,000.0	24,747.46	99%	28%	27%
English sole	Coastwide	7,129	6,815	6,815.0	7,088.01	104%	104%	99%
Lingcod	North of 42° N.	3,334	3,036	3,036.0	1,672.24	55%	55%	50%
Lingcod	South of 42° N.	1,334	1,111	1,111.0	723.35	65%	65%	54%
Longspine thornyheads	Coastwide	3,391	2,825				80%	66%
Longspine thornyheads	North of 34°27' N.			2,009.0	2,072.79	103%		
Longspine thornyheads	South of 34°27' N.			356.0	172.0	2%		
Minor shelf rockfish	North of 40°10' N.	2,183	1,920	968.0	652.22	67%	34%	30%
Minor shelf rockfish	South of 40°10' N.	1,910	1,617	714.0	380.18	53%	24%	20%
Minor slope rockfish	North of 40°10' N.	1,518	1,381	1,160.0	1,047.12	90%	76%	69%
Minor slope rockfish	South of 40°10' N.	681	618	618.0	529.39	86%	86%	78%
Other flatfish	Coastwide	10,060	6,982	4,884.0	4,843.53	99%	69%	48%
Pacific cod	Coastwide	3,200	2,221	1,600.0	1,494.08	93%	67%	47%
PACIFIC OCEAN PERCH	Coastwide	844	807	150.0	150.53	100%	19%	18%
PETRALE SOLE	Coastwide	2,711	2,592	2,592.0	2,660.71	103%	103%	98%
Sablefish	Coastwide	6,621	6,045				93%	91%
Sablefish	North of 36° N.			4,012.0	4,145.00	103%		
Sablefish	South of 36° N.			1,439.0	1,495.99	104%		

Species category	Management area	2013 OFL (mt)	2013 ABC (mt)	2013 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Shortspine thornyheads	Coastwide	2,333	2,230				86%	82%
Shortspine thornyheads	North of 34°27' N.			1,540.0	1,653.76	107%		
Shortspine thornyheads	South of 34°27' N.			397.0	268.89	68%		
Splitnose rockfish	South of 40°10' N.	1,684	1,610	1,610.0	1,675.69	104%	104%	100%
Starry flounder	Coastwide	1,825	1,520	1,520.0	828.94	55%	55%	45%
WIDOW ROCKFISH	Coastwide	4,841	4,598	1,500.0	1,403.02	94%	31%	29%
YELLOWEYE ROCKFISH	Coastwide	51	43	18.0	16.22	90%	38%	32%
Yellowtail rockfish	North of 40°10' N.	4,579	4,378	4,378.0	4,020.23	92%	92%	88%

Table C-22. 2014 Projected Impacts for Set-Asides and Non-Trawl Allocations Along with the Maximum 10 percent Shorebased Allocation.

Species category	Management area	2014 OFL (mt)	2014 ABC (mt)	2014 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Arrowtooth flounder	Coastwide	6,912	5,758	5,758	4,047.79	70%	70%	59%
BOCACCIO ROCKFISH	South of 40°10' N.	881	842	337	152.29	45%	18%	17%
CANARY ROCKFISH	Coastwide	741	709	119	86.74	73%	12%	12%
Chilipepper rockfish	South of 40°10' N.	1,722	1,647	1,647	1,408.56	86%	86%	82%
COWCOD	South of 40°10' N.	12	9	3	2.63	88%	29%	23%
DARKBLOTCHED ROCKFISH	Coastwide	553	529	330	358.13	109%	68%	65%
Dover sole	Coastwide	77,774	74,352	25,000	24,750.12	99%	33%	32%
English sole	Coastwide	5,906	5,646	5,646	5,859.49	104%	104%	99%
Lingcod	North of 42° N.	3,162	2,878	2,878	1,601.88	56%	56%	51%
Lingcod	South of 42° N.	1,276	1,063	1,063	651.29	61%	61%	51%
Longspine thornyheads	Coastwide	3,304	2,752				80%	61%

Species category	Management area	2014 OFL (mt)	2014 ABC (mt)	2014 ACL (mt)	Sum of Set asides, Max 10% Carryover, and Non-trawl Allocation (mt)	% of ACL	% of ABC	% of OFL
Longspine thornyheads	North of 34°27' N.			1,958	2,019.32	103%		
Longspine thornyheads	South of 34°27' N.			347	179.00	52%		
Minor shelf rockfish	North of 40°10' N.	2,195	1,932	968	656.23	68%	34%	30%
Minor shelf rockfish	South of 40°10' N.	1,913	1,620	714	379.75	53%	23%	20%
Minor slope rockfish	North of 40°10' N.	1,553	1,414	1,160	1,106.51	95%	78%	71%
Minor slope rockfish	South of 40°10' N.	685	622	622	532.18	86%	86%	78%
Other flatfish	Coastwide	10,060	6,982	4,884	4,849.47	99%	69%	48%
Pacific cod	Coastwide	3,200	2,221	1,600	1,493.21	93%	67%	47%
PACIFIC OCEAN PERCH	North of 40°10' N.	838	801	153	153.26	100%	19%	18%
PETRALE SOLE	Coastwide	2,774	2,652	2,652	2,843.92	107%	107%	103%
Sablefish	Coastwide	7,158	6,535				93%	85%
Sablefish	North of 36° N.			4,349	4,447.00	102%		
Sablefish	South of 36° N.			1,560	1,625.27	104%		
Shortspine thornyheads	Coastwide	2,310	2,210				86%	83%
Shortspine thornyheads	North of 34°27' N.			1,525	1,640.24	108%		
Shortspine thornyheads	South of 34°27' N.			393	268.89	68%		
Splitnose rockfish	South of 40°10' N.	1,747	1,670	1,670	1,744.47	104%	104%	100%
Starry flounder	Coastwide	1,834	1,528	1,528	841.87	55%	55%	46%
WIDOW ROCKFISH	Coastwide	4435	4,212	1,500	1,469.21	98%	35%	33%
YELLOWEYE ROCKFISH	Coastwide	51	43	18	16.26	90%	38%	32%
Yellowtail rockfish	North of 40°10' N.	4,584	4,382	4,382	3,876.24	88%	88%	85%

Table C-23. Historical Attainment of the OY, Compared to the Historical Maximum Trawl Mortality from 2007-2010 and the 2012 Shorebased Allocation with the Theoretical Maximum 10 percent Surplus Carry Over.

Species	Year	Total Mortality for All Sectors (mt)	OY (mt)	% Attainment	Historical Max Trawl Mortality 07-10 (mt)	2013/2014 ACL (mt)	Theoretical 2013/2014 SB Allocation plus 10% (mt)
Darkblotched	2007	285	290	98%	294	317/330	344/358
	2008	253	330	77%			
	2009	301	285	106%			
	2010	332	330 a/	101%			
English Sole	2007	914	6,237	11%	839	6,815/5,646	7,088/5,859
	2008	436	6,237	7%			
	2009	501	14,326	3%			
	2010	311	9,745	3%			
Longspine N. of 34°27' N. lat.	2007	928	2,696	34%	2,106	2,009/1,958	2,073/2,019
	2008	1,445	2,220	65%			
	2009	1,582	2,231	71%			
	2010	1,719	2,175	79%			
Petrale	2007	2,340	2,499	94%	2,286	2,592/2,652	2,661/2,844
	2008	2,260	2,499	90%			
	2009	1,978	2,433	81%			
	2010	936	1,200	78%			
Sablefish- N. of 36° N. lat. b/	2009	6,625	7,052	94%	3,171	4,012/4,349	4,145/4,447
	2010	6,167	6,471	95%			
Sablefish- S. of 36° N. lat. b/	2009	776	1,371	57%	19.6	1,439/1,560	1,496/1,625
	2010	1,039	1,258	83%			
Shortspine N. of 34°27' N. lat.	2007	1,557	1,608	97%	1,557	1,540/1,525	1,654/1,640
	2008	1,313	1,634	80%			
	2009	1,557	1,608	97%			
	2010	1,308	1,591	82%			
Splitnose South	2007	143	461	31%	1,593	1,610/1,670	1,676/1,744
	2008	177	461	38%			
	2009	203	461	44%			
	2010	140	461	30%			

a/ There was an HG of 288 mt in response to the court order.
b/ Sablefish data were only reported coastwide in the 2007 and 2008 Total Mortality Reports; therefore, the evaluation was limited to using 2009 and 2010 data

Attachment 1: Harvest Specifications and Management Measures

This section provides greater detail on the shorebased carry-over projected impacts analysis for 2013-2014.

Section 2.1 details the harvest specifications framework that establishes the OFL, ABC, and ACLs. Management measures are outlined in Section 2.1 to 2.3; further information on management measures as they relate to the carry-over provision is presented here. The MSA and National Standard 1 guidelines require accountability measures (AMs) to ensure that overfishing does not occur. Further, the National Standard 1 guidelines state "AMs are management controls to prevent ACLs, including sector-ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur." The first set of AMs used in the groundfish Fishery Management Plan (FMP) to prevent ACLs from being exceeded are deductions from the ACLs or annual catch targets (ACTs) to account for fishing-related groundfish mortality resulting from Pacific Coast treaty Indian tribal harvest, scientific research, non-groundfish fisheries (i.e., incidental open access), and, as necessary, exempted fishing permits (EFPs). For the 2013-2014 cycle, the Council recommended set-aside values in regulation based on various methodologies (see Attachment 1 for more detail). Most often, set-asides values were set higher than the projected impacts to increase the likelihood that total catches of all sectors would stay within the ACL and ultimately the OFL.

Allocations provide a harvest target or limit (overfished species), which increase the likelihood that catch does not exceed the ACL and OFL. Allocations between the trawl and non-trawl sectors are specified in the groundfish FMP and regulations. The trawl sector is composed of shorebased trawl and at-sea fisheries for Pacific whiting. The non-trawl sector is composed of recreational and commercial fixed gear fisheries, both limited entry and open access. Allocations can be long-term and formal, as in the case of Amendment 21 species (most IFQ species). Some allocations are set only for the biennial management period (e.g., bocaccio, canary, cowcod, and yelloweye).

National Standard 1 Guidelines state "…whenever possible, inseason AMs should include inseason monitoring and management measures to prevent catch from exceeding ACLs". Current regulations and proposed regulations for 2013-14 contain a series of management measures designed to keep catch within the ACL. Examples include set-asides, allocations, rockfish conservation areas (RCAs), trip limits for non-IFQ species and fisheries, bag limits, season dates, etc. Further, the west coast groundfish fishery relies on active inseason monitoring and adjustments to commercial and recreational management measures. In concert, these AMs work within a sector and among sectors, to prevent overfishing and keep catch within the ACL.

In the recreational fisheries, it is the combination of inseason monitoring, season dates, depth restrictions, and bag limits that ensure mortality stays within the recreational share of the non-trawl allocation, and ultimately the ACL and OFL. Preseason, groundfish bag limits are set at a level to spread socioeconomic benefits among more harvesters, generate greater charter vessel revenues and community benefits, and achieve OY while meeting conservation objectives. If the number of anglers participating in the fishery or the number of anglers achieving the bag limit increases beyond the preseason estimates, adjustments can be made through routine inseason action.

Trip limits and RCAs are the primary AMs in the commercial fixed gear fisheries. Preseason, trip limits are set to maximize economic efficiency, attain allocations, and achieve OY while meeting conservation objectives. That is, based on historical fleet performance, trip limits are set with the understanding that not every vessel will achieve the trip limit. If the number of vessels participating in the fishery or the number of vessels achieving the trip limit increases beyond the preseason estimates, adjustments to the trip limits can be accomplished through routine inseason action.

In the rationalized trawl fishery, the allocations and QP issuance, near real time inseason tracking, 100 percent monitoring (both at-sea and shoreside), and RCAs are the primary AMs that the Council expects to use to ensure catches will remain within the trawl allocation and ultimately the ACL and OFL (as is discussed in the Amendment 20 EIS). Other accountability measures are available, such as inseason adjustments to RCAs, between season adjustments, biennial adjustments, and closures. The purpose of the carry-over provision, when invoked, is based on a similar philosophy as the trip limit scenario. That is, based on historical performance of the fishery (i.e., overfished species interactions, market limits, etc.) not every vessel will attain 100 percent of their QP allocation, therefore the surplus can be carried over to the following year to allow full harvest of the sector allocation and OY to the benefit of consumers, fishermen, the community and nation. However, if all vessels carry over QP for a certain species and harvest those species in the following year, in addition to that following year's allocations, and if the following year catches in other sectors are above projections by the maximum amount, routine inseason management may need to occur to prevent a conservation concern.

In summary, not one of the AMs in isolation is sufficient to regulate the fishery impacts; however, all of the set-asides, recreational AMs, and commercial AMs in combination with inseason tracking and adjustments to management measures, result in an effective management system which is expected to keep catch within ACLs, ABCs, and OFLs. Further, no sector is held completely without management response to overages in other sectors. Finally, ACLs and OFLS are biased low by the stock assessment assumptions such that the ACL is harvested each year, i.e. there is an additional buffer between the OFLs adopted by the Council and the OFLs which would be set if assessments were updated with actual mortality instead of the ACL (Agenda Item G.5.b, Supplemental SSC Report, September 2011).

Inseason adjustments to existing management measures are informed by the robust tracking systems in place for both commercial and recreational fisheries. Adjustments can occur five times a year after Council meetings or by automatic action initiated by NMFS (e.g., closure of the at-sea whiting sectors and the bycatch reduction areas[23]). The trawl allocation is monitored by NMFS staff and the Council's Groundfish Management Team (GMT) in near real time with electronic fish ticket reporting (i.e., landings) on close to a 24-hour lag and reconciliation with observer data (i.e., discard) within a two week timeframe (except for Pacific halibut). The GMT utilizes data and reports from the Pacific Fisheries Information Network (PacFIN) to track limited entry and open access fixed gear commercial landings of stocks and stock complexes managed under ACLs or harvest guidelines. PacFIN reports are updated with most recent landings information every two weeks. Further, the GMT utilizes bycatch rates obtained by the West Coast Groundfish Observer Program, which are produced on an annual basis for the previous year. The GMT tracks total mortality inseason by combining the PacFIN landings reports with the bycatch rates to project the discard fraction of the total catch. In addition to the state reporting systems, the GMT utilizes data from the Recreational Fisheries Information Network (RecFIN) to track recreational impacts, which are on a two month lag.

If total catch is projected to exceed an ACL, routine inseason management measures can be implemented for the trawl and/or non-trawl sectors. For example, adjustments to the trawl RCA can be made to slow or stop catches in the trawl sector. Trip limit adjustments, non-trawl RCA adjustments, changes to recreational seasons, and modification of depth restrictions for recreational fisheries can be made to slow or stop catches in the non-trawl sectors. Further, if inseason tracking indicates a conservation concern, NMFS has the authority to take action in any and/or all sectors to protect the stock or complex, if needed (75FR78344, see Comment 38). In addition to routine inseason measures to reduce catch in the trawl and non-trawl sectors, NMFS retains the authority to close any or all sectors to respond to a conservation concern.

[23] See 660.131(c)(4) Subpart D

Inseason actions are not the full extent of the AMs available to manage the fishery. The FMP, as amended under Amendment 23, requires "if ACLs are exceeded more often than one in four years, then AMs may need to be implemented. AMs, such as catch monitoring and inseason adjustments to fisheries, need to improve or additional AMs may need to be implemented." Should an ACL be exceeded, there are many avenues - including emergency action, trailing actions, or actions taken every two years through the biennial process – to implement AMs to ensure the ACL is not exceeded in future years. Additionally, the percentage of QPs eligible for the carry-over and deficit provisions can be modified (increased or decreased) during the biennial management process.

Table C-24 demonstrates the record of using AMs to keep mortality within the OY for the west coast groundfish species subject to the carry-over provision. There have only been four overages over the four year period. The canary (2007) and darkblotched (2009, 2010) overages occurred due to poor impact model performance. Specifically, projections from the limited entry non-whiting trawl model, which was used historically to generate trip limits and estimate overfished species catches, failed to estimate catches with relative precision. The trawl model is no longer used to inform management measures and predict catches in the trawl fishery; instead the rationalized fishery AMs are anticipated to keep catch within the trawl allocation and ACLs. The Pacific ocean perch overage in 2007 occurred as a result of an unusually large catch event in the shorebased Pacific whiting fishery. For the 2011-2012 cycle, the Council recommended an ACT, a value set below the ACL, in order to improve the likelihood that catch will remain with the ACL. The sablefish overage in 2008 occurred as a result of a data processing error in PacFIN that has since been corrected (Agenda Item G.4.b, Supplemental GMT Report, November 2009).

Table C-24. West Coast Groundfish Accountability: Check marks indicate years in which total mortality remained within the OY, circles indicate years with overages.

Species	2007	2008	2009	2010
Arrowtooth flounder	✓	✓	✓	✓
BOCACCIO ROCKFISH	✓	✓	✓	✓
CANARY ROCKFISH	O	✓	✓	✓
Chilipepper rockfish	✓	✓	✓	✓
COWCOD	✓	✓	✓	✓
DARKBLOTCHED ROCKFISH	✓	✓	O	O
Dover sole	✓	✓	✓	✓
English sole	✓	✓	✓	✓
Lingcod N.	✓	✓	✓	✓
Lingcod S.	✓	✓	✓	✓
Longspine thornyheads N.	✓	✓	✓	✓
Minor shelf rockfish N.	✓	✓	✓	✓
Minor shelf rockfish S.	✓	✓	✓	✓
Minor slope rockfish N.	✓	✓	✓	✓
Minor slope rockfish S.	✓	✓	✓	✓
Other flatfish	✓	✓	✓	✓
Pacific cod	✓	✓	✓	✓
PACIFIC OCEAN PERCH N.	O	✓	✓	✓
PETRALE SOLE	✓	✓	✓	✓
Sablefish Coastwide	✓	O	✓	✓
Shortspine thornyheads N.	✓	✓	✓	✓
Shortspine thornyheads S.	✓	✓	✓	✓
Splitnose rockfish	✓	✓	✓	✓
Starry flounder	✓	✓	✓	✓
WIDOW ROCKFISH	✓	✓	✓	✓
YELLOWEYE ROCKFISH	✓	✓	✓	✓
Yellowtail rockfish	✓	✓	✓	✓

Attachment 2 Details of the Analysis

Background

Data from the 2007 to 2010 Total Mortality Reports, published by the West Coast Groundfish Observer Program, were used to generate projected impacts for set-asides and the non-trawl sector. While Total Mortality Reports go back to 2004, we elected to use reports from 2007-2010 because the data were more consistently reported and reliable. Two scenarios were analyzed to determine the best projection based on historical impacts by sector: 1) the maximum of either the average mortality from 2007-2010 or the 2010 mortality and 2) the maximum mortality from 2007-2010. The second approach was thought to represent the maximum impacts that might be possible. There were very few differences in the results (discussed below) and therefore to be conservative we chose to present the maximum values as our best projected impacts.

Projections

Deductions from the ACLs or ACTs are necessary to account for fishing-related groundfish mortality from Pacific Coast treaty Indian tribal harvest, scientific research catches, bycatch in non-groundfish fisheries, bycatch in at-sea whiting fisheries (off trawl allocation), and, recommended EFP activities. For Amendment 21 species and species with biennial allocations (e.g., bocaccio, canary, cowcod, and yelloweye), these values are referred to as set-asides and are used to calculate the fishery harvest guideline, which is the amount available for trawl and non-trawl allocations. Set-asides for sablefish north of 36° N. latitude, include yield deductions for research activities, recreational fisheries, and EFP activities. The tribal fishery is accommodated by an allocation. The incidental open access fishery impacts are deducted from the open access share. During the development of the biennial specifications, the set-asides for all species were recommended based on various methodologies, but were typically set higher than the projected impacts to increase the likelihood that fishing-related mortalities would stay within specified ACLs and OFLs.

The yield set-asides necessary to accommodate upcoming tribal fisheries in 2013-2014 are, in most cases, greater than the maximum catches in 2007-2010. There is no new available information demonstrating increased tribal fishery participation and higher harvests compared to historical maximums. Therefore, the set-asides were replaced with the projected impacts in the analysis, using the maximum tribal catches reported in 2007-2010 Total Mortality Reports[24]. There is a formal tribal allocation of sablefish north of 36° N. latitude and the fishery is managed to stay within the allocation (as opposed to a set-aside or harvest guideline). The allocation was not updated to projected impacts because it is assumed, given the increasing value of sablefish, the tribal allocation will be attained.

During the 2013-2014 cycle, the Council adopted the maximum mortality in recent years to estimate groundfish bycatch in the non-groundfish fisheries (also called incidental open access fisheries) and research. It is believed that the thorough evaluation and estimation in 2013-2014, though conservative, represents reasonable projected impacts for 2013-2014 and therefore no values were updated. EFP values represent the values established in the 2013-14 process based on expected applications. Therefore the EFP values were not updated.

A similarly conservative method of adopting set-asides for the at-sea whiting sectors was used for 2013-2014. Total Mortality Reports from 2007-2010 were used to generate a projected impact for the sector, based on the maximum.

The 2013-2014 EIS analysis reports projected impacts for the non-trawl sector, typically landings, for modeled species only. That is, not all IFQ species subject to the carry-over provision are modeled and projected for the non-trawl fishery and thus projected impacts may be higher than those reported. Therefore, this complimentary analysis was conducted to provide our best estimate of projected impacts for 2013-2014 non-trawl fisheries. The maximum mortality from 2007-2010 in the non-trawl sectors (sum of nearshore, non-nearshore, and recreational) was used to project impacts for 2013-2014, with a few exceptions (darkblotched rockfish, sablefish south of 36° N. latitude, and yelloweye rockfish). In these instances, the historical non-trawl catch was higher than the 2013-2014 allocation. Since the non-trawl sector will be actively managed to stay at or within the allocation, the 2013-2014 non-trawl allocation was used.

[24] Note the Total Mortality Report references “Tribal Landings”. Tribal fisheries require maximized retention therefore landings represent total catch.

C.11 Recreational Shelf Rockfish Retention in the Cowcod Conservation Area

Overview

Some recreational fishing is currently permitted within the Cowcod Conservation Area (CCA). Shelf rockfish, including bocaccio, are encountered but are required to be discarded resulting in "bycatch" (total amount of fish that are caught and discarded, regardless of mortality). To reduce bycatch by recreational fisheries operating in the CCAs, a modification to the retention allowance for shelf rockfish in the CCA is being considered. The loss of angler trips directly resulting from the CCA implementation, combined with the inability to retain shelf rockfish while fishing inside the CCA, has resulted in lost economic opportunities to southern California anglers. The impacts to anglers combined with the low risk of impacts to overfished species represents new information on fisheries interactions on which to support changes to CCA regulations.

Background

In 2001, the CCAs were implemented as part of the cowcod rebuilding strategy. As specified in the Groundfish Fishery Management Plan, as new information becomes available on cowcod behavior and fisheries interactions with cowcod, the boundaries or related regulations concerning the current CCAs may change.

The recreational targeting of groundfish has been prohibited within the CCAs since 2001, with some exceptions. In waters less than 20 fm in depth, recreational anglers are permitted to take and retain nearshore rockfish, cabezon, California scorpionfish, lingcod, greenlings of the genus *Hexagrammos*, and several state-managed species when the season is open to recreational groundfish fishing within the CCA. An additional exception exists for vessels targeting "other flatfish", which may be taken year round in any depth inside the CCA. The commercial groundfish fishery is also allowed to retain the above mentioned species in addition to shelf and slope rockfish, some species of sharks, skates, and flatfish in depths of 20 fm or less. Various recreational state fisheries for sea bass, California halibut, barracuda, bonito, marlin, tunas, and sharks also occur within the CCAs, but are not subject to depth restrictions.

The retention of shelf rockfish, including bocaccio and cowcod, is currently prohibited anywhere within the CCAs in the recreational fishery. Prohibited retention of shelf rockfish was implemented as a rebuilding measure for bocaccio and cowcod. The California Fish and Game Commission believed that prohibiting shelf rockfish retention in the recreational fishery would discourage fishing for rockfish in deeper waters (outside legal depths) where adult bocaccio and cowcod are found.

Recreational anglers have reported that prohibited retention of shelf rockfish results in unnecessary bycatch while fishing for target species. Regulatory complexity has been identified as a concern because the CCAs are the only place where shelf rockfish retention is prohibited but nearshore rockfish and other certain groundfish species (described previously) may be retained.

Summary of Options

Option 1: No Action – maintain prohibition on shelf rockfish retention in all depths of the CCA.

Option 2, Preferred: Allow shelf rockfish retention from 0-20 fm – Allow retention of shelf rockfish excluding bronzespotted, canary, cowcod and yelloweye rockfish, from 0-20 fm in the CCAs when the season is open to fishing for other groundfish species to reduce bycatch in the recreational fishery (the Council preferred option).

Option 3: Align recreational regulations inside and outside the CCA - Align species retention and depth restriction regulations inside and outside the CCA when the season is open to fishing for groundfish species to reduce bycatch in the recreational fishery. Retention of bronzespotted, canary, cowcod, and yelloweye rockfish will be prohibited.

Option 4: Prohibition on all groundfish **-** Prohibit the retention of all federal groundfish anywhere within the CCAs to reduce bycatch in the recreational fishery.

Data

The California Recreational Fisheries Survey (CRFS) is used to estimate total marine recreational finfish catch and effort in California[25]. It is a coordinated sampling survey designed to gather catch and effort data from anglers in all modes of marine recreational finfish fishing. In CRFS, the state of California is divided into six geographic areas or districts where district boundaries coincide with county boundaries. For the purposes of this analysis, the Southern Management Area (SMA), which includes the CCA, is comprised of the South and Channel Districts. Raw sample data collected in these two districts are combined before data are expanded for the entire SMA. Raw sample data can be differentiated into smaller areas, but expanded data cannot. In other words, due to the design of this program it is not possible to determine the proportion of total catches originating from a particular area (e.g., CCA) once data are expanded.

The CRFS sample data[26] from 2005 through 2010 were used to analyze rockfish catch within the CCA. The CRFS sample data contains encounters of nearshore and shelf rockfish species which is stratified by depth. Depth and location information used in the analysis are assumed to be reasonably accurate since the majority are global positioning system (GPS) coordinates taken by trained CRFS samplers on Commercial Passenger Fishing Vessels (CPFVs). These data were then used to 1) evaluate current fishing activity in depths of 20 fm or less, 2) evaluate mortality of shelf rockfish, and 3) evaluate the mortality of overfished species as a result of allowing retention of shelf rockfish in the CCA.

Comparison of Options

Option 1: No Action

Under Option 1, retention of shelf rockfish in the recreational fishery will continue to be prohibited in all depths of the CCA. Retention of shelf rockfish will still be permissible within the depths and seasons open to recreational groundfish fishing in all open areas outside the CCA. Retention of shelf rockfish in the commercial fishery is currently permissible within the depths and seasons open to commercial groundfish fishing both inside and outside the CCA. Retention of bronzespotted, canary, cowcod, and yelloweye will be prohibited.

<u>Fishing Activity in CCAs under Option 1</u>

Fishing activity in the entire CCA includes recreational targeting of groundfish and non-groundfish species. Fishing activities in depths of 20 fm or less within the CCA include groundfish and non-groundfish target strategies, although the number of anglers directly targeting bottomfish is small (26 percent between 2005 and 2010) when compared to the proportion of anglers targeting other species. Although the "bottomfish" effort category includes rockfish, it also includes other desired species such as lingcod and California halibut.

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[25] A full review of CRFS Methods is available at http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=36136&inline=true
[26] Sample data included both onboard observations and dockside sampling

Fishing activities in depths greater than 20 fm are mainly comprised of recreational targeting of non-groundfish species (e.g., tuna, yellowtail, and white seabass) that occur at various depths depending on the target. Many of these fisheries are open year round and occur in all depths. These non-groundfish fisheries incidentally encounter rockfish while in pursuit of their target species, but only retention of nearshore rockfish (and other groundfish species as described previously) is allowed in depths of 20 fm or less during the open season.

Under existing regulation, discarding of rockfishes does occur in pursuit of non-groundfish fishing and would continue under Option 1. Table C-25 shows the recreational groundfish and non-groundfish fisheries permitted to occur in the CCAs in 2012 along with corresponding management measures.

Table C-25. Recreational Fisheries in the CCAs and Corresponding Management Measures in 2012.

Groundfish	
Rockfish*, cabezon, greenling complex (RCG Complex)	March 1 through December 31 from 0-20 fm
Lingcod	March 1 through December 31 from 0-20 fm
California scorpionfish	Year round 0-20 fm
“Other flatfish” **	Year round, any depth, 20-fish bag limit for all species of finfish, of which there may be no more than 10 fish of any one species. Pacific sanddab are not subject to a daily bag limit.
Non-Groundfish	
California sheephead	March 1 through December 31 from 0-20 fm
Ocean whitefish	March 1 through December 31 from 0-20 fm
Various bass	Year round, any depth
Grunion	June 1 through March 31, all depths
White seabass	Year round, all depths
California halibut	Year round, all depths
Barracuda	Year round, all depths
Bonito	Year round, all depths
Yellowtail	Year round, all depths
Marlin	Year round, all depths
Various sharks	Year round, all depths
Non-FMP flatfish	Year round, all depths

** includes minor nearshore rockfish*
*** “Other flatfish” are defined at 50 CFR §660.11, subpart C, and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.*

<u>Recreational Groundfish Catch in CCAs under Option 1</u>

From 2005 through 2010, a total of 884 nearshore and shelf rockfish encounters (kept/retained or released) was reported in all depths in the CCA for all recreational fishing activities (groundfish and non-groundfish trips) based on CRFS sample data. These data are based on interviews with 323 anglers, which included 35 observed CPFV fishing trips. Approximately 60 percent (526 fish) of those rockfish encounters occurred in depths less than 20 fm; the remaining 40 percent (358 fish) occurred in deeper depths. Of the encounters in depths less than 20 fm, 276 encounters (52 percent) were shelf rockfish, and 250 encounters (48 percent) were nearshore rockfish (Table C-26). Vermilion and bocaccio rockfish were the most frequently encountered shelf species. No cowcod (juvenile or adult) were reported to have been encountered by anglers during interviews or sampled by CRFS samplers.

Data in Table C-26 represent sampled encounters, not total encounters, from inside the CCA. As described previously, estimates of total mortality for all shelf rockfish are only available for the entire SMA due to CRFS program expansions. Data from inside the CCA are included in that expansion, but the proportion of total mortality from only inside the CCA cannot be differentiated. Under the current regulations estimates of total mortality for shelf rockfish in the SMA are expected to be similar to previous years.

Table C-26. Encounters of Nearshore and Shelf Rockfish (Numbers of Fish) in depths of 20 fm or less in the Cowcod Conservation Area from 2005 through 2010 (source: CRFS Sample Data).

Species	Total from Sample Data	
NEARSHORE ROCKFISH		
Copper rockfish	149	
Blue rockfish	20	
Gopher rockfish	20	
Olive rockfish	17	
Treefish	17	
Kelp rockfish	15	
Other nearshore rockfish	12	
SHELF ROCKFISH		
Vermilion rockfish	173	
Bocaccio	72	
Starry rockfish	13	
Rosy rockfish	11	
Other shelf rockfish (non-overfished)	**7**	
		% total
Nearshore rockfish total	250	48%
Shelf rockfish total	276	52%
Total	526	100%

Bocaccio are encountered inside the CCA, but cannot be retained under Option 1. They can be legally retained outside the CCA as long as anglers abide by current bag limits, season and depth restrictions. Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, some increase in the encounter rate (and discard rate) would be expected within the CCA under Option 1.

Retention of cowcod is prohibited statewide in the recreational fishery. Zero cowcod have been encountered in depths of 20 fm or less inside the CCA and encounters are not expected to increase under Option 1 as cowcod slowly rebuilds.

<u>Data Uncertainty under Option 1</u>

Under Option 1, the accuracy of species identifications by anglers has been identified as a potential source of uncertainty. Although canary, vermilion and yelloweye rockfish can be challenging to distinguish in areas of northern California, misidentification by anglers is less prevalent in southern California because canary and yelloweye rockfish are not commonly found in that area. In southern

California, misidentification of overfished species is not as prevalent because the two overfished species found in that area, bocaccio and cowcod, are both distinct and easily identifiable.

Allowing retention of some species (e.g., nearshore rockfish) under Option 1 likely decreases uncertainty associated with accurate identifications by anglers because identifications can be verified by a trained CRFS sampler. As stated previously, the overfished species in southern California (bocaccio and cowcod) are both distinct and easily identifiable, thus uncertainty associated with correct identification by anglers is likely reduced. Conversely, the uncertainty associated with shelf rockfish would be higher because they cannot be retained and species identifications cannot be verified by CFRS samplers.

Biological Impacts under Option 1

Projected Mortality

Minor Shelf Rockfish South of 40°10' N. latitude
Under the Council's preferred alternative, the minor shelf rockfish ACL in 2013 would be 1,190 mt. The rockfish species with the largest contributions to the complex are as follows: yellowtail (55.7 percent), vermilion (14.1 percent), greenstriped (12.0 percent), and remaining rockfish (18.2 percent).

Total mortality from both the recreational and commercial fisheries has been far below the ACL from 2006 through 2010 (Table C-27). Between 2006 and 2010, total recreational shelf rockfish mortality south of 40°10' N. latitude ranged from 171 mt to 308 mt. In the entire SMA (including the CCA), they ranged from 72 mt to 122 mt (Table C-28).

Table C-27. Estimated total fishing mortality (mt) shelf rockfish south of 40°10' N. latitude from all sectors compared to the annual catch limit (ACL), from 2006 through 2010 (source: West Coast Groundfish Observer Program).

Year	Total Mortality (mt)	ACL (mt)	% ACL
2006	334	714	46.8%
2007	365	714	51.1%
2008	212	714	29.7%
2009	273	714	38.2%
2010	251	714	35.1%

Table C-28. Estimated total mortality (mt) of shelf rockfish in the recreational fishery by area, south of 40°10' N. latitude from 2006 through 2010 (source: RecFIN data).

Year	40°10' - 34°27' N lat	south of 34°27' N lat	Total
2006	203	72	275
2007	186	122	308
2008	80	91	171
2009	159	87	246
2010	110	101	211

Bocaccio
Seventy-two bocaccio were encountered by CRFS samplers in depths of 20 fm or less in the CCA from 2005 to 2010 (Table C-26)[27]. For the entire area south of 40°10' N. latitude, the projected recreational mortality of bocaccio in 2012 under Option 1 is 55.4 mt (PFMC and NMFS, 2011).

Projected recreational mortality of overfished species are estimated using CDFG's RecFISH model. The model incorporates historic fishery data throughout the SMA to inform future mortality and includes data prior to implementation of the CCA when the fishery was less regulated. The model currently assumes all rockfish are taken in depths of 60 fm or less throughout the entire SMA when projecting mortality; mortality inside the CCA is not modeled separately from those in other areas. In other words, the model already assumes the recreational fishery operates to depths of 60 fm inside the CCA, rather than only 20 fm; so projected mortality is overestimated by the model. Actual mortality of bocaccio under Option 1 would likely be lower than the projected mortality of 55.4 mt.

Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, some increased encounters (and discards) would be expected within the CCA in depths of 20 fm or less, although the amount cannot be quantified. In its report under Agenda Item E.4.b (November 2011), the Groundfish Management Team concluded that any increase in bocaccio mortality in 2013, as a result of the 2010 year class, is not expected to exceed the 2011 California recreational HG (131 mt). If the 2010 year class is not as strong as projected, mortality under Option 1 would likely be similar to previous years.

Cowcod
Zero cowcod were encountered by CRFS samplers on any trips from 2005 to 2010 in depths of 20 fm or less in the CCA under current regulations. Under Option 1 impacts in depths of 20 fm or less are expected to be the same – zero.

One cowcod was observed on a non-groundfish trip deeper than 20 fm in the CCA between 2005 and 2010. This cowcod was encountered by an angler targeting yellowtail (*Seriola dorsalis*). The reported depth of capture was approximately 58 fm (350 ft); the cowcod was released alive. The presence of only one cowcod in six years (outside the allowable depths) suggests that the encounter rate in depths greater than 20 fm is very low under Option 1.

The preferred ACL for cowcod in 2013-14 is 3 mt, of which 1.0 mt is allocated to the non-trawl fishery which includes both the commercial and recreational sectors. Similar to bocaccio, the RecFISH model also incorporates a "buffer" in its projections for cowcod mortality due to the fact that the model assumes the depth restriction inside the CCA is the same as outside. Projected mortality of cowcod for the entire California recreational fishery under Option 1 is 0.2 mt.

Stock Status

Minor Shelf Rockfish South of 40°10' N. latitude
The minor shelf rockfish complex includes many rockfish species with differing biological characteristics, life histories and habitat preferences. These species are included in this complex because they all inhabit areas on the continental shelf. The southern minor shelf rockfish complex is composed of the following species: bronzespotted rockfish (*Sebastes 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.

[27] In the entire SMA, 18,737 bocaccio were encountered by CRFS samplers from 2005 to 2010 at depths of 60 fm or less. Bocaccio encounters in 20 fm or less in the CCA represent 0.4 percent of total encounters in the SMA.

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*).

With the exception of greenstriped and greenspotted rockfish, none of the minor shelf rockfish species in this complex have been assessed. Under Option 1, no changes to individual stock status or complex status are expected.

Bocaccio

Declared overfished in 1999, bocaccio is one of the larger rockfish species in southern California. Pelagic young-of-year bocaccio typically recruit to shallow habitats and sub-adult bocaccio are more common in shallower water than adults and are commonly found around piers and other shore structures. Adult bocaccio are typically found in a broad range of habitats and depths, and can develop large mid-water aggregations; high densities tend to be more associated with more complex substrates. As with many other shelf species of rockfish, there is a clear trend towards larger fish at greater depths. Adults are highly sedentary and exhibit some ontogenetic movement to greater depths which is common for most shelf species. (Field et al, 2009)

Results of the current assessment indicate that bocaccio are rebuilding quickly. Under Option 1, no changes to stock status or rebuilding progress are expected.

Cowcod

Cowcod were declared overfished in 1999. They are primarily encountered in depths greater than 50 fm (Butler et. al., 1999). Though cowcod do occur from 20 fm to 267 fm (Love et. al., 2003), submersible surveys at the northern end of the Southern California Bight, indicate that juvenile cowcod were most common from 49 fm to 82 fm and adults were most common at depths of 66 fm to 115 fm (Butler et al., 1999). These trends in the depth distribution are repeated in the proportion of catch by depth from the trawl fishery in the Southern California Bight where cowcod were predominantly encountered in depths deeper than 65 fm (Butler et al., 1999). Recent submersible surveys indicate that juvenile cowcod occur over a wide range of habitat types, at depths between 28 fm and 180 fm and typically avoid soft sediment substrate, favoring hard substrate such as cobble and boulder fields or rock ridges (Love and Yoklavich, 2008). Juvenile cowcod are found in depths greater than 30 fm, and are vulnerable to recreational fishing gear (Love and Yoklavich, 2008; Dick et al., 2007).

Results of the 2009 data report indicate that cowcod are rebuilding, albeit slowly. Under Option 1, no changes to stock status or rebuilding progress are expected.

Socioeconomic Impacts under Option 1

Under Option 1, public comment submitted to National Marine Fisheries Service on the 2011-12 FEIS indicate that over 140 vessels from various ports in the SMA have been affected by the prohibition on shelf rockfish retention. Those communities include the following: Dana Point, Long Beach, Marina Del Rey, Mission Bay, Newport Beach, Oceanside, San Diego, San Pedro, Santa Barbara, Santa Monica, Santa Paula, and Temecula.

Those same public comments also spoke to the loss of trips and loss of revenue as a result of the CCA implementation and prohibition on shelf rockfish retention. Under Option 1, some loss to industry would be expected as a result of CCA implementation and prohibition on shelf rockfish retention, but that amount cannot be quantified at this time. The prohibition of shelf rockfish retention would likely result in increased operating costs to the industry. Trip durations would be increased because it takes longer for individuals to reach their bag limits as a result of discarding shelf rockfish. More time would be spent on the water, resulting in higher fuel costs and the overall number of trips could be reduced, resulting in lost income.

Fiscal Impacts under Option 1

Under Option 1, fiscal impacts to the state of California are high due to differing regulations inside and outside the CCA. Fiscal impacts include public outreach and education, enforcement, and regulation maintenance as a result of this regulatory complexity.

Option 2, Preferred: Allow retention of shelf rockfish in the recreational fishery, excluding bronzespotted, canary, cowcod and yelloweye rockfish, from 0-20 fm in the CCAs, when the season is open.

Under Option 2, the preferred option for 2012, retention of shelf rockfish in the recreational fishery will be permissible inside depths of 20 fm or less inside the CCA when the season for groundfish is open. Bocaccio, an overfished and desirable recreational species could be retained under this option[28]; retention of bronzespotted, canary, cowcod, and yelloweye bronzespotted rockfish will remain prohibited. No changes to commercial retention regulations are proposed and retention of all rockfish (except prohibited species) in the commercial fishery will be permissible within the depths and seasons open to groundfish fishing both inside and outside the CCA.

Change in Fishing Activity in CCAs Compared to Option 1

Groundfish fishing activity under Option 2 is expected to be similar to Option 1. It is highly unlikely that an overall increase in fishing effort in the entire SMA would result compared to Option 1 due to the remoteness of fishing locations (40 to 100 miles from port). As indicated by public testimony (see 2011-2012 FEIS), some increase could be realized but it is not clear whether it would be new effort or an effort shift from other areas outside the CCA. Non-groundfish fisheries target non-groundfish stocks; therefore no changes in non-groundfish trips are expected as a result of the groundfish regulation changes, compared to Option 1.

Change in Recreational Groundfish Catch in CCAs Compared to Option 1

If fishing effort and encounters with shelf rockfish, including bocaccio and cowcod, are similar to the catch under Option 1, allowing retention in this area will reduce the overall bycatch of shelf rockfish. The bycatch reduction would occur because fish previously discarded would be retained. However, it is assumed that not all shelf rockfish would be retained.

Data Uncertainty Compared to Option 1

Under Option 2, uncertainty associated with angler identifications of shelf rockfish are expected to decrease compared to Option 1. Instead of having to discard shelf rockfish species, anglers could retain them and identification could be verified by CRFS samplers. No changes to uncertainty associated with identifications to nearshore or overfished species are expected compared to Option 1.

Biological Impacts Compared to Option 1

[28] Anglers would still have to abide by current regulations, including sub-bag limit, size limit, and season restrictions.

Projected Impacts

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 2, the overall mortality of shelf rockfish could increase compared to Option 1 even though bycatch is reduced, whereas total mortality of nearshore rockfish, cabezon or greenling could be reduced because anglers may prefer to fill their 10 fish RCG bag limit with larger shelf rockfish species. This could result in high grading where smaller desirable fish are temporarily retained and discarded for the more prized catch (size or species).

Despite the increase in total mortality under Option 2, the risk of exceeding the recreational HG let alone the entire minor shelf rockfish ACL[29], is low. A doubling of total mortality from the entire SMA (both inside and outside the CCA), would still not likely result in the ACL being exceeded for the minor shelf rockfish complex (Table C-29). This event is not likely to occur because it would assume that the entire 10 fish RCG bag limit is filled solely by shelf rockfish and that angler effort both inside and outside the CCA increases. Changes of this magnitude based simply on allowing shelf rockfish retention inside 20 fm or less in the CCA are not realistic.

Table C-29. Estimated total fishing mortality of shelf rockfish south of 40°10' N. latitude assuming a doubling of recreational mortality in the Southern Management Area (south of 34°27' N. latitude) compared to the annual catch limit (ACL). (source: WCGOP and RecFIN)

Year	Recreational (mt)		Commercial (mt)	Total Mortality (mt)	ACL (mt)	% ACL
	40°10' - 34°27'	south of 34°27'				
2006	203	144	59	406	714	56.7%
2007	186	244	57	487	714	68.2%
2008	80	182	41	303	714	42.4%
2009	159	174	27	360	714	50.4%
2010	110	202	40	352	714	49.3%

Bocaccio

Under Option 2, some increase to bocaccio mortality would be expected as a result of allowing shelf rockfish retention inside 20 fm or less in the CCA, but the overall projected mortality will not change compared to Option 1. As discussed under Option 1, mortality attributed to inside the CCA are an overestimate because the model assumes the depth restrictions and retention requirements inside the CCA are the same as outside. Therefore, allowing retention of shelf rockfish inside the CCA may more closely align actual mortality with projected mortality.

Bocaccio mortality as a result of the incoming 2010 year class are expected to be the same as Option 1. If the year class is as strong as projected, any increase in mortality as a result of the year class and/or allowing shelf rockfish retention could still be accommodated without exceeding the recreational HG, let alone the entire ACL.

Cowcod

Under Option 2, no changes to projected mortality of cowcod are expected to occur compared to Option 1. Projected mortality of cowcod for the entire California recreational fishery under this option are 0.2 mt.

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[29] In September 2011, the PFMC limited the scope of harvest specifications for 2013-14 in order to more closely reflect those in place for 2012. Therefore, it is likely that the 2013-14 shelf rockfish ACL will be the same as in 2011-12.

Stock Status

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 2, no changes to individual stock status or complex status are expected compared to Option 1.

Bocaccio

Under Option 2, no changes to stock status or rebuilding progress are expected compared to Option 1.

Cowcod

Under Option 2, no changes to stock status or rebuilding progress are expected compared to Option 1.

Social-Economic Impacts compared to Option 1

Under Option 1, public comment submitted to National Marine Fisheries Service on the 2011-12 FEIS indicate that over 140 vessels from various ports in the SMA have been affected by the prohibition on shelf rockfish retention. Those communities include the following: Dana Point, Long Beach, Marina Del Rey, Mission Bay, Newport Beach, Oceanside, San Diego, San Pedro, Santa Barbara, Santa Monica, Santa Paula, and Temecula.

Those same public comments spoke to the loss of trips and loss of revenue as a result of the CCA implementation and prohibition on shelf rockfish retention. Under Option 2, some industry representatives indicate that profits of $25,000 to $50,000 (10 to 15 percent increase in revenue) could be expected by allowing shelf rockfish retention. Estimates of increased revenue (assuming 140 vessels) range from $3.5 million to $7 million.

Allowing retention of shelf rockfish could also reduce operating costs compared to Option 1. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Fiscal Impacts Compared to Option 1

Under Option 2, fiscal impacts to the state of California are expected to be less than Option 1. Public outreach and education, enforcement, and regulation maintenance will still be necessary, but outreach and education costs will be less due to the reduction in regulatory complexity.

Option 3: Align species retention and depth restriction regulations inside and outside the CCA when the season is open to fishing for groundfish species to reduce bycatch in the recreational fishery.

Under Option 3, there will be no difference in regulations inside and outside the CCA. Retention of all federal groundfish (including shelf and slope rockfish) and state-managed species in the recreational fishery will be permissible within legal depths when the season for groundfish is open. Bocaccio, an overfished and desirable recreational species could be retained under this option[30]; retention of bronzespotted, canary, cowcod and yelloweye rockfish will remain prohibited. No changes to commercial retention regulations are proposed and retention of all rockfish (excluding prohibited species) in the

[30] Anglers would still have to abide by current regulations, including sub-bag limit, size limit, and season restrictions.

commercial fishery will be permissible within the depths and seasons open to groundfish fishing both inside and outside the CCA.

Way points approximating the 60 fm depth contour inside the CCA do not currently exist in federal regulations and would need to be defined if this alternative is implemented in regulation.

Change in Fishing Activity in CCAs Compared to Option 1

Fishing activity under Option 3 is expected increase compared to Option 1. As indicated by public testimony (see 2011-2012 FEIS), some increase could be realized but it is not clear whether it is new effort or an effort shift from other areas outside the CCA. No changes in fishing effort for non-groundfish trips are expected compared to Option 1.

Change in Recreational Groundfish Catch in CCAs Compared to Option 1

Groundfish catch is expected to increase relative to Option 1 as a result of allowing retention of all groundfish species. Allowing retention of these species is expected to reduce bycatch of all groundfish species because fish previously discarded would be retained.

Data Uncertainty Compared to Option 1

Under Option 3, uncertainty associated with angler identifications of all federal groundfish species are expected to decrease compared to Option 1. Instead of having to discard all federal groundfish, anglers would be able to bring them to shore where identification can be verified by CRFS samplers. No changes to uncertainty associated with identifications to nearshore or overfished species are expected compared to Option 1.

Biological Impacts Compared to Option 1

Projected Mortality

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 3, the overall mortality of shelf rockfish could increase compared to Option 1 even though bycatch is reduced, whereas total mortality of nearshore rockfish, cabezon or greenling could be reduced because fishermen may prefer to fill their 10 fish RCG bag limit with larger shelf rockfish species. This could result in high grading where smaller desirable fish are temporarily retained and discarded for the more prized catch (size or species). Despite the increase in total mortality under Option 3, the risk of exceeding the recreational HG let alone the entire minor shelf rockfish ACL is low.

Other Federal Groundfish Species

Under Option 3, the overall mortality of other federal groundfish species is expected to increase compared to Option 1 because fish previously discarded would be retained. It is unknown whether a HG or ACL would be exceeded as a result of allowing retention.

Bocaccio

Under Option 3, some increase to bocaccio mortality would be expected as a result of allowing retention of all groundfish inside 60 fm or less in the CCA, but the overall projected mortality is not expected to change compared to Option 1. Any increase in mortality as a result of the 2010 year class could still be accommodated without exceeding the recreational harvest guideline, let alone the entire ACL.

Cowcod

Under Option 3, projected mortality of cowcod could be expected to be the same or higher than Option 1. Aligning the retention and depth restrictions inside and outside the CCA (as proposed under this alternative) could increase the likelihood of encounters with cowcod because they have higher encounter rates in deeper depths.

Any increase in mortality, if it does occur, would not cause the non-trawl allocation, let alone the entire ACL to be exceeded because a sufficient buffer exists between the projected mortality and the non-trawl allocation.

Stock Status

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 3, no changes to individual stock status or complex status are expected compared to Option 1.

Other Federal Groundfish Species

Other federal groundfish species consists of stocks with differing biological characteristics, life histories and habitat preferences. The following species or complexes would be included within the general grouping of other federal groundfish:

- Slope rockfish: aurora rockfish (*Sebastes 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*).
- Skates: big skate (*Raja binoculata*), California skate (*R.. inornata*), and longnose skate (*R. rhina*)
- Sharks: leopard shark (*Triakis semifasciata*), soupfin shark (*Galeorhinus zyopterus*), spiny dogfish (*Squalus sucklei*),
- Flatfish: Dover sole (*Microstomus pacificus*), English sole (*Parophrys vetulus*), petrale sole (*Eopsetta jordani*), arrowtooth flounder (*Atheresthes stomias*), and starry flounder (*Platichthys stellatus*)
- Other Flatfish: 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*).
- Other: finescale codling (*Antimora microlepis*), Pacific rattail (*Coryphaenoides acrolepis*), ratfish
- (*Hydrolagus colliei*), Pacific cod (*Gadus macrocephalus*), Pacific whiting (*Merluccius productus*), sablefish (*Anoplopoma fimbria*), and thornyheads (*Sebastolobus alascanus*, *S. altivelis*)

Although some of these stocks have been formally assessed, most have not; therefore it is unknown whether there would be any changes to individual stock status or complex status compared to Option 1.

Bocaccio

Under Option 3**,** no changes to stock status or rebuilding progress are expected compared to Option 1. Even if bocaccio mortality increases as a result of this alternative, rebuilding progress is not expected to be jeopardized because bocaccio is rebuilding quickly.

Cowcod

Under Option 3**,** some changes to stock status and/or rebuilding progress could be expected compared to Option 1. Increasing the depth restriction to 60 fm would allow access to potential cowcod habitat and be contrary to the intent of the CCA.

Social-Economic Impacts Compared to Option 1

Under Option 1, impacts to over 140 vessels in southern California resulting in foregone revenue of 3.5 million to 7 million dollars could be expected, whereas under Option 3 those losses would not be expected. Allowing retention of shelf rockfish could also reduce operating costs compared to Option 1. Individuals could reach their bag limits faster and with less discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Fiscal Impacts Compared to Option 1

Under Option 3, fiscal impacts related to the state of California are expected to be equal to or less than Option 1. Although there could be some reduction due to the decrease in regulatory complexity, there could be a subsequent increase due to new workload associated with implementing new RCA lines and educating the public about regulatory changes.

Option 4: Prohibition of All Groundfish in the CCA

Under Option 4, retention of all federal groundfish in the recreational fishery will be prohibited inside the CCA. No changes are proposed to retention of state-managed non-groundfish species (e.g., ocean whitefish, California sheephead) or to commercial fishery regulations. Retention of all rockfish (excluding prohibited species) in the commercial fishery will be permissible within the depths and seasons open to groundfish fishing both inside and outside the CCA.

Change in Fishing Activity in CCAs Compared to Option 1

Under Option 4, no change in fishing activity is expected compared to Option 1. CPFVs mainly travel to the CCA to specifically target non-groundfish species and those trips are still expected to occur even if all federal groundfish retention is prohibited.

Change in Recreational Groundfish Catch Compared to Option 1

Although recreational groundfish catch inside the CCA is expected to be less under Option 4, due to the prohibition on retention, it is not clear how groundfish catch will be affected in the entire SMA. Effort on nearshore rockfish, cabezon, and greenling, which previously occurred inside the CCA, could be directed outside. Fishing could continue inside the CCA for state-managed species. There may not be a change in overall catch compared to Option 1, just the location where that catch occurred.

Data Uncertainty Compared to Option 1

Under Option 4, uncertainty in species identification by anglers is likely to increase for all groundfish species because anglers targeting non-groundfish species may not pay close attention to or be able to identify what was discarded.

Biological Impacts Compared to Option 1

Projected Mortality

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 4, some reduction in total mortality for groundfish species would be expected compared to Option 1 because retained catch would be converted into discarded catch; conversely, discarding would increase compared to Option 1.

Bocaccio

Under Option 4, no changes to projected mortality are expected compared to Option 1 because retention of bocaccio would be prohibited under both options.

Cowcod

Under Option 4, no changes to projected mortality are expected compared to Option 1 because retention of cowcod would be prohibited under both options.

Stock Status

Minor Shelf Rockfish South of 40°10' N. latitude

Under Option 4, no changes to individual stock status or complex status are expected compared to Option 1.

Bocaccio

Under Option 4, no changes to stock status or rebuilding progress are expected compared to Option 1.

Cowcod

Under Option 4, no changes to stock status or rebuilding progress are expected compared to Option 1.

Socioeconomic Impacts under Option 1

Under Option 4, socioeconomic impacts are expected to be worse than Option 1.

C.12 Remove the California Recreational Bocaccio Size and Filet Limit

Overview

The recreational bocaccio fishery has been managed to a harvest guideline (HG) since the early 2000s, which is 131 mt in 2012; the presumptive harvest guidelines are expected to increase to 168 mt (2013) and 174 mt (2014; Table C-30). Bocaccio are the only rockfish subject to a recreational size limit, which is a 10 inch minimum size limit to protect recruiting juvenile fish (Table C-31). The majority of the bocaccio catch comes from the southern part of the state (south of Point Conception - 34°27’ N. latitude) where recreational anglers are allowed to access the shelf 10 months of the year to depths of 60 fm (360 feet).

The 10 inch minimum size limit and 5 inch filet limit was initially implemented in 2000 to protect juveniles from pier and jetty anglers during years of heavy recruitment. At that time, managers believed that bocaccio below that size, would have a high survival rate when caught in shallow water. However, the minimum size limit has been relatively ineffective in protecting juvenile fish even following good recruitment years (e.g., 2003, 2005 and 2009). Recent data suggest that there have been very few encounters of small bocaccio, and even fewer discards, suggesting that the size limit has been ineffective in reducing mortality by protecting juvenile fish.

Table C-30. 2012 Harvest specifications for bocaccio south of 40°10' N. latitude in metric tons, implemented in regulation.

Species	OFL	ABC	ACL	HG
Bocaccio	732	700	263	131

Table C-31. Recreational statewide management measures for bocaccio in California in 2012.

Bag Limit –2 fish w/in the 10 fish RCG complex bag limit
Size limit – 10 inch minimum size
Seasons and Depth Restrictions—Same as those for other rockfish and lingcod by Management Area

Management Issue:

Due to the need to protect overfished rockfish species, which resulted in limited access to deeper water, California's recreational fishery has been unable to attain their bocaccio HG in recent years (Table C-32).

Bocaccio has shown steady progress toward rebuilding under the current rebuilding plan. Application of the constant harvest rate in the current rebuilding plan corresponds with an ACL for 2013-2014 that is larger than the ACL in recent years. The Council proposes to remove the minimum 10 inch size limit and 5 inch filet limit for bocaccio and the additional projected mortality can be accommodated within the higher 2013-2014 ACLs and HGs.

Table C-32. West Coast Groundfish total mortality estimates of bocaccio south of 40°10' N. latitude (in metric tons) for the California recreational fishery compared to the harvest guideline from 2006-2010

Year	Total Mortality	HG	% of HG
2006	42.0	43.0	98%
2007	53.6	66.3	81%
2008	35.0	66.3	53%
2009	46.4	66.3	70%
2010	57.2	66.3	86%

Management Options

Option 1- No Action: Maintain the 10 inch minimum size limit and 5 inch filet limit

Under Option 1, the 10 inch minimum size limit and 5 inch filet limit would remain in place for all recreational anglers statewide and anglers would be forced to discard small fish. Regulatory complexity would continue and the regulation would continue to be ineffective in reducing mortality by protecting juvenile bocaccio.

<u>Biological Impacts under Option 1</u>

<u>Projected Mortality</u>

Table C-33 summarizes projected mortality of overfished species under Option 1 assuming a 10 inch minimum size limit. The projected mortality of bocaccio under Option 1 is 50.7 mt, or approximately 39 percent of the HG. Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, under Option 1 some increased encounter rate (and discarding) would be expected, although the amount cannot be quantified. In its report under Agenda Item E.4.b (November 2011), the Groundfish Management Team concluded that any increase in bocaccio catches in 2013, as a result of the 2010 year class, is not expected to exceed the 2011 California recreational harvest guideline (131 mt). If the 2010 year class is not as strong as projected, mortality under No Action would likely be similar to previous years.

Table C-33. Projected mortality of overfished species under Alternative 1

Species	Projected Mortality (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

Stock Status

Declared overfished in 1999, bocaccio are one of the larger rockfish in southern California. Pelagic bocaccio young-of-year typically recruit to shallow habitats and sub-adult bocaccio are more common in shallower water than adults and are commonly found around piers and other shore structures. Adult bocaccio are typically found in a broad range of habitats and depths, and can develop large mid-water aggregations; high densities tend to be more associated with more complex substrates. As with many other shelf species of rockfish, there is a clear trend towards larger fish at greater depths. Adults are highly sedentary and exhibit some ontogenetic movement to greater depths which is common for most shelf species (Field et al, 2009).

Results of the current assessment indicate that bocaccio is rebuilding quickly. Under Option 1, no changes to stock status or rebuilding progress are expected.

Socioeconomic Impacts

Currently, bocaccio is the only rockfish species in the recreational sector that has a minimum size limit. Since there are numerous recreational regulations to remember, having an additional size limit adds to the regulatory complexity. Removing the bocaccio size limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Option 2, Preferred: Remove the 10 inch minimum size limit and the corresponding 5 inch filet limit

The Council is proposing to remove the minimum size limit of 10 inches and 5 inch filet limit. Recreational anglers would be allowed to retain all bocaccio regardless of size under this alternative, while abiding by current depth and season restrictions. This action would reduce regulatory complexity and the overall mortality of bocaccio is expected to be minimal. No additional mortality of other overfished species is expected.

Methodology:

Length data from the California Recreational Fisheries Survey (CRFS) from 2005 to 2010 was used to analyze the projected mortality of bocaccio as a result of removing the recreational size limit; both raw sample and estimate data were used. Total lengths from 13,975 bocaccio (retained and released) were measured; fish less than 10 inches comprised 19 percent (57 fish) of all discards and 0.5 percent (73) of retained fish (Table C-34). The length frequency distribution of the released bocaccio from 2005 to 2010 is shown in Figure C-6.

The increase in mortality as a result of this analysis was calculated by determining the percentage of fish less than 10 inches (by weight) of all discarded fish. That percentage was applied to the total estimated weight of B2 fish, to determine an overall percent increase in the total catch estimate (A+B1+B2 fish)[31] that would be expected by removing the minimum size limit. For a full description of the methodology refer to Appendix A.

Table C-34. Summary of bocaccio length data (in numbers of fish) from 2005 to 2010 (source: CFRS data)

	Discarded	Retained	Total
All lengths	298	13,677	13,975
Less than 10 in.	57	73	130
% 10 inch	19%	0.5%	0.9%

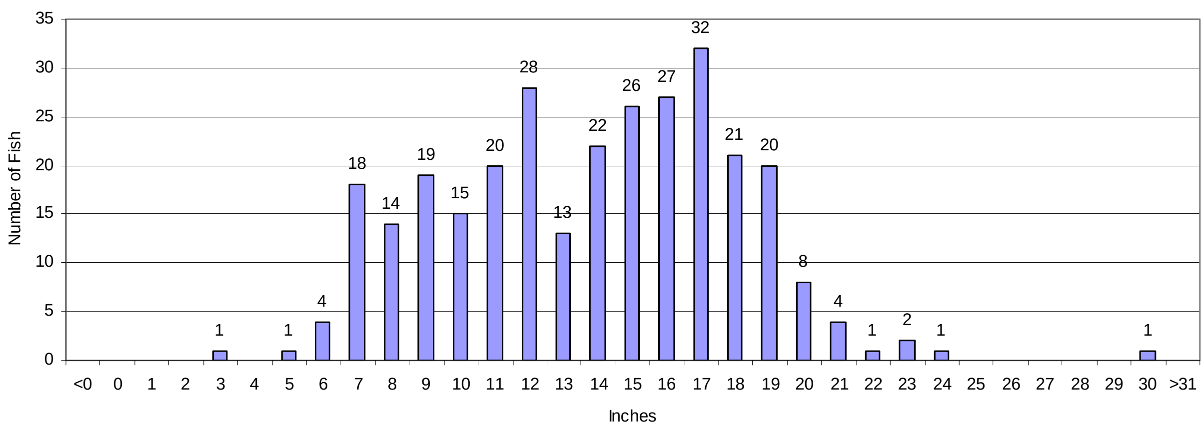

Figure C-6. Length frequency distribution of released bocaccio from 2005 to 2010

<u>Biological Impacts under Option 2</u>

<u>Projected Impacts</u>

Under Option 2, removing the size limit is only expected to increase total bocaccio mortality by 0.36 percent (0.2 mt) compared to Option 1. The total projected mortality, under this alternative, is 50.9 mt. No additional mortality to any overfished groundfish species is expected with this Option.

The Council is also proposing two additional changes to management measures in the recreational fishery related to bocaccio – increasing the sub-bag limit and allowing retention of shelf rockfish (including bocaccio) inside the Cowcod Conservation Area. The cumulative mortality of all of these proposed changes are not expected to exceed the harvest guideline or ACL.

[31] A fish include sampled dead fish, B1 fish includes both fillets and fish thrown back, and B2 fish includes mainly live fish in excess of bag limits or undersized fish

Table C-35. California recreational projected mortality of bocaccio for 2013-2014, including changes as a result of the proposed action.

	Option 1:	Option 2:
Projected Impacts (mt)	50.7	50.9
Percent of Option 1 HG	39%	39%

Stock Status

It is unlikely that there would be any changes to the stock status of bocaccio under Option 2 since mortality is projected to be within the ACL. Under Option 2, no changes to stock status or rebuilding progress are expected.

Socioeconomic Impacts of Option 2

Currently, bocaccio is the only rockfish species in the recreational sector that has a minimum size for retention. Removing the size restriction for bocaccio would reduce regulatory complexity on a recreational fishery that already has many regulations.

C.13 Sablefish Trip Limits

Overview

The following section discusses catch projection and trip limit analyses for the four fixed gear, daily trip limit (DTL) fisheries, including both limited entry (LE) and open access (OA), north and south of 36° N. lat. for 2011. Hereafter, they will be referred to as follows: LE North, LE South, OA North, and OA South. Proposed trip limits for 2013 and 2014 in the fixed gear sablefish DTL fisheries were produced through iteration using GMT catch projection models (models described briefly below, and in detail in the 2011-2012 SPEX EIS).

Management Issue

Proposed trip limit reductions or increases are considered to bring projected catch to within new management targets, resulting from changes to the sablefish ACLs for the areas north and south of 36° N. lat. Landings projections were approximately 91 percent of the landings target, in order to produce trip limits which are likely to result in full attainment of harvest guidelines, while providing sufficient catch buffer, appropriate for the uncertainty in accuracy of estimated landings data, and normal uncertainty associated with statistical model projections. This strategy was supported by the Council in establishing sablefish DTL trip limits for 2012, in the November, 2011 Council meeting.

Management Options

For 2013, in the LE North fishery, proposed trip limits for 2013 were reduced to approximately 85 percent of No Action levels; for the OA North fishery, proposed trip limits were reduced to 68 percent of No Action. In the area south of 36° N. lat., harvest guidelines were higher than No Action (due to a slightly higher sablefish ACL for 2013 and 2014 in this area). For LE South, proposed trip limits were 104 percent of no action; for OA South, 108 percent. Trip limits for 2014 were slightly higher than for 2013 (2 to 5 percent higher) across all four sablefish DTL fisheries, due to higher ACLs in 2014.

Comparison of the Management Options

Analytical Description

The purposes of this analysis are to compare predicted landings between the No Action Alternative management measures and the action alternatives (i.e., Alternatives 1-8), under their resultant regional allocations, and fishery harvest guidelines, for the four fixed gear, sablefish daily trip limit (DTL) fisheries, including limited entry (LE) and open access (OA), both north and south of 36° N. lat.

The ACLs, regional allocations, and fishery landing targets (LTs) only vary between the No Action Alternative and the remaining alternatives, within each year. Levels of these three harvest control points vary only between years (2013-2014), and between No Action and all other alternatives. Within this analysis, "harvest guidelines" is defined as numerical management harvest objectives which are not quotas. These are either cited in regulation or calculated from other higher level numerical management objectives appearing in regulation. These harvest guidelines were reduced to account for discard mortality, the method and rationale for which is described below, to produce "landings targets", which were used in projection modeling to predict landings, and determine necessary trip limits.

Model Description

The catch projection models used in this analysis are linear regression models that relate trip limits to monthly or bimonthly landings, separately for each fishery. Detailed descriptions of the models can be found in Appendix A. of the 2011-2012 harvest specifications EIS.

Limited entry models were specified as described in the 2011-2012 EIS. Minor differences in model specification were made in the open access models for 2013-2014. Sablefish ex-vessel revenue and fuel prices were removed as predictor variables in the open access north and south models. Although these variables present a meaningful picture in retrospect, when their historical values are known, they do not provide valuable information for making projections of future catch, since fuel prices and sablefish prices in the future are not known, are subject to substantial variability, and either assumptions or projections must be made about these would-be predictor variables themselves. Error in assumptions regarding future values of these variables introduces bias and substantially affects accuracy of projections; using them inflates apparent accuracy and precision, producing unrealistically high multiple-R^2 values and low standard errors for the regressions. Trip limits, on the other hand, are known (are set by the Council process), and their use for projecting catch into the future presents a realistic picture of uncertainty. Data from years 2004-2006, when there was extremely small variation in trip limits, and provided little information content for the model, were removed from the OA South model, and resulted in increased model fit.

Model Input Data

Landings and catch data were acquired from PacFIN using the query "slct_ves_sabl_arid_DTL_no_EFP.sql". As described in the GMT inseason statements from the April, June, September, and November 2011 Council meetings, data from this query were found this year to have two substantial problems, both of which were corrected before use in the analysis for these harvest specifications. First, historical landings of sablefish with fixed gear, in the LE North, DTL fishery were substantially underestimated from 2004 through 2011, as the software in the PacFIN database which estimates division of fixed gear sablefish landings between the sablefish primary fishery and DTL fisheries was malfunctioning. The software has since been modified to make the most accurate division of catch between the two fisheries which is currently possible, and the GMT and Council are working on a long-range solution that would provide direct catch accounting, which would replace the currently necessary computational estimation procedure. Second, gear-switching provisions under IFQ lead to misattribution of IFQ landings of sablefish using fixed gear, to the various sablefish DTL fisheries. This has also been corrected, and screening procedures have been put in place both in PacFIN and with the states to flag and remove IFQ fish tickets from the “slct_ves_sabl_arid_DTL_no_EFP.sql” query for the sablefish DTL projection models.

Accounting for Discards and Discard Mortality

Landings targets which appear in this section have been reduced from harvest guidelines that would appear in regulation, where applicable, in order to account for discard mortality. The harvest guideline (a specified numerical harvest objective that is not a quota) was multiplied by 15.9% (discard rate estimate), and by 20% (discard mortality rate estimate), and then that product (estimated dead discarded sablefish) was subtracted from the harvest guideline, resulting in a “landings target”, which projected landings should be beneath, in order to keep total catch within the harvest guideline. The estimated discard rate used by GMT was taken from the 2010 West Coast Groundfish Observer Program (WCGOP) Total Mortality Report. In the 2009-10 management cycle, the discard rate estimate was the same, and was derived from data in the 2007 WCGOP Total Mortality Report, which was the most recent available data at that time. That discard mortality rate estimate was taken from information in Davis (2001, LTtp://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2001.tb00495.x/abstract), Schirripa and Colbert (2005, LTtp://www.pcouncil.org/wp-content/uploads/Sable05_complete.pdf), and Schirripa (2007, LTtp://www.pcouncil.org/wp-content/uploads/Sable07v3_0.pdf). Schirripa (2005) used experimental data and sea surface temperature to predict varying release mortality by gear. The GMT considered that Davis (2001) demonstrated high sensitivity to temperature and deck time, along with high variability of predicted discard mortality in Schirripa (2005) informed by sea surface temperature data, and adopted an estimate of 20%. This value was also adopted by Taylor 2011 in the current sablefish stock assessment.

Results - No Action Alternative

Under No Action, the following Rockfish Conservation Area boundaries for use of fixed gear, from 2012 regulations, would remain in place for 2013 and 2014 (Table C-36).

Table C-36. Rockfish Conservation Area (RCA) boundaries for fixed gear, under the No Action Alternative.

Area	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
North of 46° 16'	shore - 100 fm					
45° 03’ 83” - 46° 16’	30 - 100 fm					
43° - 45° 03’ 83”	30 - 125 fm (125 line reduced to 100 fm during directed halibut season)					
42° - 43°	20 - 100 fm					
40° 10’ - 42°	20 fm depth contour - 100 fm					
34° 27’ - 40° 10’	30 fm - 150 fm line					
South of 34° 27’ (w/islands)	60 m - 150 fm line					

Projected Landings (No Action)

Projected landings under the No Action Alternative are presented in Table C-37 under the limits in Table C-38. The GMT and the Council considered, while constructing and adopting them, respectively, the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings) along with the normal uncertainty associated with projection models, the No Action trip limit structures for 2012 for each fishery presented here. The No Action Alternative resulted in projected attainments in the range of 91% to 93%, aiming to enable harvest of a high proportion of the HG, yet accommodating previously described uncertainty.

Table C-37 Model-projected landings compared to the landing target under the No Action Alternative, for the fixed-gear, sablefish, DTL fisheries. Landings targets and projected landings are in metric tons (mt) of landed catch.

Fishery	Area	Projection (mt)	Landing Target (mt)	% of LT
LE N.	North of 36° N. lat.	242	265	91%
OA N.	North of 36° N. lat.	381	419	91%
LE S.	South of 36° N. lat.	353	380	93%
OA S.	South of 36° N. lat.	284	309	92%

These trip limits can be adjusted inseason as needed to influence higher or lower catch as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure (which was appreciated by the GAP, in their statement, in the November 2011 Council meeting), and to avoid starting the year with highly variable trip limits, such as resulted from the "rolling over" of 2010 trip limits into 2011, due to unforeseeable delays in implementation.

Table C-38. Trip limits for sablefish DTL fisheries under No Action.

<table>
<tr><th>Area</th><th>Fishery</th><th>Jan-Feb</th><th>Mar-Apr</th><th>May-Jun</th><th>July-Aug</th><th>Sept-Oct</th><th>Nov-Dec</th></tr>
<tr><td rowspan="2">North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)</td><td>LE N.</td><td colspan="6">1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.</td></tr>
<tr><td>OA N.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 900 lb., not to exceed 1,800 lb. per 2 mo.</td></tr>
<tr><td rowspan="2">South of 36° N. lat.</td><td>LE S.</td><td colspan="6">1,800 lb. per week</td></tr>
<tr><td>OA S.</td><td colspan="6">300 lb. per day, or 1 landing per week of up to 1,350 lb., not to exceed 2,700 lb. per 2 mo.</td></tr>
</table>

Action Alternatives for 2013

Projected landings under the action alternatives are presented in Table C-39 under the trip limits Table C-40. As with the No Action Alternative, we considered the uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The action alternative limits result in projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2013 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the action alternatives (i.e., alternatives other than No Action), within each year.

Table C-39. 2013 Model-projected landings under the action alternatives for the limited entry and open access fixed-gear sablefish DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt) of landed catch.

Fishery	Area	Alternatives Projection (mt)	Landing (mt)	% of LT
LE N.	North of 36° N. lat.	179	197	91%
OA N.	North of 36° N. lat.	266	291	91%
LE S.	South of 36° N. lat.	405	446	91%
OA S.	South of 36° N. lat.	330	362	91%

Projected landings under the action alternatives were lower than No Action for the LE North and OA North fisheries (74 percent and 70 percent of No Action, respectively), and higher than No Action for the LE South and OA South (115 percent and 116 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table C-40 and Figure C-7.

Table C-40. 2013 Model-projected landings under the action alternatives compared to No Action for the fixed-gear sablefish DTL fisheries for 2013. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	Alternatives Projection (mt)	No Action Projection (mt)	% of No action
LE N.	North of 36° N. lat.	179	242	74%
OA N.	North of 36° N. lat.	266	381	70%
LE S.	South of 36° N. lat.	405	353	115%
OA S.	South of 36° N. lat.	330	284	116%

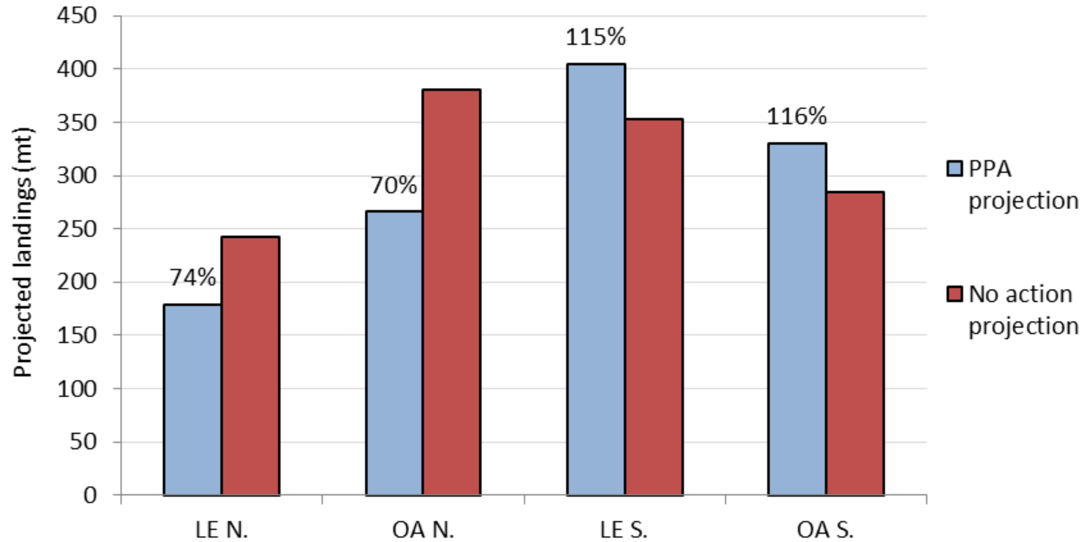

Figure C-7. Projected landings for 2013 under the preferred and No Action alternatives, for the four fixed gear, sablefish, DTL fisheries. Column labels show the projection for the preferred alternative as a percentage of No Action.

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table C-40), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 800 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 290 pounds per week and 580 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 80 pounds per week was possible in the LE South fishery, while an increase of 110 pounds per week and 220 pounds per bimonthly period was possible in the OA South fishery.

Table C-41. 2013 Proposed trip limits for 2013 in sablefish DTL fisheries under the preferred alternative, and alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,880 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.					

Action Alternatives for 2014

Projected landings under the actions alternatives for 2014 are presented in Table C-42. As with the No Action Alternative, we considered uncertainty in the landings data seen during 2011 (in terms of correctly separating sablefish primary fishery landings from DTL landings, and separating new IFQ fixed gear landings from DTL landings), along with the normal uncertainty associated with projection models, when constructing the trip limit structures for 2013 for each fishery presented here. The action alternatives for 2014 results in projected attainments of 91%, aiming to enable harvest of a high proportion of the LT, yet accommodating previously described uncertainty. These trip limits can be adjusted inseason as needed to influence higher or lower landings as 2014 progresses. We strove to present trip limits with a predictable and temporally even structure, using the same rationale as for No Action. Landings targets for each fishery are equal for the action alternatives, within each year.

Table C-42. Model-projected landings under the Action Alternatives in the fixed-gear sablefish DTL fisheries for 2014. Landings targets and projected impacts are in metric tons (mt) of landed catch.

Fishery	Area	Projection (mt)	Landing Targets (mt)	% of LT
LE N.	North of 36° N. lat.	194	214	91%
OA N.	North of 36° N. lat.	290	319	91%
LE S.	South of 36° N. lat.	441	483	91%
OA S.	South of 36° N. lat.	359	393	91%

Projected landings under action alternatives were lower than No Action for the LE North and OA North fisheries (80 percent and 76 percent of No Action, respectively), and higher than No Action for the LE South and OA South (125 percent and 126 percent, respectively), covarying with changes to the area-specific sablefish ACLs in 2013; see Table C-43 and Figure C-8.

Table C-43. Model-projected landings under the action alternatives compared to No Action in the fixed-gear, sablefish, DTL fisheries for 2014. Landings targets and projected landings are in metric tons (mt).

Fishery	Area	Alternatives Projection (mt)	No action projection (mt)	% of No act.
LE N.	North of 36° N. lat.	194	242	80%
OA N.	North of 36° N. lat.	290	381	76%
LE S.	South of 36° N. lat.	441	353	125%
OA S.	South of 36° N. lat.	359	284	126%

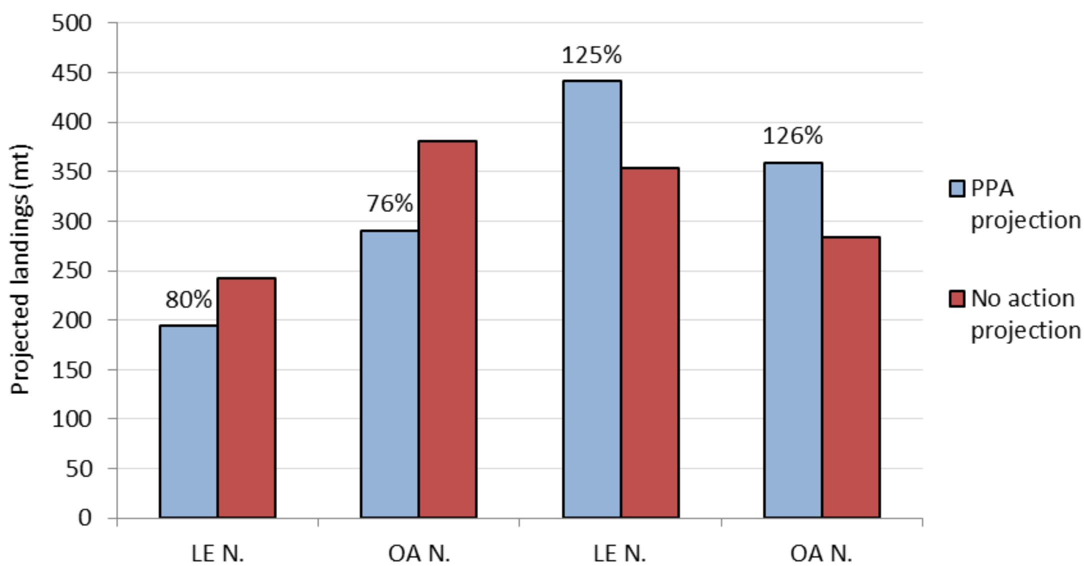

Figure C-8. Projected landings for 2014 under the Action Alternatives and No Action, for the four fixed gear, sablefish, DTL fisheries. Column labels show the projection under the preferred alternative as a percentage of No Action.

Table C-44. Proposed trip limits for 2014, in sablefish DTL fisheries under the action alternatives, other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N	1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.					
	OA N	300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.					
South of 36° N. lat.	LE S	1,930 lb. per week					
	OA S	300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.					

The proposed trip limits which informed the above landings projections were reduced accordingly in the North, compared with No Action, and increased in the South, compared with No Action (Table C-43), to keep catch within the LTs. For the LE North, weekly trip limits needed to be reduced by 200 pounds per week, and bimonthly limits by 600 pounds, to maintain a similar rate of attainment as in the No Action Alternative. For the OA North, a reduction of 225 pounds per week and 450 pounds per two months was necessary.

For the area south of 36° N. lat., an increase to trip limits of 130 pounds per week was possible in the LE South fishery, while an increase of 175 pounds per week and 350 pounds per bimonthly period was possible in the OA South fishery.

Biological and Socioeconomic Impacts of Inseason Adjustments

As noted previously, these trip limits under any alternative would be adjusted inseason as needed to influence higher or lower catch as 2013 or 2014 progresses; the aim of such adjustments is to attain the annual harvest guideline. No substantial biological or socioeconomic effects are expected from routine inseason adjustments during a year-round fishery, since the goal is ultimately to either enable or restrict the fishery to take a predetermined amount of sablefish in a given one year period. If catch were to progress too quickly, faster than trip limit adjustments could curb it, this could result in a fishery closure near the end of the year, to limit catch to within the harvest guideline. However, a year-round fishery is a primary management goal for all the fixed gear, sablefish DTL fisheries; closures can disrupt the incomes of participants, and flow of revenue from participants through communities. Even in the event of a closure of one fishery, fishers can often participate in another DTL fishery which remains open. One example is that if the LE North fishery were closed, some of those former participants may decide to fish in the OA North fishery. Another example would be if a fisher's home port was close to the 36° N. lat. boundary, they may wish to participate in a sablefish DTL fishery on the other side of the boundary, or in another fishery for a different species, such as winter Dungeness crab, etc.

Since ex-vessel prices for fixed gear caught sablefish tend to be highest in the fall of each year (September and October), and participation and catch are also highest during this season for most of the four DTL fisheries, trip limit changes during this time are expected to have a larger effect on attainment and revenue than trip limit changes during other months. Sablefish spawn in the late fall through winter, at depths greater than 150 fm. Changes in catch, seaward of the current fixed-gear RCA during this season, therefore, could affect recruitment, if it changed the catch rate for gravid females, for example.

Results from future sablefish stock assessments would indicate if seasonal changes in trip limits resulted in greater harvest of the spawning females and whether recruitment was affected. Such information could be considered in the seasonal design of future trip limits.

C.14 Regulatory fix: threshold for switch from sablefish primary fishery to DTL fishery

Overview

The Groundfish Management Team (GMT) reviewed Council guidance under Agenda Item G.7, in the November Council meeting: Inseason Adjustments Part II, and provided the following considerations relative to the limited entry fixed gear (LEFG) sablefish fishery north of 36° N. lat.

As per Council discussion, the GMT is addressing the subject of finding a remedy to the unforeseen complications to the LEFG sablefish primary fishery north of 36° N. lat., resulting from elimination of the daily trip limit in the sablefish DTL fishery in the same area. It recently came to the attention of NMFS, enforcement, the GMT, and the Council that elimination of the daily trip limit, at the request of the GAP, and following analysis by the GMT in 2009, caused the unintended consequences of impacting the amount of sablefish that primary fishery participants are allowed land, as they conclude fishing on their tier limits.

Some clarifications are in order on this somewhat complex regulatory topic. While the daily trip limit was in effect, it served a second regulatory purpose, in addition to the obvious one of a daily limit for the DTL fishery; it also served as the poundage threshold, which determines when the fixed gear, sablefish landings of a sablefish primary fishery participant begin being counted as DTL landings, and become subject to those trip limits.

Specifically, if after a delivery, a primary fishery participants remaining tier amount (sum of tier endorsements on the participant’s vessel, minus all pounds fished on those endorsements) was less than the daily trip limit amount, all subsequent fixed gear sablefish deliveries by the vessel would be attributed to the DTL fishery. Additionally, any remaining tier amount after this time would be forfeited. The daily limit, when it was in place, was either 300 or 500 pounds. In this case, in the absence of a daily trip limit, “an amount that is smaller than the DTL amount” is interpreted for enforcement purposes to mean an amount that is smaller than the weekly limit, which is currently 1,300 pounds, under the No Action Alternative. This is a substantial complication for the primary fishery participants, and means that they must make their final landing within 1,300 pounds, rather than 300 or 500 lbs.

For example, if 2,200 pounds were remaining on one’s tier limit, the fisher could land 1,000 pounds in one trip, and be required to forfeit the remaining 1,200 pounds of the tier limit. Subsequently, that vessel’s participation in the primary fishery would conclude for the season. Any subsequent landings of sablefish with fixed gear by that vessel would be subject to the DTL fishery regulations. Once a vessel that is eligible to participate in the sablefish primary fishery makes the switch into the DTL fishery, it cannot return to the primary fishery, according to Federal regulations at 50 CFR 660.232(a)(2).

That regulation states:

> *“A vessel that is eligible to fish in the sablefish primary season may fish in the DTL fishery for sablefish once that vessels' primary season sablefish limit(s) have been taken, or after the close of the primary season, whichever occurs earlier.* ***Any subsequent sablefish landings by that vessel will be subject to the restrictions and limits of the***

> ***limited entry DTL fishery for sablefish for the remainder of the fishing year***. [emphasis added]."

It also states:

> *"No vessel may land sablefish against both its primary season cumulative sablefish limits and against the DTL fishery limits within the same 24 hour period of 0001 hours local time to 2400 hours local time. If a vessel has taken all of its tier limit except for* ***an amount that is smaller than the DTL amount****, that vessel's subsequent sablefish landings are automatically subject to DTL limits* [emphasis added]."

In this case, in the absence of a daily trip limit, "an amount that is smaller than the DTL amount" is interpreted to mean the weekly limit currently in place. If the fisher were unaware of the enforcement of the weekly-limit threshold, or didn't plan carefully for it, they could unintentionally forfeit close to the full weight weekly limit. At current sablefish ex-vessel prices, this would represent substantial lost revenue by the participant.

Management Issue

The elimination of the daily trip limit in the LEFG sablefish DTL fishery, north of 36° N. latitude., at the request of the Groundfish Advisory Subpanel (GAP) and analysis of the GMT in 2009, caused the unintended consequences of impacting the amount of sablefish that LEFG primary fishery participants north of 36° N. latitude are allowed to land as they conclude fishing on their tier limits.

Management Options

No Action: (Regulations at 660.232.a.3.)

> *"If a vessel has taken all of its tier limit except for* ***an amount that is smaller than the DTL amount****, that vessel's subsequent sablefish landings are automatically subject to DTL limits* [emphasis added]."

Proposed Action: The proposal is to add the following language to regulation, immediately following the excerpt from the No Action Alternative.

> *"In the absence of a daily limit, 300 pounds would serve as a proxy for the daily limit ("the DTL amount"), only acting as the threshold to facilitate the transition of a vessel from participation in the sablefish primary fishery, to the sablefish DTL fishery."*

We propose that 300 pounds should be this amount, as it was the most common daily trip limit in this fishery over the past seven years, and would give maximum access of a fisher to their tier pounds. Out of the 80 months between January 2003, through August of 2009, in which a daily trip limit was in place for the LE North sablefish DTL fishery, in 68 of those months a daily limit of 300 pounds was in place, and during the other 12 months, a limit of 500 pounds was in place. The 500 pound limit was put in place to enable higher harvest of DTL sablefish, rather than to limit access to tier limit (primary fishery) poundage.

Alternatively, the threshold for transitioning from the sablefish primary fishery to the DTL fishery could be permanently set to 300 pounds, regardless of what the daily limit in the DTL fishery north of 36° N. lat. might be, whether or not a daily limit was in place.

Comparison of Management Options

To review, in the 660.232.a.3 (above), the “DTL amount” refers to the daily trip limit which is currently in regulation. It is also used to establish the threshold for a sablefish primary tier fisher transitioning from the primary to DTL fishery, upon exhausting his/her tier pounds. When no daily limit is specified in regulation, enforcement officials must implement the weekly limit for the transition instead, which is much larger, and this often leads to the unintentional forfeiture of fish, as described above. Since the daily trip limit was eliminated in this fishery, the proportion of the primary share that went unharvested has been larger than when there was a daily trip limit in place. In 2009 through 2011, an average of 6.7 percent of the primary landed share has been left unharvested, compared with 4.7 percent during the five previous years (2004 through 2008).

Biological Impacts

It is possible that a greater amount of the sablefish ACL will be attained under the proposed action since fewer fish with be left in the tier fishery. The biological impacts associated with harvest at the ACL level are discussed in Section 4.1.

Socioeconomic Impacts

If the No Action Alternative were left in place, it is probable that the amount of unharvested sablefish in the primary tier fishery would remain higher than when there was a daily trip limit in this fishery. It is the intent of the regulations that the primary landed share be harvested, which provides a greater economic benefit compared to No Action. The action alternative would allow fishermen to harvest a greater amount of sablefish and associated revenue in the tier fishery before switching into the DTL fishery.

C.15 Blackgill Rockfish South of 40°10 N. Latitude Management Measures

Overview

For 2011-12 groundfish fisheries, blackgill rockfish have been managed as part of the overall southern slope rockfish complex and its harvest specifications have contributed to the complex as a whole (Table C-45). Although blackgill rockfish south of 40°10 N. latitude was assessed previously, species-specific harvest specifications were never defined in federal regulation. That is, it was never given its own overfishing limit (OFL), acceptable biological catch (ABC), or annual catch limit (ACL). Targeting of blackgill rockfish occurs in all commercial fisheries south of 40°10' N. latitude Blackgill rockfish management measures are detailed in Table C-46.

Table C-45. 2012 Harvest Specifications for Minor Slope Rockfish Complex south of 40°10' N. latitude in Metric Tons, Implemented in Regulation.

Species	OFL	ABC	ACL
Minor Slope Rockfish South	903	832	626

Table C-46. Blackgill Rockfish Management Measures for the 2012 Groundfish Fisheries, south of 40°10' N. latitude.

Fishery	
Commercial	No sorting requirement for all commercial landings
--Limited Entry Trawl	Managed under slope rockfish IFQ
--Limited Entry Fixed Gear	Bi-monthly limit management under slope rockfish complex. Current limits south of 40°10' N. latitude are: Periods 1-6: "*40,000 lb/2 months slope rockfish & darkblotched rockfish*" Bi-monthly limits can be adjusted through routine inseason action.
--Open Access	Bi-monthly limit management under slope rockfish complex. Current bi-monthly limits by area are: <u>40°10' N. latitude to 38° N. latitude</u>: Periods 1-6: "*slope rockfish & darkblotched rockfish - Per trip, no more than 25% of weight of the sablefish landed*" <u>South of 38° N. latitude</u>: Periods 1-6: "*10,000 lb/2 months slope rockfish & darkblotched rockfish*" Bi-monthly limits can be adjusted through routine inseason action.

<u>Management Issue</u>

An assessment was performed for blackgill rockfish for use in the 2013-2014 management cycle. Although the 2011 blackgill rockfish assessment indicated that historical catches have been higher than the proposed OFL and ABC contributions to the complex for 2013-2014, they never exceeded the historical contribution to the complex.

Total catch data (landings plus discard) by sector from the West Coast Groundfish Observer Program Total Mortality Reports in recent years (2006-2010) can be found in Table C-47.

Table C-47. West Coast Groundfish Total Mortality Estimates in Metric Tons by Sector for Blackgill Rockfish from 2006-2010.

Year	Trawl	Non-Trawl	Other	Total Mortality
2006	65.7	57.0	0.4	123.1
2007	28.6	19.0	3.2	50.8
2008	35.6	21.3	14.8	71.7
2009	48.0	84.6	3.4	136.0
2010	61.4	84.6	6.3	152.3

The Council's preferred OFL and ABC blackgill contribution to the complex is in Table C-48. Given that blackgill stock is below 40 percent depletion, a 40-10 adjustment was applied to its contribution to the complex.

Table C-48. Preferred Component OFLs and ABCs for Blackgill Rockfish south of 40º10' N. latitude in Metric Tons.

Year	OFL	ABC
2013	131	119
2014	134	122

The estimated mortality provided by WCGOP for blackgill rockfish from 2006-2010 would have exceeded the blackgill component OFLs in 2009 and 2010 (Table C-47, compared to Table C-48).

Management Options

The options before the Council at the September and November 2011 Council meetings were whether to 1) continue status quo management of blackgill rockfish within the minor slope rockfish complex, 2) continue managing blackgill rockfish within the minor slope rockfish complex south and implement a harvest guideline, or 3) remove blackgill rockfish from the minor slope rockfish south complex and manage it with stock specific harvest specifications.

Option 1, No Action – Manage Blackgill Rockfish within the Minor Slope Rockfish Complex (south of 40°10′ N. latitude)

Under Option 1, blackgill rockfish would continue to contribute to the harvest specifications for the minor slope rockfish south complex; no Federal sorting requirement would be implemented. The blackgill rockfish contribution would be based on the results from the 2011 stock assessment. The management measures outlined in Table C-46 would remain in place and some could be modified inseason through routine management measures to slow landings if necessary.

Although there is no Federal requirement to sort blackgill rockfish to individual species under Option 1, existing regulations in California require the species, not the complex, be reported on fishtickets (Fish & Game Code sections 8043 and 8045). From 2005-2011, an average of 13 percent of the fish tickets reported data at the complex level, instead of the species level. In recent years (2009-2011), the average has declined to 9 percent. However, the slope rockfish category is the most commonly used. Blackgill rockfish are easy to identify and are more valuable compared to other slope rockfish; therefore individual sorting of blackgill rockfish is expected to continue under Option 1.

Under Option 1, the following management measures would be available by fleet to control catches of blackgill rockfish within the minor slope rockfish complex, if necessary.

<u>Limited Entry IFQ</u>

The total catch of blackgill rockfish taken in the IFQ fishery will count against the slope rockfish south of 40°10' N. latitude IFQ. One measure available to the IFQ fishery to reduce the catch of blackgill rockfish would be an adjustment to the seaward boundary of the RCA (trawl and non-trawl RCAs are currently at 150 fm). Because blackgill rockfish are most abundant from 160 to 270 fm, it is probable that to effectively reduce blackgill rockfish mortality, the RCA would have to be moved to depths that would effectively eliminate all slope rockfish opportunities, which would adversely affect the IFQ fishery. Voluntary avoidance by the fleet has proven successful in the whiting fishery and could be requested for slope rockfish to reduce blackgill rockfish encounters.

<u>Non-Trawl</u>

In the limited entry (LE) and open access (OA) fisheries, blackgill rockfish is included within the aggregate slope rockfish bi-monthly limits. Under current regulations, the slope rockfish bi-monthly limits outlined in Table C-46 could be taken entirely of blackgill. The only measures available to these fisheries to slow blackgill rockfish catches under Option 1 is to adjust the seaward boundary of the RCA (similar to the IFQ fishery), voluntary avoidance, or reductions in bi-monthly limits. Any reductions to bi-monthly limits would be applied to the aggregate slope rockfish limit and would likely be severe (because it would apply to the entire slope complex, not just blackgill rockfish) and would limit access to other healthy slope rockfish species. A two meeting process could be undertaken during 2013-2014 to establish a HG, sorting requirement, and species-specific trip limits, if needed.

Biological Impacts

Projected Impacts

Although projected catches for blackgill rockfish could exceed the blackgill rockfish contribution to the minor slope rockfish complex under Option 1, the overall slope rockfish complex harvest specification would not be exceeded. Action could be taken within the biennium, if necessary, to reduce mortality of blackgill rockfish. For example, a regulatory process could be undertaken to establish a HG, sorting requirement, and species-specific trip limits, if needed.

Stock Status

Under Option 1, the status of blackgill rockfish stock is expected to maintain its upward trajectory as indicated by the 2011 assessment (Field and Pearson, 2011). The increase in biomass is most likely due in part to implementation of the Cowcod Conservation Areas (CCA) in 2001 which removed fishing pressure and provided protection to a large fraction of the blackgill rockfish habitat.

Socioeconomic Impacts

Under Option 1, any inseason action taken to reduce catches (e.g., RCA modifications, reductions in bi-monthly limits) would likely be severe and could effectively eliminate target opportunities in other valuable fisheries such as sablefish. Voluntary avoidance would have the fewest impacts on the fleet because known blackgill rockfish hotspots could be avoided, according to industry input. Although this could reduce or eliminate a directed fishery for blackgill rockfish, it still could allow for small amounts of blackgill rockfish to be taken incidentally while prosecuting other valuable fisheries, such as sablefish.

Option 2, Preferred: Manage Blackgill Rockfish within the Minor Slope Rockfish Complex south of 40°10' N. latitude, Establish a Harvest Guideline and a Sorting Requirement.

Under Option 2, blackgill rockfish would continue to contribute to the harvest specifications for the minor slope rockfish south complex south of 40°10' N. latitude and a blackgill rockfish harvest guideline would be established based on the results from the 2011 stock assessment.

Harvest Guideline

Under Option 2, harvest guidelines of 106 mt and 110 mt would be established for 2013 and 2014 respectively. Based on the FMP, the harvest guideline would be further divided 63% trawl (67 mt) and 37% non-trawl (39 mt)[32]. Although establishment of a harvest guideline does not mean that action has to be taken based upon projected attainment, it does allow for more flexibility in creating management measures to limit catch.

Sorting Requirement

Under Option 2, implementing a sorting requirement is not expected to change current fleet practices compared to Option 1. Further, existing regulations in California require the species, not the complex, be reported on fishtickets (Fish & Game Code sections 8043 and 8045). From 2005-2011, an average of 13 percent of the fish tickets reported data at the complex level, instead of the species level. In recent years (2009-2011), the average has declined to 9 percent. However, the slope rockfish category is the most commonly used. Increased enforcement may be necessary to ensure accurate sorting for use in management.

The following management measures would be available to the IFQ and non-trawl fleets to be used in season in the landings are tracking high.

[32] Since increasing the harvest guideline to 110 mt (in 2014) will not result in any appreciable change in bi-monthly limits, the 2013 values were assumed for all calculations.

Limited Entry IFQ

Under a HG, landings and discards in the IFQ fishery would continue to count against slope rockfish QP[33]. Because a sorting requirement would be implemented, it is possible blackgill rockfish landings could be verified by catch monitors and port biologists. Discards at sea would be recorded by the observer at the species level, as currently done. If mortality appears to be tracking higher than the HG[34], the Council could reduce blackgill rockfish catches by moving the seaward boundary of the RCA, which could adversely affect IFQ fishermen as described above under Option 1, or request voluntary avoidance by the fleet.

Non-Trawl

Under Option 2, modifications to bi-monthly limits were investigated to keep blackgill rockfish removals within the yearly non-trawl allocation. No changes are proposed for the overall slope rockfish bi-monthly limits. Per Council guidance at the November 2011 meeting, the non-trawl blackgill rockfish allocation was divided 60% LE (23.4 mt) and 40% OA (15.6 mt)[35] to facilitate modeling bi-monthly limits. As removals in the LE and OA fisheries would have exceeded the 2013-2014 harvest targets given past fishery behavior (Figure 1), reductions in bi-monthly limits may provide an effective tool for controlling catches.

Blackgill rockfish landings as recorded in PacFIN from 2005-2010 for LE and OA fixed gear fleets were used to analyze catch limits by fleet and period. Bi-monthly limits for the LE fishery maintained the No Action area designation (south of 40º10' N. latitude); whereas bi-monthly limits for the OA fishery were modified from the No Action area designations (40º10' N. latitude to 38º N. latitude; south of 38º N. latitude) to a single area (south of 40º10' N. latitude). For analytical and managerial ease, bi-monthly limits are assumed the same in each bi-monthly period. Two modeling approaches (using 90% and 100% attainment of the non-trawl allocation) were used to analyze bi-monthly limits. The years 2008 to 2010 were ultimately chosen as the basis for modeling the trip limits in this analysis because they are the most representative of current and future activities. The southern sablefish ACL was larger in most recent years therefore future effort would be more similar to2008-2010 (I.e., more boats fishing for sablefish would take the time to set gear for blackgill). Both sablefish and blackgill tend to be caught in the same trips, though not necessarily the same set. For a full description of bi-monthly limit methodology refer to Appendix A.

Limited Entry Bi-Monthly Limit Options

Table C-49 summarizes a range of bi-monthly limits for blackgill rockfish in the LE fishery under varying assumptions of catch attainment. The bi-monthly limit options range from 1,200 lb/2 months (Option A) to 1,375 lb/2 months (Option B). The percentage of vessels affected per bi-monthly period by each of the options are provided in Figure C-10, which is generally less than 15% for all options over all periods.

Under Option 2, the LE bi-monthly limits would need to be restructured to accommodate the new sub-limit for blackgill. Currently the bi-monthly limit is "*40,000 lb/2 months of slope rockfish and darkblotched rockfish*". The bi-monthly limit could be restructured as "*40,000 lb/2 months of slope rockfish and darkblotched rockfish, of which no more than XX lb can be blackgill rockfish*".

[33] Species specific IFQ can only be issued based on an ACL, not a harvest guideline.
[34] Per federal regulations, attainment of a HG does not require action or closure of a fishery.
[35] Percentages were based on average participation from 2005 to 2010.

Table C-49. Range of sub-limits for blackgill rockfish in the limited entry non-trawl fishery. Bi-monthly limits are modeled for the area south of 40º10' N. latitude and may include rounding to facilitate management.

Option	Period limit	Calculation Assumptions
Option A	1,200 lb/2 mo	Assumes 90% attainment of LE portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.
Option B	1,375 lb/2 mo	Assumes 100% attainment of LE portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.

<u>Open Access Bi-Monthly Limit Options</u>

Unlike the LE fishery, OA fishery bi-monthly limits are divided at 38º N. latitude and structured differently in both areas. Since the original rationale documenting the need for the area divisions and the differences in period limit structuring is no longer available, the areas were combined for this analysis.

Table C-50 summarizes a range of OA bi-monthly limits under varying assumptions catch attainment. The bi-monthly limit options range from 410 lb/2 months (Option A) to 480 lb/2 months (Option B). The OA fishery has traditionally been more unpredictable than the LE fishery, making it difficult to accurately predict catch and fleet behavior.

Under this Option, the bi-monthly limits would need to be restructured to accommodate the new sub-limit for blackgill rockfish. For the area south of 40º 10' N. latitude, a new bi-monthly limit could be implemented as "*10,000 lb/2 months of slope rockfish and darkblotched rockfish, <u>of which no more than XX lb can be blackgill rockfish</u>*".

Overall, the percentages of open access vessels per bi-monthly period affected by each of these options are provided in Figure C-11

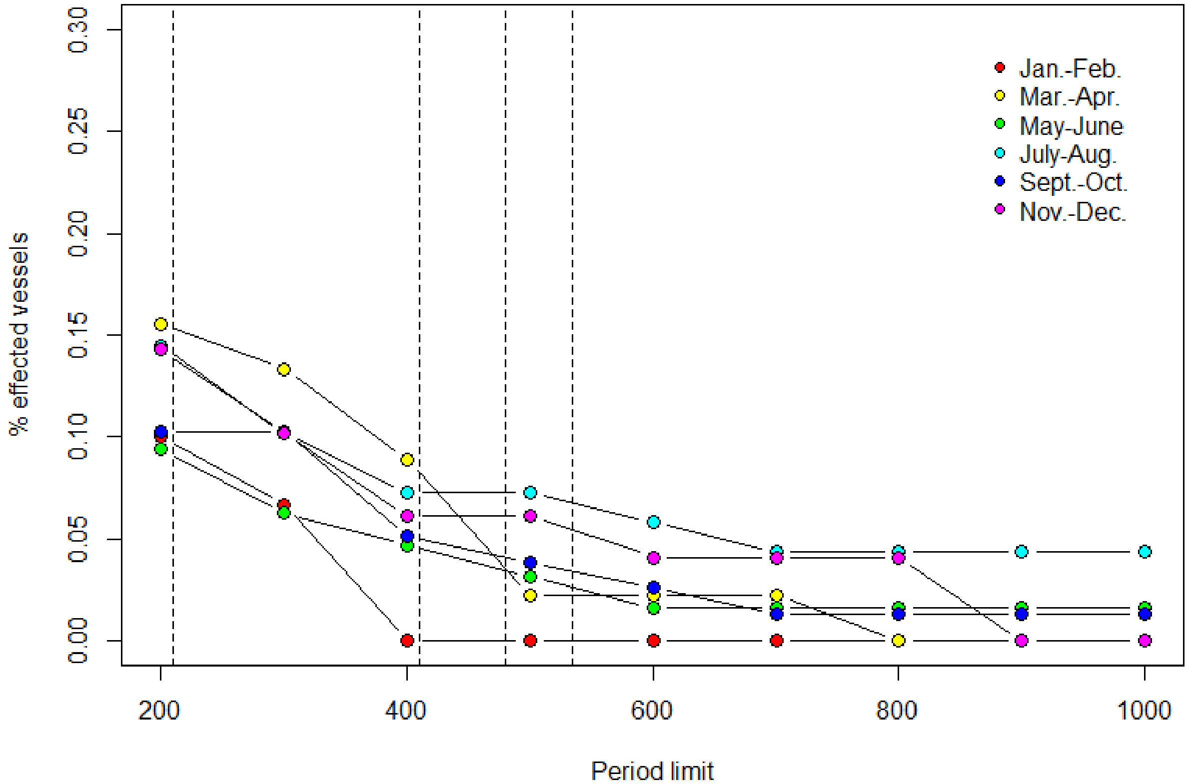

Figure C-11, which is generally 5 to 15% for most options.

Table C-50. Range of sub-limits for blackgill rockfish in the open access non-trawl fishery, assuming one area (south of 40°10' N. latitude). Values may be rounded for ease of management.

	Bi-monthly Limit	Description
Option A	410 lb/2 mo	Assumes 90% attainment of OA portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.
Option B	480 lb/2 mo	Assumes 100% attainment of OA portion of non-trawl allocation using average catch of all participating vessels from 2008 to 2010.

Comparison of the Management Options

Biological Impacts

Projected Impacts

Under Option 2, projected catches for blackgill rockfish would be expected to stay within the harvest guideline.

Stock Status

Under Option 2, a positive change to the stock status of blackgill rockfish could be expected compared to Option 1, but the extent is unknown. Blackgill are a long-lived, resilient species so small changes to total mortality over a short time period would not be expected to have any detectible impact on stock status.

Socioeconomic Impacts

Under Option 2, the fleet is expected to be negatively impacted due to the decrease in landings. This impact is expected to be mainly experienced by the non-trawl fisheries that target blackgill rockfish.

Although the percentage of LE and OA vessels affected per bi-monthly period is generally less than 15% for all options, the loss in vessel revenue will not be equal among those vessels. Some of these vessels directly targeted blackgill rockfish and had landings far above the proposed bi-monthly limits. Their losses will be much greater than a vessel that only had landings at or slightly above the new proposed bi-monthly limits. Since the LE fleet targeting blackgill primarily operates out of southern California, disproportionate losses in blackgill rockfish revenues will affect that fleet and local communities in that area.

Since the majority of the fleet is already sorting blackgill rockfish to species due to its higher value compared to other slope rockfish species, daily operations are not expected to change as a result of a sorting requirement.

Option 3: Remove Blackgill Rockfish from the Minor Slope Rockfish Complex and Apply Species Specific Harvest Specifications (i.e., ACL)

Blackgill rockfish would be removed from the minor slope rockfish south complex and its contribution to the harvest specifications for the minor slope rockfish south complex would be removed (thus lowering the minor slope rockfish complex harvest specifications). Blackgill rockfish would be managed under its own ACL, which would be based on the results from the 2011 stock assessment, and a sorting requirement would be implemented.

Sorting Requirement

Under Option 3, implementing a sorting requirement is not expected to greatly change current fleet practices compared to Options 1 or 2. Similar to Option 2 a sorting requirement could have an impact on state and federal programs because all blackgill would have to be tracked and monitored. Some increase in time and money may be expected relative to increase the accuracy of identification. Increased enforcement may be necessary to enforce the new sorting requirements.

Limited Entry IFQ

Under an ACL, QS/QP would be established for the IFQ fishery and all landings and discards would be counted against the newly formed blackgill rockfish QP. The default proxy to distribute blackgill QS would be based on that used for slope rockfish unless the Council chose to re-evaluate a different methodology. Depending on the amount of blackgill available to the trawl fishery, it is possible that blackgill QP could be as constraining, if not more, than many overfished species and limit access to many healthy target stocks.

In November 2011, the Council rejected moving forward with the detailed analysis to remove blackgill from the slope rockfish south complex, establish species-specific harvest specifications, and establish IFQ as the primary catch control until the comprehensive analysis of stock complexes is completed and the historical estimates of mortality are finalized. Methodologies to estimate the species-specific historical mortality estimates by sector need to be finalized, reviewed, and accepted by the Council and its advisory bodies. This step is necessary to inform the component OFL and ABC estimates, evaluate the existing allocation structure, and inform any potential modifications to the allocations between the trawl and non-trawl sectors as well as within the trawl sector (i.e., allocations between shorebased IFQ, mothership, and catcher-processors).

Current regulations provide a formula for issuing QS in the shorebased IFQ fishery in the event species are removed from an IFQ management unit. For example, if a person holds one percent of a species group (e.g., slope rockfish north) before the subdivision, that person will hold one percent of the QS for each IFQ species resulting from the subdivision (e.g., blackgill). However, now that species-specific estimates of landings are available, additional options for initial issuance may need to be considered. For example, it is anticipated that individual catch history of the component species (e.g., blackgill) are different than the aggregate slope rockfish north landings used in the initial issuance of slope rockfish QS.

Non-Trawl

Under Option 3, an ACL effectively functions the same as a harvest guideline (see Option 2) except projected attainment of an ACL does require management action. Reductions in bi-monthly limits would also be an effective tool for controlling catches, but unlike Option 2, establishment of an ACL would allow for species specific limits to be implemented. Therefore, no sub-limits within the slope rockfish limits would need to be applied. Any of the options presented under Option 2 in Table C-49 or Table C-50 could be implemented as a blackgill specific limit.

Comparison of the Management Options

Biological Impacts

Projected Impacts

Under Option 3, projected catches are expected to be lower than Option 1 and the same as Option 2.

Stock Status

Under Option 3, no changes to stock status are expected compared to Option 2. Some positive change to the stock status could be expected compared to Option 1, but the extent is unknown.

Impacts to Industry

Impacts to industry under Option 3 are expected to be the same as under Option 2. The fleet is expected to be negatively impacted compared to Option 1.

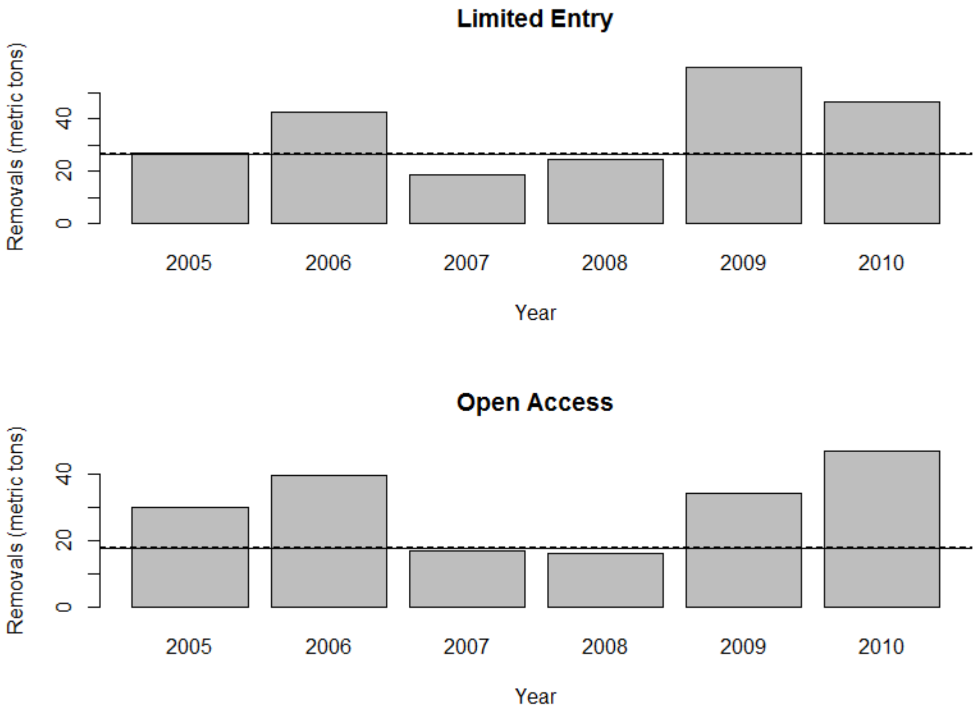

Figure C-9. Removals of blackgill rockfish in the limited entry (top panel) and open access (bottom panel) fisheries south of 40°10' N. latitude. Solid horizontal lines are the 2013 harvest guidelines; Broken horizontal lines are the 2014 harvest guidelines.

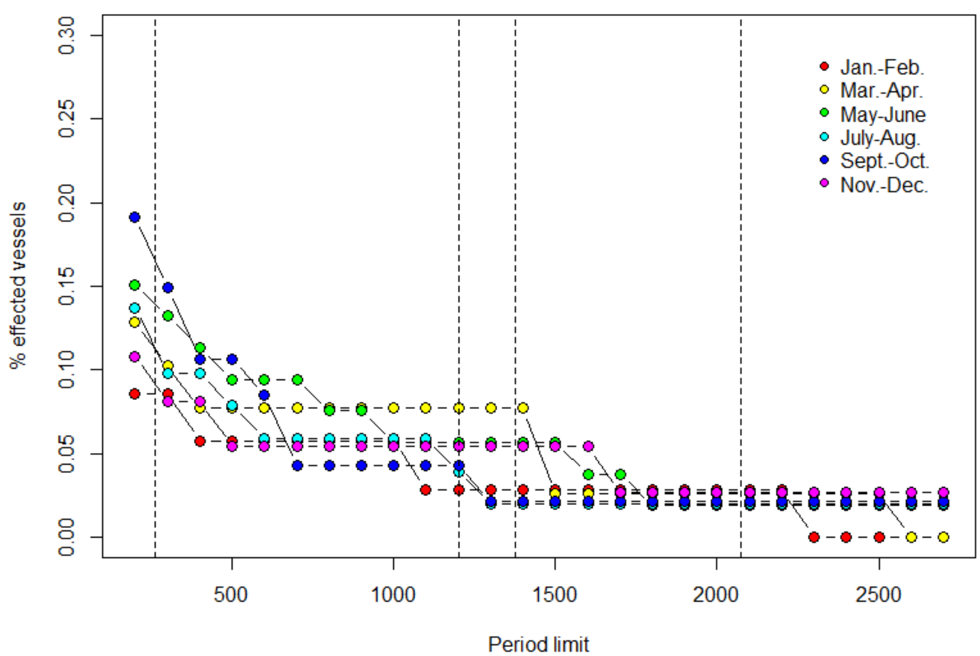

Figure C-10. Percentage of vessels per bi-monthly period (summarized from 2005-2010) that would need to reduce catch to comply with each of the proposed bi-monthly limit options for the limited entry fishery.

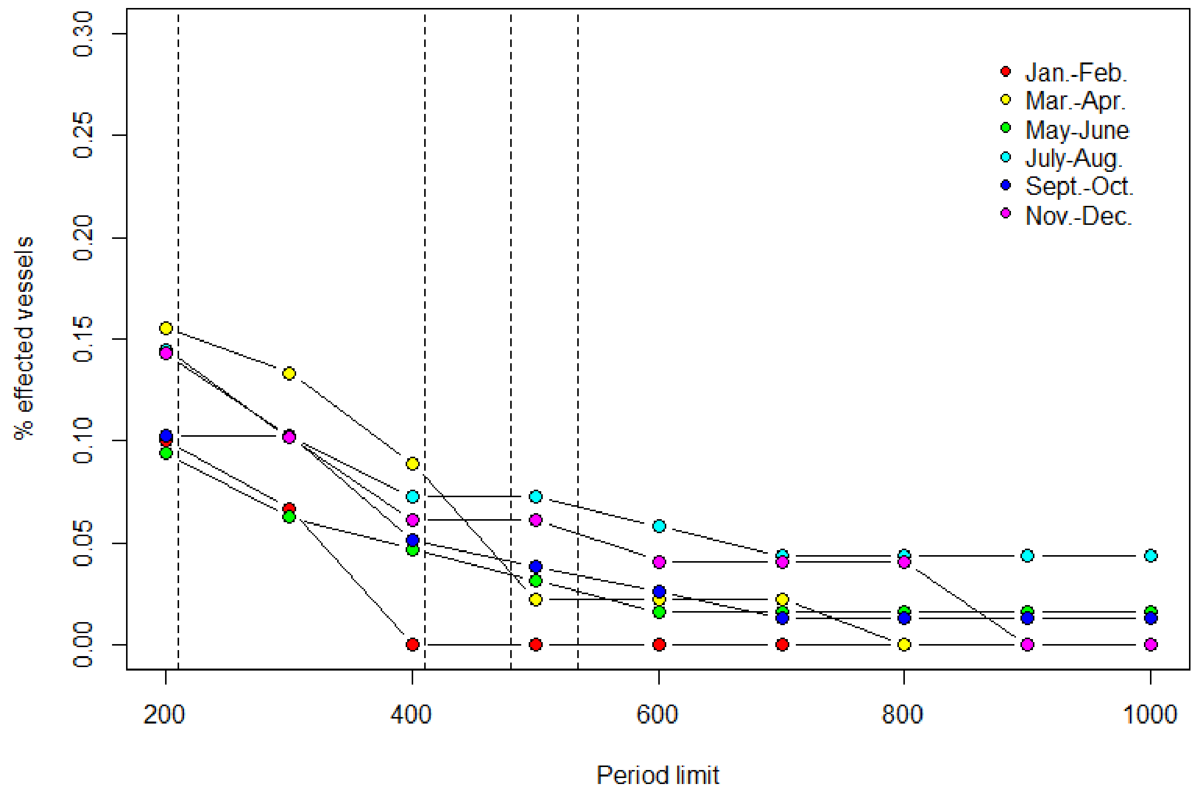

Figure C-11. Percentage of vessels per bi-monthly period (summarized from 2005-2010) that would need to reduce catch to comply with each of the proposed bi-monthly limit options for the open access fishery south of 38º N. latitude.

C.16 Longnose Skate Management Measures

Overview

Historically, longnose skate (*Raja rhina*) were not commercially important and were mostly caught as bycatch in trawl fisheries. Discards were estimated at 93% prior to 1995, and 53% thereafter (Gertseva and Schirripa 2008). The commercial importance and retention of this species appears to be increasing, however. Longnose skate landings have increased from 313 mt in 2002 (Gertseva and Schirripa 2008) to 977 mt in 2010 (Bellman et al. (2011). This 2010 level represents the 4th largest landing for longnose skate since 1950.

Herein we provide an analysis to examine the efficacy of potential management measures that could be used to restrain the catch of longnose skate by west coast commercial fisheries, if needed. Alternative trip limits and RCAs are provided. Other potential measures are also discussed.

Prior to March, 2012, catch accounting (e.g., Bellman et al., 2011) assumed that 100% of the discarded longnose skate died. Recently, however, the Council adopted the SSC recommendation that WCGOP reports should apply discard mortality rates shown in stock assessments (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012. The SSC noted that although the discard mortality assumptions used in the assessments are based on very limited information, they represent the best information available. Stock assessments (e.g., Gertseva and Schirripa 2008) assumed 50% discard mortality for longnose skate for all gear types. It should be noted that the new 50% discard-mortality rate assumption is applied only as we look forward (i.e., when evaluating options toward the end of this report). In most cases prior to that section, 100% discard mortality is shown because that was the historical perception.

2009-2010 Total Mortality of Longnose Skate

The West Coast Groundfish Observer Program (WCGOP) reported total fishing mortalities for longnose skate of 1,455 and 1,387 mt during 2009 and 2010, respectively (Bellman et al., 2010 and 2011), while assuming that all discarded longnose skate died. Under the 100% discard-mortality rate assumption, it was thought that mortality exceeded the optimum yield (OY) during both years (Table C-51; Bellman et al., 2010 and 2011). These total mortality estimates did not exceed the Annual Biological Catch (ABC; Table C-51), however. Under a 50% discard mortality assumption, only 83% and 88% of the OYs would have been attained during 2009 and 2010 (see Agenda Item E4b, Supplemental GMT Report 3, November 2011).

Table C-51. West coast groundfish total mortality estimates (mt) for longnose skate from 2009-2010 assuming 100% mortality (Bellman et al., 2010 and 2011) and 50% mortality (Agenda Item F.2.b, Revised Supplemental SSC Report, March 2012) for discarded longnose skate.

Year	Estimated mortality (mt) assuming 100% discard mortality	Estimated mortality (mt) Assuming 50% discard mortality	Optimum yield (OY) (mt)	Estimated mortality (% of OY) assuming 100% discard mortality	Allowable Biological Catch (ABC)
2009	1455.1	1,120.3	1,349	108%	3,428
2010	1,386.5	1,181.8	1,349	103%	3,269

2011-2012 Harvest Specifications

Longnose skate were considered “trawl dominant” catch under Amendment 21, therefore trawl and non-trawl allocations were set at 95 percent and 5 percent, respectively, for 2011-2012 fisheries. No within trawl allocation was necessary since longnose skate is not managed with Individual Fishing Quotas (IFQs) or allocations for the at-sea whiting sectors.

Longnose skate was removed from the “Other Fish” complex in 2009, and sorting became a requirement beginning March 6, 2009. The 2011-2012 harvest specifications for this species resulted in an annual catch limit (ACL) of 1,349 mt for 2011 and 2012 (Table C-52).

Table C-52. 2011-2012 harvest specifications for longnose skate in metric tons, implemented in regulation. OFL = overfishing limit; ABC = annual biological catch; ACL = annual catch limit.

Year	OFL	ABC	ACL
2011	3,128	2,990	1,349
2012	3,006	2,873	1,349

Historically, there has been little effort to restrict longnose skate catches because markets and landings were generally limited (with the exception of some high landings during the 1990s when Asian markets developed; Gertseva and Schirripa 2008). Subsequently, most longnose skate were caught incidentally while pursuing other species. Management measures to reduce "targeting" and restrict catches have therefore been unnecessary.

2011 - 2012 Management Measures (= No Action):

Management measures used to control catches and improve monitoring of longnose skate for the 2011-12 fisheries are summarized in Table C-53. The sorting requirement, first implemented in 2009, provides for better monitoring relative to previous years when longnose skate were reported within the "Other Fish" complex. Rockfish conservation areas (RCAs; Table C-54 and Table C-55) in regulation may inadvertently provide some catch-controls for longnose skate, because the depth distribution of this species extends from near shore to 600 fm (Keller et al. 2008). Hence, RCAs may prevent the capture of longnose skate throughout the middle of their depth distribution along the entire west coast for non-whiting groundfish fisheries. Trip limits are currently listed as "unlimited" but can be adjusted through inseason action.

Table C-53. Management measures affecting longnose skate catch and monitoring for the 2011-2012 (= No Action) groundfish fisheries.

Fishery	Management Measure
Commercial	
--All Commercial landings	Sorting required for all commercial landings
--Limited Entry Trawl	Non-IFQ species, trip limit management. Unlimited trip limits coast-wide that can be adjusted through routine inseason action. RCAs may inadvertently reduce catch.
--Limited Entry Fixed Gear	Trip limit management. Unlimited trip limits coast-wide that can be adjusted through routine inseason action. RCAs may inadvertently reduce catch.
--Open Access Fixed Gear	Trip limit management. Unlimited coast-wide trip limits that can be adjusted through routine inseason action. RCAs may inadvertently reduce catch.
Recreational	
--Washington	Included as part of the 12 fish groundfish bag limit (landed fish) implemented in federal regulation.
--Oregon	Included as part of the 10 fish marine bag limit (landed fish) implemented in federal regulation. Oregon state regulations limit retention to 7 fish marine bag limit.
--California	Included as part of a 20 fish finfish bag limit (landed fish) implemented in federal regulation. California state regulations limit retention of longnose skate species to no more than 10 within the 20 fish fin fish bag limit.

Table C-54. Limited entry non-whiting trawl RCAs for 2010-2012 (= No Action. Depth is in fathoms (fm)

Limited Entry Non-Whiting Trawl

<table>
<tr><th>Year</th><th>Area (N. latitude)</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td rowspan="6">2012</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 - 150</td><td colspan="2">0 - 200</td><td colspan="2">0 - [m]200</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2">75 - 150</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="4">75 – 150</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="4">75 - 200</td><td colspan="2">100 - 200</td><td colspan="2">75 - 200</td><td colspan="2">75 - [m]200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
<tr><td rowspan="6">2011</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 – 150</td><td colspan="2">0 - 200</td><td colspan="2">0 - [m]200</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2" rowspan="2">75 - 200</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="4">75 - 150</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="2">75 - 200</td><td colspan="2">100 - 200</td><td colspan="2">75 - 200</td><td colspan="2">75 - [m]200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
<tr><td rowspan="6">2010</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 – 150</td><td colspan="2">0 - 200</td><td>0 - [m]200</td><td>0 - 250</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2" rowspan="2">75 - 200</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="2" rowspan="2">75 - 200</td><td rowspan="2">75 - [m]200</td><td rowspan="2">75 - 250</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="2">75 - 200</td><td colspan="2">100 - 200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
</table>

Table C-55. Non-trawl rockfish conservation areas (RCAs) for limited entry and open access fixed gear (2010-2012; = No Action). Depth is in fathoms.

Limited Entry and Open Access Fixed Gear

<table>
<tr><th>Year</th><th>Area (N. lat.)</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td rowspan="7">2012</td><td>North 46 16</td><td colspan="12">0 - 100</td></tr>
<tr><td>45 03 83 - 46 16</td><td colspan="12" rowspan="2">30 - 100</td></tr>
<tr><td>43 00 - 45 03 83</td></tr>
<tr><td>42 00 - 43 00</td><td colspan="12">20 - 100</td></tr>
<tr><td>40 10 - 42 00</td><td colspan="12">20 - 100</td></tr>
<tr><td>34 27 - 40 10</td><td colspan="12">30 - 150</td></tr>
<tr><td>South 34 27 (+ islands)</td><td colspan="12">60 - 150</td></tr>
<tr><td rowspan="7">2011</td><td>North 46 16</td><td colspan="12">0 - 100</td></tr>
<tr><td>45 03 83 - 46 16</td><td colspan="12">30 - 100</td></tr>
<tr><td>43 00 - 45 03 83</td><td colspan="12">30 - 125 (125 line reduced to 100 fm during directed halibut days)</td></tr>
<tr><td>42 00 - 43 00</td><td colspan="12">20 - 100</td></tr>
<tr><td>40 10 - 42 00</td><td colspan="12">20 - 100</td></tr>
<tr><td>34 27 - 40 10</td><td colspan="12">30 - 150</td></tr>
<tr><td>South 34 27 (+ islands)</td><td colspan="12">60 - 150</td></tr>
<tr><td rowspan="7">2010</td><td>North 46 16</td><td colspan="12">0 - 100</td></tr>
<tr><td>45 03 83 - 46 16</td><td colspan="12">30 - 100</td></tr>
<tr><td>43 00 - 45 03 83</td><td colspan="12">30 - 125 (125 line reduced to 100 fm during directed halibut days)</td></tr>
<tr><td>42 00 - 43 00</td><td colspan="12">20 - 100</td></tr>
<tr><td>40 10 - 42 00</td><td colspan="12">20 - 100</td></tr>
<tr><td>34 27 - 40 10</td><td colspan="12">30 - 150</td></tr>
<tr><td>South 34 27 (+ islands)</td><td colspan="12">60 - 150</td></tr>
</table>

Management Issue

2013-2014 Harvest Specifications and Historical Total Mortality Estimates

The 2012–2014 harvest specifications are shown in Table C-56.

Table C-56. 2012 overfishing limits (OFLs), annual biological catch (ABCs), and annual catch limits (ACLs) along with the final preferred 2013-2014 OFLs and ABCs for longnose skate in metric tons.

Year	OFL	ABC	ACL
2012	3,006	2,873	1,349
2013	2,902	2,774	[a]TBA
2014	2,816	2,692	[a]TBA

[a] Although the preferred ACL for 2013 and 2014 is 2,000 mt, both 1,349 and 2,000 mt ACLs will be analyzed in the 2013-14 EIS.

The 2009 and 2010 estimated total fishing mortality for longnose skate (1,455 and 1,387 mt, respectively; Bellman et al. 2010, 2011), which was calculated assuming 100% discard mortality rates, would not exceed the final preferred 2013-14 OFLs or ABCs, nor would these have exceeded the preferred ACL of 2,000 mt (Table C-56). This reported longnose skate mortality during 2009-2010 (Bellman et al. 2010, 2011) would, however, exceed the lowest ACL alternative being analyzed within the 2013-14 EIS (i.e., 1,349 mt). However, as pointed out above, the SSC recently recommended that the WCGOP reports only 50% of the discarded longnose skate as dead (all gears; Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). The result of this new assumed discard-mortality rate would be lower total mortality estimates for longnose skate during 2009 and 2010 than was previously assumed (Table C-51). Nonetheless, even under the 50% discard-morality assumption, recent catches approach the 1,349 mt level. Therefore, some modifications to existing management measures or new management measures may need to be developed to keep total catch within the ACL if the lowest alternative is selected.

Total catch and discard of longnose skate by sector

Longnose skate catch and discard by sector can be found in Figure C-12 (for 2010) and Table C-57 (2009-2010). Most longnose skate were taken by the limited entry non-whiting trawl fishery (87% - 91%), whereas 7% to 12% were taken by the non-nearshore fixed gear fishery (Figure C-12; Table C-57). Small amounts were taken by other sectors (Table C-57).

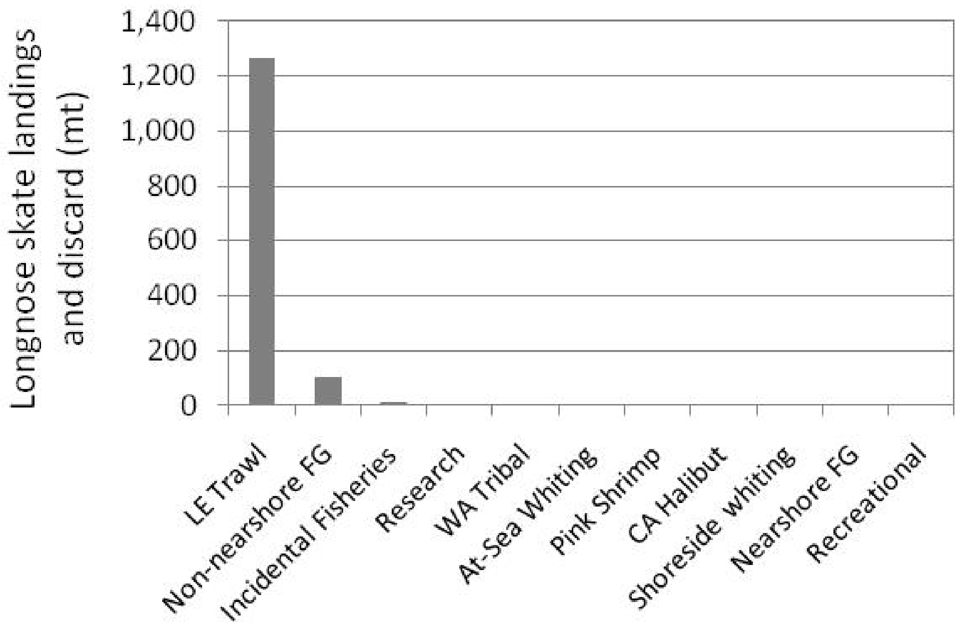

Figure C-12. Total landings and discard of longnose skate (mt) by sector during 2010. Data acquired from Bellman et al. (2011).

Table C-57. West Coast Groundfish Total Mortality Estimates, by Sector in Metric Tons, for longnose skate from 2009-2010. Estimates assume 100% mortality for discarded longnose skate. Data acquired from Bellman et al. (2010 and 2011).

	Shoreside commercial fisheries								Total recreational fishing mortality					
YEAR	LE bottom trawl	CA halibut	Pink shrimp	Non-nearshore fixed-gear	Nearshore fixed-gear	Shoreside hake mid-water trawl	WA tribal landings	All at-sea hake fisheries	WA	OR	CA	Research	Remaining incidental OA fisheries landings	Estimated total fishing mortality
2009	1,275.4	--	2.1	173.3	0.0	0.1	--	0.2	--	--	--	2.8	1.3	1455.1
2010	1,266	0.1	0.4	103.2	0.0	0.1	1.3	0.6	--	0.0	--	1.7	13.0	1,386.5

Distribution of longnose skate along the U.S. west coast

Approximately 80% of longnose skate commercial catch (landings + discards) occur north of 40°10' N. latitude (Figure C-13; Bellman et al. 2011). This roughly coincides with the pattern of longnose skate catch per unit effort (CPUE) estimates shown by the 2005 west coast groundfish trawl survey (Keller et al. 2008), which shows highest densities north of 40°30' N. latitude (Table C-58). Longnose skate CPUE was ranked #10 relative to all other species caught by the 2005 survey over all INPFC areas and depth strata combined.

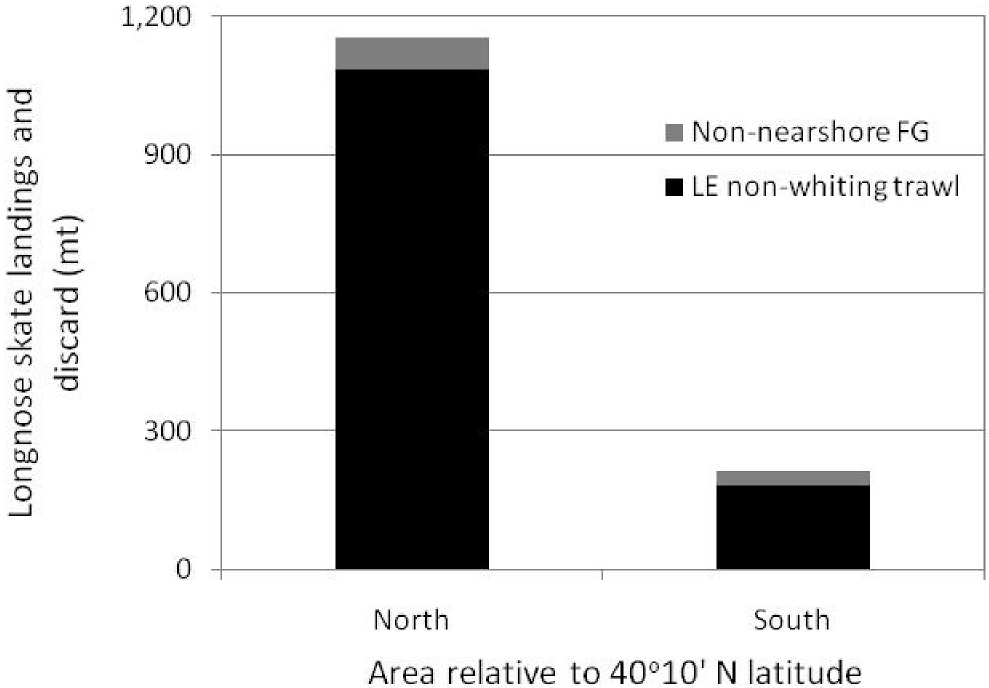

Figure C-13. Longnose skate landings and discard off the U.S. west coast during 2010 for non-nearshore fixed gear (FG) and limited entry (LE) non-whiting trawl fisheries north and south of 40°10' N. latitude. Data acquired from Bellman et al. (2011).

Table C-58. Mean catch per unit effort (CPUE; kg/ha) for longnose skate caught during the 2005 west coast trawl survey by International North Pacific Commission (INPFC) area. Data acquired from Keller et al. (2008).

INPFC Area	Southern boundary	CPUE (kg/ha)
U.S.-Vancouver	47°30' N. latitude	8.83
Columbia	43°00' N. latitude	4.88
Eureka	40°30' N. latitude	5.52
Monterey	36°00' N. latitude	4.51
Conception	Southern boundary of EEZ	1.89

The depth distribution for longnose skate caught by the 2005 west coast trawl survey is shown in Table C-59 (Keller et al. 2008). Overall, highest densities were found between 100-301 fm (9.20 kg/ha) and lowest seaward of 301 fm (0.78 kg/ha). Densities were also high shoreward of 100 fm (4.85 kg).

Table C-59. Mean CPUE (kg/ha) of longnose skate by depth strata in all INPFC areas combined during the 2005 West coast groundfish trawl survey. Data acquired from Keller et al. (2008).

Depth (m)	Depth (fm)	CPUE (kg/ha)
55 – 183	30 – 100	4.85
184 – 549	100 - 301	9.20
550 – 1,280	302 - 702	0.78

Trends in annual landings, discard and price per pound

Gertseva and Schirripa (2008) showed that the assumed discard rate for longnose skate prior to 1995 was 93%, but decreased to 53% after 1995 when Asian markets developed. Discarding of all skate species has continued to decrease in recent years, from approximately 50% in 2006 and 2007 to 28% in 2010 (Figure C-14). Consequently, landings of longnose skate have showed a constant increase over the past decade, from 313 mt in 2002 (Gertseva and Schirripa 2008) to 977 mt in 2010 (Bellman et al. 2011). This 2010 landed amount of longnose skate represents the 4th largest landing for this species 1950 (see Gertseva and Schirripa 2008).

Longnose skate discard was much different between non-whiting trawl and non-trawl fisheries during 2009 – 2010. The average discard by sector for those years was 32% for trawl, but 87% for non-trawl. The relatively low discard rate shown in Figure C-14 is because longnose skate is primarily encountered by trawl Table C-57.

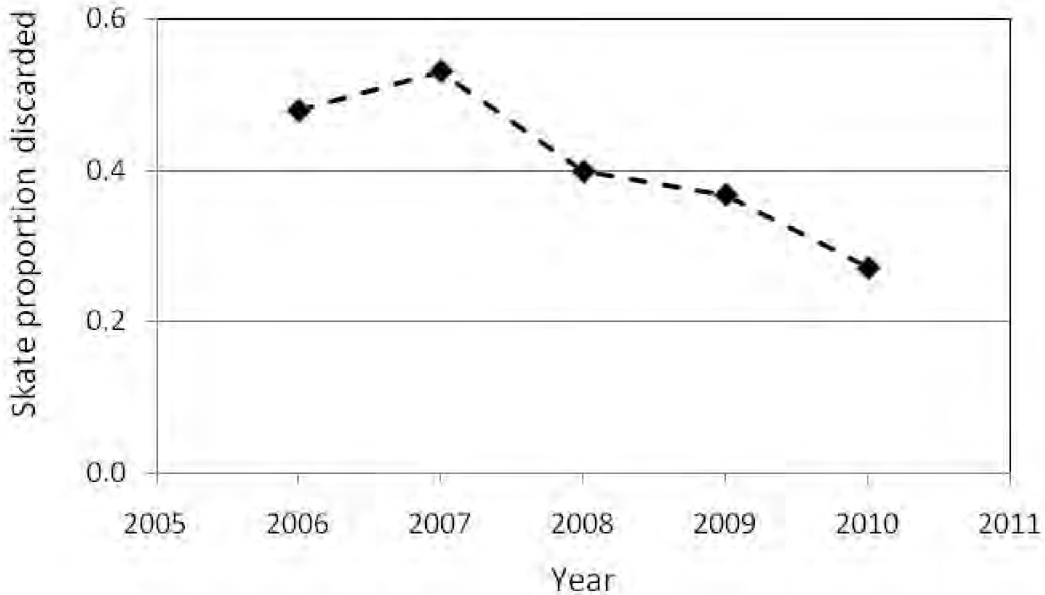

Figure C-14. Proportion of skate (longnose skate + "other skate") discarded by the limited entry non-whiting trawl and non-nearshore fixed gear fisheries. All skate were combined because longnose skate were not sorted until 2009. Data were acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

The ex-vessel prices paid for longnose skate has increased during recent years, especially for the limited entry non-whiting trawl fishery. The average price per pound for longnose skate delivered by non-whiting trawl vessels increased from $0.19 in 2009 to $0.32 during 2011 (Figure C-15). The coast-wide average price per pound for longnose skate has remained somewhat constant and lower for fixed gear vessels, increasing from $0.26 per pound in 2009 to $0.28 per pound in 2011.

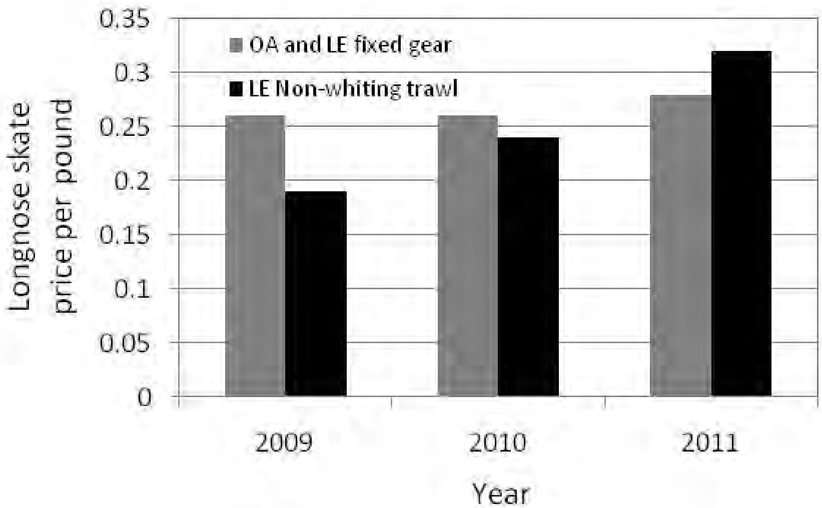

Figure C-15. Longnose skate price per pound for limited entry (LE) and open access (OA) fixed gear (gray) and limited entry non-whiting trawl (black) by year. Data acquired from PacFIN.

Only "unspecified skate" is shown in the PacFIN data base prior to 2009. To put the current average price per pound of longnose skate ($0.28 - $0.32) into historical perspective, the price per pound for "unspecified skate" is shown for the limited entry trawl fishery from 1994 – 2011 (Figure C-16). The price per pound fluctuated between $0.13 and $0.18 from 1994-2006, then abruptly increased in 2007 to $0.24. The highest price per pound for "unspecified skate" was recorded in 2011 ($0.35), during the first year of the Individual Fishing Quota (IFQ) fishery.

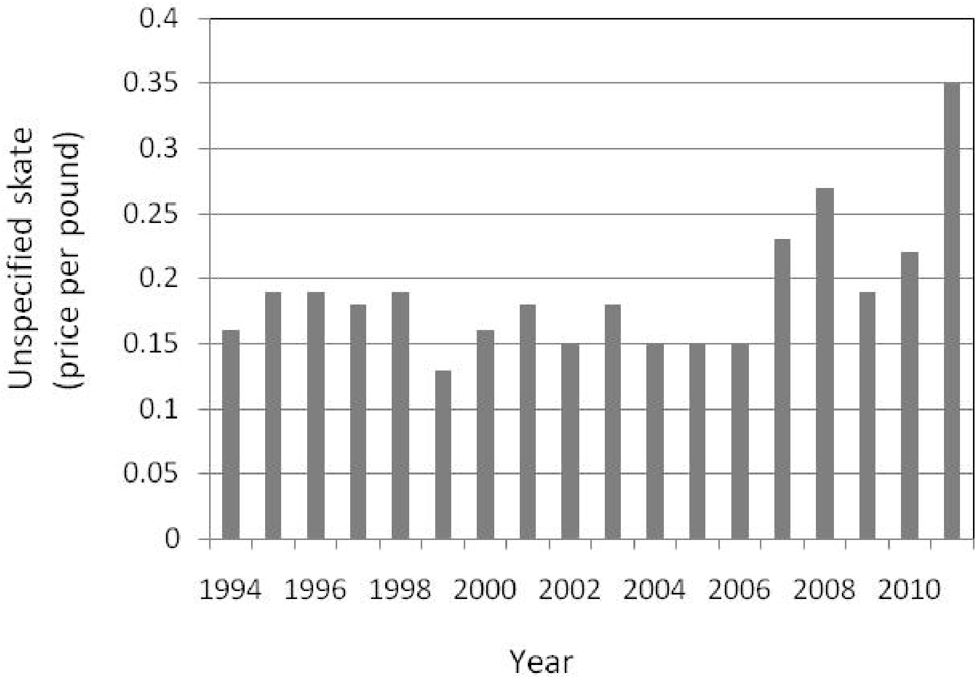

Figure C-16. "Unspecified skate" price per pound for limited entry non-whiting trawl fisheries by year. Data acquired from PacFIN.

Landings by area and port

Approximately 2/3 of the limited entry non-whiting trawl landings of longnose skate occurred in the Columbia INPFC area from 2009-2011, reaching 3.4 million pounds over the 3-year period (Figure C-17a; PacFIN data). Substantial landings were also shown for Eureka (1.0 million pounds), Vancouver (0.6 million pounds), and Monterey (0.3 million pounds) INPFC areas. Port groups receiving most longnose skate landings from limited entry non-whiting trawlers were Columbia River Oregon, Coos Bay, Newport, and Eureka area port groups (1.8, 1.1, 1.1, and 0.6 million pounds, respectively; Figure C-18a). Each of the other port groups received less than 0.2 million pounds of longnose skate during 2009-2011.

Landings of longnose skate by fixed gear fisheries (Figure C-17b) were much lower than shown for the trawl fisheries (Figure C-17a) over the 2009-2011 period, ranging from highs of 56,000 and 41,000 pounds for the Columbia and Eureka INPFC areas to lows of 11,000 pounds for the Monterey and Conception INPFC areas during 2009-2011 (Figure C-17b). Landings of longnose skate in the Vancouver INPFC area were 21,000 pounds over this same period. Most longnose skate landings by limited entry and open access fixed gear fisheries occurred in the Coos Bay, Brookings, and Northern Puget Sound port groups during 2009-2011 (47,000, 33,000, and 16,000 pounds, respectively; Figure C-18b).

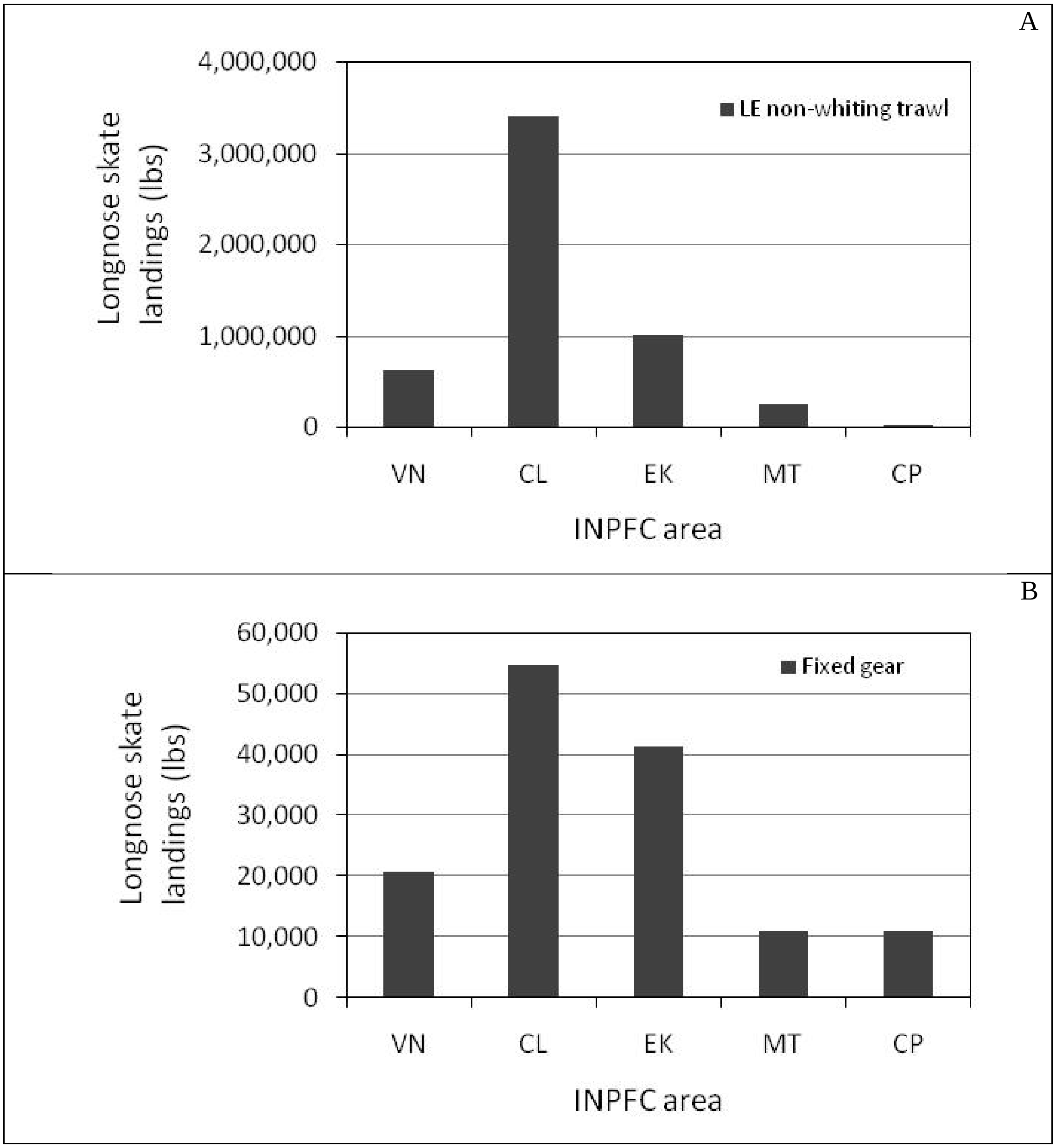

Figure C-17. Longnose skate landings (lbs.) by International North Pacific Fishery Commission (INPFC) area during 2009-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear fisheries.

Note: Data were acquired from PacFIN. INPFC areas are: VN = Vancouver, CL = Columbia, EK = Eureka, MT = Monterey, and CP = Conception.

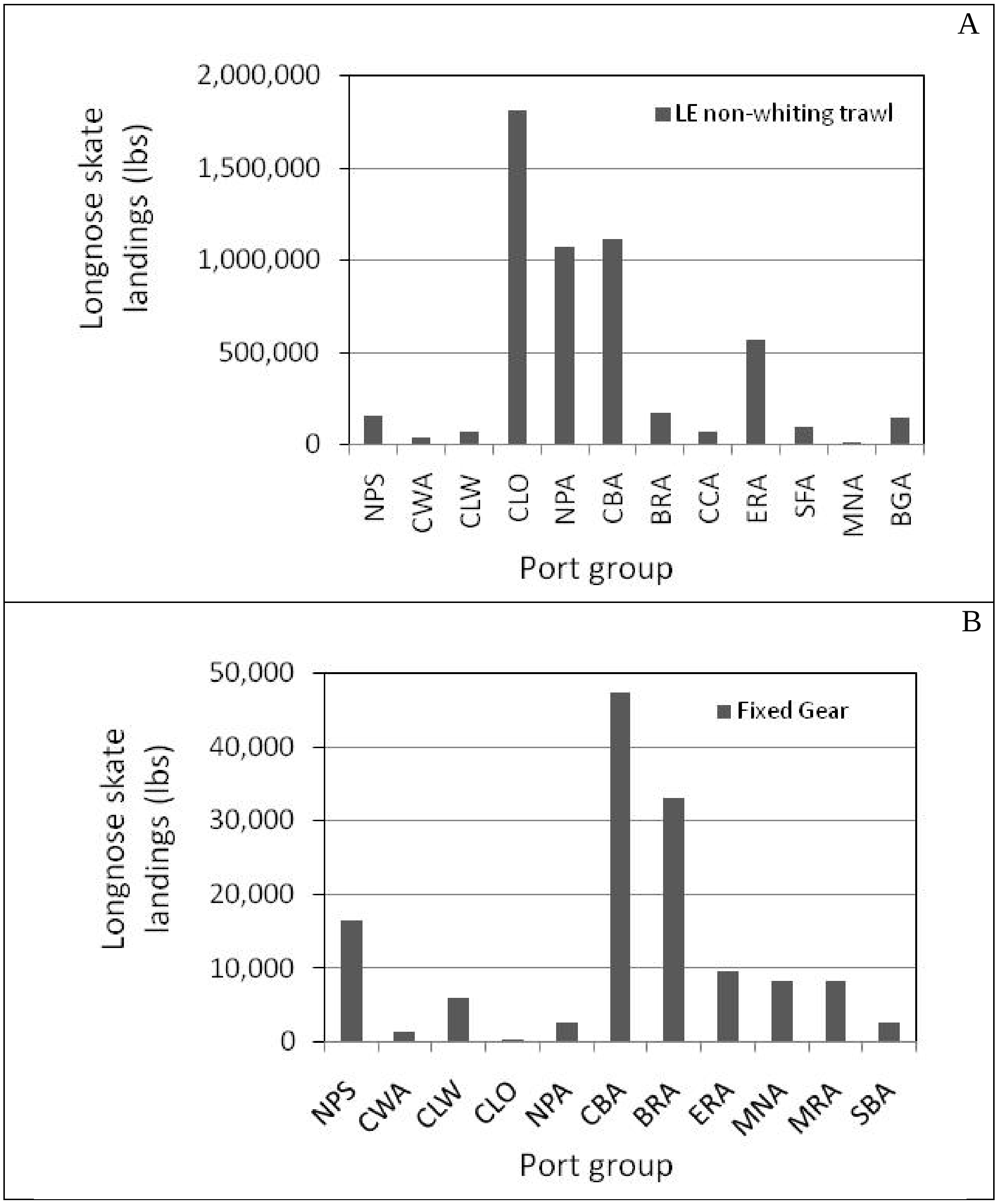

Figure C-18. Longnose skate landings (lbs.) by port group during 2009-2011 for (A) limited entry non-whiting trawl and (B) open access and limited entry fixed gear.

Note: Data were acquired from PacFIN. Port group areas are: BGA = Fort Bragg; BRA = Brookings; CBA = Coos Bay; CCA = Crescent City; CLO = Columbia River Oregon Ports; CLW = Columbia River Washington Ports; CWA = Coastal Washington; ERA = Eureka; MNA = Monterey; MRA = Morro Bay Area; NPA = Newport; NPS = North Puget Sound; SBA = Santa Barbara; SFA = San Francisco. Port group areas with less than three vessels making landings were omitted for confidentiality.

Basis for and Development of Potential New Management Measures

Longnose skate may require more restrictive management measures to keep fishing mortality below their respective ACLs (see Table C-56; also see Agenda Item E.9.b, GMT Report 2, November 2011). Although longnose skate have been intermittently retained and sold in the past, demand and markets may be increasing. Landings have increased recently to nearly all time high levels (see above) and ex-vessel price for skates have reached highest levels ever recorded (Figure C-16). This suggests that the increasing trend in landings observed since 2004 may continue. Whether an increase in total mortality will accompany potential increases in landings is uncertain. If this species is only incidentally caught while pursuing other species (see Gertseva and Schirripa 2008), then an increase in landings may reflect higher retention, and not increased targeting or the development of a targeted fishery. On the other hand, the increase in price could lead to more frequent or prolonged fishing in areas with relatively high concentrations of longnose skate, relative to that observed in the recent past.

The GMT previously suggested that longnose skate may be managed using time-area tools, such as trip limits and depth restrictions (Agenda Item E.9.b, GMT Report 2, November 2011). This section describes the development and basis for new (or additional) management measures (besides No Action). Data from WCGOP and PacFIN data were used to develop and evaluate these potential measures and options. Other potential management measures are also discussed.

Trip Limits

Trip limits may effectively reduce total mortality if trip limits (a) discourage targeting, (b) encourage fishermen to move out of or avoid areas with high longnose skate catch rates because of the burden required to sort and discard large volumes that cannot be landed, and (c) result in trip limit induced discards (instead of landings) if the mortality of discarded skate is low. It is clear that reducing targeting, or the potential for targeting, may reduce total mortality. It is also clear that fishing in areas with lower incidental catch rates may reduce total mortality. However, if trip limits result in discards (rather than landings) without affecting fishers behavior (e.g., fishing location), and if the discard mortality is 100%, then trip limits may simply convert landed mortality into discard mortality at a 1:1 conversion. In this case, total mortality would be unaffected by trip limits. Although the WCGOP had previously assumed 100% discard mortality for longnose skate (e.g., Bellman et al., 2011), catch monitoring will now assume a 50% discard mortality rate for the species, as recommended by the SSC (Agenda Item F.2.b, REVISED Supplemental SSC Report, march 2012) and shown by (Gertseva and Schirripa 2008). Under the 50%-discard mortality assumption, trip limits may be effective for reducing total mortality even if catches are incidental and fishermen behavior does not change (e.g., they do not move from areas with high longnose skate catch rates and continue targeting other species while discarding skate in excess of trip limits).

Are Longnose Skate Targeted? It has been assumed that longnose skate are not the primary target for trawl or fixed gear fisheries. Instead, it has been assumed that this species is caught incidentally while targeting other species. The following is an examination of longnose skate catches to provide insight on whether longnose skate targeting occurs. We caution that this analysis uses historical data and thus may not accurately predict the future, especially since the price for skate has been increasing and is now at an all-time high (Figure C-16). The behavior of fishermen now (and in the future) may be different than what had occurred in the past.

Catch per haul or set: West coast groundfish observer data show that maximum catches of longnose skate per set or haul were less than 6,000 lbs. for trawl and less than 1,300 lbs. for fixed gear during 2009 and 2010 (Figure C-19). Most hauls where longnose skate were present in the catch produced less than 500 lbs. (trawl) and less than 200 lbs. (fixed gear), with very few larger hauls. These catch rates suggest that longnose skate are most commonly encountered at relatively low volumes, but are occasional caught at somewhat high volumes by both gear types.

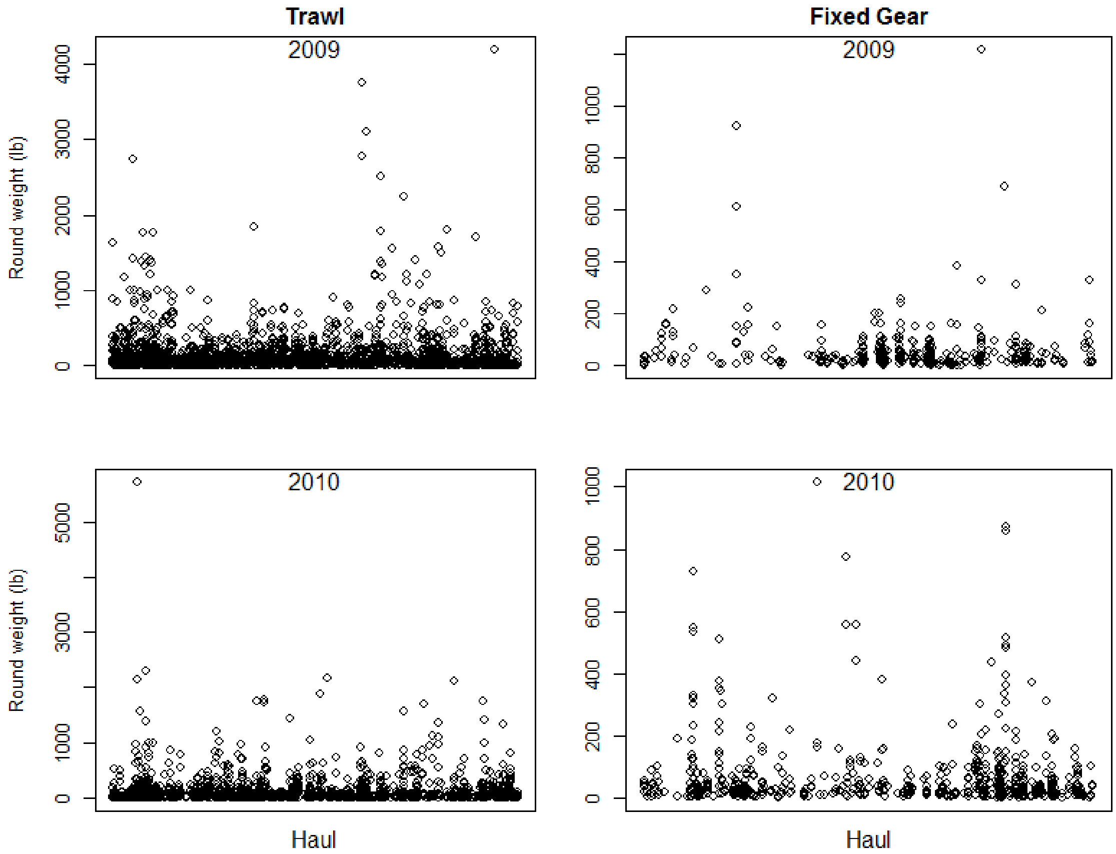

Figure C-19. Longnose skate catch (lbs.) by haul or set by limited entry non-whiting trawl (Trawl) and limited entry and open access fixed gear (Fixed Gear) during 2009 and 2010. Only positive tows were included. Data were acquired from the WCGOP.

Discard and retention weight per trip: Prior to 2008, most WCGOP observed limited entry non-whiting trawl trips showed higher maximum catches when discarding longnose skate than when retaining the species (Figure C-20). During this period, maximum longnose skate catch per trip was less than approximately 500 pounds when retained (except for 2002), while at the same time, maximum longnose skate catches for trips that discarded the species typically ranged from 2,000 pounds to nearly 10,000 pounds. This is supported by the 75th percentile for trips discarding and retaining longnose skate prior to 2008 – 75th percentiles were typically higher for trips that discarded longnose skate than for those that retained the species on for trawl vessels. One would expect the opposite if targeting occurred, or if fishers that discarded the catch (e.g., due to no market) chose to avoid or leave areas with high longnose skate concentrations.

Discard behavior changed for the limited entry non-whiting trawl sector during the 2008-2010 period, when larger hauls of longnose skate began to be retained. The range of longnose skate weight became more similar between retained and discarded trips beginning 2008, and the 75th percentile for trawl trips retaining longnose skate far exceeded those that discarded the species throughout trips. We suggest that this is a result of the increasing price per pound (and market) that began to develop for trawlers in 2007 for longnose skate (see Figure C-15 and Figure C-16).

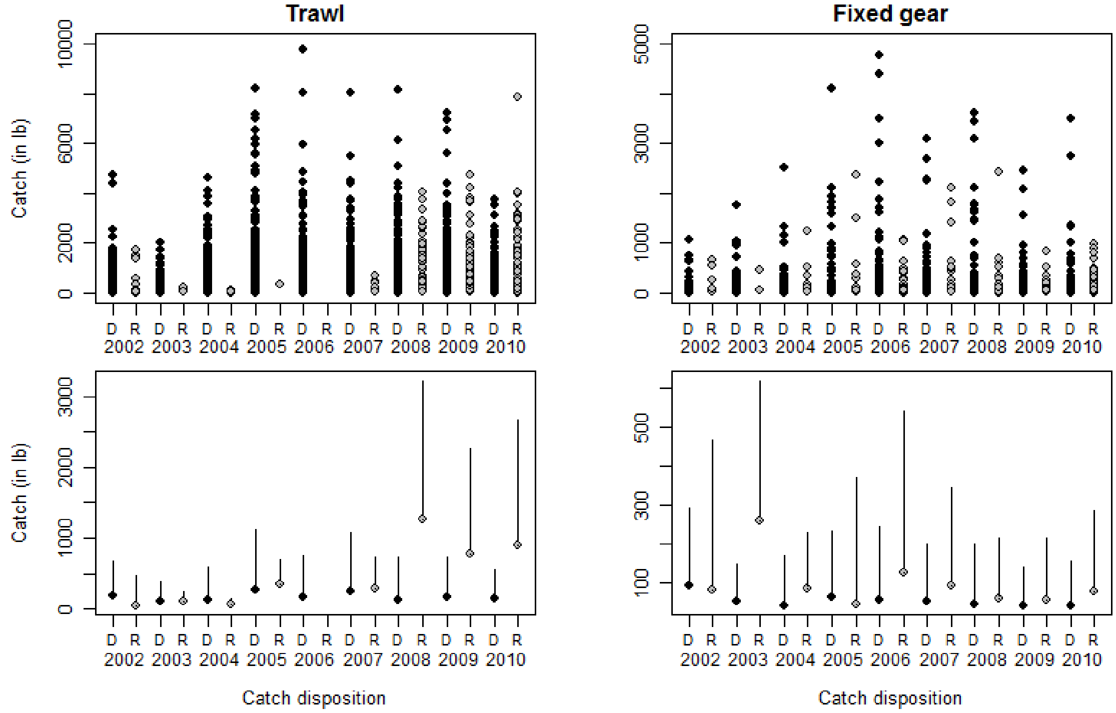

Figure C-20. Longnose skate catches by trips (top row) and median (point) and 75% quartile (upper end of vertical bars) catch values (bottom row) in observed trips that discarded (D; black points) or retained (R; gray points) longnose skate for years 2002-2010 for two gear types (columns).

Although we show trawlers retaining more longnose skate during 2008-2010 than during previous years (Figure C-20), we suggest that these data do not support the argument that fishermen began targeting "schools" of the species, but rather fishermen more frequently selected trawling sites with known concentrations of longnose skate along with other groundfish species. In these cases, they simply began retaining incidentally caught longnose skate more frequently. These results also suggest, however, that although the incidental catch and discard of longnose skate is typically low (e.g., low 75th percentile bars), many fishers that discard longnose skate remain in areas with relatively high skate catch rates (i.e., they do not avoid or leave these areas). If these fishermen opted to move from areas with high skate encounters, the range of discarded weights would be less than the range of retained weights.

The pattern of trips retaining longnose skate is different for the fixed gear sector than for the trawl sector. Differences in catch weight of longnose skate are slight between fixed-gear trips retaining and those trips discarding the species (Figure C-20). The median and 75th percentile of longnose skate catch per trip is much more similar between retained and discarded trips, although in general the 75th percentile is slightly higher for trips retaining longnose skate. Price per pound has not increased as dramatically for the fixed gear sectors as shown for the trawl sector (Table C-54). These data suggest that trip size is not a good predictor of longnose skate retention, suggesting that fixed gear fishers are not targeting longnose skate and are not moving out of areas with large concentrations of longnose skate even while discarding the catch.

Landing size of longnose skate relative to other groundfish: Another way to evaluate whether longnose skate are targeted is to compare the landed weight of longnose skate to the landed weight of all groundfish species by trip (Figure C-21). For those cases where longnose skate were landed, there was typically little relationship between longnose skate landings and total groundfish landings, except perhaps at the smallest landing levels. Longnose skate landings for the limited entry non-whiting trawl fishery were typically less than 6,000 pounds per trip (99% of the landings), whereas total groundfish landings for those trips typically exceeded 20,000 pounds, and reached 130,000 pounds (Figure C-21a). Landings for limited entry and open access fixed gear trips followed a similar trend but on a smaller scale (Figure C-21b). Most landings were less than 500 pounds for open access fixed gear (95% of the landings) and less than 1,000 pounds for limited entry fixed gear (93% of the landings). These landings were typically dominated by groundfish species other than longnose skate (Figure C-21b). Note that even for cases where landings of longnose skate were relatively large for fixed-gear trips (e.g., > 1,000 pounds per trip), longnose skate typically represented less than approximately 1/3 of the total groundfish landings per trip. These results, coupled with the results shown in Figure C-20, demonstrate that longnose skate are typically caught incidentally and landed with other groundfish species. Fishermen may opt, however, to remain in areas or select areas known for relatively high longnose skate concentrations, as demonstrated in Figure C-20 for trawl since 2008.

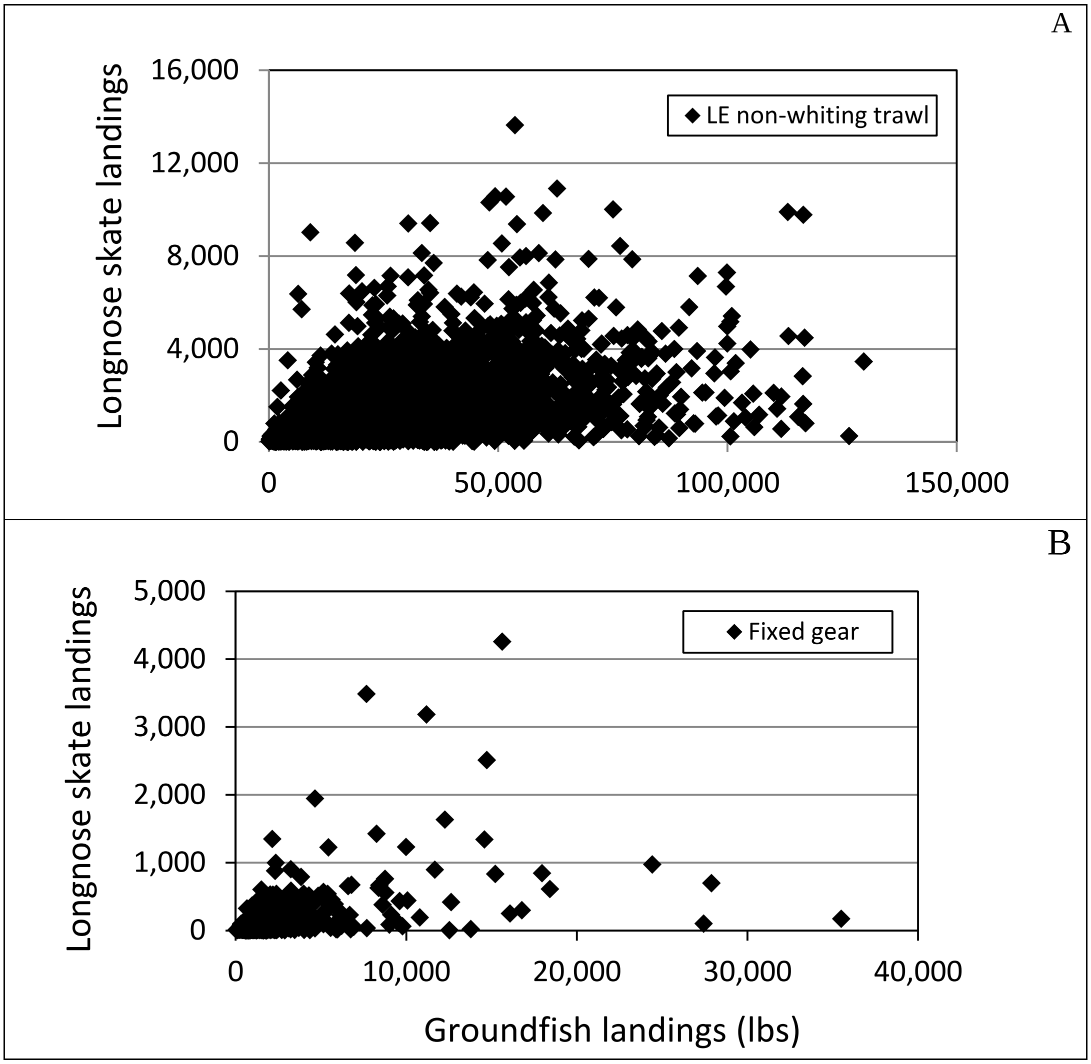

Figure C-21. Landing weight (pounds) of longnose skate and of all groundfish by trip during 2009-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear. Data were acquired from PacFIN.

Bimonthly Landings and Basis for the Selection of Alternative Trip Limits: Bimonthly landings of longnose skate over nearly a 3-year period (2009 – October 2011) by limited entry non-whiting trawl vessels are shown in Figure C-22. Cumulative bimonthly landings of longnose skate ranged from only a few pounds to nearly 40,000 pounds per vessel per bimonthly period. The pattern of bimonthly landings is somewhat linear until approximately 10,000-12,000 pounds, where vessels began landing increasingly more longnose skate relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited entry non-whiting trawlers (50^{th} percentile) were less than 3,810 pounds whereas the 75^{th} percentile of bimonthly landings resulted in 7,261 pounds. The 90^{th} percentile was 11,971 pounds. Three alternative bimonthly trip limits (=Options) for the limited entry non-whiting trawl fishery were identified based on approximate 50, 75, and 90 percentiles: 4,000, 7,000, and 12,000 pounds per bimonthly period.

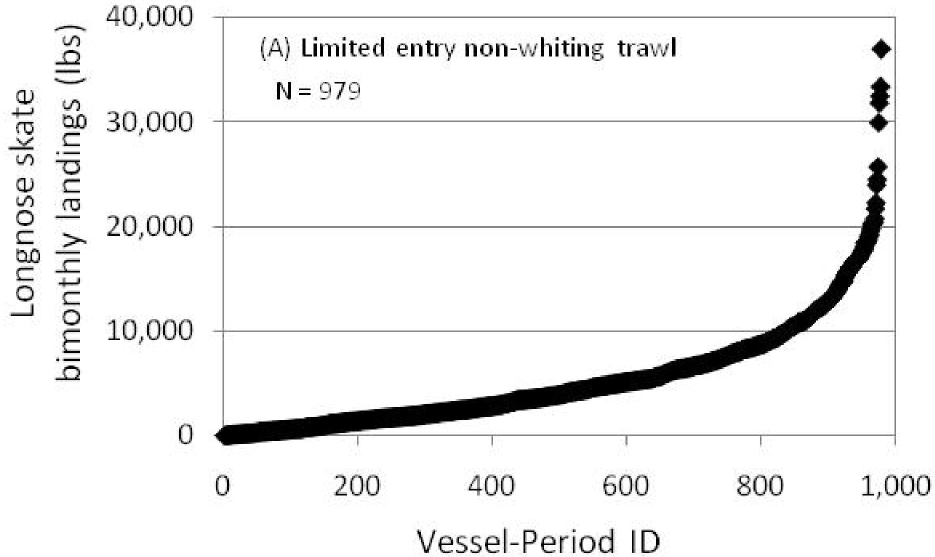

Figure C-22. Bimonthly landings (lbs.) of longnose skate by vessel and period for 2009 – October 2011 (sorted by bimonthly-landing size) for limited entry non-whiting trawl. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without longnose skate were excluded.

Bimonthly landings of longnose skate over nearly a 3-year period (2009 – October 2011) by fixed gear fisheries (limited entry and open access) are shown in Figure C-23. Nearly all cumulative bimonthly landings were less than 1,000 pounds for the open access fishery, whereas bimonthly landings for the limited entry fixed gear fishery reached nearly 6,000 pounds in some instances. The pattern of bimonthly landings for limited entry fixed gear fisheries (primarily non-nearshore fishery) is somewhat linear until approximately 500 pounds, when vessels began landing increasingly more longnose skate relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited fixed gear vessels (50^{th} percentile) were less than 187 pounds, whereas the 75^{th} percentile of bimonthly landings resulted in 482 pounds. The 90^{th} percentile was 1,040 pounds. We therefore identified three alternative bimonthly trip limits for the open access and limited entry fixed gear sectors based on these approximate 50, 75, and 90 percentiles: 200, 500, and 1,000 pounds per bimonthly period.

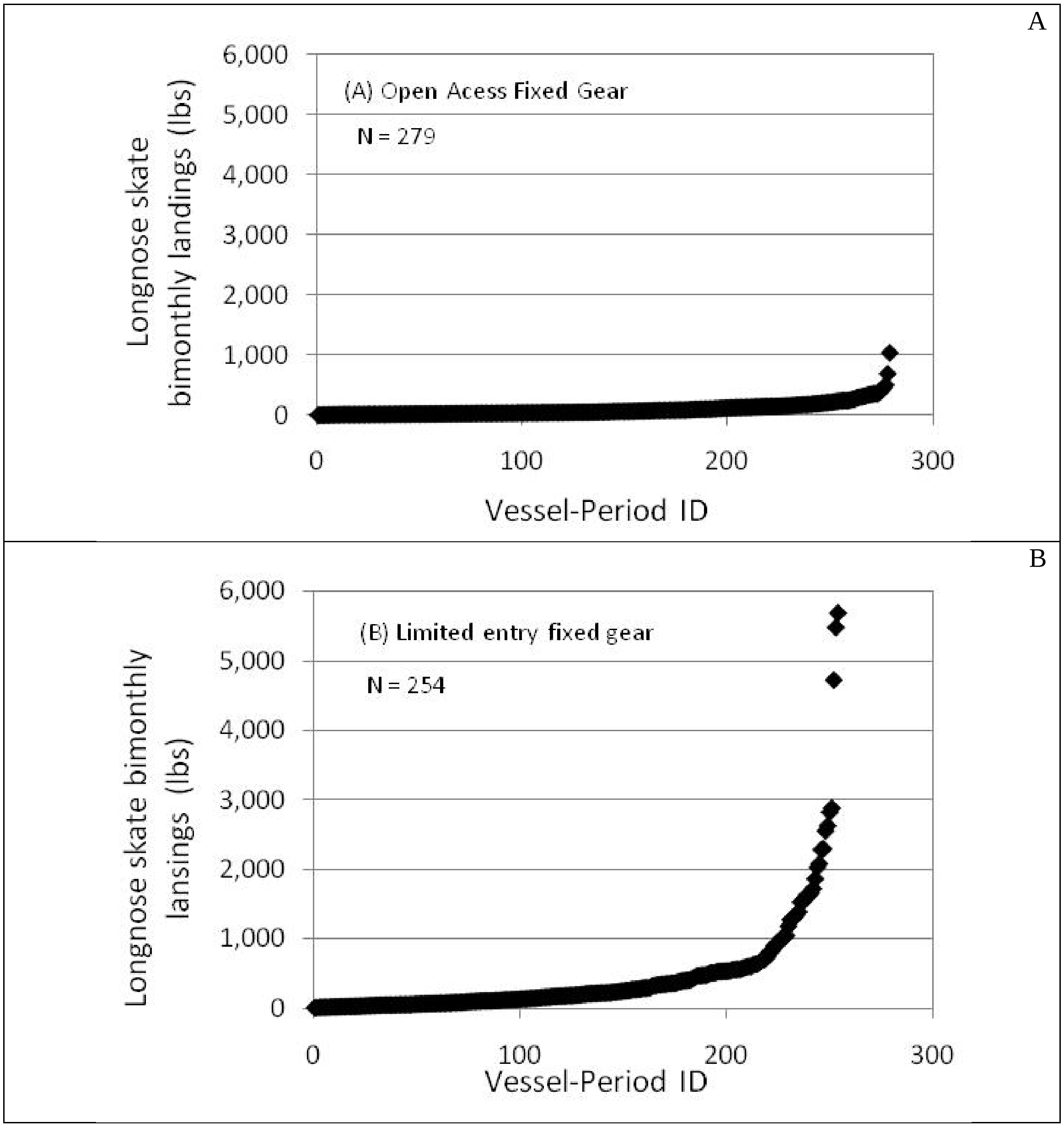

Figure C-23. Bimonthly landings (lbs.) of longnose skate by vessel and period for 2009 – October 2011 (sorted by bimonthly-landing size) for (A) Open access fixed gear, and (B) limited entry fixed gear. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without longnose skate were excluded.

Can trip limits reduce longnose skate mortality? It is uncertain how any reduction in landings may alter total mortality of longnose skate, because catch size is not a good predictor of retention. If the trip limit resulted in reduced targeting (or moving from areas with high concentrations of longnose skate), then some reduction in total mortality may occur. This analysis suggests that most longnose skate are incidentally caught while targeting other species, and are landed along with other groundfish species (Figure C-21). This is especially true for the limited entry trawl fishery, which contributes approximately 90% of the longnose skate catch coastwide (Table C-57). It is unlikely, therefore, that trip limits will have a large effect on encounter rates as long as conditions remain similar to the recent past (e.g., catch size has not been a good predictor of retention). It was pointed out, however, that the price (Figure C-15) and landings for longnose skate have recently increased, so trip limits may prevent the potential of increased targeting in the future. We acknowledge the potential for increased targeting (or reluctance to move from areas with high longnose skate catch) if prices and markets continue to develop.

A reduction in total mortality may occur if some proportion of discarded longnose skate survives, even if fishing behavior does not change (i.e., fishermen do not change their fishing location and strategy once reaching the trip limit). Although during previous years, catch accounting assumed discard mortality of 100% for longnose skate (e.g., Bellman et al. 2011), it is likely that some of the discarded skate survive. Gertseva and Schirripa (2008) suggested 50% discard mortality for longnose skate, and Enever et al. (2009) recently demonstrated short term mortality of 45% for skates caught and discarded by demersal trawlers. Effective March 2012, the assumed discard mortality rate for longnose skate is 50% (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012); hence, trip limits will likely reduce mortality even if fishermen behavior does not change.

Commercial catch rates by depth and identification of potential alternatives for depth-based management

West coast groundfish survey data showed highest densities of longnose skate to 300 fm, after which densities dropped precipitously (Table C-59). Limited entry non-whiting trawl and limited entry and open access fixed gear sets or hauls showed a similar pattern but perhaps more of an expanded pattern (Table C-60 and
Table C-61). Depending on the area, longnose skate catch and CPUEs during 2002-2010 were generally high until 250-350 fathoms, after which catches and CPUEs drop.

Interpretations of Table C-60 and
Table C-61 should be made with caution. These represent catches of longnose skates only during observed hauls, therefore, sample sizes are small and may not be representative of the fleet. These hauls also represent fishers targeting other groundfish specie while catching longnose skate incidentally (see above). Fishing patterns could change if prices continue to increase for this species. Finally, low catches at some depth strata are reflective of RCA restrictions rather than longnose skate density. For example, observed catches of longnose skate by trawl during 2002-2010 generally decline between 100-200 fm (Table C-60), where RCAs have commonly been implemented (Table C-54). Low observed catches of longnose skate due to RCAs are also apparent for fixed gear at depths less than 100 fm (north of 40^{o}10’ N. latitude) and depths less than 150 fm (south of 40^{o}10’ N. latitude). This demonstrates that the current RCA structure already prevents the capture of longnose skate across depth ranges where there densities are high (see Table C-59).

Table C-60. Observed catch of longnose skate (mt) north of 45°46’ N. latitude by depth (fm) for fixed gear and trawl sets (or hauls) for 2002-2010.

	Fixed Gear				Trawl			
Area 1	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
North of 48°10'	0-100	0	0.0%	0.00	0-100	17,485	26.9%	6.14
	100-150	2,906	15.7%	7.50	100-150	33,967	52.3%	14.02
	150-200	3,635	19.7%	6.49	150-200	12,637	19.4%	29.28
	200-250	3,706	20.1%	5.37	200-250	86	0.1%	2.23
	250-300	4,948	26.8%	4.68	250-300	496	0.8%	3.01
	300-350	2,413	13.1%	3.63	300+	322	0.5%	2.64
	350+	872	4.7%	5.56				
	Total	18,481				64,993		

Area 2	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
48°10' to 45°46'	0-50	0	0	0.00	0-50	11,673	0	17.90
	50-100	112	0.1%	14.89	50-100	274,683	44.7%	10.59
	100-150	36,992	27.7%	9.18	100-150	51,708	8.4%	13.54
	150-200	47,247	35.4%	8.44	150-200	17,476	2.8%	10.89
	200-250	31,182	23.4%	7.95	200-250	94,579	15.4%	11.54
	250-300	12,632	9.5%	5.60	250-300	99,454	16.2%	10.66
	300-350	4,008	3.0%	5.63	300-350	49,768	8.1%	5.90
	350-400	676	0.5%	6.15	350-400	12,481	2.0%	3.57
	400+	490	0.4%	3.56	400-450	2,795	0.5%	3.92
					450-500	217	0.0%	2.36
					500+	126	0.0%	2.85
	Total	133,340			Total	614,961		

Table C-61. Observed catch of longnose skate (mt) south of 45°46' N. latitude by depth (fm) for fixed gear and trawl sets for 2002-2010.

Area 3	Fixed Gear Depth (fm)	Catch (lb.)	%	CPUE	Trawl Depth (fm)	Catch (lb.)	%	CPUE
45°46 to 40°10	0-150	15,832	0	12.29	0-100	112,267	0	9.79
	150-200	35,620	38.7%	8.13	100-150	47,314	7.3%	10.28
	200-250	28,431	30.9%	9.98	150-200	5,417	0.8%	8.70
	250-300	10,466	11.4%	11.19	200-250	182,844	28.1%	11.95
	300+	1,766	1.9%	5.40	250-300	202,704	31.2%	10.00
					300-350	83,093	12.8%	5.64
					350-400	11,342	1.7%	3.33
					400-450	4,080	0.6%	3.93
					450-500	114	0.0%	1.57
					500-550	146	0.0%	3.28
					550-600	270	0.0%	2.06
					600	91	0.0%	2.36
	Total	92,115			Total	649,683		

Area 4	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
South of 40°10'	0-100	18	0.0%	1.15	0-50	2,107	0.4%	2.30
	100-150	0	0.0%	0.00	50-100	86,473	15.7%	8.34
	0-200	264	0.5%	8.38	100-150	85,675	15.5%	18.58
	200-250	5,630	11.0%	7.36	150-200	23,807	4.3%	12.97
	250-300	10,881	21.3%	8.17	200-250	105,945	19.2%	20.54
	300-350	26,730	52.3%	4.50	250-300	112,195	20.4%	19.55
	350-400	6,079	11.9%	2.62	300-350	106,087	19.2%	17.42
	400-450	654	1.3%	1.17	350-400	19,930	3.6%	5.62
	450-500	471	0.9%	2.06	400-450	5,447	1.0%	3.85
	500-550	268	0.5%	1.44	450-500	1,777	0.3%	2.70
	550-600	63	0.1%	1.56	500-550	1,391	0.3%	3.15
	600+	63	0.1%	1.04	550+	441	0.1%	3.14
	Total	51,122				551,276		

Depth restrictions in addition to current No Action RCAs (see Table C-54 and Table C-55) may reduce the catch (or catch rates) of longnose skate relative to status quo. For trawl, 15-30% of the longnose skate catch occurs between 200 and 250 fm south of 48°10' N. latitude, where CPUEs were among the highest (Table C-54 and Table C-55). Extending the seaward RCA from 200 to 250 fm may therefore reduce longnose skate catch. Actions could also be taken shoreward of the RCA to reduce catches (or catch rates) of longnose skate; 44% of the observed longnose skate caught between 40°10' and 45°46' was at 50-100 fm during 2002-2010, where CPUEs were also relatively high (Table C-60). The shoreward trawl

RCA was typically 75 fm in this area (Table C-54), which suggests that moving the trawl RCA from 75 to 50 fm may reduce catch (or catch rates) of longnose skate.

Adjusting RCAs to prevent catches by fixed gear fisheries would provide less of a savings than adjustments made to trawl fisheries, because fixed gear catches represent only approximately 10% of the longnose skate catch (Table C-57). Nonetheless, additional depth restrictions may reduce catch of longnose skate by fixed gear sectors. Approximately 16–28% of the longnose skate catch occurs between 100 and 150 fm north of 45°46' N. latitude (Table C-60). Implementing a 150 fm RCA coastwide may therefore reduce catches of longnose skate for these sectors.

There is great uncertainty regarding the level of savings that may occur by extending the trawl RCAs seaward to 250 fm (i.e., whether total mortality would be reduced). Longnose skate are incidentally caught while fishers target other species (e.g., Dover sole, sablefish, thornyheads; Figure C-21). Moving the RCA deeper to 250 fm would require fishers to target the other groundfish species at more restrictive depths and potentially less productive grounds, while continuing to catch longnose skate incidentally. Longnose skate are still abundant seaward of 250 fm (Table C-59), and commercial logbook data (Figure C-24) and observer data (Table C-60 and
Table C-61) demonstrate that longnose skate are commonly caught outside of 250 fm. Because catch rates for target species may decrease if the most productive fishing grounds are closed, fishing effort (number of hauls or sets) may increase in order to attain the quota pounds of target species (under the IFQ fishery) or tier limits (for the limited entry sablefish fishery). This increased fishing effort could ultimately eliminate any potential savings of longnose skate by moving the RCA to 250 fm; these potential catches are difficult to predict.

A 300 fm seaward depth restriction for trawl would clearly reduce catches of longnose skate. Although some commercial catches continue to occur beyond 300 fm (Table C-60 and
Table C-61), longnose skate densities drop to exceptionally low levels beyond this depth contour (Table C-59).

Two depth restriction options are analyzed herein: (a) move the shoreward trawl RCA from 75 fm to 50 fm between 45°46' and 48°10' N. latitude and (b) move the seaward trawl RCA from 200 (or 150 fm) to 300 fm. The potential benefits to the longnose skate resource of moving the seaward RCA to depths shallower than 300 fm (e.g., 250 fm) is uncertain and cannot be predicted.

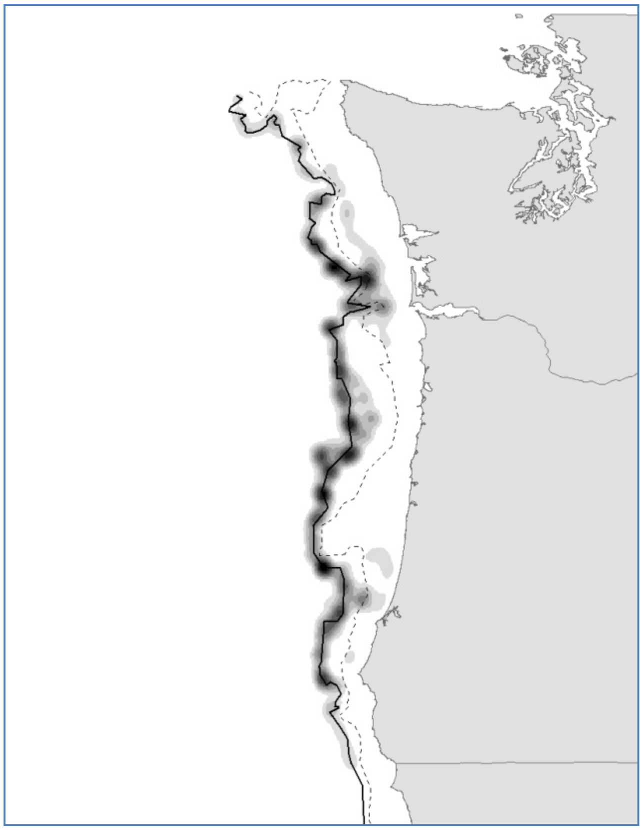

Figure C-24. Distribution of limited entry non-whiting trawl tows (shaded areas) where longnose skate were retained and recorded in logbooks during 2010.

Note: Darker shading represents higher number of tows with longnose skate. Dashed line = 75 fm line; Solid line = 250 fm line. RCA lines were included for reference only. Data was acquired from the PacFIN data base. Only hauls where a hail weight was recorded are included.

Comparison of Management Options

No Action

No Action, management measures are shown for longnose skate in Table C-53, Table C-54, and Table C-55. Trip limits would remain unlimited, and RCAs shown for 2012 in Table C-54 and Table C-55 would remain in place. These measures could be modified inseason through routine management measures to slow landings if necessary.

Under No Action, longnose skate would continue to be sorted and reported to species on state landing reports and federal fish tickets. Historical discard rates would be used inseason for catch projections and the basis for trip limit adjustments. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard rates provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

Biological Impacts: Under No Action, one can assume that total catch and discards of longnose skate would be similar to recent historical levels. Assuming 50% discard mortality, total fishing mortality during 2009 and 2010 (1,120 and 1,182 mt, respectively; Table C-51) would be less than the 2013 preferred ACL (2,000 mt) and the 2013 No Action ACL (1,349 mt) analyzed in the DEIS (Table C-56). Hence, mortality under No Action may not be substantial, assuming catch and discard in 2013 and 2014 are similar to those observed during 2009-2010.

Socioeconomic impacts:

Affected Fisheries: The primary fisheries affected by status quo trip limits and RCAs are limited entry non-whiting trawl, limited entry non-nearshore fixed gear, and open access non-nearshore fixed gear. Approximately 90% of the recent historical catch (landings + discard) has been made by the limited entry non-whiting trawl fishery, and approximately 10% has been made by non-nearshore fixed gear sectors; other sectors are less affected (Table C-54). This is a limited entry non-whiting trawl dominant fishery.

Even though historical catch and discard levels suggest no biological impact under No Action (see above), the potential of exceeding sector-specific allocations or HGs must be evaluated. If allocations or HGs are projected to be exceeded, then sector-specific trip limits or other management measures may be needed (see options below). The 2013 and 2014, the Council recommended HGs for shoreside trawl are 1,739 mt (for PREFERRED ACL) and 1,154 mt (for No Action ACL; Table C-62). Total mortality for this sector, using an assumed discard mortality rate of 50%, ranged from 1,025 – 1,106 mt, which is less than the HG. The estimated total mortality for non-trawl fisheries (65 – 91 mt assuming 50% discard mortality) under No Action is less than the preferred non-trawl HG (193.8 mt), but higher than the No Action allocation (61 mt). Hence, additional management measures would be needed to reduce total mortality for non-trawl fisheries if the No Action ACL for longnose skate is selected (see Options below).

Table C-62. 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) under two ACLs analyzed within the DEIS. Expected range of total mortality by sector is shown for comparison (minimum and maximum). Expected mortality was calculated using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear.

Option	ACL	Shoreside trawl HG	No Action shoreside trawl total mortality (50% discard mortality)	Non-trawl HG	No Action non-trawl total mortality (50% discard mortality)
Preferred	2,000	1,739	1,025 – 1,106	193.8	65 - 91
No Action	1,346	1,154		61	

Distribution of Fishery Effort: Approximately 84% of longnose skate catch (landings + discard) occurs north of 40°10’ N. latitude (Figure C-13); most longnose skate landings occur in the Columbia INPFC area (Figure C-17). Approximately 64% of longnose skate landings by the limited entry non-whiting trawl fishery were made within the Columbia INPFC area (Figure C-17). These trawl landings also occurred to a lesser extent in other INPFC areas (e.g. 12% and 19% in Vancouver and Eureka areas, respectively). Limited entry and open access fixed gear landings of longnose skate were primarily in Columbia (39%), Eureka (30%), and Vancouver (15%) INPFC areas (Figure C-17).

Importance to port groups/communities: Longnose skate are typically delivered as part of mixed groundfish complex (primarily caught seaward of the current RCA), and represent a small percentage of total groundfish landings. Primary trawl deliveries (2009-2011) were made to Oregon ports (Columbia River, Newport, and Coos Bay area ports; 34%, 20%, and 20.8%, respectively), and to a lesser extent to Eureka area ports (10.6%) (Table C-55; Figure C-18). Longnose skate caught by fixed gear were primarily landed at Coos Bay (34%), Brookings (24%), and North Puget Sound (12%) area ports during 2009-2011 (Table C-64; Figure C-17).

Ex-vessel value of the landings by port group are shown in Table C-63. Landings from January 2009 – October 2011 = 2.83 years) were averaged as annual landings (i.e., by dividing the total landed weight by 2.83). Landings were then converted to value by multiplying by the average sector-specific landed weight (pounds) by the 2011 average price per pound shown in Figure C-15. The average revenue, calculated using this method, was $602,744 for limited entry non-nearshore trawl and $13,748 for limited entry and open access fixed gear (Table C-55). Top three average annual revenues by gear/sector ranged from $120,899 (Newport area ports) to $205,080 (Columbia River Oregon area ports) for trawl and $1,625 (Northern Puget Sound area ports) to $4,690 (Coos Bay area ports) for fixed gear (Table C-63).

Table C-63. Revenue and percent contribution of longnose skate landings by port group area.

Gear/sector	Port-area group	2009-2011 Weight landed (lbs.)	Percent by area	Annual weight landed (Average; lbs.)	2011 Average price per pound ($)	Average annual revenue ($)
LE Trawl	CLO	1,813,678	34.0%	640,876	0.32	$205,080
	NPA	1,068,757	20.0%	377,653	0.32	$120,849
	CBA	1,110,461	20.8%	392,389	0.32	$125,564
	ERA	565,813	10.6%	199,934	0.32	$63,979
	Remaining	771,805	14.5%	272,723	0.32	$87,271
	TOTAL	5,330,514	100.0%	1,883,574	0.32	$602,744
Fixed gear	NPS	16429	0.12	5,805	0.28	$1,625
	CBA	47407	0.34	16,752	0.28	$4,690
	BRA	33108	0.24	11,699	0.28	$3,276
	Remaining	42012	0.30	14,845	0.28	$4,157
	TOTAL	138,956	1.00	49,101	0.28	$13,748

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; Fixed Gear = limited entry and open access groundfish fixed gear. Port group areas are: CBA = Coos Bay; CLO – Columbia River Oregon; ERA = Eureka; NPA = Newport; NPS = North Puget Sound; BRA = Brookings. Other port groups were combined into "Remaining". The number of remaining port groups were 12 for LE trawl and 10 for fixed gear.

Options 1 – 5 (general)

Under all of the following management options, longnose skate would continue to be sorted and reported to species on state landing reports and federal fish tickets. Inseason catch accounting and basis for trip limit and/or RCA adjustments will be made using: (a) historical discard rates with near real-time bycatch updates from the WCGOP observer program for the IFQ fishery to improve precision as the year proceeds and/or (b) historical discard amounts (average annual discard beginning 2009) added to landings data provided by PacFIN. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard amounts provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

Option 1 – High Trip Limit: Reduce the longnose skate bimonthly trip limit from unlimited to (a) 12,000 pounds/2 months for limited entry non-whiting trawl and (b) 1,000 pounds/2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 1 (high-trip limit) relative to No Action are shown in Table C-64 for longnose skate (trawl and fixed gear). In this case, trip limits were 12,000 pounds/2 months for limited entry non-whiting trawl and 1,000 pounds/2 months for fixed gear sectors. These trip limits represent the 90th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery. Small adjustments were made to PacFIN data downloaded for this table to allow for direct comparison with Table C-63. Longnose skate weights shown here were increased by factors of 3.19% (trawl) and 0.58% (fixed gear). PacFIN queries were made at different times for this analysis and the analysis shown in Table C-63 resulting in the small differences that were standardized (scaled) using the factors shown above.

Table C-64. Option 1 "high" trip limits for longnose skate and potential landings and lost revenue relative to No Action. Trip limits were selected based on the 90th percentile of landings over the period 2009 – October 2011 (see Figure C-22 and Figure C-23).

Gear/sector & Option	Bi-monthly trip limit (lbs.)	2009-2011 bimonthly trip limits exceeded (%)	2009-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 1 average annual landings (lbs.)	Option 1 average amount discarded or avoided due to trip limits (lbs.)	Option 1 average annual revenue lost ($)
No Action							
OA FG	Unl.	0%	0%	9,382			
LE FG	Unl.	0%	0%	39,721			
LE Trawl	Unl.	0%	0%	1,883,511			
TOTAL				1,932,614			
Option 1							
OA FG	1,000	0.4%	0.2%		9,366	16	$5
LE FG	1,000	11.0%	28.3%		28,500	11,221	$3,142
LE Trawl	12,000	9.9%	9.0%		1,713,884	169,627	$54,280
TOTAL					1,751,750	182,854	$57,427

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings (see above). Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 182,854 pounds (83 mt), or 9.5% for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings combined (Table C-64). If fishers' behavior remained unchanged, and assuming discard mortality were 50%, then total mortality may be reduced by 91,427 pounds (42 mt) for trawl and fixed gear combined relative to No Action. Total mortality would be reduced even more (to a maximum of 83 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of longnose skate (i.e., so that no additional discarding were caused by trip limits).

Under Option 1, the total fishing mortality (all sectors) would be 42 – 83 mt lower than shown under No Action; estimated total mortality for all fisheries shown in Table C-51 would therefore be reduced to a range of 1,037 - 1,140 mt, which is less than both preferred and No Action ACLs analyzed herein (2,000 and 1,349 mt, respectively).

Socioeconomic Impacts: Approximately 10% of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings may be affected by Option 1 trip limits (Table C-64; Figure C-22 and Figure C-23). Open access fisheries would largely be unaffected relative to No Action (Table C-64). Reducing trip limits from unlimited to 12,000 pounds bimonthly for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 9% (= 169,627 pounds or 78 mt) relative to No Action. Reducing trip limits from unlimited to 1,000 pounds bimonthly for fixed gear sectors could reduce landed pounds by 28.3% for the limited entry fixed gear sector (11,221 pounds or 5 mt reduction relative to No Action) and 0.2% for the open access fixed gear sector (16 pounds or 0.007 mt reduction relative to No Action).

The estimated value of longnose skate revenue forgone under Option 1 relative to No Action is $57,427 ($3,147 for fixed gear and $54,280 for trawl). Oregon port groups would be most impacted by longnose skate trip limits (Table C-63).

The only sector that may require trip limits to keep its mortality below its HG is the non-trawl fishery if the No Action ACL (61 mt) is selected (Table C-65) Trip limits described under Option 1 may not keep the total mortality by this sector (expected range = 60 – 89 mt) below its No Action allocation. Trip limits may not be required for non-trawl if the preferred HG is adopted and may not be required for shoreside trawl under either alternative (preferred or No Action).

Table C-65. Expected range of total mortality by sector under Option 1, along with 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) for comparison.

Option	ACL	Shoreside trawl HG	Option 1 shoreside trawl total mortality (50% discard mortality)	Non-trawl HG	Option 1 non-trawl total mortality (50% discard mortality)
Preferred	2,000	1,739	947 – 1,067	193.8	60 - 89
No Action	1,346	1,154		61	

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear (see Table C-51). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with a 50% discard mortality rate) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 2 – Moderate Trip Limits: Reduce the longnose skate bimonthly trip limit from unlimited to (a) 7,000 pounds/2 months for limited entry non-whiting trawl and (b) 500 pounds/2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 2 (moderate-trip limit) relative to No Action are shown in Table C-66 for longnose skate (trawl and fixed gear). In this case, trip limits were 7,000 pounds/2 months for limited entry non-whiting trawl and 500 pounds/2 months for fixed gear sectors. These trip limits represent the 75th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery. Small adjustments were made to PacFIN data downloaded for this table to allow for direct comparison with Table C-63. Longnose skate weights shown here were increased by factors of 3.19% (trawl) and 0.58% (fixed gear). PacFIN queries were made at different times for this analysis and the analysis shown in Table C-63 resulting in the small differences that were that were standardized (scaled) using the factors shown above.

Table C-66. Option 2 "moderate" trip limits for longnose skate and potential landings and lost revenue relative to No Action. Trip limits were selected based on the 75th percentile of landings over the period 2009 – October 2011 (see Figure C-22Figure C-23).

Gear/sector & Option	Bi-monthly trip limit (lbs.)	2009-2011 bimonthly trip limits exceeded (%)	2009-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 2 average annual landings (lbs.)	Option 2 average amount discarded or avoided due to trip limits (lbs.)	Option 2 average annual revenue lost ($)
No Action							
OA FG	Unl.	0%	0%	9,382			
LE FG	Unl.	0%	0%	39.721			
LE Trawl	Unl.	0%	0%	1,883,511			
TOTAL				1,932,614			
Option 2							
OA FG	500	1.1%	2.8%		9,117	265	$74
LE FG	500	24.8%	40.8%		23,524	16,197	$4,535
LE Trawl	7,000	26.3%	24.8%		1,415,825	467,686	$149,670
TOTAL					1,448,466	484,148	$154,279

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings (see above). Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce longnose skate landings by 484,148 pounds (219 mt), or 25% for limited entry non-whiting trawl and groundfish fixed gear fisheries landings combined (Table C-66). If fishers' behavior remained unchanged, and assuming discard mortality were 50%, then total mortality may be reduced by 242,074 pounds (110 mt) relative to No Action. Total mortality would be reduced even more (to a maximum of 219 mt) if this trip limit caused fishermen to reduce targeting or fishing in areas with high concentrations of longnose skate (i.e., so that no additional discarding were caused by trip limits).

Under Option 2, the total fishing mortality (all sectors) would be 110 – 220 mt lower than shown under No Action; estimated total mortality for all fisheries shown in Table C-51 would be reduced to range of 901 – 1,072 mt, which is less than both preferred and No Action ACLs analyzed herein (2,000 and 1,349 mt, respectively).

Socioeconomic Impacts: Approximately 25% of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings may be affected by Option 2 trip limits (Table C-66; Figure C-22 and Figure C-23). Only approximately 1% of the open access bimonthly landings (number) may be affected by this trip-limit option relative No Action (Table C-66). Reducing trip limits from unlimited to 7,000 pounds bimonthly for the limited entry non-whiting trawl sector would reduce landed pounds for that sector by 24.8% (= 467,686 pounds or 212 mt) relative to No Action. Reducing trip limits from unlimited to 500 pounds bimonthly for fixed gear sectors would reduce landed pounds by 40.8% for the limited entry fixed gear sector (= 16,197 pounds or 7 mt relative to status quo) and 2.8% for the open access fixed gear sector (265 pounds or 0.1 mt relative to No Action).

The estimated value of longnose skate revenue forgone under Option 2 relative to No Action is $154,279 ($4,609 for fixed gear and $149,670 for trawl). Oregon port groups would be most impacted by longnose skate trip limits (Table C-63).

The only sector that may require trip limits to keep its mortality below its HG is the non-trawl fishery if the No Action ACL (61 mt) is selected (Table C-67) Trip limits described under Option 2 may not keep the total mortality by this sector (expected range = 58 – 88 mt) below its No Action allocation. Trip limits may not be required for non-trawl if the preferred HG is adopted and may not be required for shoreside trawl under either alternative (preferred or No Action).

Table C-67. Expected range of total mortality by sector under Option 2, along with 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) for comparison.

Option	ACL	Shoreside trawl HG	Option 2 shoreside trawl total mortality (50% discard mortality)	Non-trawl HG	Option 2 non-trawl total mortality (50% discard mortality)
Preferred	2,000	1,739	813 - 961	193.8	58 - 88
No Action	1,346	1,154		61	

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear (see Table C-51). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with a 50% discard mortality rate) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 2 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 3 – Low Trip Limits: Reduce the longnose skate bimonthly trip limit from unlimited to (a) 4,000 pounds/2 months for limited entry non-whiting trawl and (b) 200 pounds/2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 3 (low-trip limit) relative to No Action are shown in Table C-68 for longnose skate (trawl and fixed gear). In this case, trip limits were 4,000 pounds/2 months for limited entry non-whiting trawl and 200 pounds/2 months for fixed gear sectors. These trip limits represent the 50^{th} percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery. Small adjustments were made to PacFIN data downloaded for this table to allow for direct comparison with Table C-63. Longnose skate weights shown here were increased by factors of 3.19% (trawl) and 0.58% (fixed gear). PacFIN queries were made at different times for this analysis and the analysis shown in Table C-63 resulting in the small differences that were that were standardized (scaled) using the factors shown above.

Table C-68. Option 3 "low" trip limits for longnose skate and potential landings and revenue relative to No Action. Trip limits were selected based on the 50th percentile of landings over the period 2009 – October 2011 (see Figure C-22Figure C-23).

Gear/sector & Option	Bi-monthly trip limit (lbs.)	2009-2011 bimonthly trip limits exceeded (%)	2009-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 3 average annual landings (lbs.)	Option 3 average amount discarded or avoided due to trip limits (lbs.)	Option 3 average annual revenue lost ($)
No Action							
OA FG	Unl.	0%	0%	9,382			
LE FG	Unl.	0%	0%	39,721			
LE Trawl	Unl.	0%	0%	1,883,511			
TOTAL				1,932,614			
Option 3							
OA FG	200	12.2%	16.2%		7,862	1,520	$426
LE FG	200	48.4%	68.0%		12,730	26,991	$7,558
LE Trawl	4,000	48.3%	45.6%		1,024,422	859,089	$274,909
TOTAL					1,045,014	887,520	$282,893

Note: Annual-landed weights were calculated by averaging the 2009 – October 2011 landings (see above). Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 887,520 pounds (402 mt), or 46% for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries combined (Table C-68). If fishers' behavior remained unchanged, and assuming discard mortality were 50%, then total mortality may be reduced by 443,760 pounds (201 mt) relative to No Action. Total mortality would be reduced even more (to a maximum of 402 mt) if this trip limit caused fishermen to reduce targeting or fishing in areas with high concentrations of longnose skate (i.e., so that no additional discarding were caused by trip limits).

Under Option 3, the total fishing mortality (all sectors) would be 201 – 402 mt lower than shown under No Action; estimated total mortality for all fisheries shown in Table C-51 would be reduced to a range of 718 – 981 mt, which is less than both preferred and No Action ACLs analyzed herein (2,000 and 1,349 mt, respectively).

Socioeconomic Impacts: Approximately 50% of the limited entry fixed gear and limited entry non-whiting trawl fleet may be affected by Option 3 trip limits, whereas 12% of the open access bimonthly landings (number) may be affected by this trip-limit option relative to No Action (Table C-68; Figure C-22 and Figure C-23). Reducing trip limits from unlimited to 4,000 pounds bimonthly for the limited entry non-whiting trawl sector would reduce landed pounds for that sector by 45.6% (= 859,089 pounds or 390 mt) relative to No Action. Reducing trip limits from unlimited to 200 pounds bimonthly for fixed gear sectors would reduce landed pounds by 68% for the limited entry fixed gear sector (= 26,991 pounds or 12 mt relative to No Action) and 16.2% for the open access fixed gear (= 1,520 pounds or 0.7 mt relative to No Action).

The estimated value of longnose skate revenue forgone under this Option 3 relative to No Action is $282,893 ($7,984 for fixed gear and $274,909 for trawl). Oregon port groups would be most impacted by longnose skate trip limits (Table C-63).

The only sector that may require trip limits to keep its mortality below its HG is the non-trawl fishery if the No Action ACL (61 mt) is selected (Table C-69) Trip limits described under Option 3 may not keep the total mortality by this sector (expected range = 52 – 85 mt) below its No Action allocation. Trip limits may not be required for non-trawl if the preferred HG is adopted and may not be required for shoreside trawl under either alternative (preferred or No Action).

Table C-69. Expected range of total mortality by sector under Option 3, along with 2013 and 2014 longnose skate ACLs and HGs for non-trawl and shoreside trawl (also see Tables 2-11 and 2-12) for comparison.

<table>
<tr><th>Option</th><th>ACL</th><th>Shoreside trawl HG</th><th>Option 3 shoreside trawl total mortality (50% discard mortality)</th><th>Non-trawl HG</th><th>Option 3 non-trawl total mortality (50% discard mortality)</th></tr>
<tr><td>Preferred</td><td>2,000</td><td>1,739</td><td rowspan="2">635 - 991</td><td>193.8</td><td rowspan="2">52 - 85</td></tr>
<tr><td>No Action</td><td>1,346</td><td>1,154</td><td>61</td></tr>
</table>

Expected mortality was initially calculated by using historical catch and discard presented for 2009 and 2010 by Bellman et al. (2010 and 2011) while assuming 50% discard mortality for trawl and non-trawl gear (see Table C-51). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with a 50% discard mortality rate) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 3 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

<u>Option 4 – Extend Seaward Trawl RCA Deeper:</u> Extend trawl seaward RCA to 300 fm coastwide.

Biological Impact: Extending the trawl RCA from 150 or 200 fm to 300 fm coastwide may decrease encounters with longnose skate substantially. Approximately 15.9% of the longnose skate observed catch (coastwide) was made seaward of 300 fm by observed trawl trips where CPUEs were relatively low (Table C-60 and
Table C-61). The density of longnose skate was also shown to drop to low levels seaward of 300 fm (Table C-59).

The actual savings in total catch of longnose skate under this management measure cannot estimated from the data obtained WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource. However, it is expected that longnose skate mortality under Option 4 will be substantially less than under No Action.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. Maximum revenues are shown in Table C-64; the direct loss would be something less than ~$600,000, and would likely be in the low $100,000's. Most of this loss would be incurred by the Oregon trawl fleet. The loss in longnose skate landings revenue may be lower than anticipated, however, because landings may be more of a function of market than encounters for this species (see above), at least in the recent past.

Any direct revenue loss due to a reduction in longnose skate landings may be inconsequential relative to other associated economic and safety impacts of a seaward RCA change. This measure would (a) force fishers off some of their most productive fishing grounds and on to less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) require fishers to travel greater distances and spend more time on the water to catch targeted species at levels similar to status quo, and (d) concentrate fishers into a smaller fishing area, resulting in likelihood of increased gear impacts. These impacts will either reduce landings of target species (e.g., sablefish, Dover sole, thornyheads), or increase time and expense (e.g., fuel, number of trips, and days at sea) to maintain status quo landings of target species. The additional time at sea, running distance, and potential gear conflicts also may result in increased accidents at sea. The impact to communities under alternative 4, based on these criteria, would be severe and substantial relative to No Action and relative to Options 1 – 3.

<u>Option 5 – Extend Shoreward Trawl RCA Shallower</u>: Extend shoreward trawl RCAs from 75-100 fm to 50 fm between 45^{o}46’ and 48^{o}10’ N. latitude.

Biological Impact: Extending the shoreward trawl RCA from 75-100 fm to 50 fm between 45^{o}46’ and 48^{o}10’ N. latitude may decrease encounters with longnose skate (Table C-60). The actual savings in total catch of longnose skate under this management measure cannot be estimated from the data obtained WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource. Although uncertain, the reduction in dogfish mortality may be great relative to No Action, but less than Option 4.

Impacts to communities: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. Most revenue loss would be incurred by the Oregon trawl fleet. The loss in longnose skate landings revenue may be lower than anticipated, however, because landings may be more of a function of market than encounters for this species (see above), at least in the recent past.

Any ex-vessel revenue loss caused by reduced landings of longnose skate (due to RCAs) may be small relative to other economic and safety impacts associated with moving the shoreward trawl RCA to 50 fm. This measure would (a) force fishers off some of their most productive fishing grounds in the nearshore area and onto less productive areas within the nearshore, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) concentrate fishers into a smaller area, resulting in likelihood of increased gear conflicts, (d) reduce or eliminate the catch of flatfish species that are primarily found between 50 and 100 fm, and (e) create gear conflicts and potential competition with nearshore fixed gear fisheries. The impact to communities under Option 5, based on these, would be severe relative to the No Action option and Options 1 – 3.

Other Potential Management Measures and Considerations

Other management measures or considerations are available to reduce fishing mortality for longnose skate. The alternatives provided above may reduce longnose skate catch, but may result in a high cost to communities and fishers (especially RCA changes). The following considerations may reduce mortality of longnose skate with lower associated impacts to communities than those described in alternatives 1-5.

- Gear modifications may reduce fishing mortality of longnose skate. For example, flexible grates and escape panels (e.g., halibut excluders) have been shown to effectively allow escapement of skate at fishing depth while retaining most target species that enter the net. These types of potential management measures could be further explored and considered as a regulatory or a voluntary measure if it is anticipated that longnose skate catch might exceed the ACL under status quo management measures.

- Voluntary avoidance of areas with highest longnose skate catch rates may be considered to keep longnose skate catch below the ACL.

Summary of Management Options and Comparison of Impacts

A summary of management measures and associated impacts are provided in Table C-70. Note that under No Action, total mortality of longnose skate may be lower than the preferred and No Action ACLs (i.e., less than 2,000 and 1,349 mt, respectively). Management measure options were analyzed, however, in the event inseason tracking and monitoring predicts higher fishing mortality than anticipated. Prices and retention have increased over the past few years, so that situation may occur.

Under the preferred ACL for longnose skate (2,000 mt), the total mortality by sector will likely be below each sector HG. Under the No Action ACL, however, the non-trawl allocation may be exceeded during 2013 and 2014.

Trip limit options (Options 1 – 3) would be effective for reducing No Action fishing mortality for the non-whiting trawl fishery, if necessary. This fishery retained approximately 68% of the longnose skate encountered during 2009 and 2010 (i.e., discarded 32%), so trip limits may cause increased discard (of which 50% may survive) or change fishermen's behavior (fishermen may choose to avoid areas with high concentrations of longnose skate). Hence, this measure could be used to substantially reduce total mortality relative to No Action. Options 1-3 would have moderate to substantial impacts to communities – severity of impacts to communities increase as option number increases. Option 3 would have most substantial impacts to communities and would affect approximately 50% of the non-whiting trawl fishermen and reduce landings by approximately $250,000.

Trip limits for fixed gear fisheries (Options 1 – 3), on the other hand, may not substantially reduce longnose skate mortality relative to No Action. Few longnose skate encountered by this fishery are landed (13% landed; 87% discarded), so trip limits will likely not change fishermen behavior relative to No Action. Conversely, Options 1 – 3 will have no substantial impacts on this fishery since most are already discarded and the annual revenue lost due to the trip limits range from only $3,142 for Option 1 to $7,984 for Option 3.

Moving the seaward RCA deeper (Option 4) or the shoreward RCA shallower (Option 5) may reduce mortality relative to No Action, however, additional data is required to estimate the extent of that reduction. Regardless, expanding the RCAs to reduce mortality will have the most substantial impacts on communities relative to No Action and relative to Options 1 – 3 (trip limits).

Voluntary avoidance or use of excluder devices may be most effective at reducing mortality while having the least impact on communities.

Table C-70. Comparison and summary of management options.

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
No Action	Trip Limit: Status quo RCA: Status quo	Preferred ACL = 2,000 mt No Action ACL = 1,349 mt Expected total mortality (all fisheries and set asides) = 1,120 to 1,182 mt Caution is advised if price, targeting, and retention increase.	**Shoreside Trawl Allocation:** Expected total mortality = 1,025 – 1,106 mt - Preferred Allocation (1,739 mt) - No Action Allocation (1,154 mt) **Non-trawl Allocation** Expected total mortality = 65 – 91 mt - Preferred Allocation (194 mt) - ***No Action ACL (61 mt)*** - ***Expected Mortality Exceeds Allocation*** **Revenue:** Average annual ex-vessel value was $602,744 (trawl) and $13,748 (LE and OA fixed gear). **Fisheries Most Affected**: Limited entry bottom trawl (historically caught 90%) and non-nearshore fixed gear (LE and OA historically caught 10%). **Discard and mortality rates:** Recent discard rates are approximately 32% for non-whiting trawl and 87% for fixed gear. Assumed discard mortality is 50% for non-whiting trawl and fixed gear. **Areas Most Affected**: Most encounters (catch and discard) and landings occur north of 40°10' N. latitude and in the Columbia INPFC area. Oregon ports receive

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			most landings; North Puget sound and Eureka area ports are also but to a lesser extent.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 1	Trawl trip limit = 12,000 lbs. / 2 months Non-trawl trip limit = 1,000 lbs. / 2 months	Option 1 trip limits reduces total mortality (all sectors and set asides) by 42 – 83 mt relative to No Action Expected total mortality (all fisheries and set asides) = 1,037 – 1,140 mt Preferred ACL = 2,000 mt No Action ACL = 1,349 mt	**<u>Shoreside Trawl HG</u>:** Expected Total Mortality = 947 – 1,067 mt - Preferred HG (1,739 mt) - No Action Allocation (1,154 mt) **<u>Non-trawl HG</u>** Expected Total mortality = 60 – 89 mt - Preferred HG (194 mt) - ***No Action Allocation (61 mt)*** - ***Expected Mortality Exceeds allocation*** **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $54,280 (trawl) and $3,142 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 169,627 pounds or 77 mt (trawl) and 11,237 pounds or 5.1 mt (LE and OA fixed gear) relative to No Action.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 2	Trawl trip limit = 7,000 lbs. / 2 months Non-trawl trip limit = 500 lbs. / 2 months	Option 2 trip limits reduces total mortality (all sectors and set asides) by 110 - 220 mt relative to No Action	**<u>Shoreside Trawl HG</u>:** Expected Total Mortality = 813 – 961 mt - Preferred HG (1,739 mt) - No Action Allocation (1,154 mt)

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
		Expected total mortality (all fisheries and set asides) = 901 – 1,072 mt Preferred ACL = 2,000 mt No Action ACL = 1,349 mt	**<u>Non-trawl HG</u>** Expected Total mortality = 58 – 88 mt - Preferred HG (194 mt) - ***No Action Allocation (61 mt)*** - ***Expected Mortality May Exceed Allocation*** **<u>Revenue:</u>** Average annual ex-vessel value was reduced by \$149,670 (trawl) and \$4,609 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 467,686 pounds or 212 mt (trawl) and 16,462 pounds or 7.5 mt (LE and OA fixed gear) relative to No Action.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 3	Trawl trip limit = 4,000 lbs. / 2 months Non-trawl trip limit = 200 lbs. / 2 months	Option 3 trip limits reduces total mortality (all sectors and set asides) by 201 - 402 mt relative to No Action Expected total mortality (all fisheries and set asides) = 718 - 981 mt Preferred ACL = 2,000 mt No Action ACL = 1,349 mt	**<u>Shoreside Trawl HG</u>:** Expected Total Mortality = 635 – 991 mt - Preferred HG (1,739 mt) - No Action Allocation (1,154 mt) **<u>Non-trawl HG</u>** Expected Total mortality = 52 – 85 mt - Preferred HG (194 mt) - ***No Action Allocation (61 mt)***

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			- ***Expected Mortality May Exceed Allocation*** **<u>Revenue:</u>** Average annual ex-vessel value was reduced by \$274,909 (trawl) and \$7,984 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 859,089 pounds or 390 mt (trawl) and 28,511 pounds or 12.9 mt (LE and OA fixed gear) relative to No Action.
Option 4	Extend the trawl RCA from 150 or 200 fm to 300 fm coastwide	*Mortality greatly reduced from No Action, but the level of decrease is uncertain.*	**<u>Shoreside Trawl</u>:** *The socioeconomic impact of Option 4 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 3.* **<u>Non-trawl:</u>** *No Substantial Impact*
Option 5	Extend shoreward trawl RCAs to 50 fm between 45°46’ and 48°10’ N. latitude	*Mortality greatly reduced from No Action, but the level of decrease is uncertain.*	**<u>Shoreside Trawl</u>:** *The socioeconomic impact of Option 5 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 3.* **<u>Non-trawl:</u>** *No Substantial Impact*

C.17 Spiny Dogfish Management Measures

Overview

Spiny dogfish was assessed for the first time off the off the U.S. west coast in 2011 (Gertseva and Taylor 2011). This species is currently not considered overfished; the spawning output at the beginning of 2011 was estimated to be 29,337 thousands of fish, which represents 63 percent of the unfished spawning output level (Gertseva and Taylor 2011).

Since 2002, average discard rates have been 85 percent and 52 percent for trawl and hook-and-line fisheries, respectively (Gertseva and Taylor 2011). More than 90 percent of the recent landed catch has been in Washington. A small portion of the catch is taken by recreational fisheries.

Herein we provide an analysis to examine the efficacy of potential management measures that could be used to restrain the catch of spiny dogfish shark by west coast commercial fisheries, if needed. Alternative trip limits and RCAs are provided for fixed gear and limited entry non-whiting trawl fisheries. Considerations of set asides or allocations are shown for the at-sea whiting sector. Other potential measures are also discussed.

Prior to March, 2012, catch accounting (e.g., Bellman et al., 2011) assumed that 100 percent of the discarded dogfish shark died. Recently, however, the Council adopted the SSC recommendation that WCGOP reports should apply discard mortality rates shown in stock assessments (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). The SSC noted that although the discard mortality assumptions used in the assessments are based on very limited information, they represent the best information available. Stock assessments (e.g., Gertseva et al. 2011) assumed 50 percent dogfish shark discard mortality for fixed gear (i.e., hook and line and pots), but retained the 100 percent discard mortality assumption for all trawls. It should be noted that the new 50 percent discard-mortality rate assumption is applied to non-trawl sectors herein only as we look forward (i.e., when evaluating management options toward the end of this report). In most cases prior to that section, 100 percent discard mortality is shown for all sectors because that was the historical perception.

2006-2010 Total Mortality of Spiny Dogfish Shark and “Other Fish”

Spiny dogfish shark is managed within the “Other Fish” complex but is sorted by regulation. Therefore, fishing mortality of dogfish and the “Other Fish” complex are described in this section.

The West Coast Groundfish Observer Program (WCGOP) reported total fishing mortalities for dogfish shark (Table C-71) that ranged from a low of 1,215 mt (2010) to a high of 2,497 mt (2008) while assuming that all discarded dogfish died from all gear types. The trend is similar for the “Other Fish” category, which includes spiny dogfish shark (Table C-71). Note that beginning 2009, longnose skate were removed from the “other fish” category. Had longnose skate been included in this category during all years, then the adjusted “other fish” mortality would have been 3,969 mt in 3,617 mt in 2009 and 2010, respectively.

There was no optimum yield (OY) or allowable biological catch (ABC) for dogfish shark during this period; these harvest specifications were provided only for the “other fish” complex. The total mortality of “other fish” did not exceed the ABC or OY during any of the years shown in Table C-71, even under the assumption of 100 percent discard mortality for dogfish shark among all gear types.

Note that beginning March, 2012, catch accounting will assume new discard rates for dogfish shark relative to assumptions made prior to 2012. From that date forward, WCGOP will report 100 percent discard mortality for dogfish for all gear types except fixed gear (i.e., longline and pot gear), for which 50 percent mortality will be assumed. Estimated total mortality using these new assumed discard mortality rates are included in (Table C-56) for comparative purposes.

Table C-71. West coast groundfish total mortality estimates (mt) for dogfish shark and "Other Fish" complex from 2006-2010.

Year	Estimated dogfish mortality (mt) assuming 100% discard mortality	Estimated dogfish mortality (mt) assuming 50% discard mortality for fixed gear	[a] "Other Fish" mortality (mt), assuming 100% discard mortality for dogfish	"Other Fish" ABC (mt)	"Other Fish" Optimum yield (OY) (mt)
2006	1,407	1,222	3,452	14,600	7,300
2007	1,504	1,346	4,516	14,600	7,300
2008	2,497	2,393	5,339	14,600	7,300
2009	1,207	1,032	[b]2,514	11,200	5,600
2010	1,215	1,093	[c]2,231	11,200	5,600

Notes: Total mortality estimates prior to 2012 assume 100% mortality for discarded dogfish shark among all gear types. Data acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011). For comparison and future projections, dogfish shark mortality estimates were provided assuming 50% discard mortality for fixed gear and 100% mortality for all other gears, as specified under Agenda Item F.2.b, Revised Supplemental SSC Report, March 2012.

[a]Other fish category consisted of cabezon (north of 42° N. latitude), kelp greenling, spiny dogfish shark, other sharks, **longnose skate**, big skate, unspecified skate, ratfish, morids, and grenadiers until 2009. Longnose skate was removed from the "other fish" category beginning 2009.

[b]**Longnose skate** was removed from the other fish complex in 2009. Longnose skate total mortality in 2009 was 1,455.1 mt (Bellman et al., 2010). Had longnose skate not been removed, the "Other Fish" total mortality for 2009 would have been 3,969 mt.

[c]**Longnose skate** was removed from the other fish complex in 2009. Longnose skate total mortality in 2010 was 1,386.5 mt (Bellman et al., 2011). Had longnose skate not been removed, the "Other Fish" total mortality for 2010 would have been 3,617 mt.

2011-2012 Harvest Specifications

For 2011-12 groundfish fisheries, spiny dogfish harvest specifications were analyzed and continued to be implemented in regulation with the "Other Fish" complex (Table C-72). Note that longnose skate was removed from the "Other Fish" complex beginning 2009, so the harvest specifications shown in Table C-72 for "Other Fish" were substantially lower than pre-2009 levels (see Table C-71).

Table C-72. 2011-2012 harvest specifications for ""Other Fish" in metric tons, implemented in regulation. OFL = overfishing limit; ABC = annual biological catch; ACL = annual catch limit.

Year	Species	OFL (mt)	ABC (mt)	ACL (mt)
2012	Other fish	11,150	7,742	5,575
2011	Other fish	11,150	7,742	5,575

2011 – 2012 Management Measures (= No Action)

Spiny dogfish are caught by trawl, commercial fixed gear, and recreational fisheries. Management measures that may control catches of dogfish shark for these fisheries in 2011-12 are summarized in Table C-73. All commercial landings of spiny dogfish are sorted. Rockfish conservation areas (RCAs; Table C-74 and Table C-75) in regulation may inadvertently provide some catch-controls for dogfish shark, because the depth distribution of this species extends from near shore to 470 fm (Keller et al., 2007a, 2007b, 2008). Hence, RCAs prevent the capture of some dogfish shark throughout a portion of their depth distribution along the entire West Coast. Trip limits range from 60,000 lb./month (limited entry trawl) to 100,000-200,000 lbs./2 months (limited entry and open access fixed gear).

Table C-73. Management measures affecting dogfish shark catch and monitoring for the 2011-2012 (= No Action) groundfish fisheries.

Fishery	Management Measure
Commercial	
--All Commercial landings	Sorting required for all commercial landings
--Limited Entry Trawl	Non-IFQ species. Trip limit management. Coastwide limits are: Periods 1-6: 60,000 lb./month. Trip Limits can be adjusted through routine inseason action. Current RCA structure may inadvertently reduce catch.
--Limited Entry Fixed Gear	Trip limit management. Coastwide limits are: Periods 1-2: 200,000 lb./2 months Period 3: 150,000 lb./2 months Periods 4-6: 100,000 lb./2 months Trip limits can be adjusted through routine inseason action. Current RCA structure may inadvertently reduce catch.
--Open Access Fixed Gear	Trip limit management. Coastwide limits are: Periods 1-2: 200,000 lb./2 months Period 3: 150,000 lb./2 months Periods 4-6: 100,000 lb./2 months Trip limits can be adjusted through routine inseason action. Current RCA structure may inadvertently reduce catch.
Recreational	
--Washington	Included as part of the 12 fish groundfish bag limit (landed fish) implemented in federal regulation.
--Oregon	Included as part of the 10 fish marine bag limit (landed fish) implemented in federal regulation. Oregon state regulations limit retention to 7 fish marine bag limit.
--California	Included as part of a 20 fish finfish bag limit (landed fish) implemented in federal regulation.

Table C-74. Limited entry non-whiting trawl RCAs for 2010-2012 (= No Action). Depth is in fathoms (fm).

Limited Entry Non-Whiting Trawl

<table>
<tr><th>Year</th><th>Area (N. latitude)</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td rowspan="6">2012</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 - 150</td><td colspan="2">0 - 200</td><td colspan="2">0 - [m]200</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2">75 - 150</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="4">75 – 150</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="4">75 - 200</td><td colspan="2">100 - 200</td><td colspan="2">75 - 200</td><td colspan="2">75 - [m]200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
<tr><td rowspan="6">2011</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 – 150</td><td colspan="2">0 - 200</td><td colspan="2">0 - [m]200</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2" rowspan="2">75 - 200</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="4">75 - 150</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="2">75 - 200</td><td colspan="2">100 - 200</td><td colspan="2">75 - 200</td><td colspan="2">75 - [m]200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
<tr><td rowspan="6">2010</td><td>North of 48°10'</td><td colspan="2">0 - [m]200</td><td colspan="2">0 - 200</td><td colspan="4">0 – 150</td><td colspan="2">0 - 200</td><td>0 - [m]200</td><td>0 - 250</td></tr>
<tr><td>48°10' - 45°46'</td><td colspan="2" rowspan="2">75 - [m]200</td><td colspan="2" rowspan="2">75 - 200</td><td colspan="2">75 - 150</td><td colspan="2">100 - 150</td><td colspan="2" rowspan="2">75 - 200</td><td rowspan="2">75 - [m]200</td><td rowspan="2">75 - 250</td></tr>
<tr><td>45°46' - 40°10'</td><td colspan="2">75 - 200</td><td colspan="2">100 - 200</td></tr>
<tr><td>40°10' - 34°27'</td><td colspan="12" rowspan="2">100 – 150</td></tr>
<tr><td>South 34°27' (mainland)</td></tr>
<tr><td>South 34°27' (islands)</td><td colspan="12">0 – 150</td></tr>
</table>

Table C-75. Non-trawl rockfish conservation areas (RCAs) for limited entry and open access fixed gear (2010 – 2012; = No Action). Depth is in fathoms.

Limited Entry and Open Access Fixed Gear

Year	Area (N. lat.)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83												
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											
2011	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83	30 - 125 (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											
2010	North 46 16	0 - 100											
	45 03 83 - 46 16	30 - 100											
	43 00 - 45 03 83	30 - 125 (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100											
	40 10 - 42 00	20 - 100											
	34 27 - 40 10	30 - 150											
	South 34 27 (+ islands)	60 - 150											

Management Issue 2013-2014 Harvest Specifications

Final preferred overfishing limits (OFLs) and allowable biological catch (ABCs were adopted for the Other Fish complex at the March 2012 Council meeting. The values for these specifications (Table C-76) are calculated as the sum of the known contributions of component stocks. The dogfish component of the Other Fish complex OFL and ABC is provided for reference.

Table C-76. Final preferred 2013-2014 OFLs and ABCs for the Other Fish Complex and the spiny dogfish shark component that contributed to the Other Fish complex specifications.

Year	Species or Complex	OFL (mt)	ABC (mt)	Preferred - ACL (mt)
2013	Other Fish	6,832	4,717	4,717
	Dogfish component	2,980	2,044	NA
2014	Other Fish	6,802	4,697	4,697
	Dogfish component	2,950	2,024	NA

2013-2014 Harvest Specifications Relative to Historical Total Mortality Estimates

The 2009 - 2010 estimated total fishing mortality for the Other Fish complex (Table C-71; 2,231 and 2,514 mt, respectively), which was calculated assuming 100 percent discard mortality rates for all species and gears, would not have exceeded the final preferred 2013-14 OFLs or ABCs, nor would these have exceeded the preferred Other Fish complex ACLs of 4,717 and 4,697 mt (Table C-76). Comparisons were not made for previous years because longnose skate was included in the Other Fish complex prior to 2009.

The 2013 and 2014 component ABC for spiny dogfish shark (2,044 and 2,024 mt, respectively; Table C-76) would have been exceeded by the 2008 dogfish total mortality (2,597 mt assuming 100 percent discard mortality for all gears; Table C-71) by 27 percent and 28 percent, respectively. These component ABCs also would be exceeded by the 2008 dogfish total mortality using 50 percent discard survival for fixed gear (= 2,393 mt; Table C-71). The remaining total fishing mortality for spiny dogfish (i.e., for the years 2006, 2007, 2009, and 2010; Table C-71) are far below the 2013 and 2014 component ABC for this species (Table C-76). Note that reconstructed historical catch records indicated that the dogfish ABCs shown in Table C-76 also would have been exceeded by catches in 2002, 2004, and 2005 (Gertseva and Taylor 2011), assuming 100 percent discard mortality for all gears.

This demonstrates that some modifications to existing management measures or new management measures may be needed to keep total fishing mortality of spiny dogfish shark within its component ABC.

Total catch and discard of dogfish shark by sector

Dogfish shark catch and discard by sector can be found in Figure C-25 (for 2010) and **Error! Reference source not found.**. During 2010, most dogfish were taken by the limited entry non-whiting trawl fishery (43%). Other sectors that caught substantial amounts of dogfish shark in 2010 were at-sea whiting (23%), non-nearshore fixed gear (21%) and shoreside whiting (10%). Small amounts were taken by other sectors (Figure C-25).

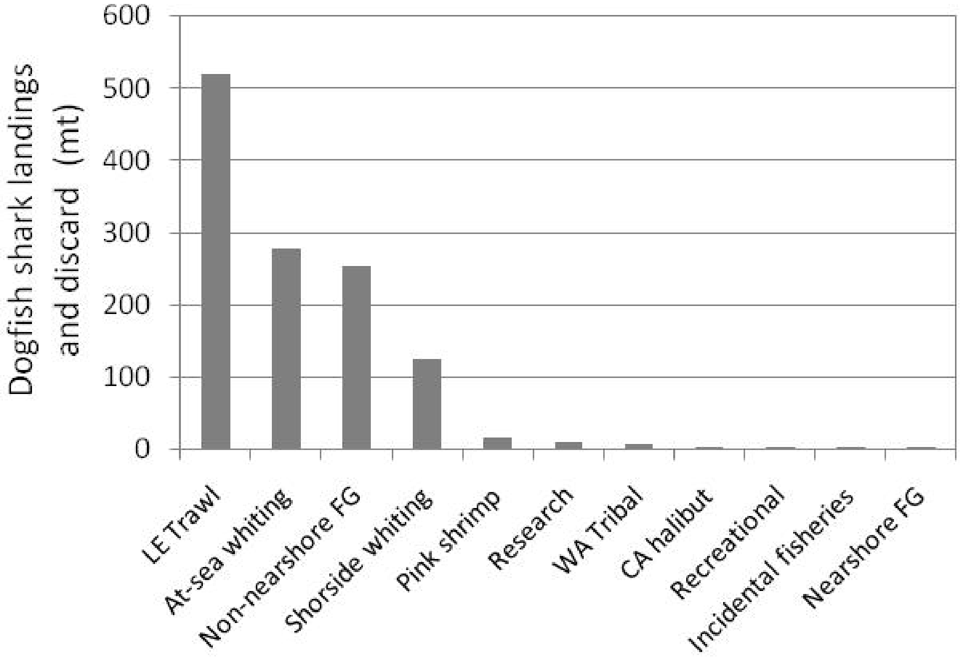

Figure C-25. Total landings and discard of spiny dogfish shark (mt) by sector during 2010. Data acquired from Bellman et al. (2011).

Sector-specific catches and total mortality of dogfish shark has been extremely variable over recent years (**Error! Reference source not found.**). One large difference among years is apparent for the non-nearshore fixed gear fishery, where total mortality during 2006 and 2007 (509 and 563 mt, respectively) was noticeably higher than during 2008-2010 (total mortality ranged from 216 to 332 mt). This reduction in total mortality was due, in part, to the loss of a spiny dogfish processor in northern Washington after the 2007 season. The reduction in processing capability also is responsible for a reduction in dogfish targeting after the 2007 season (see below).

Most sectors showed noticeably higher catches in 2008 relative to other years shown in **Error! Reference source not found.**. For example, total mortality of spiny dogfish for the non-tribal at-sea whiting sectors during 2008 was 673 mt, which was 2x – 11x higher than during the other years. This annual variability in catches should be considered if spiny dogfish set asides or formal allocations become adopted.

Table C-77. West coast groundfish total mortality estimates, by sector in metric tons, for dogfish shark from 2006-2010. Estimates assume 100 percent mortality for discarded dogfish shark. Data acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

	Shoreside commercial fisheries								Total recreational fishing mortality					
YEAR	LE bottom Trawl	CA halibut	Pink Shrimp	Non-nearshore fixed-gear	Nearshore fixed-gear	Shoreside hake mid-water trawl	WA tribal landings	All at-sea hake fisheries	WA	OR	CA	Research	Remaining incidental OA fisheries landings	Estimated total fishing mortality
2006	666.0	--	--	563.0[a]	--	33.2	77.0	59.0	0.0	0.0	3.9	5.8	1.3	1,407.0
2007	652.0	3.0	1.0	509.0	0.0	51.0	113.0	155.0	0.0	0.0	5.0	13.0	1.0	1,504.0
2008	1,023.0	3.0	4.0	332.0	1.0	59.0	303.0	673.0	--	0.0	3.0	14.0	82.0	2,497.0
2009	665.5	3.2	0.4	216.2	0.0	16.0	125.4	163.4	--	0.1	4.9	10.9	1.0	1,206.9
2010	520.1	2.9	16.4	254.1	0.1	124.6	6.9	277.7	--	0.1	1.6	10.2	0.4	1,215.1

[a]Reported as “estimated non-trawl”, which included non-nearshore fixed gear, nearshore fixed gear, and minor landings made with troll

It is important to point out that for the two fisheries that have characteristically targeted and sold dogfish shark in the past (e.g., non-whiting trawl and hook-and-line fisheries), that most of the total mortality is represented by discard mortality, rather than landed fish (Figure C-25). Landings by the non-whiting trawl fishery have been consistently low during 2006-2010, ranging from 43 – 85 mt. Landings for the non-nearshore fishery show a dramatic reduction from 191 mt in 2006 to 10 mt in 2010.

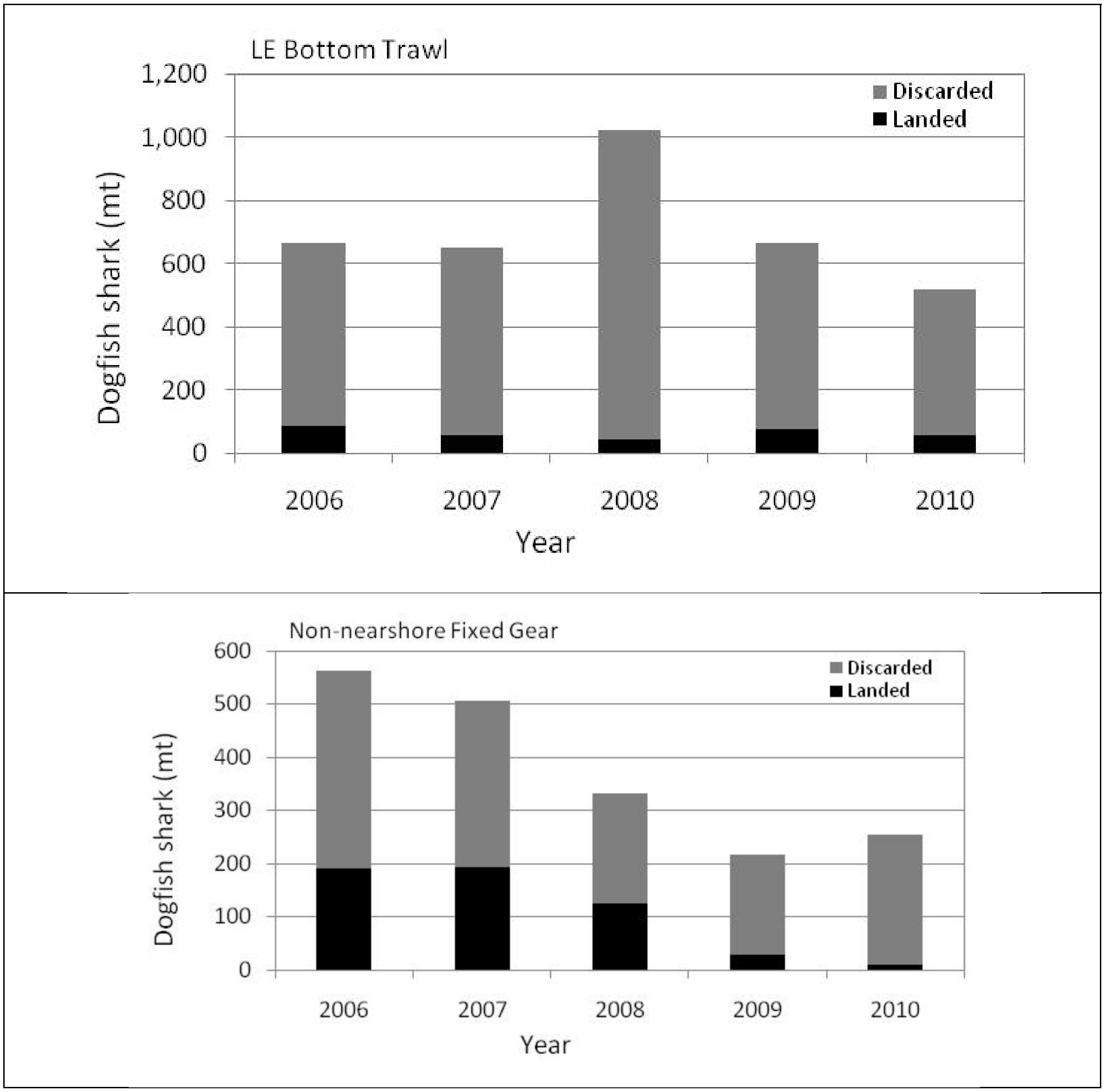

Figure C-26. Discarded and landed dogfish shark (mt) during 2006-2010 for the limited entry non-whiting trawl fishery(top) and the non-nearshore fixed gear fishery (bottom). Data acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

Distribution of dogfish shark along the U.S. West Coast

Approximately 92 percent of dogfish shark total mortality by the non-nearshore fixed gear fisheries and the limited entry non-whiting trawl fishery (landings + discards) occur north of 40°10’ N. latitude (Figure C-27; Bellman et al. 2011).

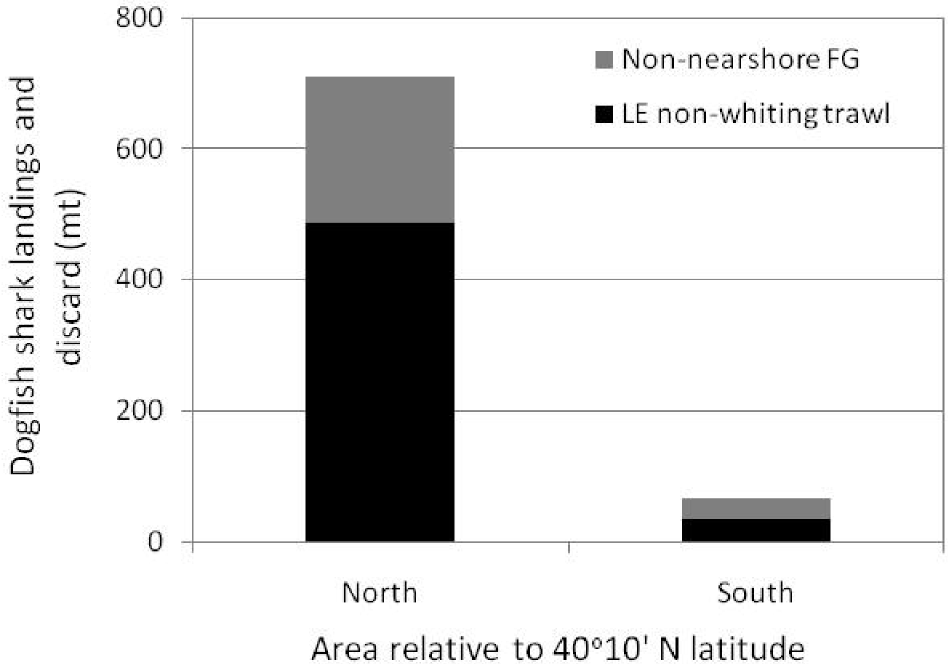

Figure C-27. Dogfish shark landings and discard off the U.S. west coast during 2010 by fishery north and south of 40°10’ N. latitude. Data acquired from Bellman et al. (2011).

The latitudinal distribution is provided in more detail by the 2005 west coast groundfish trawl survey (Table C-78; Keller et al. 2008), which shows highest dogfish shark concentrations north of 47°30’ N. latitude in the U.S.-Vancouver INPFC area. Dogfish was estimated to be the most abundant of all species caught by the trawl survey within this northern area. The density of dogfish shark is considerably lower in Columbia and Eureka INPFC areas, but relatively high in the Monterey INPFC area, where it ranked #10 relative to all other species caught by the 2005 trawl survey (Table C-78). This bimodal trend of density was also displayed by the 2003 and 2004 trawl surveys (Keller et al. 2007a,b).

Table C-78. Mean catch per unit effort (CPUE; kg/ha) for dogfish shark caught during the 2005 west coast trawl survey by INPFC area. Data acquired from Keller et al. (2008).

INPFC Area	Southern boundary	CPUE (kg/ha)
U.S.-Vancouver	47°30’ N. latitude	43.6
Columbia	43°00’ N. latitude	< 0.5
Eureka	40°30’ N. latitude	2.6
Monterey	36°00’ N. latitude	10.1
Conception	Southern boundary of EEZ	< 0.5

The high density of spiny dogfish shark in northern Washington is also demonstrated by the International Pacific Halibut Commission (IPHC) hook-and-line surveys (Figure C-28). Catch rates of dogfish shark were consistently highest north of 46° N. latitude from 1995-2010.

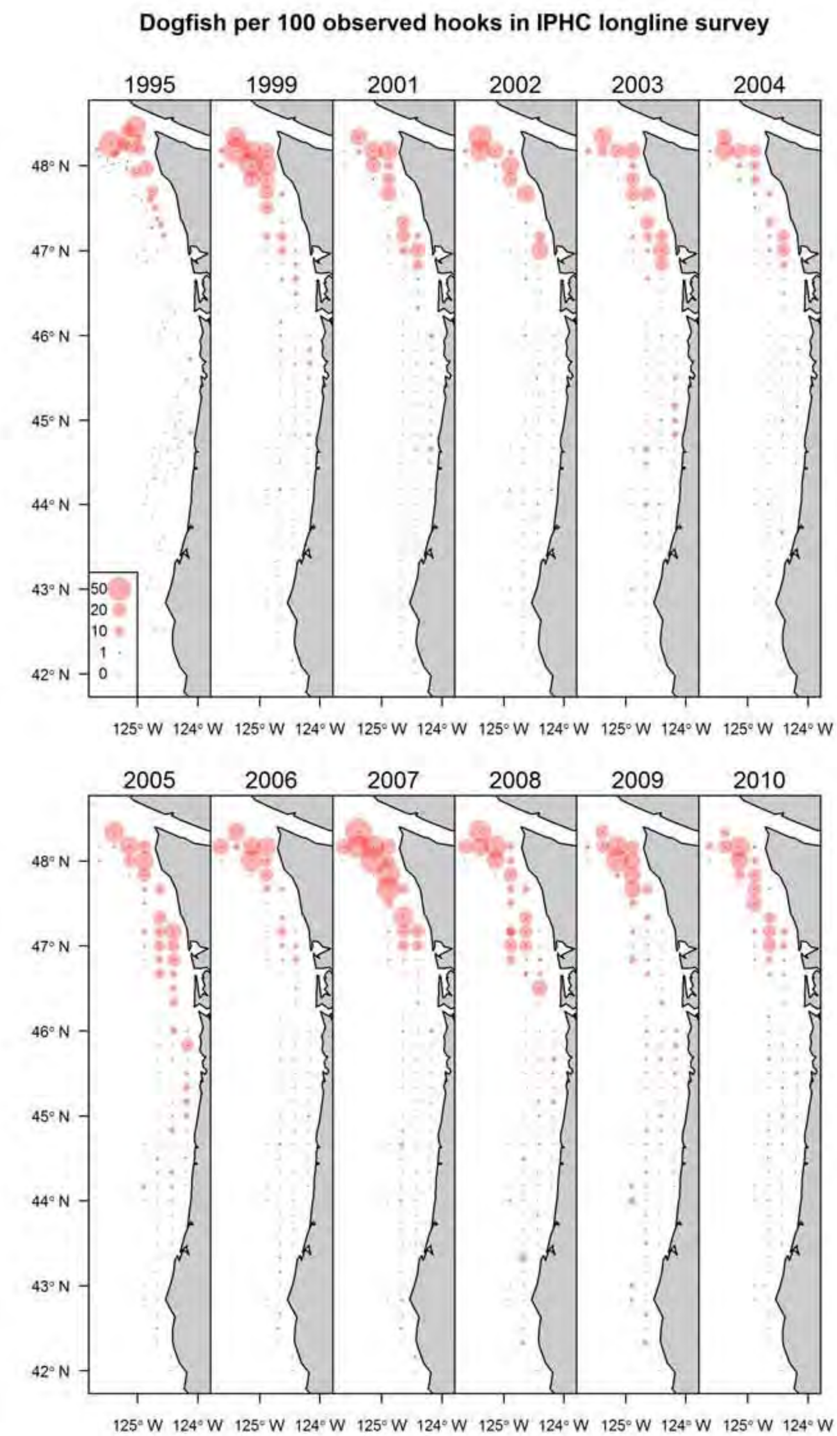

Figure C-28. Spatial distribution of spiny of spiny dogfish catches within the International Pacific Halibut Commission (IPHC) hook and line survey (expressed as the number of dogfish per 100 observed hooks). This figure was acquired from Gertseva and Taylor (2011).

Although dogfish shark were caught by trawl surveys from 20 to 470 fm (Keller et al., 2007a, 2007b, 2008), highest densities were found at the shallowest depths (shoreward of 100 fm) across all INPFC areas (Table C-79; 13.86 kg/ha). Densities declined to 4.7 kg/ha at moderate depths, and were lowest seaward of 301 fm (< 0.16 kg/ha) for all INPFC areas combined. Within the U.S.-Vancouver INPFC area, where densities were highest (Table C-79; Figure C-27), CPUEs were 126.9 kg/ha, 10.9 kg/ha, and < 0.1 kg/ha at the shallowest, moderate, and deepest depth strata (Table C-79).

Table C-79. Mean CPUE (kg/ha) of dogfish shark by depth strata in all INPFC areas combined and within the U.S.-Vancouver INPFC area during the 2005 West coast groundfish trawl survey. Data acquired from Keller et al. (2008).

INPFC Area	Depth (m)	Depth (fm)	CPUE (kg/ha)
All combined	55 – 183	30 – 100	13.9
	184 – 549	100 - 301	4.7
	550 – 1,280	302 - 702	< 0.2
U.S.-Vancouver	55 – 183	30 – 100	126.9
	184 – 549	100 - 301	10.9
	550 – 1,280	302 - 702	< 0.1

Trends in annual landings, discard and price per pound

Gertseva and Taylor (2011) provided a comprehensive catch history for dogfish shark. They showed highest catches in the 1940s, driven by the high demand for Vitamin A. During this period, catches (landings + discards) averaged 6,281 mt per year and peaked at 16,876 mt. The demand for dogfish livers (and therefore West Coast dogfish) waned in the 1950s when synthetic vitamins were developed, but increased again in the 1970s due to increased sales to Europe for fish and chips. Dogfish shark landings averaged approximately 450 mt until recent years (Gertseva and Taylor 2011). That demand for west coast dogfish shark decreased, and the subsequent loss of a processor in northern Washington after the 2007 season resulted in noticeably less landings (Figure C-26) and an increase in at-sea discarding for this species (Figure C-29).

Dogfish discard rates have averaged 90 percent for limited entry non-whiting trawl fisheries since 2006, (range 87% - 91%; Figure C-29). Discard rates were lower for the non-nearshore fixed gear fishery from 2006 – 2008 (62% – 66%) but increased to levels more similar to the recent trawl-discard rates in 2009 (86%) and 2010 (96%). These increased discard rates for the non-nearshore fixed gear fishery roughly coincides with the closing of the processor in northern Washington in 2007. Gertseva and Taylor (2011) showed much lower discarding for dogfish shark by limited entry non-whiting trawl and for hook-and-line fisheries during the 1990s and early 2000s when demand was higher (see above); discard rates during this period when targeting was likely prevalent may have been a as low as 25 percent (trawl) and 14 percent (hook-and line) during some years.

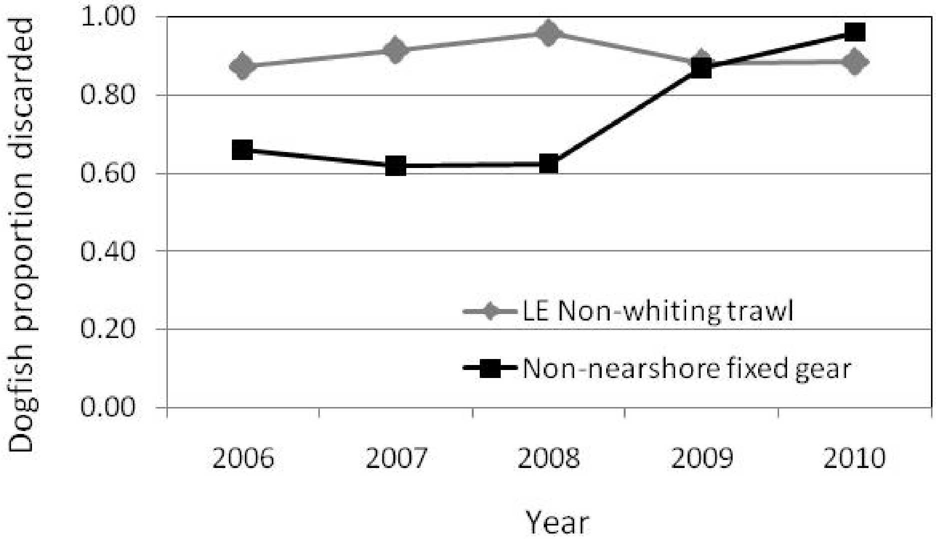

Figure C-29. Proportion of dogfish shark discarded by the limited entry non-whiting trawl and non-nearshore fixed gear fisheries. Data were acquired from Hastie and Bellman (2007) and Bellman et al. (2008-2011).

The ex-vessel prices paid for dogfish shark in recent years has fluctuated between $0.17 and $0.25 per pound for open access and limited entry fixed gear fisheries, and has shown a general decline from $0.37 to $0.28 per pound for trawl since 2008 (Figure C-30). Recent prices may reflect special niche markets, because landings have become small (Figure C-29) relative to earlier years (see Gertseva and Taylor 2011).

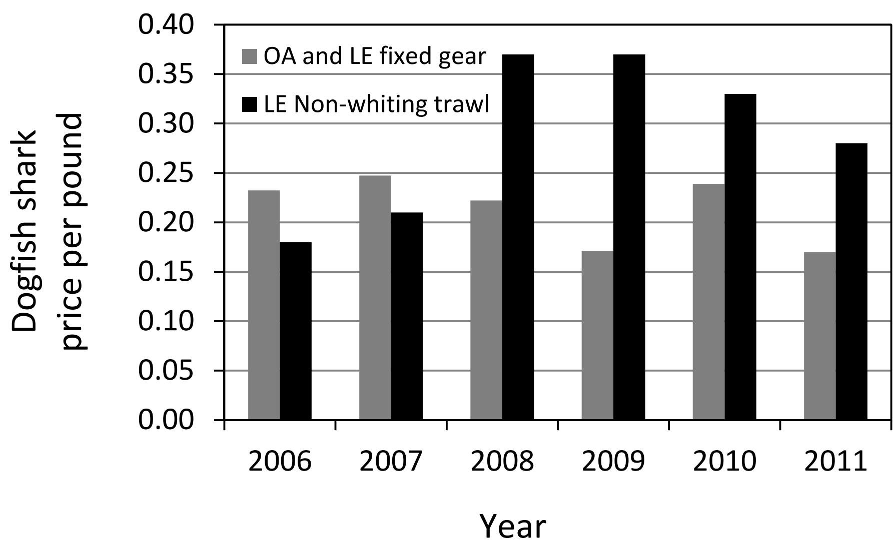

Figure C-30. Dogfish shark price per pound for limited entry (LE) and open access (OA) fixed gear (gray) and limited entry non-whiting trawl (black) by year. Data acquired from PacFIN.

Landings by area and port

Approximately 83 percent of the limited entry non-whiting trawl landings of dogfish shark occurred in the Vancouver and Columbia INPFC areas from 2006-2011, reaching 863,000 pounds over the 5-year period (Figure C-31a; PacFIN data). Noticeable landings were also made in the Monterey INPFC area during this period (140,000 lbs.). Almost no trawl landings of dogfish shark were recorded in the other INPFC areas (Figure C-31a). Port groups receiving most dogfish shark landings from limited entry non-whiting trawlers during 2006-2011 were North Puget Sound (280,000 lbs.), Columbia River Oregon (439,000 lbs.), Monterey (91,000), and Fort Bragg (49,000 lbs.; Figure C-32a. Each of the other port groups received less than 3,000 lbs. of dogfish during 2006-2011.

Landings of dogfish shark by fixed gear fisheries (Figure C-31b) were larger than shown for the trawl fisheries (Figure C-31a) over the 2006-2011 period, and were primarily concentrated in the Vancouver INPFC area (1,334,000 lbs.). Dogfish shark landings in the other INPFC areas over the 5-year period were low and ranged from 335 lbs. to 35,000 lbs. Most dogfish shark landings by limited entry and open access fixed gear fisheries occurred in the North Puget Sound port group (1,252,000 lbs.; Figure C-32b). Small dogfish landings were also recorded for Central Washington area (86,000 lbs.) and Brookings (35,512) area port groups during 2006-2011.

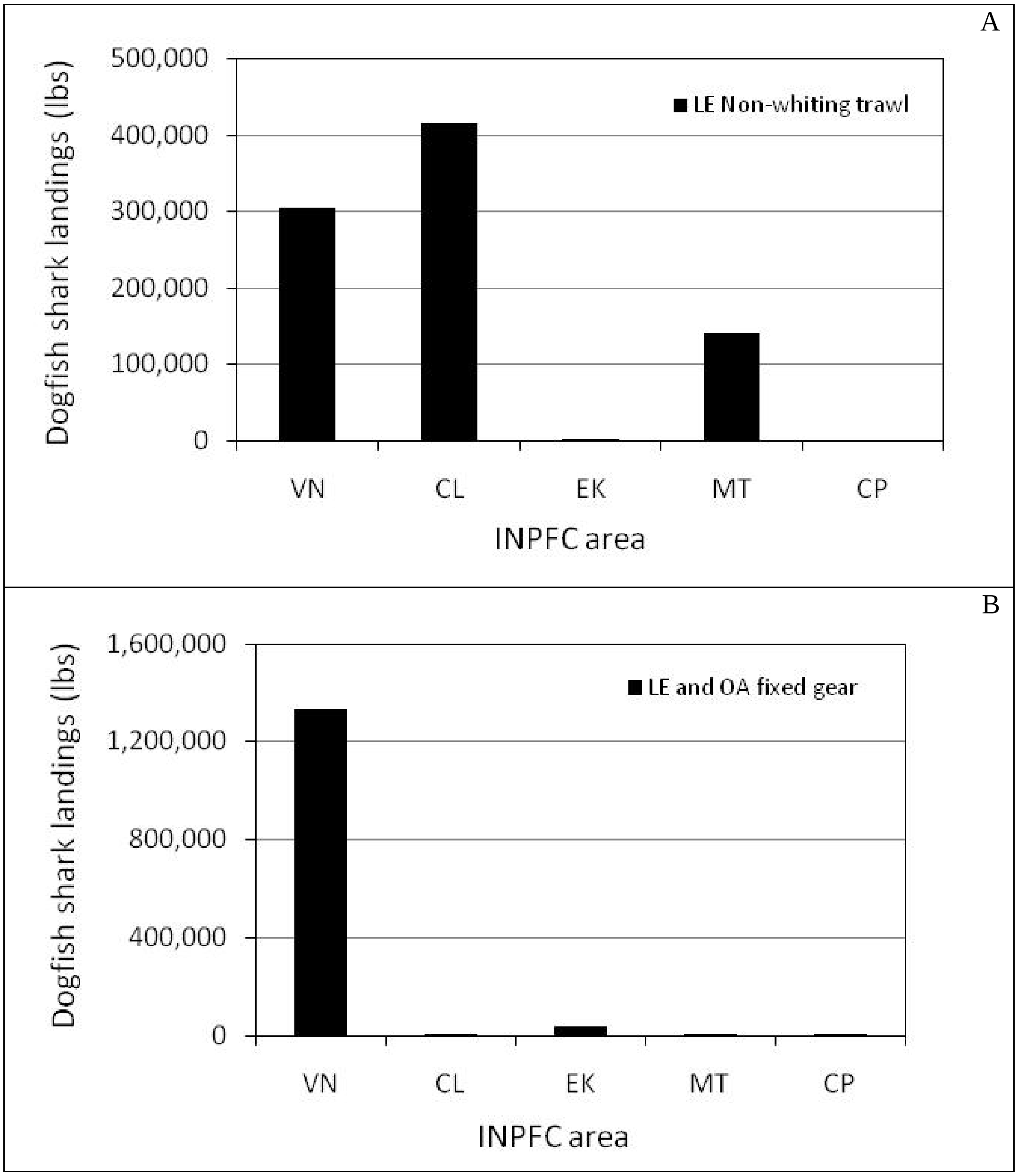

Figure C-31. Dogfish shark landings (lbs.) by International North Pacific Fishery Commission (INPFC) area during 2006-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear fisheries.

Note: Data were acquired from PacFIN. INPFC areas are: VN = Vancouver, CL = Columbia, EK = Eureka, MT = Monterey, and CP = Conception.

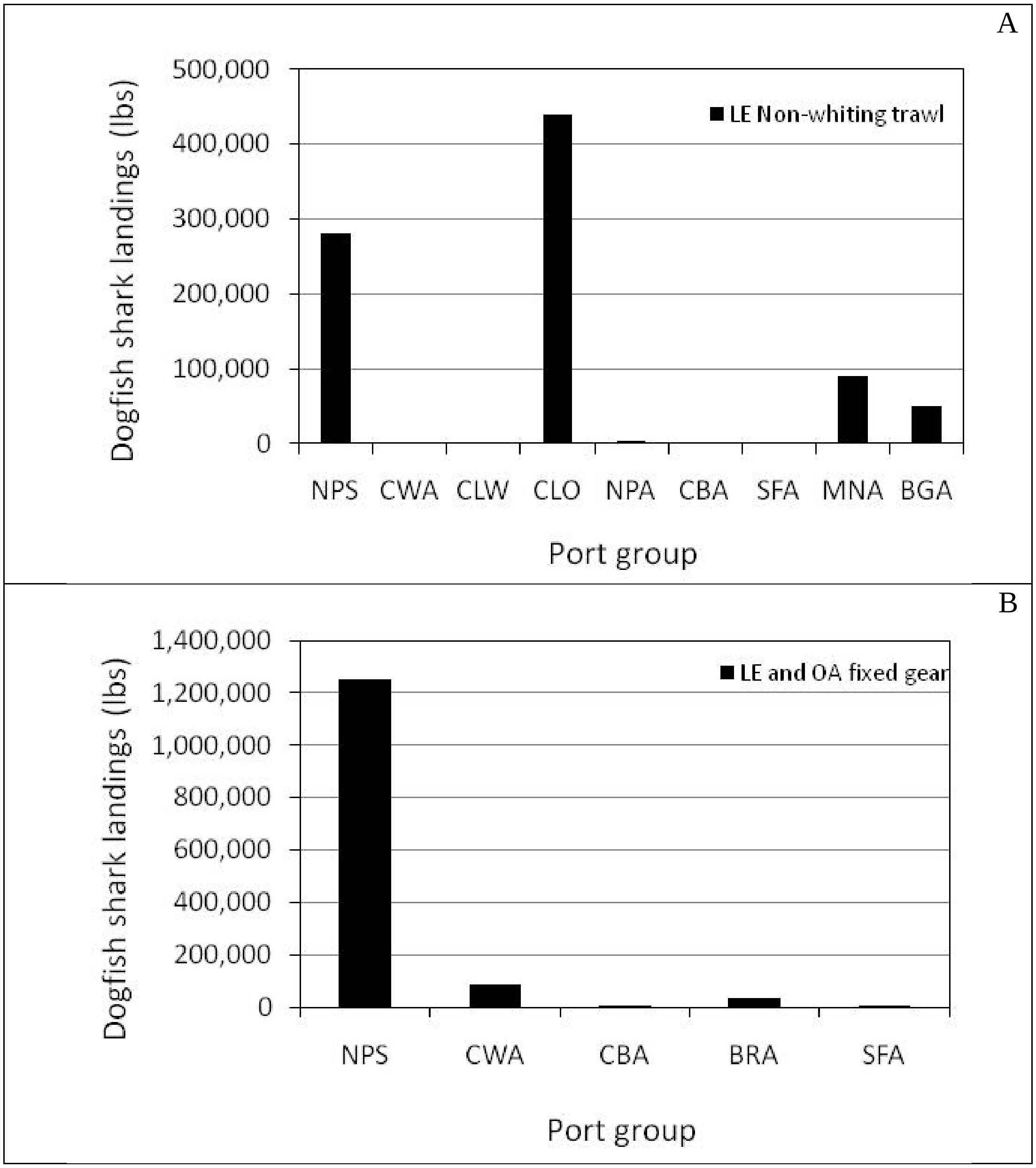

Figure C-32. Dogfish shark landings (lbs.) by port group during 2006-2011 for (A) limited entry non-whiting trawl and (B) open access and limited entry fixed gear.

Note: Data were acquired from PacFIN. Port group areas are: BGA = Fort Bragg; BRA = Brookings; CBA = Coos Bay; CLO = Columbia River Oregon Ports; CLW = Columbia River Washington Ports; CWA = Coastal Washington; MNA = Monterey; NPA = Newport; NPS = North Puget Sound; SFA = San Francisco. Port group areas with less than three vessels making landings were omitted for confidentiality.

Basis for and Development of Potential New Management Measures

Management measures already in effect are likely holding the total mortality of dogfish shark lower than would otherwise be observed in their absence. For example, the current RCA structure north of $46^{o}16'$ (0 – 100 fm for fixed gear; Table C-75) and north of $48^{o}10'$ (0 – 150 or

0-200 fm trawl; Table C-74) prevents fishing by these sectors in areas showing the highest concentrations of dogfish shark along the U.S. west coast (Figure C-28; Table C-78 and Table C-79). Regardless, dogfish shark may require even more restrictive management measures to keep fishing mortality below their 2013-2014 ABC contributions (see Table C-76 and Table C-77; also see Agenda Item E.9.b, GMT Report 2, November 2011). Although landings have been low during recent years (Figure C-29), recent WCGOP total mortality reports suggest that discard and landings of dogfish shark (Table C-77) would exceed the 2013-2014 ABC for the ABC-contribution for dogfish shark (Table C-76). The Other Fish complex ABCs would not be exceeded by recent historical catches.

The markets for dogfish shark have declined in recent years (Gertseva and Taylor 2011), resulting in decreased landings (Figure C-29) and increased discard rates (Figure C-29). Targeting has probably also decreased due to the decreased market for dogfish shark. If markets improve to levels seen in the late 90s and early 2000s (see Gertseva and Taylor 2011), then it is possible that total mortality may increase to even higher levels.

Highest 2010 total mortalities for dogfish shark are shown for limited entry non-whiting trawl, at-sea whiting, non-nearshore fixed gear, and shoreside-whiting trawl fisheries (Figure C-25; **Error! Reference source not found.**). Catch (landings + discards) of dogfish shark in the at-sea whiting (277.7 mt) and shoreside whiting (124.6 mt) fisheries is incidental while targeting whiting and represents only 0.3 percent and 0.2 percent of the whiting catch, respectively (Bellman et al., 2011). "Trip" limits, even if feasible for these whiting fisheries, would therefore be ineffective for reducing the total mortality of dogfish shark. Trip limits are not feasible for whiting fisheries because (a) the at-sea sector processes their catch prior to landings and (b) the shoreside-whiting sector must immediately immerse their catch at low temperatures in the fish hold to prevent tissue degradation. Thus, most of the discussions and analyses that follow will primarily focus on limited entry non-whiting trawl and limited entry and open access fixed gear fisheries. These fisheries have demonstrated dogfish targeting in the past (see below). If markets develop to recent historic levels, then increased targeting may occur. Depth-area restrictions and other potential management measures may be considered for whiting sectors but are not included within this analysis.

The GMT previously suggested that dogfish shark may be managed using time-area tools, such as trip limits, area closures, and depth restrictions (Agenda Item E.9.b, GMT Report 2, November 2011). This section describes the development and basis for new (or additional) management measures beside (besides No Action). Data from WCGOP and PacFIN were used to develop and evaluate these potential measures and options. Other potential management measures are also discussed.

Trip Limits

Trip limits may effectively reduce total mortality if trip limits (a) discourage targeting, (b) encourage fishermen to move out of or avoid areas with high dogfish shark catch rates and (c) result in trip limit induced discards (instead of landings) if the mortality of discarded dogfish shark is low. It is clear that reducing targeting may reduce total mortality. It is also clear that fishing in areas with lower incidental catch rates may reduce total mortality. However, if trip limits result in discards (rather than landings) without affecting fishers behavior (e.g., selection of fishing location), and if the discard mortality is 100 percent, then trip limits may simply convert landed mortality into discard mortality at a 1:1 conversion. In this case, total mortality would be unaffected by trip limits. Although the WCGOP had previously assumed 100 percent discard mortality for dogfish shark (e.g., Bellman et al., 2011), catch monitoring will now assume 100 percent discard mortality for trawl fisheries and 50 percent discard mortality for fixed gear fisheries as described by (Gertseva and Taylor 2011) and recommended by the SSC (Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). Under these new discard mortality assumptions, trip limits may be effective for reducing total mortality even if catches are incidental and fishermen behavior does not change because of trip limits (e.g., they do not move from or avoid areas with high dogfish shark catch rates and continue targeting other species while discarding dogfish in excess of trip limits).

Are dogfish shark targeted? It is well known that dogfish shark may form very large and dense schools (see Gertseva and Taylor 2011), and may be targeted if markets exist. It is also common knowledge that large schools may be inadvertently encountered while targeting other groundfish species. The following is an examination of dogfish shark catches to provide insight on the potential level of targeting compared to catch that is largely incidental. We caution that this analysis uses historical data and thus may not accurately predict the future, especially if markets and RCAs change.

Catch per haul or set: West coast groundfish observer data show that most hauls where dogfish shark were present in the catch produced less than 500 pounds (trawl) and 250 lbs. (fixed gear) during 2009 and 2010 (Figure C-33). However, hauls frequently exceeded 1,000 lbs. of dogfish shark per haul for both trawl and fixed gear, and reached nearly 12,000 lbs. for both gear types. These data suggest that dogfish shark are most commonly encountered at relatively low volumes, but are occasionally caught in high volumes by both gear types.

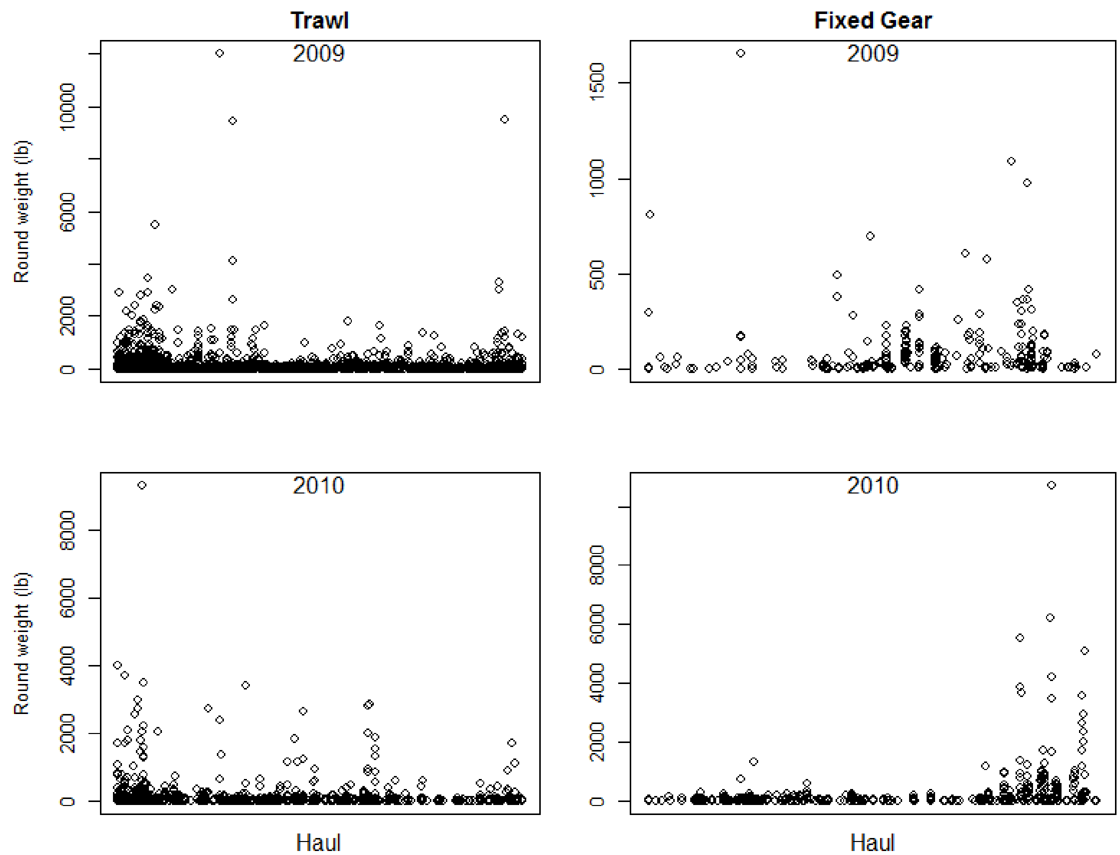

Figure C-33. Dogfish shark catch (lbs.) by haul or set by limited entry non-whiting trawl (Trawl) and limited entry and open access fixed gear (Fixed Gear) during 2009 and 2010. Only positive tows were included. Data were acquired from the WCGOP.

Discard and retention weight per trip: The maximum weight of retained dogfish shark per trip rarely exceeded the maximum weight of those discarded (Figure C-34). Dogfish shark were frequently discarded at levels between 10,000 and 40,000 pounds per trip for both trawl and fixed gear. More than 50,000 pounds of dogfish shark were incidentally caught and discarded on some trips.

The 75th and 50th percentiles (weight) for discarded dogfish per trip are consistently low (i.e., less than 100 – 300 lbs.), meaning that most trips encounter low concentrations of dogfish, and larger catches were relatively rare. The 75th and 50th percentiles (weight) for trips that retained dogfish shark were, in some cases, substantially higher than for trips that discarded dogfish shark during the same years, especially for trawl. These data, although inconsistent across years, suggest that when fishers intend to retain dogfish shark, they may select areas where high catch rates are likely and known.

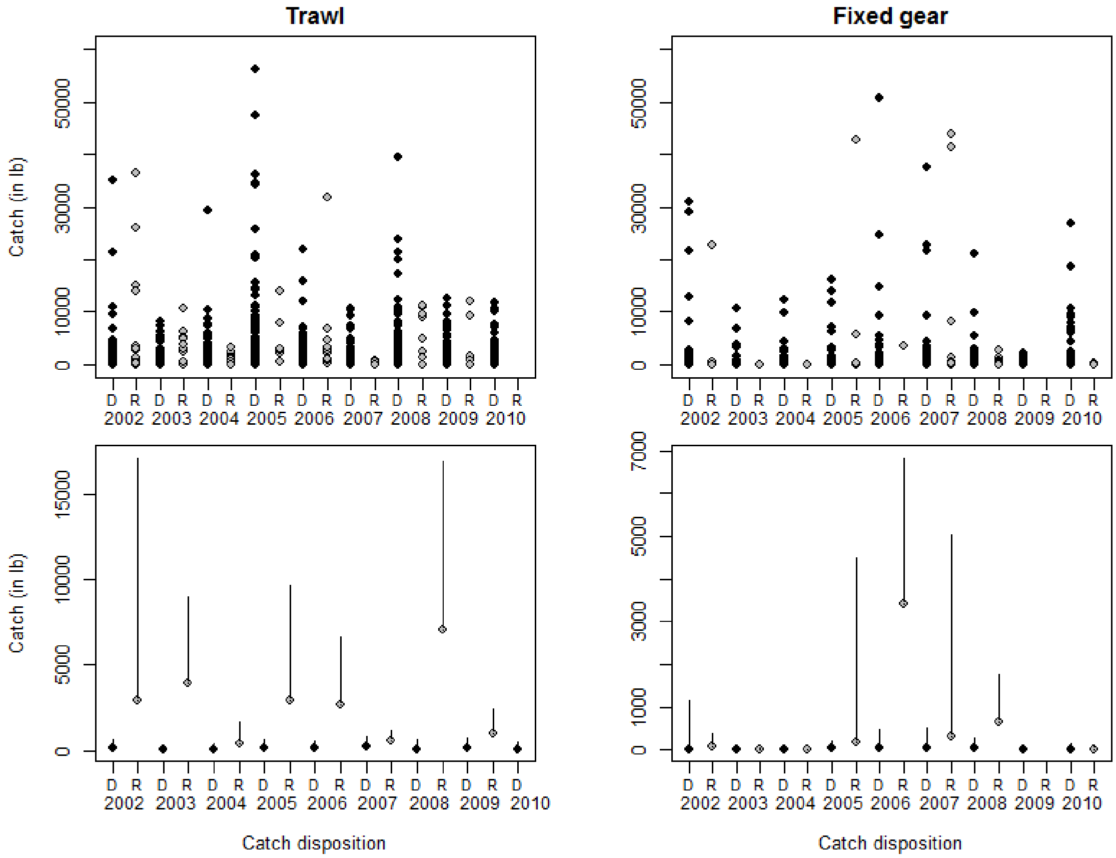

Figure C-34. Spiny dogfish catches by trips (top row) and median (point) and 75% quartile (upper end of vertical bars) catch values (bottom row) in observed trips that discarded (D; black points) or retained (R; gray points) dogfish shark for years 2002-2010 for two gear types (columns).

Although dogfish may be targeted, resulting in large catches, large unintentional catches of dogfish shark also occur. The level of discard shown in Figure C-34 would likely be avoided if possible. Setting longline gear in areas with high concentrations of dogfish shark, while targeting other species, results in bait loss due to dogfish taking the bait or the capture of dogfish shark on baited hooks before the gear reaches the bottom (or soon after). Towing a trawl through schools or high concentrations of dogfish shark would also be unintentional if retention was not planned for many reasons, including (a) the girth, rough skin, and spines of dogfish shark make them extremely susceptible to gilling (i.e., becoming wedged within 4.5" trawl meshes), and may become tightly stuck in almost every mesh of the codend, and (b) dogfish shark are difficult to clear from a deck because of their sandpaper-like skin. Shark are difficult to remove from the deck with a shovel, and therefore must be tossed overboard one at a time when discarding. The incidental capture by trawl and subsequent discard of large amounts shown in Figure C-34 would result in hours of down time due to picking gilled fish from the meshes and clearing the deck.

Figure C-34 indicates that maximum trip size may not be a good indicator of dogfish shark retention, because this species is sometimes encountered in very high volumes when retention is not planned. Some targeting may occur, however, as is suggested by the difference between retained and discarded median percentiles (weights) during certain years.

Landing size of dogfish shark relative to other groundfish: Another way to evaluate the level of targeting for dogfish shark is to compare the landed weight of dogfish to the landed weight of all groundfish species by trip (Figure C-35). For limited entry non-whiting trawl (Figure C-35a), most landings of spiny dogfish shark were less than 300 lbs./trip and represented a small percentage of total groundfish landed by those trips. Even for cases where dogfish landings reached 5,000 lbs. per trip, the proportion of the total groundfish landed was often less than 25 percent, because groundfish landings reached more than 100,000 lbs./trip. In these cases, dogfish were most likely incidentally caught while targeting a suite of groundfish species, but were retained and sold. There were cases for trawl; however, where dogfish shark landings exceeded 20,000 lbs./trip (reaching 50,000 lbs./trip) and where the percent contribution of dogfish shark exceeded 50 percent of the total groundfish landings (Figure C-35). Approximately 5 percent of the trawl landings consisted of more than 50 percent dogfish shark. These infrequent cases may be representative of trips directed at dogfish shark (i.e., targeting).

The relationship between dogfish landings and total groundfish landings for fixed gear fisheries suggests numerous directed dogfish trips during the 2006-2011 period (Figure C-35b). Dogfish shark landings during these trips reached 45,000 pounds; numerous landings (7%) exceeded 10,000 lbs. of dogfish shark. Indeed, groundfish landings that exceeded 10,000 pounds by these fisheries typically consisted almost entirely dogfish shark (Figure C-35b). Approximately 10 percent of the landings consisted of more than 80 percent dogfish shark.

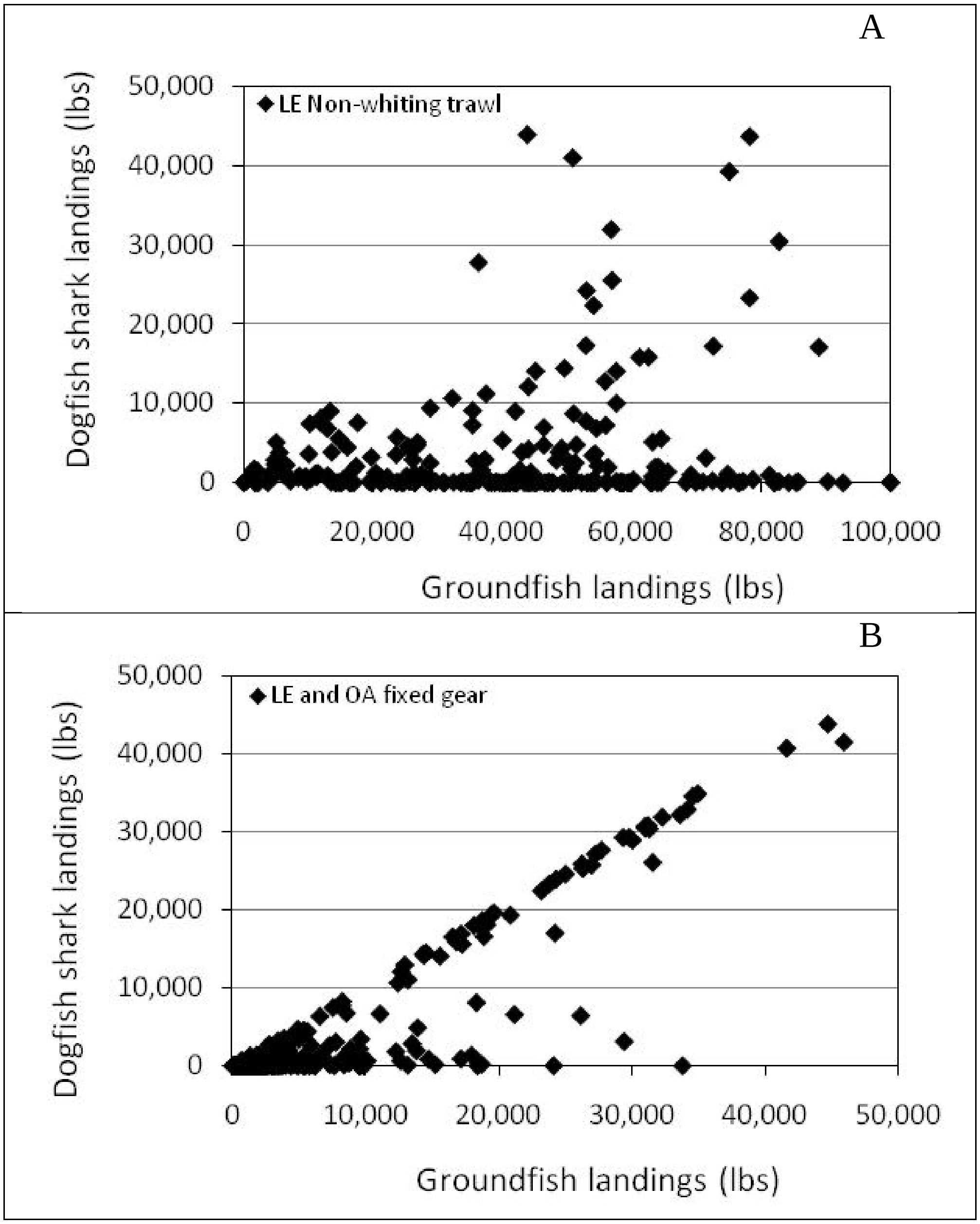

Figure C-35. Relationship between landed weight (pounds) of dogfish shark and the landed weight of all groundfish by trip during 2006-2011 for (A) limited entry non-whiting trawl and (B) limited entry and open access fixed gear.

Note: The x-axis for the limited entry non-whiting trawl was truncated at 100,000 lbs. for illustrative purposes, which caused the exclusion of fifteen groundfish landings (all exceeding 100,000 lbs.) and fifteen associated dogfish landings (ranging from 7 – 955 lbs.). Data were acquired from PacFIN.

Bimonthly Landings and Basis for the Selection of Alternative Trip Limits: Bimonthly landings of dogfish shark over nearly a 6-year period (2006 – October 2011) by limited entry non-whiting trawl vessels are shown in Figure C-36. Cumulative bimonthly landings of dogfish shark for limited entry non-whiting trawl ranged from only a few pounds to nearly 72,000 pounds per vessel per bimonthly period. The pattern of bimonthly landings is somewhat linear until approximately 5,000 – 7,000 pounds, where vessels began landing increasingly more dogfish shark relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited entry non-whiting trawlers (50th percentile) were less than 588 pounds whereas the 75th percentile of bimonthly landings resulted in 4,752 pounds. The 90th percentile was 20,547 pounds. Three bimonthly trip limit options for the limited entry non-whiting trawl fishery were identified based on approximate 50, 75, and 90 percentiles: 600, 5,000, and 20,000 pounds per bimonthly period.

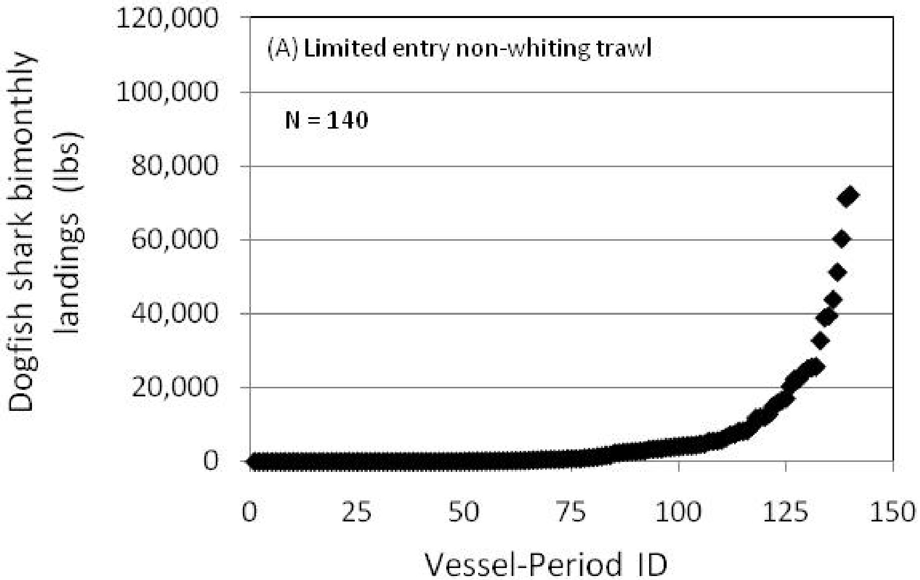

Figure C-36. Bimonthly landings (lbs.) of dogfish shark by vessel and period for 2006 – October 2011 (sorted by bimonthly-landing size) for limited entry non-whiting trawl. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without dogfish shark were excluded.

Cumulative bimonthly landings of dogfish shark over nearly a 6-year period (2006 – October 2011) by limited entry and open access fixed gear fisheries are shown in Figure C-37. Most (85%) cumulative bimonthly landings were less than 1,000 pounds for the open access fishery, whereas 5 percent of the bimonthly landings ranged from 5,000 to 74,000 pounds. The 50th percentile for open access fixed gear was 50 lbs.

Cumulative bimonthly landings for the limited entry fixed gear fishery reached nearly 115,000 pounds; seven bimonthly cumulative landings (3%) exceeded 60,000 pounds. The pattern of bimonthly landings for limited entry fixed gear fisheries (primarily non-nearshore fishery) is somewhat linear until approximately 5,000 pounds, when vessels began landing increasingly more dogfish relative to the rest of the fleet (i.e., approximate inflection point). Half of the bimonthly landings by limited fixed gear vessels (50th percentile) were less than 314 pounds, whereas the 75th percentile of bimonthly landings resulted in 2,245 pounds. The 90th percentile was 17,657 pounds. We therefore identified three bimonthly trip limit options for the open access and limited entry fixed gear sectors based on these approximate 50, 75, and 90 percentiles: 300, 2,500, and 18,000 pounds per bimonthly period.

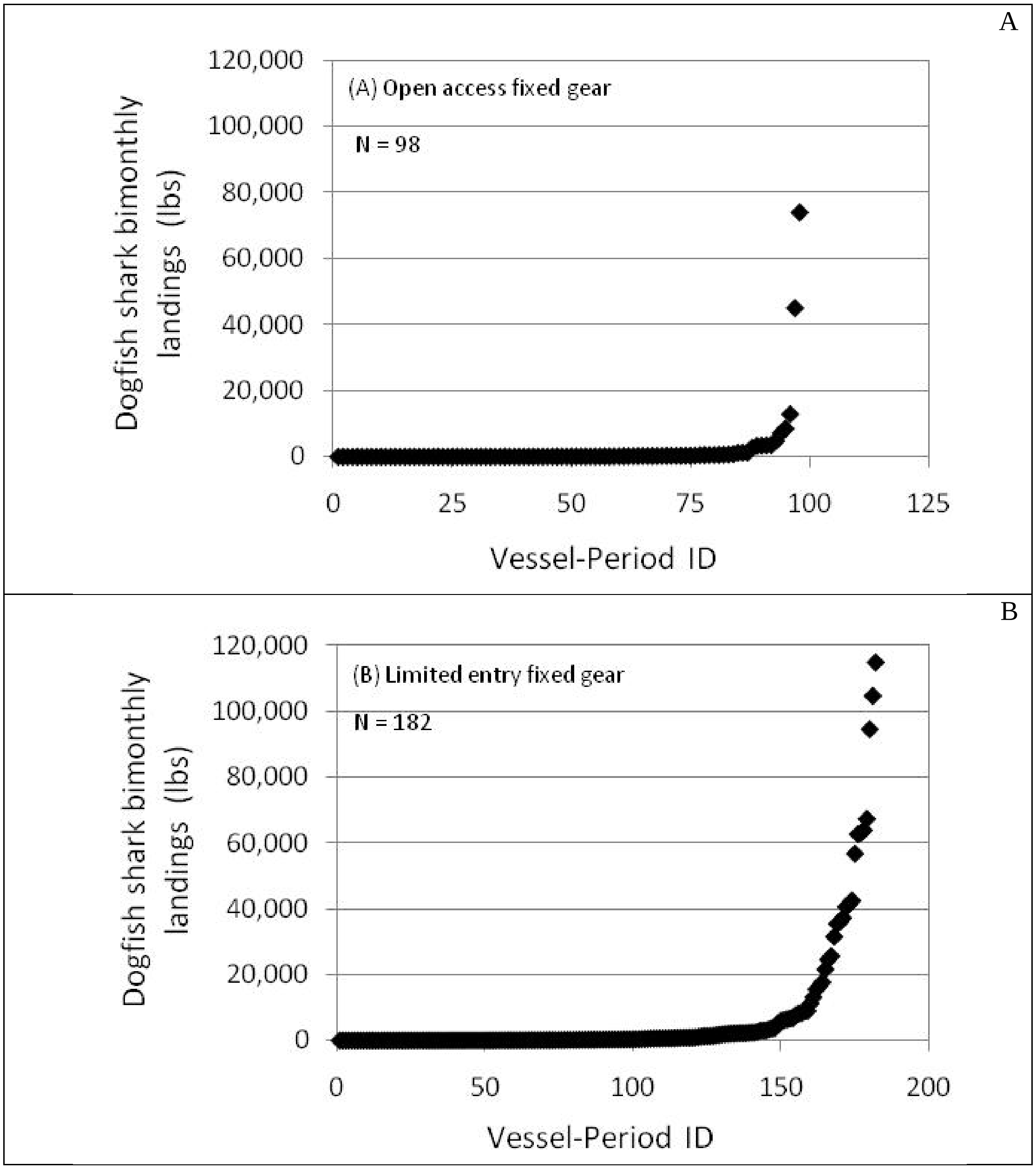

Figure C-37. Bimonthly landings (lbs.) of dogfish shark by vessel and period for 2006 – October 2011 (sorted by bimonthly-landing size) for (A) Open access fixed gear, and (B) limited entry fixed gear. Each vessel and landing period (by year) were assigned individual identification numbers (ID) based on landing volume. Landings without dogfish shark were excluded.

Can trip limits reduce dogfish shark mortality? It is uncertain how any reduction in landings may alter total mortality of dogfish shark, because catch size is not a good predictor of retention (Figure C-34). Even though some targeting occurs when markets are available (Figure C-35), targeting has likely decreased, discarding has increased (Figure C-29), and landings have decreased since 2008 (Figure C-26). If trip limits result in reduced targeting (or moving from areas with high concentrations of dogfish), then some reduction in total mortality may occur. In addition, if mortality of dogfish shark is something less than 100 percent, then total mortality may be reduced under trip limit management even if trip limits cause discards.

It is clear that current dogfish trip limits (60,000 lbs./month for trawl and 100,000-200,000 lb./2 months for fixed gear; Table C-73) would have had almost no impact on landings over the past 6 years (Figure C-36 and Figure C-37). Two fixed gear landings may have been impacted by the 100,000 lb./2 month limit for that fishery, and no trawl landings would have been affected by the trawl limit. Nonetheless, historical catch data demonstrates that dogfish shark can be targeted and caught with few other groundfish species at high volumes (Figure C-35). Appropriate trip limits may therefore prevent the potential for large-volume targeting, especially for fixed gear fisheries. On the other hand, large amounts of dogfish shark are incidentally caught and discarded (Figure C-34). Therefore, even under trip limits, incidental catch may remain high. In these cases, trip limits may have little effect on most potential encounters and may simply convert landings to discards. It is important to be aware that, at present, most dogfish encountered are discarded even in the absence of effective trip limits.

A reduction in total mortality may occur if some proportion of discarded dogfish shark survives, even if fishing behavior does not change (i.e., fishermen do not change their fishing location and strategy once reaching the trip limit). Although during previous years, catch accounting assumed discard mortality of 100 percent for dogfish shark (e.g., Bellman et al. 2011), it is likely that some of the fixed-gear caught dogfish survive the discard process. It is unlikely, however, that trawl-caught and discarded dogfish survive, especially when caught in large amounts. Gertseva and Taylor (2011) assumed 50 percent discard mortality for dogfish shark in the fixed gear fisheries, and 100 percent mortality for dogfish discarded by trawl fisheries. Effective March 2012, the assumed discard mortality rate for dogfish shark is equal to that assumed by Gertseva and Taylor (2011; Agenda Item F.2.b, REVISED Supplemental SSC Report, March 2012). Hence, trip limits applied to fixed gear fisheries (i.e., non-nearshore fixed gear) will likely reduce mortality even if fishermen behavior does not change.

Commercial catch rates by depth and identification of potential alternatives for depth-area based management

West coast groundfish trawl survey data showed highest densities of dogfish shark north of 47°30’ N. latitude (Vancouver INPFC Area; Table C-78) at depths less than 100 fm. This survey showed that dogfish shark were also present but less abundant between 100-300 fm, and almost nonexistent at depths > 300 fm. High catch rates have also been shown by IPHC hook and line surveys north of 46° N. latitude (Figure C-28). We provide additional information in Table C-80 and Table C-81 from the WCGOP to further elucidate potential depth-area management measures that may reduce dogfish total mortality. Table C-80 and Table C-81 suggest that dogfish shark catch rates (CPUE) may be high at much deeper depths than 300 fm, and in some cases, to at least 400 fm. The commercial catch data from WCGOP (Table C-80 and Table C-81) support remaining conclusions drawn from other data sources (e.g., trawl survey and the IPHC hook-and-line survey) - largest catches and CPUEs were generally north of 45°46’ N. latitude (Table C-79).

Interpretations of Table C-80 and Table C-81 should be made with caution. These represent dogfish shark catches only during observed hauls, therefore, sample sizes are small and may not be representative of the fleet. In addition, RCA structures (current and past) affected catches and may affect interpretations. For example, low catches at some depth strata are reflective of RCA impacts rather than dogfish shark density. This can be seen for trawl where catch may appear bi-modal and low at moderate depths (e.g., 100-200 fm; Table C-80) where RCAs have typically been in regulation throughout much of the 2002-2010 period (see Table C-74). Low catches of dogfish shark due to RCAs are also apparent for fixed gear at depths less than 100 fm (north of 40°10' N. latitude) and depths less than 150 fm (south of 40°10' N. latitude). This demonstrates that the current RCA structure already prevents the capture of dogfish shark over many areas and depths where densities are high. Depths with the least restrictive 2012 RCAs are displayed by gray cells in Table C-80 and Table C-81.

Table C-80. Observed catch (lbs.) of dogfish shark by depth north of 45°46' N. latitude by depth (fm) for fixed gear and trawl sets (or hauls) for 2002-2010.

	Fixed gear				Trawl			
Area 1	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
North of 48°10'	0-100	0	0.0	0.00	0-100	279,868	53.6	40.32
	100-150	46,066	25.1	60.49	100-150	191,974	36.8	50.80
	150-200	28,240	15.4	49.19	150-200	49,013	9.4	118.03
	200-250	22,257	12.1	31.42	200-250	220	0.0	3.23
	250-300	32,376	17.6	46.77	250-300	709	0.1	4.45
	300-350	18,070	9.8	55.57	300-350	12	0.0	0.95
	350+	36,557	19.9	113.30	350+	5	0.0	0.77
	Total	183,566				521,800		

Area 2	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
48°10' - 45°46'	0-50	0	0.0	0.00	0-50	14,692	1.0	6.13
	50-100	6,358	0.9	343.66	50-100	678,475	45.4	20.72
	100-150	264,741	38.5	44.43	100-150	239,244	16.0	43.41
	150-200	200,465	29.2	31.26	150-200	62,063	4.2	33.91
	200-250	110,152	16.0	30.16	200-250	311,495	20.8	28.76
	250-300	67,221	9.8	42.41	250-300	122,284	8.2	14.90
	300-350	6,928	1.0	12.91	300-350	55,518	3.7	9.65
	350-400	4,836	0.7	49.90	350-400	10,319	0.7	5.57
	400+	26,735	3.9	81.95	400-450	621	0.0	1.54
					450-500	178	0.0	1.67
					500+	188	0.0	1.73
	Total	687,436				1,495,075		

Note: CPUE (lbs./hour) and % of total catch by area are also provided. Some depth bins were collapsed due to confidentiality concerns. Gray shading represents the most liberal 2012 RCA throughout the year for trawl (shoreward and seaward) and fixed gear (seaward). Data were acquired from WCGOP.

Table C-81. Observed catch (lbs.) of dogfish shark by depth south of 45°46’ N. latitude by depth (fm) for fixed gear and trawl sets (or hauls) for 2002-2010.

	Fixed gear				Trawl			
Area 3	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
45°46 - 40°10	0-150	19,035	20.9	9.59	0-100	46,327	9.2	4.68
	150-200	44,160	48.6	7.29	100-150	41,547	8.2	8.66
	200-250	23,028	25.3	5.26	150-200	25,418	5.0	22.39
	250-300	3,985	4.4	4.27	200-250	295,398	58.5	19.18
	300+	661	0.7	1.92	250-300	76,364	15.1	6.97
					300-350	18,155	3.6	3.64
					350-400	944	0.2	1.27
					400-450	350	0.1	1.10
					450-500	158	0.0	1.14
					500-550	88	0.0	1.06
					550-500	32	0.0	0.83
					600+	26	0.0	1.27
	Total	90,870				504,807		

Area 4	Depth (fm)	Catch (lb.)	%	CPUE	Depth (fm)	Catch (lb.)	%	CPUE
South of 40°10'	0-100	963	7.3	2.26	0-50	15,356	4.0	2.45
	100-150	0	0.0	0.00	50-100	49,910	13.0	5.37
	150-200	382	2.9	6.12	100-150	133,889	34.8	38.67
	200-250	6,132	46.7	7.89	150-200	40,335	10.5	20.78
	250-300	2,456	18.7	3.43	200-250	118,243	30.8	34.07
	300-350	1,441	11.0	1.13	250-300	22,564	5.9	8.55
	350-400	1,255	9.6	2.93	300-350	3,396	0.9	3.25
	400-450	126	1.0	1.05	350-400	459	0.1	1.33
	450-500	102	0.8	1.59	400+	88	0.0	0.59
	500-550	72	0.5	0.52				
	550-600	52	0.4	1.09				
	600+	142	1.1	0.79				
	Total	13,123				384,239		

Note: CPUE (lbs./hour) and % of total catch by area are also provided. Some depth bins were collapsed due to confidentiality concerns. Gray shading represents the most liberal 2012 RCA throughout the year for trawl (shoreward and seaward) and fixed gear (seaward). Data were acquired from WCGOP.

Depth restrictions in addition to current No Action RCAs (see Table C-74 and Table C-75) may reduce the catch (or catch rates) of dogfish shark relative to No Action. For trawl, 21-59 percent of the observed dogfish shark catch occurred between 200 and 250 fm south of 48°10’ N. latitude (Table C-80 and Table C-81) during 2002-2010. These depths also exhibited relatively high CPUEs (20-34 lbs./hour). Extending the seaward trawl RCA from 150/200 fm to 250 fm would likely reduce dogfish shark encounters. Actions could also be taken shoreward of the RCA to reduce catches (or catch rates) of dogfish shark; 45 percent of the dogfish shark caught between 45°46’ and 48°10’ N. latitude was at 50-100 fm during 2002-2010 (Table C-80); CPUE in this area was (21 lbs./hour) and ranked third among currently open depth strata. The shoreward trawl RCA was typically 75 fm in this area (Table C-74), which suggests that moving the trawl RCA from 75 to 50 fm may reduce catch (or catch rates) of dogfish shark considerably.

As shown for trawl, depth-area restrictions may also result in reduced encounters of dogfish shark by fixed gear sectors. Fixed gear RCAs have typically extended to 100 fm north of 40°10 N. latitude since 2002 (Table C-75). Extending the seaward RCA from 100 fm to 150 fm north of 45°46’ N. latitude may result in substantial reductions of dogfish shark encounters. For example, the 2002-2010 observed catches of dogfish shark were high (25-39% of the total catch) in this 100-150 fm depth range in the areas north of 45°46’ N. latitude; (Table C-80). Implementation of a 150 fm RCA (northern areas) may therefore reduce catches of dogfish shark for these sectors.

There is uncertainty regarding the level of savings (i.e., reduction in total mortality) that may occur by extending the seaward RCAs (i.e., trawl to 250 fm and fixed gear to 150 fm). Dogfish shark are incidentally caught while fishers target other species (Figure C-35). Moving the RCA deeper may require fishers to target the other groundfish species (e.g., sablefish for fixed gear) at more restrictive depths and potentially less productive grounds, while continuing to catch dogfish shark incidentally. Dogfish shark are still abundant seaward of 150 and 250 fm (Table C-80 and Table C-81).

Because catch rates for target species may decrease if the most productive fishing grounds are closed, fishing effort (towing hours) may increase in order to attain the quota pounds of target species (under the IFQ fishery), tier limits (for the limited entry sablefish fishery), and bimonthly trip limits for “daily trip limit” sablefish fisheries. This increased fishing effort could ultimately eliminate any potential savings of dogfish shark by moving the seaward RCA to 200 or 250 fm.

The WCGOP observer data demonstrates that, in some cases, the catch and CPUE for dogfish shark may be high at depths exceeding 300 fm. Extending RCAs beyond 300 is not analyzed herein, because the impacts to communities would likely be severe relative to No Action. Hence, only three relatively moderate RCA change will be analyzed herein: (a) move the shoreward trawl RCA from 75 fm to 50 fm between 45°46 to 48°10’ N. latitude, (b) move the seaward trawl RCAs from 150 fathoms to 200 fathoms north of 48°10’ and from 150/200 fathoms to 250 fathoms south of 48°10’ N. latitude, and (c) move the seaward fixed gear RCA from 100 to 150 fm north of 45°46’ N. latitude.

Note that there are numerous potential RCA alternatives that could be analyzed, depending on objectives and need. For example, another viable alternative may be to move the seaward trawl RCA to 200 fathoms coastwide, or 200 fathoms during all periods north of 45°46’ where dogfish concentrations are highest. The impacts would be less severe than shown for the analyzed alternatives, but may provide the reduction in total mortality that is desired. The alternatives analyzed here are illustrative to promote discussion that may narrow the focus and improve the applicability of these analyses.

Spiny Dogfish Bycatch Reduction Areas

Potential inseason action to reduce spiny dogfish interactions in the at-sea and shoreside whiting component of the IFQ program includes implementing bycatch reduction areas (BRA), which would prohibit vessels from fishing shoreward of a boundary line approximating the 75, 100, or 150 fm depth contours (i.e., bottom depth). Dogfish are pelagic and can range from top to bottom of the water column across a wide range of depths. The reported depth distribution of dogfish is 0->640 fm and the depth distribution of highest density was 0-190 fm (PFMC, 2008).

Data from shoreside and at-sea whiting trips from 2007-2011 were analyzed to assess the impact to operations and evaluate potential reductions in spiny dogfish bycatch if BRAs in the area north of 47°30' N. latitude, the highest area of spiny dogfish occurrence in the groundfish trawl survey (Table C-78)[36], were implemented. Over 2007-2011, 20 percent of shoreside whiting tows were set in this area. On average, 32 percent of the catcher-processor tows and 37 percent of mothership tows occurred in this area from 2007-2011. These percentages varied by year with shoreside tows ranging from 6 to 38 percent, catcher processor tows from 19 to 40 percent, and mothership tows from 12 to 63 percent. Given the geographic distribution of historical operations north of 47°30' N. latitude, if BRAs were implemented, a substantial portion of the fishing grounds would have depth restrictions.

The average bottom depth for a majority of tows (~99 percent) for the at-sea sectors were on average 310 fm for catcher-processors and 237 fm for motherships. The historical tows were deeper than the most common depth of occurrence of dogfish in the groundfish trawl survey data (Table C-78) but similar to data from the non-whiting trawl fishery where high CPUEs were observed in deeper waters (i.e., to 300 fm; Table C-79). For the shoreside whiting sector, effort was shallower than the at-sea sectors with less than 18 percent of tows set deeper than 150 fm. A quarter of the shoreside whiting tows were set deeper than 100 fm. Implementing a 150 fm BRA would prohibit fishing in shallower waters that typically have not been fished by the at-sea sectors. Based on the historical shoreside data, implementing BRAs may prohibit fishing in waters historically fished by the shoreside whiting vessels. The data only include average depth; therefore, it is possible that fishing during the tow occurred in shallower and deeper waters. To the extent that implementing a BRA results in fishing activities in waters deeper than the dogfish distributions, spiny dogfish bycatch could be lower.

The average depth of fishing operations varied by year; however, it was often much shallower, on average 166 fm for catcher-processors and 122 fm for motherships, than the average bottom depth. This was anticipated since the target species for the at-sea sectors, Pacific whiting, has a pelagic or mid-water distribution. The data only include average depth; therefore, it is possible that fishing during the tow occurred in shallower and deeper waters. Implementing a BRA would regulate the area of fishing defined by bottom depth and not the depth of fishing; therefore, it is difficult to assess the effectiveness of BRAs. To the extent that implementing a BRA results in fishing activity that is deeper than the spiny dogfish distributions, bycatch would be reduced.

Comparison of Management Options

No Action

No Action management measures are shown for dogfish shark in Table C-73. Trip limits would remain high (60,000 lbs. / month for shoreside trawl and 150,000-200,000 /2 months for fixed gear), and RCAs shown for 2012 would remain in place for non-whiting trawl and fixed gear sectors. No Action for at-sea whiting fisheries include no trip limits and no RCA restrictions. The No Action dogfish shark management measures would remain in place and could be modified inseason through routine management measures to slow landings if necessary.

[36] Monterey is the area with the second greatest occurrence of spiny dogfish in the groundfish trawl survey; however, at-sea operations are prohibited in this area.

Under No Action, dogfish shark would continue to be sorted and reported to species on state landing reports and federal fish tickets. Historical discard rates would be used inseason for catch projections and the basis for trip limit adjustments. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard rates provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

Biological Impacts: Under No Action, one can assume that total catch and discards of dogfish would be similar to recent historical levels. Assuming 50 percent discard mortality for fixed gear and 100 percent discard mortality for trawl, total fishing mortality from 2006 – 2010 ranged from 1,032 – 2,393 mt; Table C-71). The total mortality observed in 2008 would exceed the 2013 and 2014 preferred component ABC (2,044 and 2,024 mt respectively, whereas the total mortalities observed during the other 4 of 5 years would be less than the preferred component ABC for dogfish shark.

<u>Socioeconomic Impacts:</u>

Affected Fisheries: The primary fisheries affected by No Action trip limits and RCAs are limited entry non-whiting trawl, limited entry non-nearshore fixed gear, and open access non-nearshore fixed gear. These fisheries accounted for approximately 63 percent of the dogfish shark total mortality in 2010 (Figure C-25; **Error! Reference source not found.**). Although most total mortality of dogfish shark is caused by the limited entry bottom trawl fishery (43% in 2010), management measures applied to the non-nearshore fixed gear, which accounted for 21 percent of the total mortality in 2010), may help reduce total mortality. Area closures, if deemed necessary, may be considered for at-sea and shore-side whiting fisheries, which accounted for 23 percent and 10 percent of the dogfish total mortality in 2010 (Figure C-25; **Error! Reference source not found.**). Even though these fisheries may fish within RCAs, area restrictions may be applied if deemed necessary to reduce bycatch. Other sectors showed relatively little impact on dogfish total mortality during 2010. It should be pointed out, however, that Washington Tribal fisheries have encountered substantial amounts of dogfish shark during certain years; set asides for Tribal fisheries should be high enough to take into account recent catches (e.g., 303 mt was taken by Tribal fisheries in 2008; **Error! Reference source not found.**).

Sector-specific allocations (Tables 2-11 and 2-12**)**, and the potential for exceeding those allocations under No Action management measures are shown in Table C-82. Expected total mortalities shown in Table Y1 were the minimum and maximum total mortalities from 2006-2010 (Hastie and Bellman 2007; Bellman et al. 2008, 2009, 2010, and 2011) adjusted assuming a 50 percent discard mortality for the non-trawl sector. If allocations are projected to be exceeded, then sector-specific trip limits or other management measures may be needed (see options below). In this case, the shore-side trawl sector may exceed its allocation under No Action management measures, whereas recent catches suggest that the non-trawl and at-sea whiting sectors may not exceed allocations or set-asides. Hence, additional management measures may be needed to reduce total mortality for shoreside trawl fisheries under No Action.

Table C-82. 2013 and 2014 dogfish shark preferred allocations for shoreside trawl, non-trawl, and non-tribal at-sea whiting sectors (also see Tables 2-11 and 2-12, DEIS).

Year	Sector	Preferred Allocation (mt)	No Action sector total mortality
	Shoreside trawl[a]	770	645 – 1,082
2013	Non-trawl	434.5	132 - 377
	Non-tribal at-sea whiting	534	23 - 513
	Shoreside trawl	755	645 – 1,082
2014	Non-trawl	429.5	132 - 377
	Non-tribal at-sea whiting	534	23 - 513

Notes: Expected range of total mortality by sector is shown for comparison (minimum and maximum). Expected mortality was calculated using historical total mortality data 2006 – 2010) presented by 2009 and 2010 by Hastie and Bellman (2007) and Bellman et al. (2008-2011) and adjusted assuming 50% discard mortality for non-trawl sectors.
[a]Total mortality ranged from 520 – 1,023 mt for non-whiting trawl and 16 - 125 mt for shoreside whiting.

Distribution of Fishery Effort: Approximately 92 percent of dogfish shark total mortality by limited entry non-whiting trawl and non-nearshore fixed gear fisheries occur north of 40^{o}10’ N. latitude (Figure C-27); most dogfish shark landings occur in the Vancouver INPFC area (97%) for fixed gear fisheries and the Vancouver (35%) and Columbia (48%) INPFC areas for limited entry non-whiting trawl. Some non-whiting trawl landings of dogfish shark also occurred in the Monterey INPFC area (16%).

Importance to port groups/communities: Dogfish shark may be delivered almost exclusively by directed-dogfish trips or as a portion of mixed groundfish landings (see Figure C-35). Dogfish typically represents a small fraction of the total groundfish landings when delivered with other groundfish. Because most dogfish shark encountered are discarded, the total annual landings by non-nearshore and by limited entry non-whiting trawl fisheries have been relatively small, especially during recent years (107 mt and 70 mt during 2009 and 2010, respectively; Figure C-29).

Fixed gear deliveries of dogfish shark during 2006-2011 were almost exclusively made in Washington at Northern Puget Sound area ports (90%; Figure C-32, **Error! Reference source not found.**). Trace fixed gear landings were also made in Coos Bay, Brookings, San Francisco, and other area ports. Dogfish shark caught by limited entry non-whiting trawl were primarily landed at North Puget Sound (32%) and Columbia River Oregon (51%) area ports (Figure C-32; Table C-83). Fort Bragg and Monterey area ports received 6 percent and 11 percent of the trawl landings during the 2006-2011 period.

The ex-vessel value of dogfish shark by port group are shown in **Error! Reference source not found.**. Landings from January 2006 – October 2011 (= 5.83 years) were averaged as annual landings (i.e., by dividing the total landed weight by 5.83). Landings were then converted to value by multiplying by the average sector-specific landed weight (pounds; **Error! Reference source not found.**) by the annual average price per pound shown in Figure C-30. The average revenue, calculated using this method, was $42,964 for limited entry non-nearshore trawl and

$49,932 for limited entry and open access fixed gear (**Error! Reference source not found.**). Top two average annual revenues by gear/sector ranged from $13,920 (North Puget Sound area ports) to $21,827 (Columbia River Oregon area ports) for trawl and $3,094 (Coos Bay area ports) to $45,083 (Northern Puget Sound area ports) for fixed gear (**Error! Reference source not found.**).

Table C-83. Revenue and percent contribution of dogfish shark landings by port group area. Annual-landed weights were calculated by averaging the 2006 – October 2011 landings.

Gear/sector	Port-area group	2006-2011 Weight landed (lbs.)	2006-2011 Average Percent by area	Annual weight landed (Average; lbs.)	2006-2011 Average price per pound ($)	Average annual revenue ($)
LE Trawl	NPS	279,835	32.4%	47,999	0.29	$13,920
	CLO	438,789	50.8%	75,264	0.29	$21,827
	MNA	90,581	10.5%	15,537	0.29	$4,506
	BGA	49,215	5.7%	8,442	0.29	$2,448
	Remaining	5,302	0.6%	909	0.29	$264
	TOTAL	863,722	100.0%	148,151	0.29	$42,964
Fixed gear	NPS	1,251,593	90.3%	214,681	0.21	$45,083
	CBA	85,909	6.2%	14,736	0.21	$3,094
	BRA	35,512	2.6%	6,091	0.21	$1,279
	Remaining	13,201	1.0%	2,264	0.21	$476
	TOTAL	1,386,215	100.0%	237,773	0.21	$49,932

Note: Gear/sectors are: LE Trawl = limited entry non-whiting trawl; Fixed Gear = limited entry and open access groundfish fixed gear. Port group areas are: BGA = Fort Bragg; BRA = Brookings; CBA = Coos Bay; CLO – Columbia River Oregon; MNA = Monterey; NPS = North Puget Sound;. Other port groups were combined into “Remaining”. The number of remaining port groups were 7 for LE trawl and 10 for fixed gear.

Options 1 - 7

Under all non-whiting management options, dogfish shark would continue to be sorted and reported to species on state landing reports and federal fish tickets. Inseason catch accounting and basis for trip limit and/or RCA adjustments will be made using: (a) historical discard rates with near real-time bycatch updates from the WCGOP observer program for the IFQ fishery to improve precision as the year proceeds and/or (b) historical discard amounts (e.g., average annual discard beginning 2006) added to landings data provided by PacFIN. Catch estimates would be revised post season using landed catch as reported to PacFIN combined with observer based discard amounts provided by WCGOP and specific to the fishing year. The determination of total fishing mortality relative to the harvest specifications would be evaluated post season for all fisheries.

<u>Option 1 – High Trip Limit</u>: Reduce the dogfish shark trip limit (a) from 60,000 lbs./month to 20,000 lbs./2 months for non-whiting trawl and (b) from 100,000-200,000 lbs./2 months to 18,000 lbs./2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 1 (high-trip limit) relative to No Action are shown in Table C-84 for dogfish shark (trawl and fixed gear). In this case, trip limits were 20,000 pounds/2 months for limited entry non-whiting trawl and 18,000 pounds/2 months for fixed gear sectors. These trip limits represent the 90th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery.

Table C-84. Option 1 "high" trip limits for dogfish shark and potential landings and lost revenue relative to No Action. Trip limits were selected based on the 90th percentile of landings over the period 2006 – October 2011 (see Figure C-36Figure C-37).

Gear/sector & Option	Trip limit (lbs.)	2006-2011 bimonthly trip limits exceeded (%)	2006-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 1 average annual landings (lbs.)	Option 1 average amount discarded or avoided due to trip limits (lbs.)	Option 1 average annual revenue lost ($)
No Action							
OA FG	100,000 /2 mos	0%	0%	31,643			
LE FG	100,000 /2 mos	0%	0%	206,677			
LE Trawl	60,000 /mo	0%	0%	148,371			
TOTAL				386,691			
Option 1							
OA FG	18,000 /2mo	2.0%	45%		17,418	14,225	$2,987
LE FG	18,000 /2mos	9.9%	53%		96,663	110,014	$23,103
LE Trawl	20,000 /2 mos	10.7%	32%		101,200	47,171	$13,680
TOTAL					215,281	171,410	$39,770

Note: Annual-landed weights were calculated by averaging the 2006 – October 2011 landings (see above). Average price per pound (2006-2011) used to estimate value was $0.29 for trawl and $0.21 for fixed gear. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 171,410 pounds (78 mt), or 44 percent for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings. If fishers' behavior remained unchanged, and assuming discard mortality were 100 percent for trawl and 50 percent for non-trawl, then total mortality would be reduced by 62,195 pounds (28 mt).   Total mortality would be reduced even more (to 171,410 pounds or 78 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of dogfish shark (i.e., so that no additional discarding were caused by trip limits.

The maximum expected mortality under Option 1 would exceed the 2013 and 2014 ABC (2,044 and 2,024 mt, respectively).

Socioeconomic Impacts: Approximately 10 percent of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings (by number) may be affected by Option 1 trip limits (18,000 and 20,000 lbs./2 mos, respectively), whereas only 2 percent of the bimonthly landings by the open access fishery would be affected by 18,000 lb./2 month cumulative trip limits (Figure C-36and Figure C-37; Table C-84). Reducing trip limits from 60,000 lbs./month 20,000 lbs./2 months for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 32 percent (= 47,171 pounds or 21 mt) relative to No Action. Reducing trip limits from 100,000-200,000 lbs./2 months to 18,000 pounds/2 months for fixed gear sectors could reduce landed pounds by 53 percent for the limited entry fixed gear sector (= 110,014 pounds or 50 mt reduction relative to No Action) and 45 percent for the open access fixed gear sector (14,225 pounds or 7 mt relative to No Action).

The estimated value of dogfish shark revenue forgone under this Option 1 relative to No Action is $39,770. Washington port groups (Northern Puget Sound) and Oregon port groups (Columbia River Oregon) would be most impacted by dogfish shark trip limits (**Error! Reference source not found.**).

The only sector that may require trip limits to keep its mortality below its allocation option is the shoreside fishery (Table C-85). Trip limits described under Option 1 may not keep the total mortality by this sector (expected range = 624 – 1,082 mt) below its preferred allocation; expected mortality was reduced 0 – 21 mt relative to No Action. Note that the maximum expected mortality represents (a) the largest encounter rate during a five year period (2006-2010) and (b) assumes that fishermen behavior does not change and all forgone landings are converted to 100 percent discard mortality. The maximum mortality shown for the non-whiting trawl may also be reduced by 21 mt (to 1,062 mt) if all of the forgone landings were avoided rather than discarded. The expected mortality for the non-trawl sector, reduced 25 – 50 mt relative to No Action, remains below the sector allocation (as it was under No Action). Finally, the expected mortality for at-sea whiting remains the same as shown for No Action, because trip limits were not analyzed for that sector.

Table C-85. Expected range of total mortality by sector under Option 1, along with 2013 and 2014 preferred allocations and set-asides shoreside trawl, non-trawl, and at-sea whiting sectors (also see Tables 2-11 and 2-12) for comparison.

Year	Sector	Allocation Option (mt)	Option 1 sector total mortality
2013	Shoreside trawl[a]	770	624 – 1,082
	Non-trawl	434.5	75 - 349
	Non-tribal at-sea whiting	534	23 - 513
2014	Shoreside trawl	755	624 – 1,082
	Non-trawl	429.5	75 - 349
	Non-tribal at-sea whiting	534	23 - 513

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2006 – 2010 by Hastie and Bellman (2007) and Bellman et al. (2008, 2009, 2010, and 2011), but adjusted assuming 100% discard mortality for trawl and 50% discard mortality non-trawl gear (see Table C-84). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with 50 – 100% discard mortality rates) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 2 – Moderate-to-Low Trip Limit: Reduce the dogfish shark trip limit (a) from 60,000 lbs./month to 5,000 lbs./2 months for non-whiting trawl and (b) from 100,000-200,000 lbs./2 months to 2,500 lbs./2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 2 relative to No Action (moderate-to-low trip) are shown in Table C-86 for dogfish shark (trawl and fixed gear). In this case, trip limits were 5,000 pounds/2 months for limited entry non-whiting trawl and 2,500 pounds/2 months for fixed gear sectors. These trip limits represent the 75th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery.

Table C-86. Option 2 "moderate-to-low" trip limits for dogfish shark and potential landings and lost revenue relative to No Action.

Gear/sector & Option	Trip limit (lbs.)	2006-2011 bimonthly trip limits exceeded (%)	2006-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 2 average annual landings (lbs.)	Option 2 average amount discarded or avoided due to trip limits (lbs.)	Option 2 average annual revenue lost ($)
No Action							
OA FG	100,000 /2 mos	0%	0%	31,643			$
LE FG	100,000 /2 mos	0%	0%	206,677			
LE Trawl	60,000 /mo	0%	0%	148,371			
TOTAL				386,691			
Option 2							
OA FG	2,500 /2mo	11.2%	77%		7,365	24,278	$5,098
LE FG	2,500 /2mos	22.5%	86%		28,386	178,292	$37,441
LE Trawl	5,000 /2 mos	24.2%	69%		46,032	102,339	$29,678
TOTAL					81,783	304,909	$72,217

Note: Trip limits were selected based on the 75th percentile of landings over the period 2006 – October 2011 (see Figure C-36Figure C-37). Annual-landed weights were calculated by averaging the 2006 – October 2011 landings (see above). Average price per pound (2006-2011) used to estimate value was $0.29 for trawl and $0.21 for fixed gear. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 304,909 pounds (138 mt), or 79 percent for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings. If fishers' behavior remained unchanged, and assuming discard mortality were 100 percent, for trawl and 50 percent for non-trawl, then total mortality may be reduced by 102,275 pounds (47 mt). Total mortality would be reduced even more (to 304,909 pounds or 138 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of dogfish shark (i.e., so that no additional discarding were caused by trip limits).

The maximum expected mortality under Option 2 would exceed the 2013 and 2014 ABC (2,044 and 2,024 mt, respectively).

Socioeconomic Impacts: Approximately 23-24 percent of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings (by number) may be affected by the Option 2 trip limits (2,500 and 5,000 lbs./2 mos, respectively), whereas 11 percent of the open access bimonthly landings may be affected by 2,500 lb./2 month cumulative trip limits (Table C-86; Figure C-36 and Figure C-37). Reducing trip limits from 60,000 lbs./month to 5,000 lbs./2 months for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 69 percent (= 102,339 pounds or 46 mt) relative to No Action. Reducing trip limits from

100,000-200,000 lbs./2 months to 2,500 pounds/2 months for fixed gear sectors could reduce landed pounds by 86 percent for the limited entry fixed gear sector (178,292 pounds or 81 mt reduction relative to No Action) and 77 percent for the open access fixed gear sector (24,278 pounds or 11 mt reduction relative to No Action).

The estimated value of dogfish shark revenue forgone under this Option 2 relative to No Action is $72,217. Washington port groups (Northern Puget Sound) and Oregon Port Groups (Columbia River Oregon) would be most impacted by dogfish shark trip limits (**Error! Reference source not found.**).

The only sector that may require trip limits to keep its mortality below its allocation is the shoreside fishery (Table C-87). Trip limits described under Option 2 may not keep the total mortality by this sector (expected range = 599 – 1,082 mt) below its preferred allocation; expected mortality was reduced 0 – 46 mt relative to No Action. Note that the maximum expected mortality represents (a) the largest encounter rate during a five year period (2006-2010) and (b) assumes that fishermen behavior does not change and all forgone landings are converted to 100 percent discard mortality. The maximum mortality shown for the shoreside trawl may also be reduced by 46 mt (to 1,036 mt) if all of the forgone landings were avoided rather than discarded. The expected mortality for the non-trawl sector, reduced 46 – 92 mt relative to No Action, remains below the sector allocation (as it was under No Action). Finally, the expected mortality for at-sea whiting remains the same as shown for No Action, because trip limits were not analyzed for that sector.

Table C-87. Expected range of total mortality by sector under Option 2, along with 2013 and 2014 preferred allocations and set-asides shoreside trawl, non-trawl, and at-sea whiting sectors (also see Tables 2-11 and 2-12) for comparison.

Year	Sector	Allocation Option (mt)	Option 2 sector total mortality
2013	Shoreside trawl	770	599 – 1,082
	Non-trawl	434.5	40 - 331
	Non-tribal at-sea whiting	534	23 - 513
2014	Shoreside trawl	755	599 – 1,082
	Non-trawl	429.5	40 - 331
	Non-tribal at-sea whiting	534	23 - 513

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2006 – 2010 by Hastie and Bellman (2007) and Bellman et al. (2008, 2009, 2010, and 2011), but adjusted assuming 100% discard mortality for trawl and 50% discard mortality non-trawl gear (see Table C-84). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with 50 – 100% discard mortality rates) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 3 – Low Trip Limit: Reduce the dogfish shark trip limit (a) from 60,000 lbs./month to 600 lbs./2 months for trawl and (b) from 100,000-200,000 lbs./2 months to 300 lbs./2 months for limited entry and open access fixed gear.

Landings and lost revenue under Option 3 (low trip limit) relative to No Action are shown in Table C-88 for dogfish shark (trawl and fixed gear). In this case, trip limits were 600 pounds/2 months for limited entry non-whiting trawl and 300 pounds/2 months for fixed gear sectors. These trip limits represent the 50th percentile for landings by the limited entry non-whiting trawl fishery and the limited entry fixed gear fishery.

Table C-88. Option 3 "low" trip limits for dogfish shark and potential landings and lost revenue relative to No Action.

Gear/sector & Option	Trip limit (lbs.)	2006-2011 bimonthly trip limits exceeded (%)	2006-2011 pounds in excess of trip limit (%)	No Action average annual landings (lbs.)	Option 3 average annual landings (lbs.)	Option 3 average amount discarded or avoided due to trip limits (lbs.)	Option 3 average annual revenue lost ($)
No Action							
OA FG	100,000 /2 mos	0%	0%	31,643			
LE FG	100,000 /2mos	0%	0%	206,677			
LE Trawl	60,000 /mo	0%	0%	148,371			
TOTAL				386,691			
Option 3							
OA FG	300 /2mo	29.6%	90%		3,214	28,429	$5,970
LE FG	300 /2mos	50.5%	97%		6,050	200,627	$42,132
LE Trawl	600 /2 mos	49.3%	94%		8,255	140,116	$40,634
TOTAL					17,519	369,172	$88,736

Note: Trip limits were selected based on the 50th percentile of landings over the period 2006 – October 2011 (see Figure C-36 and Figure C-37). Annual-landed weights were calculated by averaging the 2006 – October 2011 landings (see above). Average price per pound (2006-2011) used to estimate value was $0.29 for trawl and $0.21 for fixed gear. Gear/sectors are: LE Trawl = limited entry non-whiting trawl; OA FG = open access fixed gear (groundfish); LE FG = limited entry fixed gear (groundfish).

Biological Impacts: Overall, this alternative may reduce landings by 369,172 pounds (167 mt), or 95 percent for limited entry non-whiting trawl and limited entry and open access fixed gear fisheries landings. If fishers' behavior remained unchanged, and assuming discard mortality were 100 percent for trawl and 50 percent for non-trawl, then total mortality may be reduced by 114,528 pounds (52 mt). Total mortality would be reduced even more (to 369,172 pounds or 167 mt) if this trip limit caused fishermen to reduce targeting or avoid fishing in areas with high concentrations of dogfish shark.

The maximum expected mortality under Option 3 would exceed the 2013 and 2014 ABC (2,044 and 2,024 mt, respectively).

Socioeconomic Impacts: Approximately 50 percent of the limited entry fixed gear and limited entry non-whiting trawl bimonthly landings (by number) may be affected by Option 3 trip limits (300 and 600 lbs./2 mos, respectively), whereas 30 percent of the open access bimonthly landings may be affected by 300 lb./2 month cumulative trip limits (Table C-88; Figure C-36 and Figure C-37). Reducing trip limits from 60,000 lbs./month to 600 lbs./2 months for the limited entry non-whiting trawl sector may reduce landed pounds for that sector by 94 percent (= 140,116 pounds or 63.5 mt) relative to No Action. Reducing trip limits from 100,000-200,000 lbs./2 months to 300 pounds/2 months for fixed gear sectors could reduce landed pounds by 97 percent for the limited entry fixed gear sector (200,627 pounds or 91 mt reduction relative to No Action) and 90 percent for the open access fixed gear sector (28,429 pounds or 11 mt reduction relative to No Action).

The estimated value of dogfish shark revenue forgone under Option 3 relative to No Action is $88,736. Washington port groups (Northern Puget Sound) and Oregon Port Groups (Columbia River Oregon) would be most impacted by dogfish shark trip limits (**Error! Reference source not found.**).

The only sector that may require trip limits to keep its mortality below its allocation is the shoreside fishery (**Error! Reference source not found.**). Trip limits described under Option 3 may not keep the total mortality by this sector (expected range = 582 – 1,082 mt) below its preferred allocation; expected mortality was reduced 0 – 63.5 mt relative to No Action. Note that the maximum expected mortality represents (a) the largest encounter rate during a five year period (2006-2010) and (b) assumes that fishermen behavior does not change and all forgone landings are converted to 100 percent discard mortality. The maximum mortality shown for the shoreside trawl may also be reduced by 63.5 mt (to 1,018.5 mt) if all of the forgone landings were avoided rather than discarded. The expected mortality for the non-trawl sector, reduced 52 – 104 mt relative to No Action, remains below the sector allocation (as it was under No Action). Finally, the expected mortality for at-sea whiting remains the same as shown for No Action, because trip limits were not analyzed for that sector.

Table C-89. Expected range of total mortality by sector under Option 3, along with 2013 and 2014 preferred allocations and set-asides shoreside trawl, non-trawl, and at-sea whiting sectors (also see Tables 2-11 and 2-12) for comparison.

Year	Sector	Allocation Option (mt)	Option 3 sector total mortality
2013	Shoreside trawl	770	582 – 1,082
	Non-trawl	434.5	29 - 325
	Non-tribal at-sea whiting	534	23 - 513
2014	Shoreside trawl	755	582 – 1,082
	Non-trawl	429.5	29 - 325
	Non-tribal at-sea whiting	534	23 - 513

Note: Expected mortality was initially calculated by using historical catch and discard presented for 2006 – 2010 by Hastie and Bellman (2007) and Bellman et al. (2008, 2009, 2010, and 2011), but adjusted assuming 100% discard mortality for trawl and 50% discard mortality non-trawl gear (see Table C-84). Additional savings due to trip limits were subtracted from these total mortality estimates as minimum savings (all lost landings due to trip limits were assumed to be caught and discarded, with 50 – 100% discard mortality rates) or maximum savings (all lost landings due to trip limits were assumed to be avoided, resulting in 0% mortality of the forgone landings). The range of sector-specific mortalities under Option 1 were calculated as: Minimum Expected Mortality = (Minimum No Action Total Mortality) – (Maximum Savings); Maximum Expected Mortality = (Maximum No Action Mortality) – (Minimum Savings).

Option 4 – Extend Shoreward Trawl RCA Shallower: Extend shoreward trawl RCAs to 50 fm (from 75 fm) between 45°46'- 48°10' N. latitude.

Biological Impacts: Extending the shoreward trawl RCA to 50 fm between 45°46' and 48°10' N. latitude may decrease encounters with dogfish shark relative to No Action (Table C-80). No action would be taken north of 48°10' N. latitude, where the shoreward RCA is 0 fm. The CPUEs south of 45°46' in the shallow areas are generally low (Table C-81), so no action in the south is proposed within this alternative. The actual savings in total catch cannot be estimated using the data obtained from the WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource. Although it is expected that dogfish mortality under this option would be lower than No Action, the level of savings is uncertain. Additional analyses with more data is required to estimate the savings.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) by moving the RCA shallower. However, it should be pointed out that most dogfish are discarded because few markets exist, resulting in ex-vessel value that is very small (**Error! Reference source not found.**) relative to the remaining groundfish landed by this fishery. That could change if markets strengthened. Nonetheless, other economic and safety impacts associated with moving the shoreward trawl RCA to 50 fm may be severe relative to No Action. This measure would (a) force fishers off some of their most productive fishing grounds in the nearshore area and onto less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) concentrate fishers into a smaller area, resulting in likelihood of increased gear conflicts, (d) reduce or eliminate the catch of nearshore flatfish species that are primarily found between 50 and 100 fm, and (e) create gear conflicts and potential competition with nearshore fixed gear fisheries. These socioeconomic impacts would be substantially greater than those expected No Action and Options 1 – 3.

Option 5 – Extend Seaward Trawl RCA Deeper: Extend trawl seaward RCA to 150 fathoms to 200 fathoms north of 48°10' and from 150/200 fathoms to 250 fathoms south of 48°10' N. latitude; Extend depth closures to, or create separate depth closure specific to, whiting trips under the IFQ program.

Biological Impacts: Extending the trawl RCA from 150 fathoms to 200 fathoms north of 48°10' N. latitude and from 150/200 fathoms to 250 fathoms south of 48°10' N. latitude may decrease encounters with dogfish shark substantially relative to No Action. North of 48°10' N. latitude, the CPUE drops from 118 lbs./hr. at depths of 150-200 fm to less than 5 lbs./hr. at deeper depths. A reduction of encounters may also occur south 48°10' N. latitude by moving the seaward RCA to 250 fm (from 150/200 fm). A reduction in encounters may even be substantial south of 40°10 N. latitude relative to No Action (Table C-81). However, it must be stressed that relatively small amounts of dogfish are caught south of 40°10 N. latitude relative to the area north (Figure C-27). CPUE by depth was not available for directed whiting trips in the shoreside sector at the time of writing. These trips use mid-water trawl gear to target whiting and have been exempted from the RCA. Given the different gears, CPUE would differ from CPUE by depth for bottom trawl gear. Nonetheless, the general depth pattern in CPUE by depth from the bottom trawl sector is expected to apply to whiting trips.

Although it is expected that dogfish mortality is less under Option 5 relative to No Action, the actual savings in total mortality cannot be estimated using the data obtained from the WCGOP; additional data is required to provide a reasonable estimate of impacts to the resource.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. However, it should be pointed out that most dogfish are discarded because few markets exist, resulting in current ex-vessel values that are small (**Error! Reference source not found.**) relative to the remaining groundfish landed by these fisheries. That could change if markets strengthened. Nonetheless, any revenue loss due to a reduction in dogfish landings may be inconsequential relative to other associated economic and safety impacts of a seaward RCA change. Other economic and safety impacts associated with moving the seaward RCA deeper may be severe. This measure would (a) force fishers off some of their most productive fishing grounds and on to less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) require fishers to travel greater distances and spend more time on the water to catch targeted species at levels similar to status quo, and (d) concentrate fishers into a smaller fishing area, resulting in likelihood of increased gear impacts. These impacts will either reduce landings of target species (e.g., sablefish, Dover sole, thornyheads), or increase time and expense (e.g., fuel, number of trips, and days at sea) to maintain status quo landings of target species. The same dynamic would be expected in directed whiting trips. Whiting tend to be available deeper later in the year and so a depth closure to mitigate dogfish bycatch may not have a large cost if put into place at that time. Participants in the shoreside whiting sector have different abilities to fish deep based on the location of their homeport, size of vessel, and other factors. In general, closed areas can lead to additional time at sea, running distance, and potential gear conflicts may result in increased accidents at sea. Finally, the anticipated savings in dogfish shark encounters under this measure may be offset by the need to increase fishing effort to levels necessary for attaining quota pounds of target species.

The socioeconomic impacts under Option 5 are expected to be substantially greater than those expected under Options 1 – 4.

Option 6 – Extend Seaward Fixed Gear RCA Deeper: Extend seaward fixed gear RCA from 100 to 150 fm north of 45°46' N. latitude.

Biological Impacts; Extending the seaward fixed gear RCA from 100 fathoms to 150 fathoms north of 45°46' N. latitude may decrease encounters with dogfish shark substantially. The percent of the total catch and the CPUEs were highest in these depth strata and these areas during 2002-2010 (Table C-80). Although dogfish mortality is expected to be lower compared to No Action, the actual savings in total catch cannot be estimated using the data obtained from the WCGOP. Additional data is required to provide a reasonable estimate of impacts to the resource.

Socioeconomic Impacts: It is difficult to estimate revenue loss (in ex-vessel value) that may be caused by this RCA change because additional data are required from WCGOP to estimate potential reduced encounters (total catch) caused by this measure. However, it should be pointed out that most dogfish are discarded because few markets exist, resulting in current ex-vessel values that are small (**Error! Reference source not found.**) relative to the remaining groundfish landed by this fishery. That could change if markets strengthened. Nonetheless, any revenue loss caused by a reduction in dogfish landings may be inconsequential relative to other associated economic and safety impacts of this alternative seaward RCA. Other economic and safety impacts associated with moving the seaward RCA deeper may be severe. This measure would (a) force fishers off some of their most productive fishing grounds and on to less productive areas, (b) require more fishing effort to catch targeted species at levels similar to status quo, (c) require fishers to travel greater distances and spend more time on the water to catch targeted species at levels similar to status quo, and (d) concentrate fishers into a smaller fishing area, resulting in likelihood of increased gear impacts. These impacts will either reduce landings of target species (e.g., sablefish), or increase time and expense (e.g., fuel, number of trips, and days at sea) to maintain status quo landings of target species. The additional time at sea, running distance, and potential gear conflicts may result in increased accidents at sea. Finally, the anticipated savings in dogfish shark encounters under this measure may be offset by the need to increase fishing effort to levels necessary for attaining quota pounds, tier limits, and trip limits of target species.

The socioeconomic impacts under Option 6 are expected to be substantially greater than those expected under Options 1 – 4, but less than under Option 5.

Option 7. Consideration of set asides, formal allocations, or depth closures for the at-sea sectors:

Spiny dogfish catch for the non-tribal at-sea sectors has averaged nearly 150 mt per year combined over the period 2005-2010 (Table C-77). Catch was highly variable over this time period, ranging from 7 mt to 45 mt in the mothership sector; and, from 6 mt to 489 mt in the catcher processor sector—nearly three times that sector's average. This indicates that the annual dogfish catch in the at sea sectors has the potential to be large relative to the stock's ABC (see Table C-76).

To manage dogfish under the Amendment 20 at sea whiting harvest cooperative ("coop") programs, the Council could establish either: (1) a formal allocation, or, (2) a set aside. The Council has made formal allocations to the at sea sectors for the key bycatch stocks where the combined catch across sectors has the potential to reach or exceed an ACL (e.g., canary rockfish). Stocks with formal allocations to coops, or the non-coop fishery when active, are distributed to fishery participants on a permit basis, typically pro rata to the whiting allocated to each permit. A formal allocation can trigger a fishery closure, or if available, a mitigating management measure like a depth or area closure if catch is projected to exceed the allocation amount.

Set asides, in contrast, “are not formal allocations but they are amounts which are not available to the other fisheries during the fishing year.” (50 C.F.R. § 660.55(j)). The Council has established set asides for stocks where bycatch is non-negligible yet also unlikely to raise the need for inseason management. The set asides facilitate active management in other sectors and gives the sector for which the set aside is created some assurances that management measures will not be adjusted inseason as long as the set aside is not exceed. Inseason management of set aside stocks is possible where "there is a risk of a harvest specification being exceeded, unforeseen impact on another fisheries, or conservation concerns in which case inseason action may be taken” (50 C.F.R. 660.150(c)(i)(B)(2) and 660.160(c)(3)(ii)).

Unlike formal allocations, set asides are not permit based and are instead assigned to a sector or both sectors as whole. Another key difference between set asides and formal allocations is that set asides are not available for inseason reapportionment between the at sea sectors (50 C.F.R. 660.150 (c)(4)(iii)), under No Action. Under the proposed action, set-asides could be reapportioned (see C.2 Management of ACL Set-Asides).

The Council and NMFS would have authority to take inseason management action of dogfish bycatch in the at sea whiting sectors even without a formal allocation or set aside designation. The regulations allow for inseason action for a non-whiting bycatch in the at sea sectors where the same risk factors named above for set asides stocks arise (50 C.F.R. 660.150(c)(i)(B)(3) and 660.160(c)(3)(ii)).

Dogfish catch is likely truly incidental in the at sea sectors. Even the high catch seen in the catcher processor sector in 2008 amounted to only 0.4 percent of the whiting harvested by that sector by volume (Bellman et al., 2009). Depth closures would therefore be the most effective management measure for mitigating dogfish bycatch in this sector. The at sea sectors use midwinter trawl gear, yet are likely to encounter dogfish across the same depths as seen in the bottom trawl data (Bellman et al., 2009). The whiting sectors are not held to the RCA and so can currently operate in prime dogfish habitat. The biological and socioeconomic impacts relating to such depth closures under Option 5 apply generally to the at sea sectors as well.

Table C-90. Annual catch (mt) and discard percentage of dogfish in the two at sea whiting sectors, 2005-2010 (source: Hastie and Bellman (2006-2007); Bellman et al. (2008-2011)).

	2005	2006	2007	2008	2009	2010	2005-10 avg.
Catcher Processor							
Total catch (mt)	42	6	64	489	28	110	123
Discard (%)	93%	74%	55%	67%	93%	93%	--
+/- (%) from avg. catch	-66%	-95%	-48%	297%	-77%	-11%	--
Mothership							
Total catch (mt)	28	17	23	24	7	45	24
% discard	39%	76%	87%	83%	78%	97%	--
+/- (%) from avg. catch	17%	-29%	-4%	0%	-71%	88%	--

Other Potential Management Measures and Considerations

Other management measures or considerations are available to reduce fishing mortality for dogfish shark. The alternatives provided above may reduce dogfish shark landings and possibly encounters, but may result in a high cost to communities and fishers (especially RCA changes). The following considerations may reduce mortality of dogfish shark with lower associated impacts to communities than those described in the alternatives above.

- Gear modifications may reduce fishing mortality of dogfish shark. For example grates and raised footropes have recently been tested to reduce bycatch of spiny dogfish shark from silver hake trawls (Chosid et al., 2012). Artificial baits were shown to substantially reduce the catch of dogfish shark relative to longlines baited with herring, while showing no substantial reduction in catch of target species (e.g., Pacific halibut and sablefish; Erickson and Berkeley 2008). These types of potential management measures could be further explored and considered as a regulatory or a voluntary measure if it is anticipated that dogfish catch might exceed the component ABC under No Action management measures.

- Voluntary avoidance of areas with highest dogfish shark catch rates may be considered to keep dogfish shark catch below its contributing ABC level.

Summary of Management Options and Comparison of Impacts

A summary of management measures and associated impacts are provided in Table C-91. Under No Action, expected total mortality ranged from a minimum of 1,032 mt to a maximum of 2,393 mt. Hence, total mortality of dogfish shark may be higher than the preferred ABC contribution (i.e., greater than 2,046 and 2,024 mt for 2013 and 2014, respectively). The component ABCs would be exceeded only under the worst-case scenario (i.e., assuming highest catch and discard observed during 2006 – 2007 and assuming that fishermen behavior remains similar). The expected mortality was lower than the 2013-2014 preferred ABCs in 4 of 5 years.

Under No Action, the shoreside trawl allocation may be exceeded under the worst-case scenario. The 2013 allocation for this sector is 770 mt, and the range of expected mortalities is 645 – 1,082 mt. Allocations for non-trawl and at-sea whiting would not be expected to be exceeded under the No Action option.

Trip limit options (Options 1 – 3) are largely ineffective for substantially reducing No Action fishing mortality because most dogfish are already discarded; options 2 and 3 may moderately reduce fishing mortality relative to No Action. The effectiveness of trip limits depends on whether trip limits cause fishermen to avoid catching dogfish altogether (i.e., through area avoidance or gear modifications) or if trip limits create more discarding. It is important to note that 50% of the non-trawl discarded dogfish may survive, whereas 0% of the trawl-discarded dogfish may survive (i.e., 100% mortality).

Socioeconomic impacts of Options 1 – 3 are low (fleet-wide and coast-wide) relative to No Action (because more than 90% are discarded under No Action), but may be substantial for certain individuals, processing plants, and distinct areas. Impacts increase with increasing option number.

Moving the shoreward trawl RCA shallower (Option 4) or the seaward RCA deeper (Option 5) may decrease dogfish mortality relative to No Action, however, additional data is required to estimate the extent of that impact. Regardless, expanding the trawl RCAs to reduce mortality will have most substantial impacts on communities relative to No Action and relative to Options 1 – 3 (trip limits). Options 4 and 5 will have no impacts on non-trawl and at-sea whiting sectors (i.e., no difference from No Action)

Under Option 6, the seaward fixed gear RCA would be moved from 100 fm to 150 fm north of 45^{o}46' N. latitude. This depth closure could also be applied to directed whiting trips in the IFQ sector. Although dogfish mortality under Option 6 is expected to be less than under No Action, the extent of the savings is uncertain. The reduction in mortality would likely be higher under Option 6 than under No Action and Options 1-3. Socioeconomic impacts would be severe and substantial relative to No Action and Options 1-3 for non-trawl sectors.

Dogfish shark set-asides or allocations would be provided to at-sea whiting sectors under Option 7. The biological and socioeconomic impacts may be greater; area closures may be implemented under this Option 7 if at-sea whiting fisheries approach the maximum set-aside or allocation.

Voluntary avoidance or use of selective fishing gear (grates and escape panels for trawls and selective baits for hook-and-line) may be most effective at reducing mortality while having the least impact on communities.

Table C-91. Comparison and summary of management options.

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
No Action	Non-whiting trawl trip limit = 60,000 pounds / month Non-trawl trip limit = 150,000 to 200,000 pounds /2 months RCA: Same as 2012	Dogfish preferred component ABC = 2,044 mt (2013) and 2,024 mt (2014) Expected total mortality (all fisheries and set asides) = 1,032 – 2,393 mt (minimum and maximum)	**<u>Shoreside Trawl Allocation</u>:** Expected total mortality = 645 – 1,082 mt - Preferred Allocation (770 mt and 755 mt for 2013 and 2014) - ***Shoreside trawl allocation may be exceeded under No Action.*** **<u>Non-trawl Allocation</u>** Expected total mortality = 132 – 377 mt - Preferred Allocation (434.5 mt and 429 mt for 2013 and 2014) - Expected non-trawl mortality under No Action is expected to be less than its allocation. **Non-tribal At-sea Whiting Allocation** - Expected total mortality = 25 – 513 mt - Preferred Set-Aside (534 mt for 2013 and 2014) **Affected Area:** 92% of dogfish shark total mortality by non-whiting trawl and non-nearshore fixed gear fisheries occurs north of 40° 10' N. latitude. **<u>Revenue:</u>** Average annual ex-

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			vessel value was $42,964 (trawl) and $49,932 (LE and OA fixed gear). **<u>Fisheries Most Affected</u>**: Limited entry bottom trawl and non-nearshore fixed gear. At-sea whiting fisheries may also be affected. **<u>Discard and mortality rates</u>:** Recent discard rates exceed 90% for both trawl and fixed gear. Assumed discard mortality is 100% for trawl and 50% for fixed gear. **<u>Areas Most Affected</u>**: 92% of dogfish shark total mortality by non-whiting trawl and non-nearshore fixed gear fisheries occurs north of 40^{o} 10' N. latitude. Fixed-gear deliveries were made almost exclusively in Washington and Northern Puget Sound area ports (90%) Non-whiting trawl deliveries were predominately in North Puget Sound (32%) and Columbia River Oregon (51% area ports.
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 1	Trawl trip limit = 20,000 lbs. / 2 months Non-trawl trip limit = 18,000 lbs. / 2 months	*ABC may be exceeded if maximum recent historical catch and discard rates occur.* Option 1 trip limits reduces total mortality (all sectors and set asides) by 28 – 78 mt relative to No Action	**<u>Shoreside Trawl Allocation</u>:** Expected Savings (reduction in mortality) relative to No Action = 0 – 21 mt Expected Total Mortality = 624 – 1,082 mt - Preferred Allocation (770 and 775 mt for 2013 and 2014)

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
		Expected total mortality (all fisheries and set asides) = 954 – 2,365 mt Preferred ABC = 2044 and 2,024 mt for 2013 and 2014	- ***Shoreside trawl allocation may be exceeded under Option 1.*** **<u>Non-trawl Allocation</u>** Expected savings (reduction in mortality) relative to No Action = 25 – 50 mt Expected Total mortality = 75 – 349 mt - Preferred Allocation (434.5 – 429.5 mt) **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $13,680 (trawl) and $26,090 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 47,171 pounds or 21 mt (trawl) and 124,239 pounds or 56 mt (LE and OA fixed gear) relative to No Action. *Impacts relative to No Action are not substantial (fleet-wide), because most dogfish are discarded; impacts may be substantial to certain individuals.*
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 2	Trawl trip limit = 5,000 lbs. / 2 months Non-trawl trip limit = 2,500 lbs. / 2 months	*ABC may be exceeded if maximum recent historical catch and discard rates occur.* Option 2 trip limits reduces total mortality (all sectors and set	**<u>Shoreside Trawl Allocation</u>:** Expected Savings (reduction in mortality) relative to No Action = 0 –46 mt Expected Total Mortality = 599 – 1,082 mt - Preferred Allocation (770 and 775 mt for 2013 and

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
		asides) by 46 – 138 mt relative to No Action Expected total mortality (all fisheries and set asides) = 894 – 2,347 mt Preferred ABC = 2044 and 2,024 mt for 2013 and 2014	2014) - ***Shoreside trawl allocation may be exceeded under Option 2.*** **<u>Non-trawl Allocation</u>** Expected savings (reduction in mortality) relative to No Action = 46 – 92 mt Expected Total mortality = 40 – 331 mt - Preferred Allocation (434.5 – 429.5 mt) **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $29,678 (trawl) and $42,539 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 102,339 pounds or 46 mt (trawl) and 202,570 pounds or 92 mt (LE and OA fixed gear) relative to No Action. *Impacts relative to No Action are not substantial (fleet-wide), because most dogfish are discarded; impacts may be substantial to certain individuals.* *Impacts are greater for Option 2 than for Option 1.*
Option	Management Measure	Biological Impacts	Socioeconomic Impacts
Option 3	Trawl trip limit = 600 lbs. / 2 months Non-trawl trip	*ABC may be exceeded if maximum recent historical catch and discard rates occur.*	**<u>Shoreside Trawl Allocation</u>:** Expected Savings (reduction in mortality) relative to No Action = 0 –64 mt

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
	limit = 300 lbs. / 2 months	Option 3 trip limits reduces total mortality (all sectors and set asides) by 52 – 167 mt relative to No Action Expected total mortality (all fisheries and set asides) = 865 – 2,341 mt Preferred ABC = 2044 and 2,024 mt for 2013 and 2014	Expected Total Mortality = 582 – 1,082 mt - Preferred Allocation (770 and 775 mt for 2013 and 2014) - ***Shoreside trawl allocation may be exceeded under Option 3.*** **<u>Non-trawl Allocation</u>** Expected savings (reduction in mortality) relative to No Action = 52 – 104 mt Expected Total mortality = 29 – 325 mt - Preferred Allocation (434.5 – 429.5 mt) **<u>Revenue:</u>** Average annual ex-vessel value was reduced by $40,634 (trawl) and $48,102 (LE and OA fixed gear) relative to No Action. **<u>Landings:</u>** Average annual landings reduced by 140,116 pounds or 64 mt (trawl) and 229,056 pounds or 104 mt (LE and OA fixed gear) relative to No Action. *Impacts relative to No Action are not substantial (fleet-wide), because most dogfish are discarded; impacts may be substantial to certain individuals.* *Impacts are greater for Option 3 than for Options 1 and 2.*
Option 4	Extend shoreward trawl RCAs to 50	*Mortality reduced compared to No*	**<u>Shoreside Trawl</u>:**

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
	fm (from 75 fm) between 45°46'-48°10' N. latitude	*Action, but the magnitude is uncertain.*	*The socioeconomic impact of Option 4 would be severe for certain individuals and processors and substantially higher than expected impacts of No Action and of Options 1 – 3.* **<u>Non-trawl:</u>** *No Substantial Impact*
Option 5	Extend trawl seaward RCA to from 150 fathoms to 200 fathoms north of 48°10' and from 150/200 fathoms to 250 fathoms south of 48°10' N. latitude; Extend depth closure to directed whiting trips in the IFQ sector.	*Mortality reduced compared to No Action, but the magnitude is uncertain.*	**<u>Shoreside Trawl</u>:** *The socioeconomic impact of Option 5 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 4* **<u>Non-trawl:</u>** *No Substantial Impact*
Option 6	Extend seaward fixed gear RCA from 100 to 150 fm north of 45°46' N. latitude.	*Mortality reduced compared to No Action, but the magnitude is uncertain.*	**<u>Shoreside Trawl</u>:** *No Substantial Impact* **<u>Non-trawl:</u>** *The socioeconomic impact of Option 6 would be severe and substantially higher than expected impacts of No Action and of Options 1 – 3. The impacts are substantially greater than Options 4 and 5 for non-trawl.*
Option 7	Set-asides, formal allocations, or depth closures for at-sea whiting fisheries	Area closures may be implemented if these levels are approached.	**<u>Shoreside Trawl</u>:** *No Substantial Impact* **<u>Non-trawl:</u>**

Option	Management Measure	Biological Impacts	Socioeconomic Impacts
			No Substantial Impact **At-sea whiting:** *Impacts substantial relative to No Action and Options 1 – 6.*

C.18 Increase the California Recreational Bocaccio Bag Limit

Overview

The recreational fishery has been managed to a recreational harvest guideline (HG) since the early 2000s, which is 131 mt in 2012; the presumptive harvest guidelines are expected to increase to 168 mt (2013) and 174 mt (2014; Table C-92). For 2012 recreational groundfish fisheries in California, anglers are allowed two bocaccio within a 10 fish Rockfish, Cabezon, Greenling (RCG) complex bag limit. In addition, bocaccio are the only rockfish subject to a recreational size limit, which is a 10 inch minimum size limit to protect recruiting juvenile fish (Table C-93). The majority of the bocaccio catch comes from the southern part of the state (south of Point Conception - 34°27' N. latitude) where recreational anglers are allowed to access the shelf 10 months of the year to depths of 60 fm (360 feet).

Because bocaccio have a high susceptibility to barotrauma[37] the statewide two fish sub-bag limit results in discarding (and subsequent mortalities) of bocaccio caught in excess of the bag limit. Rather than adding the extra bocaccio to their bag, anglers are required to discard and therefore fish longer to achieve their 10 fish bag limit, increasing the likelihood of encounters with overfished species.

[37] Bocaccio has a discard mortality rate of 100% in depths of 40 fm or greater (PFMC and NMFS, 2009).

Table C-92. 2012 Harvest specifications for bocaccio south of 40°10' N. latitude in metric tons, implemented in regulation.

Species	OFL	ABC	ACL	HG
Bocaccio	732	700	263	131

Table C-93. Recreational statewide management measures for bocaccio in California in 2012.

Bag Limit –2 fish w/in the 10 fish RCG complex bag limit
Size limit – 10 inch minimum size
Seasons and Depth Restrictions—Same as those for other rockfish and lingcod by Management Area

Management Issue

Due to the need to protect overfished rockfish and the lack of access to deeper water on the shelf, California's recreational fishery has been unable to attain the bocaccio HG in recent years (Table 3). Bocaccio has shown steady progress toward rebuilding under the current rebuilding plan. Application of the constant harvest rate in the current rebuilding plan corresponds with an ACL for 2013-2014 that is larger than the ACL in recent years. The Council proposes to increase the bag limit for bocaccio and the additional projected mortality can be accommodated within the higher 2013-2014 ACLs and HGs.

Table C-94. West Coast Groundfish total mortality estimates of bocaccio south of 40°10' N. latitude (in metric tons) for the California recreational fishery compared to the harvest guideline from 2006-2010

Year	Total Mortality	HG	% of HG
2006	420	43.0	98%
2007	53.6	66.3	81%
2008	35.0	66.3	53%
2009	46.4	66.3	70%
2010	57.2	66.3	86%

Management Options

Option 1- No Action: Maintain the two fish sub-bag limit for bocaccio within the 10 fish RCG bag limit

Under Option 1, the sub-bag limit for bocaccio would continue to be two fish within the 10 fish RCG bag limit. It is expected that anglers will discard bocaccio in excess of the sub-bag limit while in pursuit of other fish, increasing the likelihood of encounters with other overfished species. Under Option 1, bocaccio encounters and associated total catch mortality are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected some increased encounter rate (and discarding) would be expected.

<u>Biological Impacts under Option 1</u>

<u>Projected Impacts</u>

Table C-95 summarizes projected mortality of overfished species under Option 1. Bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. If this year class is as strong as projected, under Option 1 some increased encounter rate (and discarding) would be expected, although the amount cannot be quantified. In its report under Agenda Item E.4.b (November 2011), the Groundfish Management Team concluded that any increase in bocaccio mortality in 2013, as a result of the 2010 year class, is not expected to exceed the 2011 California recreational HG (131 mt). If the 2010 year class is not as strong as projected, mortality under Option 1 would likely be similar to previous years.

Table C-95. Projected mortality to overfished species under Option 1.

Species	Projected Mortality (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

<u>Stock Status</u>

Results of the current assessment indicate that bocaccio are rebuilding quickly. Under Option 1, no changes to stock status or rebuilding progress are expected since total mortality will be within the ACL.

<u>Socioeconomic Impacts</u>

Option 2: Increase the bocaccio sub-bag limit from two to three fish within the RCG complex

Under Alternative 2, the sub-bag limit on bocaccio would be increased statewide from two to three fish within the RCG complex.

RecFIN data from 2004 to 2009 was used to analyze impacts to bocaccio as a result of increasing the sub-bag limit. Using the RecFIN Hypothetical Bag Limit Analysis tool, estimates of increased mortality of bocaccio was calculated using A+B1+B2 fish. For the purpose of this analysis, A fish include sampled dead fish, B1 fish includes both bocaccio fillets and fish thrown back dead due to low survival rates in deep water, and B2 fish includes mainly live fish in excess of bag limits or undersized fish. Since RecFIN cannot estimate the proportion of fish that were undersized, this analysis assumes that no sub-legal fish were discarded (thus overestimating impacts). The analysis also assumes that all B2 fish would be retained if the bag limit were increased, as the most conservative estimate. All bags over the existing limit were then set to the hypothetical limit to calculate increased take.

Biological Impacts under Option 2

<u>Projected Impacts</u>

Under Option 2, bocaccio mortality is expected to increase by 11.5 percent (5.8 mt) as a result of the increase in the sub-bag limit (Table C-96). The HG is not expected to be exceeded under Option 2, given the magnitude of the buffer between projected mortality and the recreational allocation. Similar to Alternative 1, bocaccio encounters are anticipated to increase throughout southern California in 2013 due to a strong 2010 year class. The increased mortality (if they materialize) could also be accommodated under Option 2 without exceeding the HG, let alone the entire bocaccio ACL.

The Council is also proposing two additional changes to management measures in the recreational fishery related to bocaccio – removing the 10 inch minimum size limit and allowing retention of shelf rockfish (including bocaccio) inside the Cowcod Conservation Area. The cumulative mortality of all of these proposed changes are not expected to exceed the harvest guideline or ACL therefore the measures will be unlikely to affect rebuilding.

Table C-96. Projected mortality (in metric tons) of increasing the bocaccio bag limit from two to three fish compared to the No Action harvest guideline

	Alternative 1	**Alternative 2**
Projected Impact	50.7	56.5
% HG	38.7%	43.1%

Impacts on Overfished Species

Table 6 summarizes mortality of all overfished species under Option 2. No additional mortality of other overfished species are expected to occur by increasing the sub-bag limit on bocaccio. Because the majority of the bocaccio encountered in the recreational fishery comes from southern California, mortality of canary and yelloweye rockfish should not increase because they are not commonly found in that part of the state. No additional mortality of cowcod are expected because bocaccio are commonly encountered in different areas inside the CCA than cowcod.

Table C-97. California recreational projected mortality of overfished species for 2013-2014 under Option 2.

Species	**Projected Mortality (mt)**
Bocaccio	56.5
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

Stock status

Under Option 2, no changes to stock status or rebuilding progress are expected compared to Option 1.

Socioeconomic Impacts

Increasing the bocaccio bag limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

C.19 Increase the California Recreational Greenling Bag Limit

For 2011-12 groundfish fisheries, kelp greenling in California have been managed as part of the Other Fish complex and its harvest specifications contribute to the complex as a whole. The ACL contribution for kelp greenling was substantially increased in 2011-2012 based on new methods for estimating harvest specifications for data limited species (Table C-98). However, more conservative state regulations including a total allowable catch (TAC) [38] of 17 mt currently govern the catch of kelp greenling in California. Recreational management measures include the same season and depth restrictions as rockfish, lingcod, and many other groundfish, as well as a two fish sub-bag limit within the 10 fish RCG complex (Table C-99). Kelp Greenling are also

[38] A state total allowable catch (TAC) is equivalent to an annual catch limit (ACL)

subject to a 12 inch minimum size limit. The state is in the process of increasing the kelp greenling TAC to conform to the higher federal ACL contribution and implementing a higher recreational sub-bag limit of 10 fish.

The majority of California's recreational kelp greenling catch comes from the area between San Francisco and the Oregon Border. Depth is restricted to 30 fm (180 ft) in the San Francisco area and 20 fm (120 ft) from Point Arena north. Kelp greenling inhabit kelp beds and rocky reefs but have also been found to frequent sandy bottom areas. They are solitary fish commonly found at depths between 10 and 60 feet.

Table C-98. 2012 Harvest Specifications for Kelp Greenling in Metric Tons, within the Other Fish Complex Implemented in Regulation.

Species	OFL	ABC	ACL
Kelp Greenling (contribution to Other Fish)	111	55.3	55.3

Table C-99. Recreational Management Measures for Kelp Greenling in California in 2012

Bag Limit	Two fish sub-bag limit within the RCG complex
Size limit	12 inch minimum size
Seasons and Depth Restrictions	Same as those for rockfish and lingcod by Management Area

Management Considerations:

A revised kelp greenling contribution to the other fish complex was analyzed and adopted for use in management in 2011-12 (2011-12 FEIS). As a result, the state is requesting federal conformance to state rulemaking by increasing the recreational kelp greenling bag limit. The kelp greenling contribution to the other fish complex is also expected to further increase for 2013-14; therefore increased mortality as a result of this action could be accommodated with low risk of exceeding a harvest guideline, let alone the kelp greenling ABC contribution to the complex. Between 2006 and 2010, total mortality of kelp greenling in the California recreational fishery has ranged from 8.2 mt to 15.2 mt (Table C-100).

Table C-100. Estimates of kelp greenling total mortality in the California recreational fishery from 2006 to 2010, in metric tons (source: West Coast Groundfish Total Mortality Reports)

Year	Total Mortality (mt)
2006	8.2
2007	9.5
2008	9.4
2009	15.2
2010	10.5

Range of Options for Consideration

Option 1 - No Action: Maintain the kelp greenling sub-bag limit at 2 fish

Under Option 1, the kelp greenling sub-bag limit will be two fish in federal waters within the 10 fish RCG complex. Anglers will have less opportunity and be required to discard kelp greenling in excess of the sub-bag limit; the recreational allocation will also not be attained. In addition, when new state regulations increasing the kelp greenling sub-bag limit to 10 fish become effective, state and federal regulations will be inconsistent and state regulations will be more liberal.

Biological Impacts under Option 1

Projected Mortality

Under Option 1, the projected impact to kelp greenling based on a two fish sub-limit is 14.6 mt; Table C-101 summarizes projected mortality of all overfished species. Due to the shallow distribution of kelp greenling, and the fact that over half of the catch comes from shore anglers, encounters with overfished species are expected to be minimal.

Table C-101. Projected mortality of overfished species under Alternative 1

Species	Projected Mortality (mt)
Bocaccio	50.7
Canary Rockfish	11.1
Cowcod	0.3
Yelloweye Rockfish	3.2

Stock Status

A formal stock assessment was conducted in 2005 for kelp greenling in California but it was not adopted for use in management; therefore, stock status is unknown.

Option 2: Increase the kelp greenling sub-bag limit to 5 fish

Under Option 2, the kelp greenling bag limit would be increased from two to five fish within the 10 fish RCG complex; no change to the minimum size limit is proposed. Under this alternative, anglers would be able to keep more of their catch—reaching their 10 fish RCG bag limit sooner reducing the possibility of encountering canary or yelloweye rockfish (which is unlikely given the depths where greenlings are caught.)

RecFIN data from 1995-2001 and 2009-2010 were used to analyze mortality of greenlings under a five-fish and 10-fish.bag limit. Due to differences in management measures, two time periods were investigated. The first time period (1995-2001) includes years when the fishery was much less regulated and there was a 10-fish bag limit per angler per day; whereas the second period (2009-2010) includes more recent years when the bag limit was two fish per angler per day. The sample data from both time periods was ultimately combined for this analysis. Only catch estimates from north of Point Conception (34º27' N. latitude) were used since very few greenlings are taken in southern California.

Since this analysis estimates the amount of fish that potentially would be taken, estimates of increased mortality of greenling were calculated using A+B1+B2 fish. For the purpose of this analysis, A fish include sampled dead fish, B1 fish includes both greenling fillets and fish thrown back dead, and B2 fish includes mainly live fish in excess of bag limits or undersized fish. Since RecFIN cannot estimate the proportion of fish that were undersized, this analysis also assumes that no sub-legal fish were discarded. The analysis also assumes that all B2 fish would be available if the bag limit were increased, as the most conservative estimate. All bags over the existing limit were then set to the hypothetical limit to calculate increased take. For a full description of the sub-bag limit analysis refer to Appendix A.

Socioeconomic Impacts

Increasing the greenling bag limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Biological Impacts under Option 2

Projected Impacts

Under Option 2, the projected mortality of greenlings is expected to increase by 6.6 percent (1.0 mt) compared to Option 1. This increase is not expected to exceed the kelp greenling harvest guideline or ACL. No additional impacts are expected on overfished species compared to Option 1 (Table C-101) because kelp greenling are commonly encountered in shallower depths and more than 50 percent of the catch comes from shore anglers.

Stock Status

Under Option 2, no changes to stock status are expected compared to Option 1.

Option 3, Preferred: Increase the kelp greenling bag limit to 10 fish

Under Alternative 3, the Council is proposing to increase the sub-bag limit from two fish to 10 fish to provide more opportunity for anglers to achieve their allocation of kelp greenling; no changes to the minimum size limit are proposed. This measure would maintain consistency with state regulations, which are being modified to reflect the greenling contribution to the "Other Fish" complex.

Socioeconomic Impact

Increasing the greenling bag limit could also reduce operating costs compared to No Action. Individuals could reach their bag limits faster and with less regulatory discarding which could result in less time on the water, lower fuel costs, and increased opportunities for more trips.

Biological Impacts under Option 3

Projected Impacts

Under Option 3, the projected impact to greenlings is expected to increase by 7.4 percent (1.1 mt) compared to Option 1. The projected impacts of increasing the sub-bag limit on kelp greenling is not expected to exceed the harvest guideline or ACL. No additional impacts are expected on overfished species compared to Option 1 (Table C-101) because kelp greenling are commonly encountered in shallower depths and more than 50 percent of the catch comes from shore anglers

Stock Status

Under Option 3, no changes to stock status are expected compared to Option 1.

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Appendix D GROUNDFISH FMP EXCERPTS OF REVISIONS ASSOCIATED WITH AMENDMENT 21-2

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

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This appendix provides excerpts from the Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery (FMP) showing the revisions associated with Amendment 21-2. The revised FMP in its entirety will be available on the Pacific Council's web site at http://www.pcouncil.org/groundfish/fishery-management-plan/ once the Secretary of Commerce approves FMP Amendment 21-2. The heading numbers in the following excerpts comport with the chapter sections in the FMP.

Excerpts Associated with FMP Amendment 21-2

5.5.2 Inseason Establishment and Adjustment of ACLs, OYs, HGs, and Quotas

ACLs, OYs ACTs, and HGs or quotas may be established and adjusted inseason (1) for resource conservation through the "points of concern" framework described in Section **Error! Reference source not found.**; (2) in response to a technical correction to OFL described above; or, (3) under the socioeconomic framework described in Section **Error! Reference source not found.**.

Quotas may be established and adjusted inseason only for resource conservation or in response to a technical correction to OFL. These constraints on establishing and adjusting ACLs, OYs, ACTs, HGs, and quotas do not apply to the process for establishing and adjusting off the top deductions, which is provided in Section 0, or sector-specific catch limits, which is provided in Section **Error! Reference source not found.**.

6.2.1 Routine Management Measures Overview

6.2.1.1 Routine Management Measures ~~through Amendment 18~~:

This section outlines those actions determined to be routine. Additional actions may be designated as routine through the biennial specifications process as outlined above and/or specified in regulations therefore they may not appear in this section. The current list of routine management measures is published in Federal regulations at 50 CFR 660.60(c).

All fisheries, all gear types:

Depth-based management measures, particularly the setting of closed areas known as GCAs may be imposed on any sector of the groundfish fleet using specific boundary lines that approximate depth contours with latitude/longitude coordinates. Depth-based management measures and the setting of closed areas may be used to: protect and rebuild overfished stocks; extend the fishing season; for the commercial fisheries, to minimize disruption of traditional fishing and marketing patterns; to reduce discards; for the recreational fisheries, to spread the available catch over a large number of anglers; to discourage target fishing while allowing small incidental catches to be landed; and to allow small fisheries to operate outside the normal season.

~~The current list of routine management measures is published in Federal regulations at 50 CFR 660.370.~~

Routine management measures have been developed to deal with management uncertainty in the groundfish fishery. The process allows timely adjustment of measures inseason to respond to the most current scientific and management information. These routine management measures are AMs under the Magnuson-Stevens Act as amended.

Deductions ~~amounts~~ of yield from ACLs made prior to fishery allocations to accommodate research fisheries, exempted fishing permits and groundfish bycatch in non-groundfish fishery sectors can be adjusted routinely in accordance with sector needs as determined by the Council. Any changes must be made in accordance with Section 6.2 paragraph B above.

Commercial limited entry and open access fisheries:

Trip landing and frequency limits, size limits, for all gear types may be imposed: to extend the fishing season; to minimize disruption of traditional fishing and marketing patterns; to reduce discards; to discourage target fishing while allowing small incidental catches to be landed; to protect overfished species; to allow small fisheries to operate outside the normal season; and, for the open access fishery only, to maintain landings at the historical proportions during the 1984-88 window period.

Trip landing and frequency limits have been designated as routine for the following species or species groups: black rockfish, blue rockfish, bocaccio, canary rockfish, chilipepper rockfish, cowcod, darkblotched rockfish, Pacific ocean perch, shortbelly rockfish, splitnose rockfish, widow rockfish, yelloweye rockfish, yellowtail rockfish, minor nearshore rockfish or shallow and deeper minor nearshore rockfish, shelf or minor shelf rockfish, and minor slope rockfish; DTS complex, which is composed of Dover sole, sablefish, shortspine thornyheads, and longspine thornyheads, both as a complex and for the species within the complex; arrowtooth flounder, English sole, petrale sole, Pacific sanddabs, rex sole, and the Other Flatfish complex, which is composed of those species plus any other FMP flatfish species; Pacific whiting; lingcod; cabezon; Pacific cod; spiny dogfish; and Other Fish as a complex consisting of all groundfish species listed in the FMP and not otherwise listed as a distinct species or species group.

Size limits have been designated as routine for sablefish and lingcod.

Trip landing and frequency limits that differ by gear type and closed seasons may be imposed or adjusted on a biennial or more frequent basis for the purpose of rebuilding and protecting overfished or depleted stocks. To achieve the rebuilding of an overfished or depleted stock, a sector or sectors of the primary Pacific whiting may be closed if a total catch limit of an overfished species has been designated for the whiting fishery and that total catch limit is reached before the sector's whiting allocation is reached. Total catch limits in the primary Pacific whiting fishery may be established or adjusted as routine management measures. In the shorebased IFQ fishery, changes to the surplus carry-over percentages may be routinely adjusted (see Appendix E, Section E.2.1.3 and Table 1, A-2.2.2.b).

Recreational fisheries all gear types:

Routine management measures for all groundfish species, separately or in any combination, include: bag limits, size limits, time/area closures, boat limits, hook limits, and dressing requirements. All routine management measures on recreational fisheries are intended to keep landings within the harvest levels announced by NMFS, to rebuild and protect overfished or depleted species, and to maintain consistency with State regulations, and for the other purposes set forth in this section.

Bag limits may be imposed to spread the available catch over a large number of anglers; to protect and rebuild overfished species; to avoid waste.

Size limits may be imposed to protect juvenile fish; to protect and rebuild overfished species; to enhance the quality of the recreational fishing experience.

Season duration restrictions may be imposed to spread the available catch over a large number of anglers; to protect and rebuild overfished species; to avoid waste; to enhance the quality of the recreational fishing experience.

~~**All fisheries, all gear types:**~~

~~Depth-based management measures, particularly the setting of closed areas known as GCAs may be imposed on any sector of the groundfish fleet using specific boundary lines that approximate depth contours with latitude/longitude coordinates. Depth-based management measures and the setting of closed areas may be used to: protect and rebuild overfished stocks; extend the fishing season; for the commercial fisheries, to minimize disruption of traditional fishing and marketing patterns; to reduce discards; for the recreational fisheries, to spread the available catch over a large number of anglers; to discourage target fishing while allowing small incidental catches to be landed; and to allow small fisheries to operate outside the normal season.~~

~~The current list of routine management measures is published in Federal regulations at 50 CFR 660.370.~~

~~Routine management measures have been developed to deal with management uncertainty in the groundfish fishery. The process allows timely adjustment of measures inseason to respond to the most current scientific and management information. These routine management measures are AMs under the Magnuson-Stevens Act as amended.~~

11.2.2 Allocations Between the Limited Entry and Open Access Fisheries and Management of the Open Access Fishery

1. The division of the fleet into LE and open access participants will require that separate allocations be established for each group where management measures are required to prevent harvest in excess of annual catch limits. For those species, species groups and areas covered by the trawl/-non-trawl allocations provided in Table 6- 1 and for which the Council determines an allocation is necessary, ad hoc allocations to the directed open access sector will be established as needed through the biennial specifications process.
2. For those species for which trawl/non-trawl allocations are not established in Table 6- 1, allocations for the open access fishery will be based on historical catch levels for the period July 11, 1984 to August 1, 1988 by exempted, longline, and fishpot gears used by vessels which did not receive an endorsement for the gear where management measures are required to prevent harvest in excess of ACLs.

a. On the basis of landings over this period, a percentage of catch[1] for these gears will be determined and applied to harvest guidelines and quotas in order to establish the allocation for the open access portion of the fishery. The open access portion of harvest guideline or quota will be set aside before other allocations are made.

b. LE/open access allocation percentages for specific species and species groups will be determined after this LE program is implemented, and permitted and non-permitted vessels are identified.

c. An open access allocation based on catch history will be determined for each separate species, species group, and area for which the Council determines an allocation is necessary.

d. Initial determination and any subsequent revision of the species or species groups and areas for which an open access allocation will be made will occur through a rulemaking under the appropriate framework in Chapter 6 of this plan.

e. Open access allocations for species, species groups and areas identified for such allocation by the Council will be specified during the biennial process for setting specifications described in Section **Error! Reference source not found.** of this plan.

f. A change in the catch history allocation method for determining the allocation for the open access fishery will require a plan amendment.

g. If a group of vessels that initially is to participate in the open access fishery later receives permits in the limited access fishery, the historical catch levels of those vessels shall be deducted from the historical catch levels used to calculate the open access allocation, and the percentages used in setting the open access allocation recalculated. For example, if a vessel whose gear is prohibited by a state or the Secretary of Commerce qualifies for a LE permit under Section **Error! Reference source not found.**(9), or if a small LE fleet is incorporated under Section **Error! Reference source not found.**(9) and its vessels are issued LE permits, their catch history with the banned gear or the LE gear for which they are now going to receive permits shall be deducted from the open access fishery's historical catch levels, and open access percentages will be recalculated.

h. Prior to expiration of "B" endorsements, vessels' catch history using gears for which they receive "B" endorsements is not included in the catch history used to calculate the percentage of catch for open access vessels. When "B" endorsements expire, the historic catch levels of vessels which received "B" endorsements for longline or fishpot gear when using that gear will then count toward determining the proportion allocated to the open access quota. The historic catch levels of vessels which received "B" endorsements for trawl gear will continue to count toward determining the limited access quota and will not be transferred to the catch history used to determine the open access quota, even after trawl "B" endorsements expire.

3. For International North Pacific Fisheries Commission areas where quotas or harvest guidelines for a stock are not fully utilized, no limited/open access allocation will be established until it is anticipated the allowable catch for a species or group of species will be reached.

4. Any groundfish catch by a vessel registered to an LE permit will be counted against the allocation for the limited entry gear(s) that the permit is endorsed for when the fishery for the limited entry gear is allowed, except when the vessel is fishing in a fishery for which

[1] Percentage of catch as determined through the Pacific Coast Fisheries Information Network database or some comparable database.

the catch has already been accounted for in the preseason set-asides deducted from the ACLs. A vessel may not carry or deploy limited entry gear for which its permit is endorsed when the limited entry fishery for that gear is closed or otherwise prohibited. Once the limited entry fishery for the gear for which the permit is endorsed has closed, any groundfish landings by the vessel with open access gear will count toward the allocation covering the open access fishery. The catch of vessels fishing without LE permits will count toward the allocation covering the open access fishery regardless of what open access gear is used, except when the vessel is participating in a fishery for which the catch has already been accounted for in the preseason set-asides deducted from the ACLs.

~~Groundfish catch will be counted against the allocation to the fishery or sector into which the vessel has declared or is otherwise participating.~~

5. Allocations among gear types for species other than sablefish north of 36° N. latitude may be established in the future. If this occurs, portions of the new allocations may, in turn, be allocated to the open access fishery under the principles set forth in this section.
6. Management of the open access fishery.
   a. The open access portion of the fishery will be managed to provide year-round fishing opportunity.
   b. The purpose of providing an open access alternative for vessels using longline or fishpot gear is to allow a group of vessels which has historically fished at low levels, with minimal impacts on the resource (fewer than 5 or 6 landings greater than 500 pounds per vessel during the qualifying window period, July 1, 1984 through August 1, 1988), to remain in the fishery without creating permits which may be used at higher effort levels.
   c. The open access fishery will be managed with the intent of maintaining the historic fishing opportunities for the participant groups and to keep the overall catch in line with historic harvests. For example, trip limits for non-permitted longline and fishpot gears operating in the open access fishery will likely be fairly low because the historic fishing levels of this group are low. Trip limits, when necessary, for some exempted gears will probably be higher because their historic fishing levels are higher.

APPENDIX E COMMENT LETTERS RECEIVED ON THE DEIS

Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan Final Environmental Impact Statement

Prepared by
The Pacific Fishery Management Council
And The National Marine Fisheries Service

September 2012

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
620 SW Main Street, Suite 201
Portland, Oregon 97205-3026

9043.1
IN REPLY REFER TO
ER12/429

Electronically Filed

July 30, 2012

William W. Stelle, Jr.
Regional Administrator
NMFS Northwest Region
National Oceanic and Atmospheric Administration
7600 Sandpoint Way NE
Seattle, Washington 98115

Dear Mr. Stelle, Jr.:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for the Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast FMP. The Department does not have any comments to offer.

We appreciate the opportunity to comment.

Sincerely,

Allison O'Brien

Allison O'Brien
Regional Environmental Officer

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF ECOSYSTEMS, TRIBAL AND PUBLIC AFFAIRS

NOAA NMFS RECEIVED JUL 30 2012 NORTHWEST REGIONAL OFFICE

July 27, 2012

William W. Stelle, Jr., Regional Administrator
NMFS Northwest Region
National Oceanic and Atmospheric Administration
7600 Sandpoint Way NE
Seattle, Washington 98115

Re: EPA comments on the Draft Environmental Impact Statement for the Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan, EPA Project #12-0029-NOA.

Dear Mr. Stelle:

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Groundfish Fishery Management Plan (CEQ # 20120190). We have reviewed the EIS in accordance with our responsibilities under National Environmental Policy Act and Section 309 of the Clean Air Act. Section 309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions as well as the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.

We understand that the purpose of this action is to set the 2013-2014 season biennial limits for 40 management unit species, including seven overfished species, as well as reinstate a provision inadvertently deleted in a previous Fishery Management Plan amendment. In addition to the No Action alternative, the EIS evaluates 8 "integrated" action alternatives. The EIS states that the Pacific Fishery Management Council has identified Alternative 1 as its preferred alternative, noting that the Council may identify additional changes to the this alternative at the June 2012 Council meeting.

We have assigned a rating of EC-2 (Environmental Concerns-Insufficient Information) to this EIS. A description of our rating system is enclosed (Enclosure 1). We recognize the need to balance the economic needs of the communities with the continued harvest, even unintentional, of the overfished species. However, we are concerned that all alternatives include harvest levels that will extend the length of time it will take to reach rebuilding targets for both Pacific Ocean Perch and Canary Rockfish. We also have concerns related to the identified adverse impacts to non-target species, such as leatherback turtles.

The EIS does not include an alternative that considers annual catch limits for both species that are lower than the current conditions (No Action). We recommend that the National Marine Fisheries Service consider such an alternative. If deemed not reasonable, or unable to meet the community considerations required by the Magnuson-Stevens Fishery Conservation and Management Act, we recommend that a discussion of this conclusion be included in the Final EIS. We believe such an alternative may decrease the time needed to rebuild both species as well as minimize impacts to non-target species.

We commend the National Marine Fisheries Service and Council for the inclusion and evaluation of new accountability measures that are intended to improve the performance of the management program, as well as the extensive environmental justice analysis included in the EIS. We believe both will strengthen implementation of the management plan and support the requirements of the Magnuson-Stevens Act.

Again, we appreciate the opportunity to offer comments on the Draft EIS. Please contact me at (206) 553-1601 or by email reichgott.christine@epa.gov, or you may contact Jennifer Curtis of my staff in Anchorage at (907) 271-6324 or by email at curtis.jennifer@epa.gov with any questions you have regarding our comments.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediments Management Unit

Enclosure

ENCLOSURE 1

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.