Trawl Rockfish Conservation Area (RCA) Boundary Modifications

Final Environmental Assessment

February 2014

National Marine Fisheries Service
Sustainable Fisheries Division
West Coast Region

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CHAPTER 1 EXECUTIVE SUMMARY

Since 2002, NMFS has used large-scale, depth-based closures to reduce catch of overfished groundfish, while still allowing the harvest of healthy stocks to the extent possible. These closures are called Rockfish Conservation Areas (RCAs). The RCAs are gear-specific closures, and apply to vessels that take and retain groundfish species. This Final Environmental Assessment (EA) describes revisions to the RCA boundaries proposed for the groundfish bottom-trawl RCA. This EA contains analysis of the effects that may occur as a result of the proposed action.

A detailed description of the No-Action/status quo trawl RCA boundaries can be found in CHAPTER 3 (Description of Alternatives). The "core" trawl RCA (the area between 100 and 150 fm) is not proposed to be opened in either of the two action alternatives.

- Under the No-Action alternative, trawl RCAs stay as they are currently and are described in Table .

- The proposed Council-preferred action, Alternative 1, (see Chapter 3, Description of Alternatives) is to reduce the closed area from No-Action to between 100 and 150 fm, coastwide. This would open the trawl RCA, year-round, from 40° 10' N. latitude to 48° 10' N. latitude, 75 to 100 fm (shoreside); and year round, from 40° 10' N. latitude to 48° 10' N. latitude, from 200 fm to 150 fm (seaward).

- Under Alternative 2, all of the trawl RCA boundary modifications under Alternative 1 would be implemented, with the exception of the changes to the seaward boundary from 200 fm to 150 fm, 40° 10' N. lat to 45° 46' N. lat. Instead, the seaward boundary in this area would be changed to the modified 200 fm line year-round.

NMFS has decided to implement a modified version of Alternative 1. The only change from Alternative 1 is maintaining the No-Action seaward boundary line between 40° 10' N. latitude to 45° 46' N. latitude. Alternative 1 as modified implements trawl RCA boundaries as follows:

- Shoreward 100 fm (183-m)(year-round) between 40° 10’ N. latitude to 48° 10’ N. latitude, and;
- Seaward 150 fm (274-m)(year-round) north of 45° 46’ N. latitude to 48° 10’ N. latitude, and;
- Seaward 200 fm (366-m) between 40° 10’ N. latitude to 45° 46’ N. latitude during periods 2-5, and modified 200 fm (366-m) in periods 1 and 6 (i.e., status quo).

NMFS finds that Alternative 1 as modified will not have a significant effect on the human environment (see 10.2, Finding of No Significant Impact).

Differences among the No-Action Alternative, the Council-preferred, Alternative 1, Alternative 2, and the NMFS-preferred Alternative 1 as modified are described below (This EA demonstrates that the upper slope area benthic habitat between 45° 46’ N. latitude to 40° 10’ N. latitude, 150 to 200 fm, which would be opened under the Council-preferred Alternative 1, may have experienced some recovery from the effects of bottom trawling (see section 4.6, 4.7, 4.8, and 5.1.4). This area has been closed to bottom-trawl gear impacts for almost a decade. NMFS has determined that the area between 45° 46’ N. latitude to 40° 10’ N. latitude, from the 150 fm to modified 200 fm lines should remain closed pending completion of the groundfish Essential Fish Habitat (EFH) review or additional consideration of whether opening that area is consistent with minimizing the adverse effects on groundfish EFH caused by fishing to the extent practicable.

Table ES-1 and Table ES-2). Alternative 1 as modified will continue with No-Action seaward boundaries (south of 45° 46' N. lat. to 40° 10' N. lat.), which includes seasonal changes between the 200 fm seaward petrale cutout line and the slightly more conservative 200 fm line (without the petrale cutouts). This latter distinction is described in greater detail within Section 4.6.

This EA demonstrates that the upper slope area benthic habitat between 45° 46' N. latitude to 40° 10' N. latitude, 150 to 200 fm, which would be opened under the Council-preferred Alternative 1, may have experienced some recovery from the effects of bottom trawling (see section 4.6, 4.7, 4.8, and 5.1.4). This area has been closed to bottom-trawl gear impacts for almost a decade. NMFS has determined that the area between 45° 46' N. latitude to 40° 10' N. latitude, from the 150 fm to modified 200 fm lines should remain closed pending completion of the groundfish Essential Fish Habitat (EFH) review or additional consideration of whether opening that area is consistent with minimizing the adverse effects on groundfish EFH caused by fishing to the extent practicable.

Table ES-1: Trawl RCA Boundaries; No-Action/Status Quo, Alternative 1, Alternative 2, and NMFS-Preferred Alternative 1 as modified, North (to 48° 10'N. latitude) and South (to 40° 10'N. latitude) of 45° 46' N. latitude, periods 1 through 6 (depth in fathoms). Differences in Alternatives among the No-Action/Status Quo Alternative to Alternative 1, Alternative 2, and NMFS-preferred Alternative 1 as modified (change in fathoms by period and region).

Alternatives and Alternative Comparison

Status Quo (SQ) latitudes-North-South Boundaries	**Area**	**Alternative**	**East-West Boundary**	**Two Month Periods (Jan-Feb=1) (Depth-Fanthoms) 1**	**2**	**3**	**4**	**5**	**6**
48°10' N to 45°46' N	Northern	SQ	Shoreward	75	75	100	100	100	75
48°10' N to 45°46' N	Northern	SQ	Seaward	200	150	150	150	150	150
45°46' N to 40°10' N	Southern	SQ	Shoreward	75	75	100	100	100	75
45°46' N to 40°10' N	Southern	SQ	Seaward	m200	200	200	200	200	m200

Alternative 1 (Alt 1)				**1**	**2**	**3**	**4**	**5**	**6**
48°10' N to 45°46' N	Northern	Alt1	Shoreward	100	100	100	100	100	100
48°10' N to 45°46' N	Northern	Alt1	Seaward	150	150	150	150	150	150
45°46' N to 40°10' N	Southern	Alt1	Shoreward	100	100	100	100	100	100
45°46' N to 40°10' N	Southern	Alt1	Seaward	150	150	150	150	150	150

Alternative 2 (Alt 2)				**1**	**2**	**3**	**4**	**5**	**6**
48°10' N to 45°46' N	Northern	Alt2	Shoreward	100	100	100	100	100	100
48°10' N to 45°46' N	Northern	Alt2	Seaward	150	150	150	150	150	150
45°46' N to 40°10' N	Southern	Alt2	Shoreward	100	100	100	100	100	100
45°46' N to 40°10' N	Southern	Alt2	Seaward	m200	m200	m200	m200	m200	m200

NMFS-Preferred Alternative 1 as modified				**1**	**2**	**3**	**4**	**5**	**6**
48°10' N to 45°46' N	Northern	Alt2	Shoreward	100	100	100	100	100	100
48°10' N to 45°46' N	Northern	Alt2	Seaward	150	150	150	150	150	150
45°46' N to 40°10' N	Southern	Alt2	Shoreward	100	100	100	100	100	100
45°46' N to 40°10' N	Southern	Alt2	Seaward	m200	200	200	200	200	m200

Differences in Alternatives

SQ-Alt1

				1	**2**	**3**	**4**	**5**	**6**
48°10' N to 45°46' N	Northern	SQ-Alt1	Shoreward	-25	-25	0	0	0	-25
48°10' N to 45°46' N	Northern	SQ-Alt1	Seaward	50	0	0	0	0	0
45°46' N to 40°10' N	Southern	SQ-Alt1	Shoreward	-25	-25	0	0	0	-25
45°46' N to 40°10' N	Southern	SQ-Alt1	Seaward	50	50	50	50	50	50

SQ-Alt2

				1	**2**	**3**	**4**	**5**	**6**
48°10' N to 45°46' N	Northern	SQ-Alt2	Shoreward	-25	-25	0	0	0	-25
48°10' N to 45°46' N	Northern	SQ-Alt2	Seaward	50	0	0	0	0	0
45°46' N to 40°10' N	Southern	SQ-Alt2	Shoreward	-25	-25	0	0	0	-25
45°46' N to 40°10' N	Southern	SQ-Alt2	Seaward	0*	0*	0*	0*	0*	0*

0*- estimate does not include approximately 211 sq. mi. that would be opened year-round for petrale cutouts.

SQ-NMFS-Preferred Alternative 1 as modified				**1**	**2**	**3**	**4**	**5**	**6**
48°10' N to 45°46' N	Northern	SQ-Alt2	Shoreward	-25	-25	0	0	0	-25
48°10' N to 45°46' N	Northern	SQ-Alt2	Seaward	50	0	0	0	0	0
45°46' N to 40°10' N	Southern	SQ-Alt2	Shoreward	-25	-25	0	0	0	-25
45°46' N to 40°10' N	Southern	SQ-Alt2	Seaward	0	0	0	0	0	0

Table ES-2. Differences among Alternatives between No-Action/Status Quo Alternative to Alternative 1, Alternative 2, and NMFS-preferredAlternative 1 as modified (fathoms by region, including "affected" petrale cutouts that would be opened year-round).

Alternative 1	**Fathom Range**	**Latitude Span**	**Area Square miles**
	75-100 fm	**40°10' -48° 10' N lat.**	**2,091**
	150-200 fm	**40°10' -48° 10' N lat.**	**953**
		Total Square miles	**3,044**
Alternative 2	**Fathom Range**	**Latitude Span**	**Area Square miles**
	75-100 fm	**40°10' -48° 10' N lat.**	**2,091**
	150-200 fm	**45°10' -48° 10' N lat.**	**298**
	modified 200 fm	**40°10' -45° 46' N lat. Petrale cutout**	**211**
		Total Square miles	**2,600**
Partial Alternative 1	**Fathom Range**	**Latitude Span**	**Area Square miles**
	75-100 fm	**40°10' -48° 10' N lat.**	**2,091**
	150-200 fm	**45°10' -48° 10' N lat.**	**298**
		Total Square miles	**2,389**

CHAPTER 2 INTRODUCTION

2.1 How This Document is Organized

This document proposes alternatives (Chapter 3), describes the current physical, biological, and socio-economic environments relevant to the action (Chapter 4), and analyzes the alternatives for trawl rockfish conservation area (RCA) boundary configurations (Chapter 5). The analyses in Chapter 5 compare the action alternatives to the No Action Alternative and provide an assessment of the potential impacts relative to specified ecological, biological, and socio-economic resources.

2.2 Purpose and Need

The purpose of the action is to increase access to target stocks through liberalizations of the trawl RCA boundaries from 40°10' to 48° 10' N. latitude while allowing the individual accountability of the shorebased trawl Individual Fishing Quota (IFQ) program to minimize bycatch and incidental catch of overfished species. The action is needed to enable participants the ability to more fully and efficiently utilize their quota pounds while still meeting the Council's and Agency's goal for sustainability of the Pacific Coast groundfish fishery.

2.3 Background

An RCA is an area closed to fishing by particular gear types, bounded by lines specifically defined by latitude and longitude coordinates established at 50 CFR 660.391–394. Although the boundary lines defined by the latitude and longitude coordinates are typically generalized approximations of depth, the RCAs are not actually defined by depth contours, and the boundary lines that define the RCA may close areas that are deeper or shallower than the actual depth contours. 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. The coordinates establishing a specific boundary line, such as the 100-fathom

(fm) line, can be used to define RCAs for different gear types.

There are numerous commercial gears used in the Pacific coast groundfish fishery, among which are groundfish trawl gears. There are two primary types of groundfish trawl: bottom trawl and midwater trawl. Bottom trawl gear is divided into large footrope and small footrope gear (including selective flatfish gear). The action being considered here would affect where vessels fishing with groundfish bottom trawl gear can fish. Trawl RCA boundaries have been routinely adjusted over various depths since their inception. Once RCA boundary lines are established in regulation through latitude and longitude coordinates and are available for use, there are two primary ways in which RCAs can change through time. The first is modification of latitude and longitude coordinate points to better approximate a particular depth contour while allowing access to target stocks, or to correct inaccurate coordinates. The second is changing already approved waypoints to alter seaward and shoreward boundary lines that are used to define the RCA (e.g., an RCA originally bounded by the lines approximating the 75 fm and 150 fm depth contours may be changed to be bounded from the shoreline to 250 fm). The action alternatives under consideration, described in Chapter 3 and 4, are this second type of change.

2.4 History of the Trawl RCAs North of 40°10' N. Latitude

Depth-based management measures, particularly the setting of large areas closed to bottom trawling, were first implemented in 2002 to reduce catch of darkblotched rockfish. Darkblotched rockfish was declared overfished in 2000 and management measures at the time were proving inadequate to keep catch within the species' optimum yield (OY). Through the use of depth-based closures, the Council and NMFS sought to allow some fishing for healthy stocks while still protecting darkblotched rockfish.

After reviewing the darkblotched rockfish depth distribution and the depth distribution of healthy co-occurring stocks, in 2002, the Council recommended prohibiting bottom trawling between lines approximating the 100 fm and 250 fm depth contours north of 40°10' N. latitude. To allow vessels to fish for nearshore flatfish and deep-water species occurring outside of the primary darkblotched rockfish depth range, flatfish trawling shoreward of the 100 fm line was still allowed, as was bottom trawling seaward of the 250 fm line. (67 FR 57973, September 13, 2002). The only depth-based management measure in the groundfish fishery that was in use prior to that action was a 20 fm contour off California south of 40°10' N. lat., used to control fishing inside and outside of that contour by commercial and recreational hook-and-line fisheries.[1]

Subsequently, when designing 2003 management measures, the Council recommended and NMFS implemented trawl RCAs that would provide protection for several overfished species including darkblotched rockfish, canary, lingcod, widow rockfish, yelloweye

[1] For the month of September, all groundfish bottom trawling shoreward of the 100 fm line was prohibited. Other closures, such as the cowcod conservation areas, were established earlier (e.g., 2001).

rockfish, and Pacific ocean perch. For the 2003 limited entry bottom trawl fisheries north of 40°10' N. lat., the Council recommended a closed area between lines approximating the 100–250 fm depths, with the shoreward boundary line moving to a 75 fm line for the months of July-August. In the months of January–February and November–December, the offshore closed area boundary was revised to allow some bottom trawling in areas where petrale sole tends to aggregate. These revisions, often referred to as "petrale cutouts" are still in use when the trawl RCA boundary is established using the "modified" boundary lines as described in regulation. For example, the modified 200 fm line would include petrale cutouts, the 200 fm line would not.

While the majority of U.S. protected areas were established to conserve biodiversity or ecosystem structure (NOAA 2008), the management goal of the RCA was to aid in rebuilding overfished rockfish species (*Keller et al., in prep., 2013*).

Beginning in 2007, the structure of the RCA became highly complex, due to efforts by management to allow as much access to target species as possible, while avoiding discrete areas with high bycatch rates of rebuilding species (*Agenda Item E.5.b, Supplemental GMT Report, March 2007*); much of this management effort was focused on controlling catch of darkblotched rockfish and canary rockfish; breaking up the RCA into numerous discreet blocks to encourage more seaward effort in areas of lower risk of extreme catch events for darkblotched rockfish, to take some fishing pressure off of the shoreward areas, and balance against bycatch of canary rockfish on the shelf.

2.5 Scoping

At the Council's March 7–11, 2013 meeting in Tacoma, Washington, the Groundfish Advisory Sub-panel (GAP) requested a liberalization of the shoreward trawl RCA from 75 fm to 100 fm, between 40° 10' N. latitude and 48° N. latitude, for the latter part of Period two (March-April). The GAP stated that the boundary change could increase access to target species such as yellowtail rockfish, Pacific cod, lingcod, and Dover sole (*Agenda Item H.3.b, Supplemental GAP Report*). The Groundfish Management Team (GMT) analyzed current and historical catch data to assess the potential for increased catch of overfished species resulting from the proposal (*Agenda Item H.3.b, Supplemental GMT Report*). After consideration, the Council adopted the recommendation to move the shoreward trawl rockfish conservation area boundary from 75 to 100 fm between 40°10' and 48°10' N. latitude for Period two.

Due to questions about the adequacy of the timing of the Federal Register notice announcing the March 2013 meeting, the Council's recommendations from March were considered "Preliminary Selections" to be formalized under a specific agenda item at the April 6–11, 2013 Council meeting in Portland, Oregon. At the April meeting, the Council reaffirmed its recommendation from the March meeting. In addition, Mr. Frank Lockhart (Sustainable Fisheries, NMFS West Coast Region) met with the GAP to discuss NMFS' intention to make any liberalizations being considered for 2013-2014 trawl RCA boundaries through full notice and comment rulemaking. The setting of depth-based management measures, such as changes to RCA boundaries, is designated as a routine

management measure under the Groundfish FMP. As a routine measure, the Council can make recommendations for changes at a single Council meeting, which typically occurs under the groundfish inseason agenda items. Under the typical inseason process, NMFS usually asserts it has good cause to waive the Administrative Procedure Act requirements for notice and comment because allowing for the time necessary for notice and comment would be impracticable and contrary to the public interest. However, under the specific circumstances, it did not seem that the benefits of the Council's March recommendation, as reconfirmed at the April meeting, outweighed the public's interest in having the opportunity to provide comment. (*PFMC, June, Agenda Item F.9.b, NMFS Letter 2*).

Based on NMFS' belief that that it was in the broader public interest to allow for notice and comment during the consideration of RCA liberalizations for 2013-2014, at its April meeting the Council also considered shoreward and seaward trawl RCA boundary modifications beyond its March recommendation. Specifically, the GAP recommended making changes to the trawl RCA boundaries north of 40° 10' N. lat. to 48° 10' N. lat. through the remainder of 2014 beginning in period six of 2013 such that a 100 fm shoreward boundary and 150 fm seaward boundary would be in place year round north of 40° 10' N. lat. to 48° 10' N. lat. The GAP noted the recent low attainments of some economically important species and that liberalizing the RCA lines would allow trawlers to take advantage of opportunities to maximize the potential of their business plans, while allowing the IFQ system to minimize risks to stocks of concern. (*Agenda Item D.8.b Supplemental GAP Report*.) After consideration, the Council adopted the GAP's recommendation.

Additionally, at the Council's June 18-25, 2013 meeting in Garden Grove, California, NMFS staff notified GMT and GAP members that there was an area in the 2013-2014 recommendation that would open fishing grounds that may have had some opportunity to recover from impacts caused by bottom trawl gear. The Council was also made aware of NMFS' intention to prepare an environmental assessment (EA). The Council requested to have opportunity to evaluate the draft EA on the proposed action and either reaffirm its April recommendation, or revise their recommendation during the public comment period for the proposed action.

Additionally, an environmental organization provided public comment on the inseason agenda item (*PFMC, June 2013, agenda item F.9*). That testimony mentioned concerns about opening areas that may have recovered from bottom trawling impacts prior to completion of the groundfish Essential Fish Habitat (EFH) review. The group also stated that habitat value and the risks of a bycatch "disaster tow" should be the focus of analysis with respect to RCA boundary modifications.

At the Council's September 12-17, 2013 meeting in Boise, Idaho, NMFS provided the Council with additional information from the draft EA regarding the alternative boundaries. After considering the information NMFS presented, reports from the Council's advisory bodies, and public comment, the Council reaffirmed its recommendation to modify the trawl RCA boundaries as originally proposed.

Last, representatives from industry commented that they were in support of the proposed action at the March, April, and June, and September Council meetings.

2.6 Additions to the Final EA

Differences between the draft and final EA, including information previously not included in the draft EA, are as follows:

- Executive summary.
- Additional information regarding specific individual petrale cutout differences between the 200-fm line and the "modified" 200-fm line (see Table 4-2 and Figure 4-5).
- Additional information regarding groundfish bottom-trawl gear restrictions under current West Coast groundfish regulations is provided in section 4.7.1 (see Table 4.8).
- Additional information regarding petrale sole management (see Section 4.8.1).
- Additional information regarding stock status and management of longnose skate, spiny dogfish, rougheye rockfish, shortraker rockfish, and blackgill rockfish (see Section 4.8.1.1).
- More specific information on threatened/endangered status of ESA-listed species (see Section 4.8.4).
- Selected RCA area boundaries overlain on map panels showing locations of standardized catch of Canary rockfish, Darkblotched rockfish, Pacific ocean perch, Petrale sole, Spiny dogfish, Longnose skate, Aurora rockfish, and Rougheye rockfish, during NWFSC West Coast Groundfish Bottom Trawl Surveys for years 2003-2012 combined (see Figure 5-3, Figure 5-10, Figure 5-18 through Figure 5-22)
- Additional bycatch analysis for other species of interest; Spiny dogfish, Longnose skate, Aurora rockfish, Rougheye rockfish, and Shortraker rockfish (see section 5.1.4.2.1, Table 5-5, Figure 5-11 andFigure 5-12, Table 5-6, through Table 5-9, Figure 5-14 through Figure 5-17).
- Additional information regarding Catch per unit of effort (CPUE) by latitude and depth (fm) for petrale sole (see Figure 5-13).
- Public comments, including response to comments as they pertain to the Draft EA (see Section 10.1).

CHAPTER 3 DESCRIPTION OF ALTERNATIVES

3.0 Alternatives

This EA considers three alternatives: (1) a no-action alternative (status-quo); (2) the action alternative as recommended by the Council at the April 2013 meeting; and, (3) an action alternative that would keep the area that may have had a greater opportunity to recover from bottom trawl gear (150 fm- modified 200 fm, 40° 10' to 45° 46' N. lat.) closed to groundfish bottom trawling for 2013-2014. Under all of the alternatives, only changes to RCA boundaries are considered. All other existing closed areas (including EFH conservation areas) would be maintained, as would all existing gear requirements.

3.1 No-Action Alternative

Under the no-action alternative, trawl RCAs stay as they are currently and are described in Table 3-1, below.

Table 3-1: Current (No-Action) trawl RCA boundaries (fathom) for the area between 48°10' N. lat. and 40°10' N. lat. Grey filled cells indicate the boundaries and seasons, which would be changed under the action alternative(s). "m" indicates a boundary line that is modified to keep open areas seaward of the RCA for fishing winter aggregations of petrale sole.

Area	Boundary	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
48°10' - 45°46'	shoreward	75	75	100			75
	seaward	m200	150	150			150
45°46' - 40 °10'	shoreward	75	75	100			75
	seaward	m200	200	200			m200

3.2 Alternative 1, 100 fm Shoreward Boundary, 150 fm Seaward Boundary.

Under alternative 1, trawl RCAs would be modified as recommended by the Council at its April 2013 meeting.

The end result under alternative 1 would be a trawl RCA structure south of 48° 10' N. latitude that prohibits bottom trawling between the 100 fm and 150 fm RCA boundary lines. Specifically, the proposed action would change the trawl RCA boundaries as follows: (1) from a shoreward boundary line between 40° 10' N. latitude and 48° 10' N. latitude approximating 75 fm to a line approximating100 fm during periods 1, 2, and 6; (2) from a seaward boundary line between 40° 10' N. latitude and 45° 46' N. latitude approximating 200 fm to a line approximating 150 fm, during periods 1-6 (note that the modified 200 fm line is currently in place in periods 1 and 6), and; (3) from a seaward boundary line between 45° 46' N. latitude and 48° 10' N. latitude approximating the modified 200 fm to a line approximating 150 fm, during period 1. Table 3-2 below depicts the trawl RCA boundaries under alternative 1.

Table 3-2: Alternative 1 trawl RCA boundaries (fathom) for the area between 40°10' N. lat. and 48°10' N. latitude. Note: no-action trawl RCA boundaries prior to November 1, 2013 will be as demonstrated in the No-Action alternative for 2013.

Area	Boundary	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
48°10' - 40°10'	shoreward	100					
	seaward	150					

3.3 Alternative 2, Maintaining an RCA closure from 40°10' N. latitude to 45°46' N. latitude, 150 fm to modified 200 fm.

Under alternative 2, all of the trawl RCA boundary modifications under alternative 1 would be implemented with the exception of the changes to the seaward boundary from 200 fm to 150 fm, 40° 10' N. lat to 45° 46' N. lat. Instead, the seaward boundary in this area would be changed to the modified 200 fm line year-round. The end result under alternative 2 would be a trawl RCA structure south of 48° 10' N. lat. that: (1) prohibits bottom trawling between the 100 fm and 150 fm RCA boundary lines from 45° 46' N. latitude to 48° 10' N. latitude; and (2), prohibits bottom trawling from 100 fm to the modified 200 fm line from 40° 10' N. latitude to 45° 46' N. latitude. Specifically, the proposed action would change the trawl RCA boundaries as follows: (1) from a shoreward boundary line between 40° 10' N. lat. and 48° 10' N. lat. approximating 75 fm to a line approximating100 fm during periods 1, 2, and 6; (2) from a seaward boundary line between 45° 46' N. latitude and 48° 10' N. latitude approximating the modified 200 fm to a line approximating 150 fm, during period 1.; (3) from a seaward 200 fm boundary in periods 2-5 to a modified 200 fm boundary in periods 2-5. The table below depicts the trawl RCA boundaries under alternative 2

Table 3-3: Alternative 2 trawl RCA boundaries (fathom) for the area between 40°10' N. lat. and 48°10' N. latitude. Note: no-action trawl RCA boundaries prior to November 1, 2013 are as demonstrated in the no-

action alternative for 2013. “m” indicates a boundary line that is modified to keep open areas seaward of the RCA for fishing winter aggregations of petrale sole.

Area	Boundary	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
48°10' - 45°46'	shoreward	100					
	seaward	150					
45°46' - 40°10'	shoreward	100					
	seaward	m200					

3.3 Alternatives considered but rejected from analysis

At the Council’s March 7-11, 2013 meeting, the Council considered an industry request for changes to the trawl RCA boundaries forwarded by the GAP and analyzed by the GMT (see 2.5 Scoping). After consideration, the Council adopted the recommendation to move the shoreward trawl rockfish conservation area boundary from 75 to 100 fm between 40°10' and 48°10' N. latitude for Period two (March-April). Because the March recommendation, which was reconfirmed at the Council’s April meeting, was considered a preliminary selection and would have only made boundary changes for the last two weeks of Period 2, the alternative was rejected. Making changes only for two weeks within a single period is not considered further in this EA under either Alternatives 1 or 2 because the short-term change would not fully meet the need to provide increased access to underutilized target species.

CHAPTER 4 STATUS OF THE AFFECTED ENVIRONMENT

4.0 Physical Environment

A divergence in prevailing wind patterns causes the west wind drift (North Pacific Current) to split into two broad coastal currents when it reaches the North American Continent near Vancouver, B.C.: the California Current to the south and the Alaska Current to the north. As there are really several dominant currents in the California Current 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.

4.1 West Coast Marine Ecosystem

Along the U.S. west coast within the California Current system, spatial patterns of biological distribution (biogeography) have been observed to be influenced by various factors including depth, ocean conditions, and latitude. Cape Mendocino (Mendocino Escapement) is one of the most noteworthy influences to the latitudinal distribution of rockfish species diversity in the PFMC area. Most stock assessments for groundfish tend to be either coastwide assessments, or are relative to the stocks north or south of Cape Mendocino (occasionally Cape Blanco).

The California Current Ecosystem (CCE) is loosely defined as encompassing most of the U.S. and Canada west coasts, from the northern end of Vancouver Island, British Columbia, to Point Conception, California. The trophic interactions in the CCE are extremely complex, with large fluctuations over years and decades.

To some degree, food webs are structured around coastal pelagic species (CPS) that exhibit boom-bust cycles over decadal time scales in response to low frequency climate variability, although this is a broad generalization of the trophic dynamics. Similarly, the top trophic levels of such ecosystems are often dominated by highly migratory species such as salmon, albacore tuna, sooty shearwaters, fur seals, and baleen whales, whose dynamics may be partially or wholly driven by processes in entirely different ecosystems, even different hemispheres.

4.3 Essential Fish Habitat

The Magnuson-Stevens Act defines EFH as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1802(10)).

4.4 Non-Groundfish Species

EFH has been designated for non-groundfish species, such as salmon, coastal pelagic species, and highly migratory species. For salmonids, EFH in the action area is limited to pelagic habitats. For coastal pelagic and highly migratory species EFH is limited to pelagic (e.g. in the water column) or oceanographic (e.g. temperature) habitats.

4.5 Pacific Coast Groundfish

Groundfish EFH has been deemed through the PFMC process to include 1) all ocean and estuarine waters and substrates in depths less than or equal to 3,500 m, to the upriver extent of saltwater intrusion, which is defined based on ocean salt content during low runoff periods, and 2) areas associated with seamounts in depths greater than 3,500 m. The groundfish EFH designation describes 59.2 percent of the EEZ, which equates to 48,719,109 ha (142,042 square miles) in addition to state waters such as bays and estuaries (Figure 4-1) (EFH EIS, NMFS 2005).

NMFS prepared an EIS evaluating programmatic measures designed to identify and describe west coast groundfish EFH (Figure 4-1 below, 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.

In addition to identifying EFH and describing habitat areas of particular concern (HAPCs), the Council also adopted mitigation measures directed at the adverse impacts of fishing on groundfish EFH. Principal among these are closed areas to protect sensitive habitats. There are three types of closed areas: bottom trawl closed areas, bottom contact closed areas, and a bottom trawl footprint closure. The bottom trawl closed areas are closed to all types of bottom trawl fishing gear. The bottom trawl footprint closure closes areas in the EEZ between 1,280 m (700 fm) and 3,500 m (1,094 fm), which is the outer extent of groundfish EFH. The bottom contact closed areas are closed to all types of bottom contact gear intended to make contact with the bottom during fishing operations, which includes fixed gear such as longline and pots. A more complete description of groundfish and associated EFH is contained in the groundfish FMP

Bottom trawl gear is documented often in scientific literature as having a higher impact to ocean habitat than other gear types, largely due to the unique impacts of bottom trawl gear to bottom substrate caused primarily from the trawl doors. Trawl doors can penetrate the substrate, and footropes and sweep gear may flatten and disturb biogenic mound, biogenic depression microhabitats, and micro-topographic structures (De Marignac et al., 2008). Fish utilize these micro-habitats for protection from predation and as refugia from currents (De Marignac et al., 2008).

Bottom trawling is anticipated to cause greater impact to mixed and hard substrates, as these habitats have been observed to have the vast majority of sensitive biota such as coral and sponges. Although fishermen may try to avoid these substrate types to reduce gear damage, incidental encounters with these substrates may result in some increased impacts to sensitive biota.

Small footrope gear (less than 8" in diameter) requirements were implemented to reduce impact and incentive for trawling activities in mixed (boulder) and hard substrates, and are currently required in regulation when fishing shoreward of 100 fm. In comparing differences in bottom trawl fishing patterns since before and after small footrope gear requirements were put in place, "Spatial shifts in fishing effort away from rock habitat were strikingly evident (intensity decreases were 69 - 93.7%) for all reference sites after the 2000 footrope restriction (*Bellman et al, 2005*)." Maximum trawl footrope diameter restrictions were implemented in 2000 to help control rockfish catch in hard substrate areas; reductions in rockfish catch limits prior to 2000 had already reduced trawl activity within these areas. Because these two measures were implemented together, it has confounded the effects of reduced trip limits and footrope diameter restrictions (*Hannah, 2008*). However, regarding soft substrate, small footrope gear may have a larger impact on mud substrate than sand, as small footropes may dig into the more consolidated mud causing greater disruption and longer recovery from impacts.

The impacts of specific fisheries can vary widely on the characteristics of the gear and fleet (*Kaplan et al., 2012*). It is typically assumed that trawl-induced changes have detrimental effects on production of desired species, however heavily trawled systems remain very productive (Hilborn, 2007). Recent analysis by NWFSC staff investigating long-term abundance of rockfish and demersal groundfish in the survey area has been conducted. The authors point out that there is "clear evidence that CPUE was higher in the closed area of the RCA for multiple fish species including rockfishes and other commercially targeted and non-target species, even though we were unsure if the differences were related to the original siting of the RCA in high density rockfish habitat (*Keller et al., in prep., 2013*)." It is difficult to determine if the differences observed in catch among areas existed before the closure or are a result of the ongoing protection from commercial bottom trawling afforded to closed and periodically closed areas (*Keller et al., in prep., 2013*). The consistently and significantly greater catch taken in the closed area of the trawl RCA after accounting for covariates suggests that the closure provided some degree of protection for demersal fish species within its borders (*Keller et al., in prep., 2013*)."

This analysis highlights a few key points in the Final EFH Synthesis Report to PFMC, April 2013 (*incorporated by reference*). The majority of bottom trawling effort occurred over soft seafloor habitats on the shelf and upper slope before EFH conservation areas were enacted, but shifted to the upper slope post-2006.The majority of observed fixed gear effort occurred over soft seafloor habitat. Midwater trawling ranges from 8-31% annually over EFH conservation areas where bottom trawling is prohibited. Bottom trawl effort did not appear to occur where bottom contact gear was prohibited either before or after the EFH conservation areas were established. A low level of bottom trawl fishing in these areas is likely attributable to having only start and end points of trawl sets. In areas were only fixed gear is allowed, effort has ranged annually from 4 – 18% of the total fixed gear effort. 5% of observed fixed gear fishing effort on both the shelf and upper slope occurred over hard habitat. The highest effort relative to hard habitat occurred over the central shelf (23.7%).

Existing EFH conservation areas, other Federal closed areas, and the various state Marine Protected Areas will not be affected by this proposed action (Figure 4-2, below).

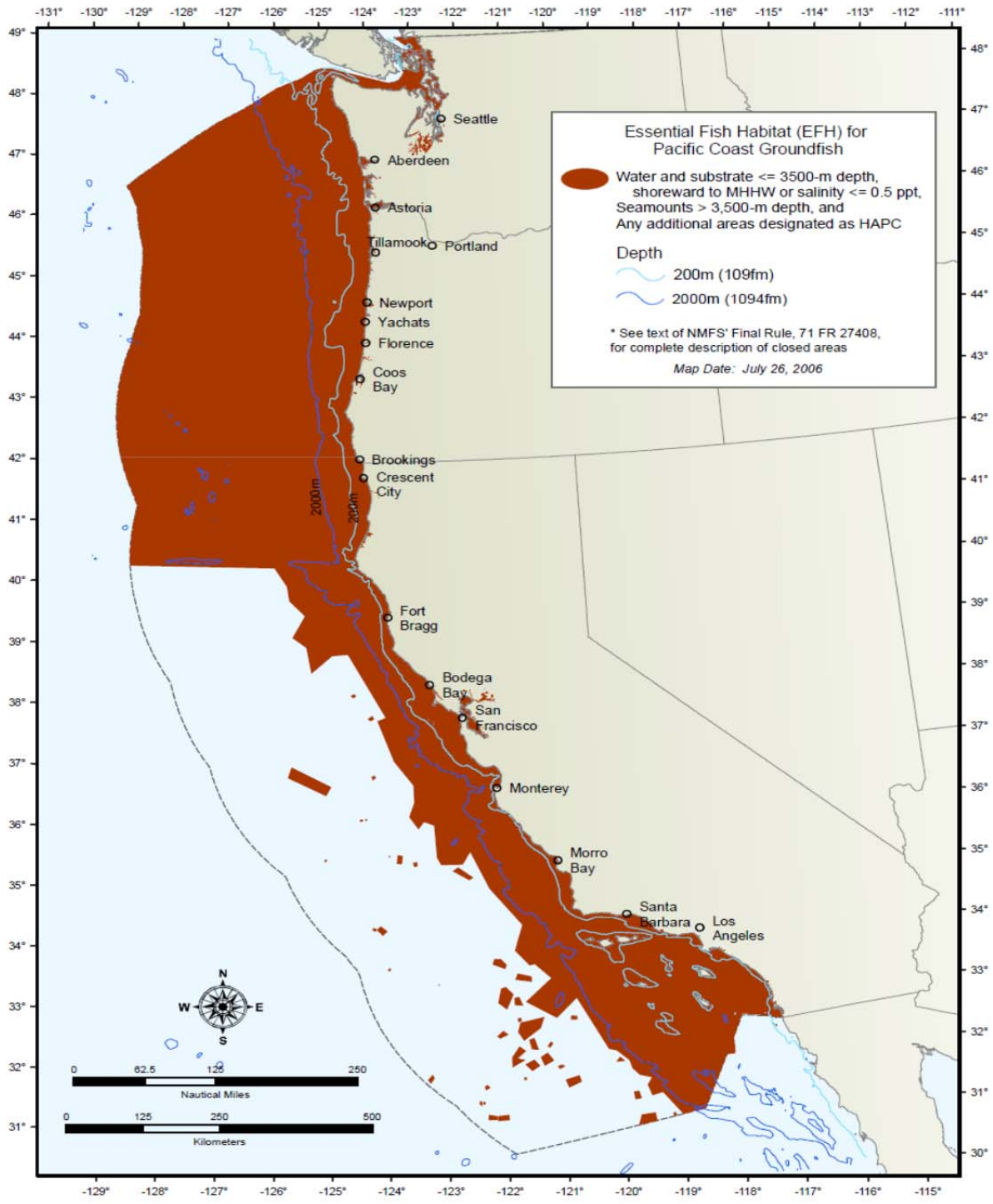


Figure 4-1: Map of EFH boundaries (AM 19 EFH EIS, 2005, NMFS 2005).

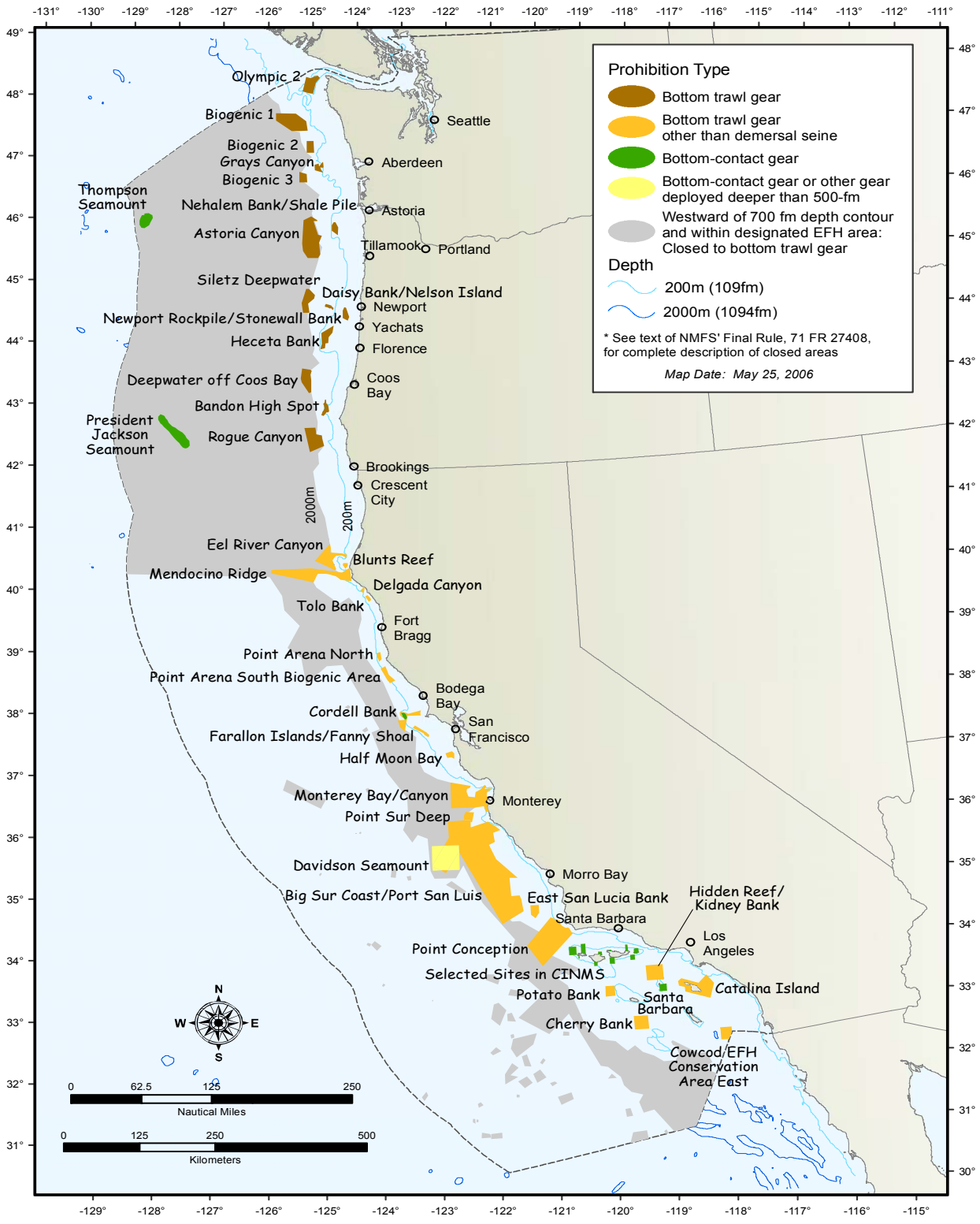


Figure 4-2: Map of EFH area closures to protect Pacific Coast groundfish habitat (AM 19 EFH EIS, 2005, NMFS 2005).

4.6 Benthic Habitat Substrates and Recovery

Considering that the trawl RCAs were established to reduce catch of overfished species, this EA describes the overfished groundfish species most likely to be affected by the proposed action (4.8 Biological Resources) and analyzes the potential for increased catch of overfished species (4.8.2.1 Overfished Groundfish Species). This EA also addresses the primary offshore benthic habitat types contained within the trawl RCA areas that would be opened to groundfish bottom trawling under the action alternatives, taking into account their rates of recovery from historic and current impacts.

Offshore habitat recovery from the effects of trawl fishing varies by habitat type (2005 EFH EIS). Offshore biogenic mixed and hard habitats generally have longer recovery times from trawl gear impact compared to offshore unconsolidated habitats such as soft substrate (2005 EFH EIS). Offshore mixed and hard bottom habitats may take up to 2.8 years to recover from pre-fishing conditions for non-structure forming benthic habitats (Table 4-1, below). This estimation does not take into account more defined habitat categories, such as slope sponge, which may take up to 10.5 years to recover (2005 EFH EIS, table 3-1 in the EIS), nor coral species, some of which are known to live beyond 100 years or more. Regeneration rates for corals following disturbance are also not fully understood in the scientific literature.

Table 4-1: Recovery time (years) for four major gear and three bottom types adapted from PFMC 2004 (EFH EIS) & PFMC 2013 (EFH habitat synthesis report, April 2013).

Part B Recovery Times	Bottom Trawl	Midwater Trawl	Fixed Gear Distance	Fixed Gear Point
Hard shelf	2.8	na	0.1	0.1
Hard upper slope	2.8	na	0.3	0.1
Hard lower slope	2.8	na	0.3	0.1
Mixed shelf	2.8	na	0.4	0.1
Mixed upper slope	2.8	na	0.4	0.1
Mixed lower slope	2.8	na	0.4	0.1
Soft shelf	0.4	na	0.4	0.1
Soft upper slope	1	na	0.4	0.1
Soft lower slope	1	na	0.4	0.1

The estimated recovery time (years) for four major gear and three bottom types (*PFMC 2005 Amendment 19, EFH EIS, PFMC 2013 EFH habitat synthesis report, April 2013*) is demonstrated above in Table 4-1. It is important to note that recovery times for bottom trawl habitat in soft substrates are estimated to be substantially less than hard or mixed/medium substrates, ranging

from 0.4 to 1 year, whereas impacts on hard and medium substrates are approximately 2.8 years. However, some large coral and sponge species, particularly larger species over 30 cm in height are known to tangle, damage, or experience mortality when pulled from substrate during entanglements from various fishery gear types (fixed gear longline or pot, groundfish and non-groundfish), or when bottom trawl gear (groundfish and shrimp) encounters medium and hard substrate (Brancato et al, 2007, NMFS). Recovery time for some hard corals could be on the order of 100 years (EFH 5-year review, Apendix J, September 2012).

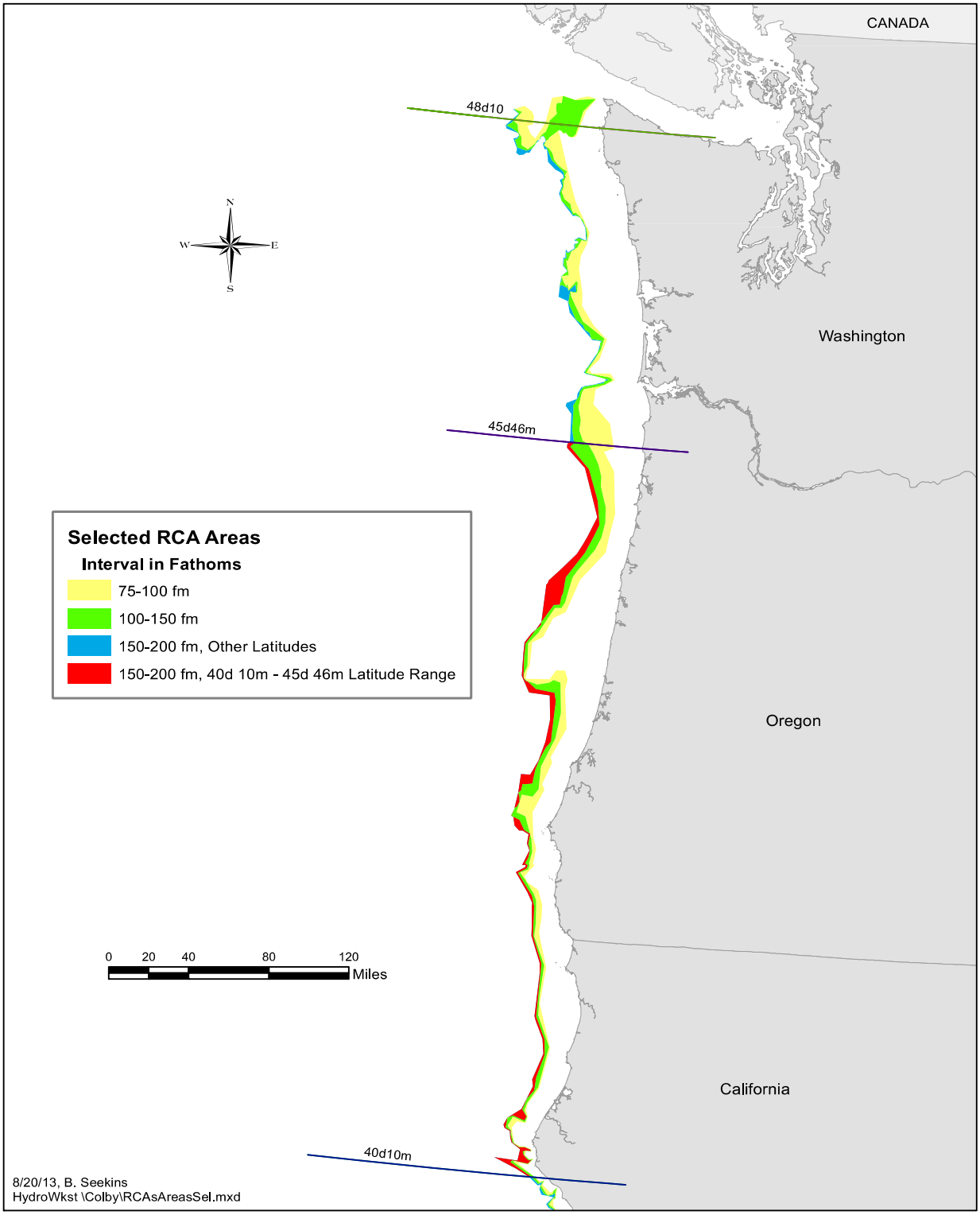


Figure 4-3: Proposed action area with selected RCA areas, interval by fm, emphasis added for 40° 10' N. latitude, 45° 43' N. latitude, and 48° 10' N. latitude. Interval by fm is represented in yellow (75-100 fm), green (100-150 fm), blue (North of 45° 46' N. lat. to 48° 10' N. lat., 150-200 fm), and red (North of 40° 10' N. lat. to 45° 46' N. lat., 150-200 fm). Modified petrale cutouts are not displayed. Any discrepancies between the CSV coordinate files illustrated here and the coordinates published in the *Federal Register* will be resolved in favor of the *Federal Register*.

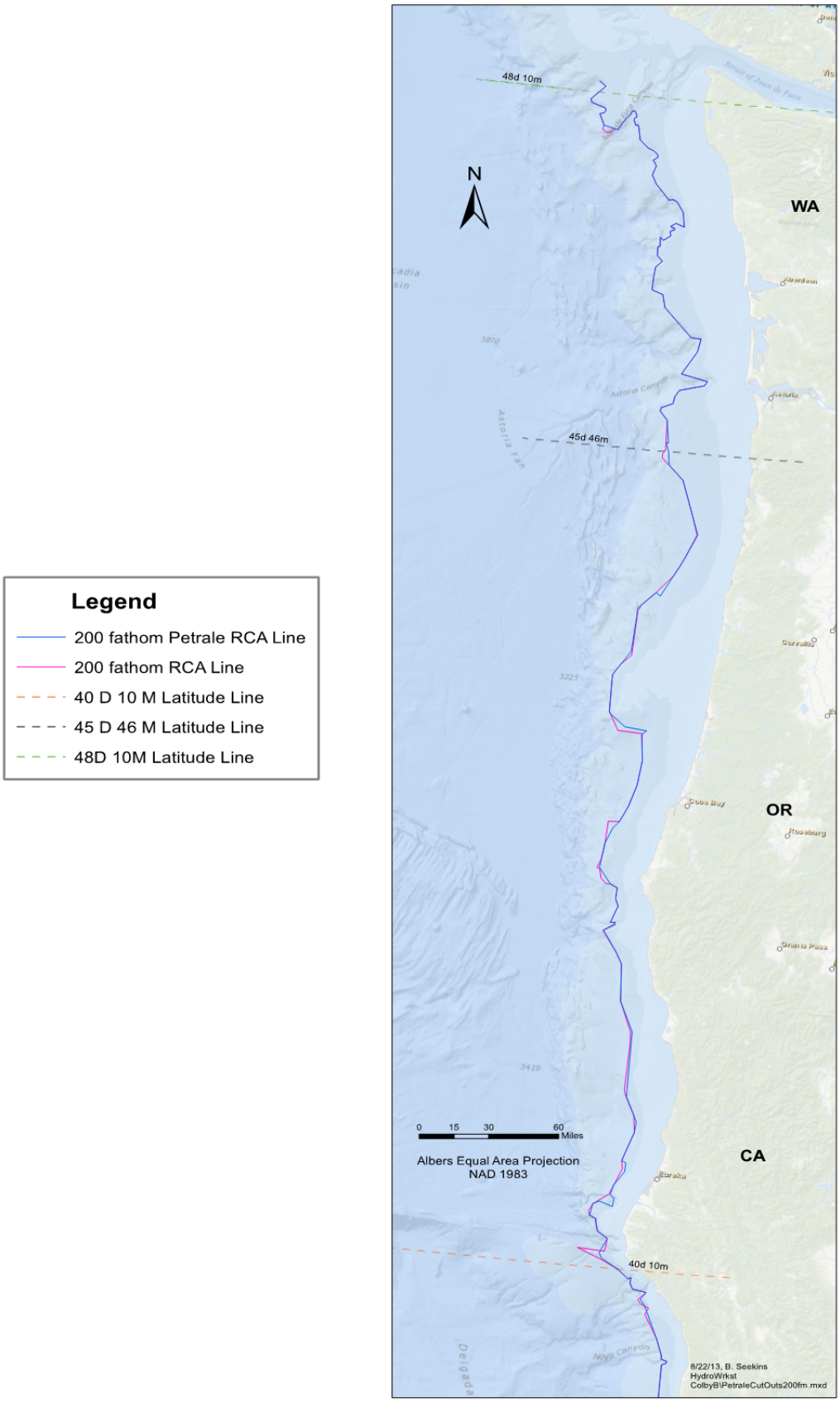


Figure 4-4: Proposed action area with selected RCA areas, 200 fm estimated waypoint line and modified "petrale cutouts", North of 40° 10' N. lat. to 48° 10' N. lat., 150-200 fm). Any discrepancies between the CSV coordinate files illustrated here and the coordinates published in the *Federal Register* will be resolved in favor of the *Federal Register*.

Table 4-2**:** 200 fm estimated modified Petrale cutout waypoint differences from the non-modified 200 fm line, 40° 10' N. latitude to 48° 10' N. latitude. Red shading indicates obvious petrale cutout differences between 200 and the modified 200 fm line. Letters A-T indicate differences between the two lines, and exact coordinates for each petrale cutout can be obtained from NMFS staff. Any discrepancies between the CSV coordinate files illustrated here and the coordinates published in the *Federal Register* will be resolved in favor of the *Federal Register*.

Approximate Geographic Extent				
Latitude, decimal degrees	Longtitude, decimal degrees	Petrale Cutout Area	Area, Square Miles	Comments
47.949	-125.6108	A		Intentional
47.9185	-125.6153	A	10.426	
45.9832	-124.7403	B		Intentional, In 2 parts, See map
45.7667	-124.7378	B	8.9051	South part - southern boundary is 45d46m latitude
45.766667	-124.697	C		Intentional, North boundary is 45d46m latitude
45.5813	-124.5431	C	12.8444	
45.3375	-124.4245	D		Uncertain if Intentional
45.0638	-124.4522	D	2.5821	
44.9266	-124.5394	E		Intentional
44.781243	-124.636738	E	13.9435	
44.704	-124.8008	F		Intentional - Odd Shape for CutOut
44.292833	-124.917333	F	10.9755	
44.219879	-124.977606	G		Thought to be Unintentional
43.9648	-124.9688	G	0.82545	
43.948167	-124.9555	H		Intentional
43.855796	-124.63231	H	33.6645	
43.221503	-124.783318	I		Intentional
43.070979	-124.884205	I	18.913	
42.9593	-124.9017	J		Intentional
42.792811	-124.802055	J	13.9661	
42.534738	-124.726337	K		Intentional?
42.328559	-124.693325	K	4.086	
42.252026	-124.639026	L, part 1		Thought to be Unintentional, both Parts 1 & 2
42	-124.613833	L, part 2	0.404382	
42	-124.613833	M		Intentional?, Very elongated area north-south
41.225	-124.406667	M	29.1882	
41.22533	-124.408	N		Intentional
41.1115	-124.388333	N	3.9173	
41.11183	-124.3895	N-South		Thought to be Unintentional
40.911	-124.47	N-South	0.610734	
40.912167	-124.469167	O		Intentional
40.7415	-124.514833	O	12.2481	
40.7415	-124.514833	P		Intentional
40.522167	-124.6835	P	25.7471	
40.522167	-124.6835	Q		Small but seems Intentional
40.455667	-124.621333	Q	0.66405	
40.455667	-124.621333	R		Small - Uncertain if Intentional
40.41633	-124.6073	R	0.28439	
40.372333	-124.52033	S		Intentional
40.284	-124.568	S	6.2707	
40.16666	-124.4107	T		Intentional
40.293	-124.755	T	21.71096	

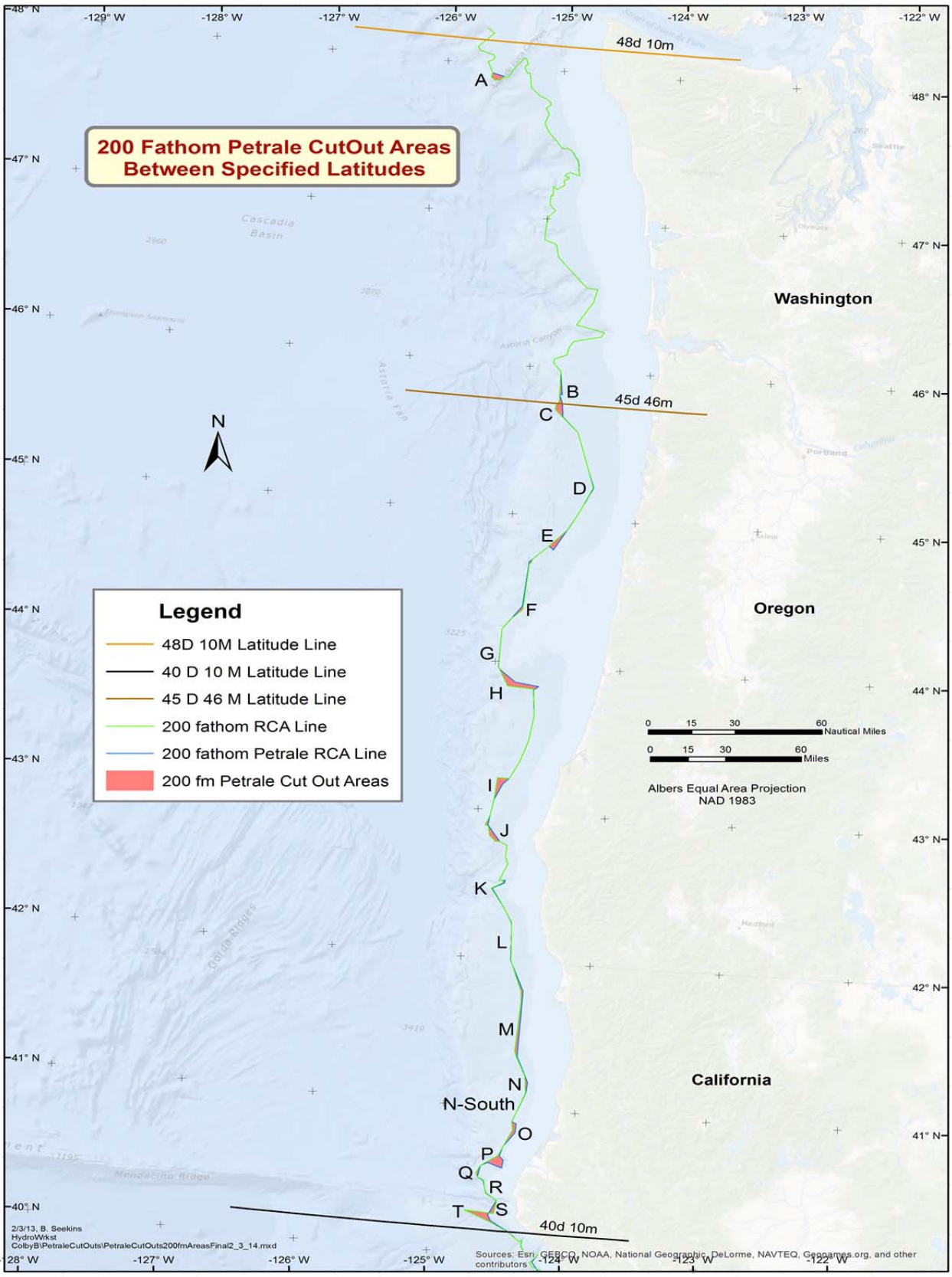


Figure 4-5: 200 fm estimated modified Petrale cutout waypoint differences from the non-modified 200 fm line, 40° 10' N. latitude to 48° 10' N. latitude. Red shading indicates obvious petrale cutout differences between 200 and the modified 200 fm line. Letters A-T indicate differences between the two lines, and exact coordinates for each petrale cutout can be obtained from NMFS. Any discrepancies between the CSV coordinate files illustrated here and the coordinates published in the *Federal Register* will be resolved in favor of the *Federal Register*.

4.6.1 Description of Substrate Types in the Action Area

Bottom topography varieties may best be summarized among the following substrate types, which may occur in nearshore, shelf, or slope benthic environments:

Soft substrate: unconsolidated sediment, mud, silt, sand.
Medium/mixed substrate: low-relief, cobble and boulder.
Hard substrate: steep ridge, rocky reef.

Some species of groundfish (and non-groundfish) may utilize varying substrate types at different stages in their life history. For example, rockfish were usually quiescent beside or within erect structures, but over flat seafloor they were swimming or moved passively with the current (Du Preez & Tunnicliffe, 2011). Previously published studies agree that most rockfish have higher abundances in areas that are difficult to trawl and that most flatfish have higher abundances in areas that are easier to trawl (*Zimmerman, 2003*). Trawl marks on the California seafloor are commonly oriented parallel to bathymetric contours (Bellman et al, 2005).

4.6.1.1 Soft substrate

Soft substrate may be the least susceptible to habitat impact by various groundfish gear types, including bottom trawl. Although some degradation of invertebrate communities resulting from bottom trawling has been described in various scientific literature publications and EFH publications, impacts are considered to be less than when gear interacts with hard or medium substrates. Shoreward of the trawl RCA, bottom trawl fishing vessels may target species such as aggregations of lingcod, yellowtail rockfish, pacific sanddabs, and other groundfish species that prefer soft sandy substrate or shallow mud, or are able to be intercepted while transiting through soft substrates between mixed and hard substrate regions. Rockfish recruitment to soft benthic habitats has been documented (*Johnson et al., 2001*). Seaward of the RCA, fishing vessels can target what is often referred to as the "Deepwater Dover sole assemblage," or Dover, Thornyhead, and Sablefish (DTS) complex. Some species may migrate spatially among depth zones depending on temporal season or interannual changes, but fish assemblages on deeper mud-dominated bottoms appeared to be relatively constant among years **(**B.N. Tissot et al., 2007). "Deep mud slope" is the primary habitat fished by commercial bottom trawlers outside the Heceta bank region (*Tissot et al, 2007*).

4.6.1.2 Mixed substrate

Mixed substrate may be second most susceptible to habitat impact (and hence, longer times for recovery from impacts). Although vertical relief may be less common in mixed substrates, boulders/cobble, boulder/sand substrate may serve as intermittent refuge for groundfish from predators, between potential feeding or localized seasonal depth migrations for overfished rockfish, or other more prominent latitudinal migratory groundfish. Epibenthic sponges or corals greater than 30 cm may have additional habitat benefit when connected to boulders or mixed substrate. In general, bottom trawl fishermen try to avoid mixed or hard substrate areas as trawling in those areas can cause damage to their nets and rigging. Mid-depth boulder-cobbles (55 fm to 82 fm) had the second lowest density of fish and the lowest species richness (about 43 fish species) compared to the other major habitats, and is of sufficiently low relief to be fished by commercial bottom trawlers (*Tissot et al, 2007*).

4.6.1.3 Hard substrate

Hard substrate is one of least common substrates within the proposed action area, but these substrates are also among the most important to rockfish. Off the West Coast of northern British Columbia it was locally observed that 95% of the rockfish occurred on 27% of the seafloor surveyed (*Du Preez & Tunnicliffe, 2011*). Other observations documented that "most of the hard substrate (bedrock and boulders) had attached benthic invertebrates, and at two of the sand transects, there were significant numbers of seawhips and hydroids present (*Rooper et al., 2010*)." GIS analysis of 5,039 bottom trawl events from U.S. West Coast bottom trawl surveys (1977-1998) estimated that the survey area was about 77% trawlable, but five of the 30 strata were less than 50% trawlable, while untrawlable areas by definition cannot be towed (*Zimmerman, 2013*). Jagielo et al (2003) found higher rockfish (*Sebastes*) abundances on untrawlable (rocky) sites off Washington State (*Zimmerman, 2003*). In general, bottom trawl fishermen try to avoid hard substrate areas as trawling in those areas can cause damage to their nets and rigging. In some ROV observations, "the shallow rock-ridge and large-boulder habitat was clearly untrawlable, and thus represented a natural refuge from the bottom-trawl fishery (*Tissot et al, 2007*)." From submersible observations made off southern B.C., Richards (1986) found that yelloweye rockfish abundance increased with habitat complexity, whereas greenstriped rockfish abundance did not (*Zimmerman, 2003*).

4.6.1.4 Proportion of Substrate Types in the Action Area

Data supporting substrate assumptions in this assessment are from Oregon State University (titled "NOAA EFH Synthesis Benthic Substrate"), which were put together as part of the Groundfish EFH review process. The data is a compilation of many data sources, but is characterized by the hardness. Percentages of substrate within the different depth zones throughout this assessment *do not* subtract EFH conservation areas within RCA depth zones, nor do they subtract area opened under the modified 200 fm line (petrale cutout areas). Therefore, actual square mileage estimates within depth zones that would be opened under the proposed action are less than that described below to some extent. However, most EFH conservation areas are outside of the RCAs.

4.6.1.4.1, 75-100 fathom RCA Depth Zone

Figure 4-6and Table 4-3 (below) demonstrate the amount of: (1) estimated soft seabed (90 percent, 1,882 square miles); (2) estimated mixed seabed (3 percent, 63 square miles); and, (3) estimated hard seabed (7 percent, 144 square miles) within the 75-100 fathom RCA depth zone.

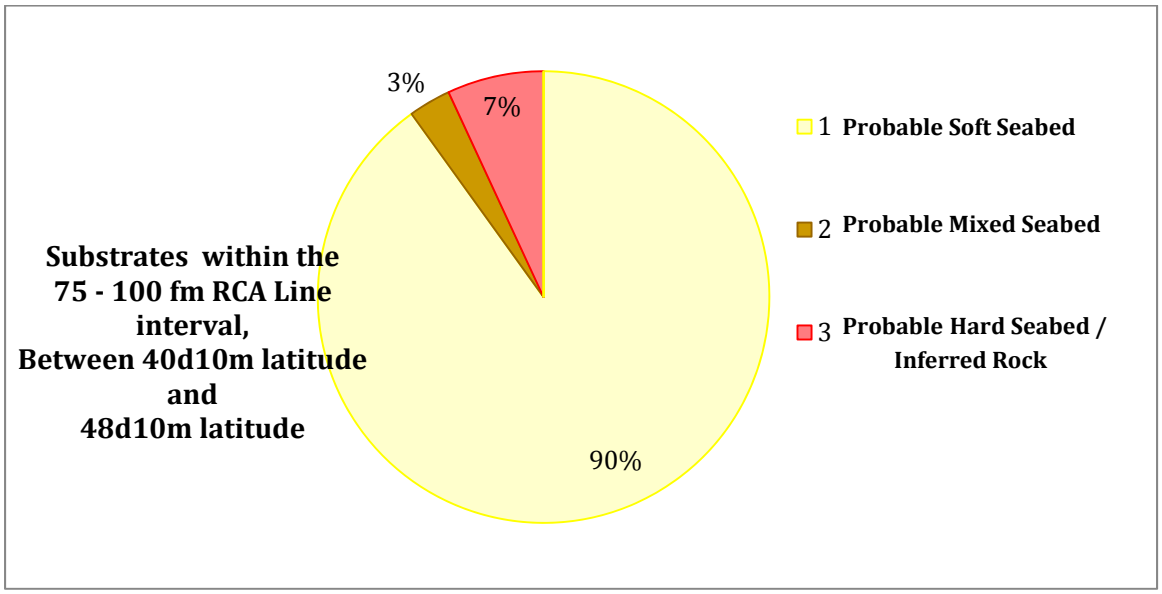


Figure 4-6: Substrates within the 75-100 fathom line interval, between 40° 10’ N. latitude and 48° 10’ N. latitude, and estimated substrate (seabed) types soft, mixed, and hard.

Table 4-3: Comparison of probable substrate type by 75-100 fathom range, square miles, and percent substrate type between 40° 10’ N. latitude and 48° 10’ N. latitude, including probable substrate (seabed) types soft, mixed, and hard.

Substrate Type	Fathom Range	Sq Miles	% Substrate
Probable Soft Seabed	75-100fm	1882.00	90.06
Probable Mixed Seabed	75-100fm	63.40	3.03
Probable Hard Seabed / Inferred Rock	75-100fm	144.39	6.91

4.6.1.4.2, 100-150 fathom RCA Depth Zone

Figure 4-7 and Table 4-4 demonstrate the amount of: (1) estimated soft seabed (94 percent, 1,289 square miles); (2) estimated mixed seabed (3 percent, 47 square miles); and, (3) estimated hard seabed (3 percent, 38 square miles) within the 100-150 fathom RCA depth zone between 40° 10' N. latitude and 48° 10' N. latitude. The proposed action does not include any groundfish bottom trawling within the 100-150 fathom RCA depth zone between 40° 10' N. latitude and 48° 10' N. latitude. However, fixed gear fisheries, midwater trawling, pink shrimp fisheries, and other non-groundfish fisheries may be conducted in this depth zone under existing regulations.

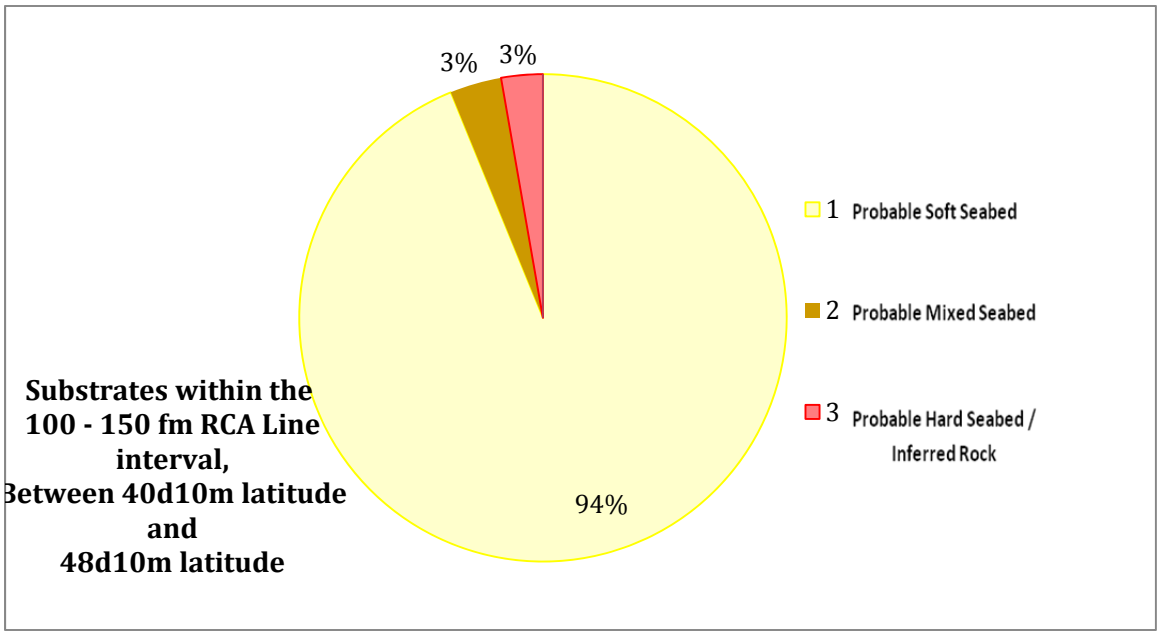


Figure 4-7: Substrates within the 100-150 fathom line interval, between 40° 10' N. latitude and 48° 10' N. latitude, and estimated substrate (seabed) types soft, mixed, and hard.

Table 4-4: Comparison of probable substrate type by100-150 fathom range, square miles, and percent substrate type between 40° 10' N. latitude and 48° 10' N. latitude, including probable substrate (seabed) types soft, mixed, and hard.

Substrate Type	Fathom Range	Sq Miles	% Substrate
Probable SoftSeabed	100 - 150 fm	1289	93.83
Probable Mixed Seabed	100 - 150 fm	47	3.42
Probable Hard Seabed / Inferred Rock	100 - 150 fm	37.82	2.75

4.6.1.4.3, 150-200 fathom RCA Depth Zone

Figure 4-8 and Table 4-5 (below) demonstrate the amount of: (1) estimated soft seabed (93 percent, 885 square miles); (2) estimated mixed seabed (4 percent, 36 square miles); and, (3) estimated hard seabed (3 percent, 32 square miles) within the 150-200 fathom RCA depth zone between 40° 10' N. latitude and 48 10' N. latitude.

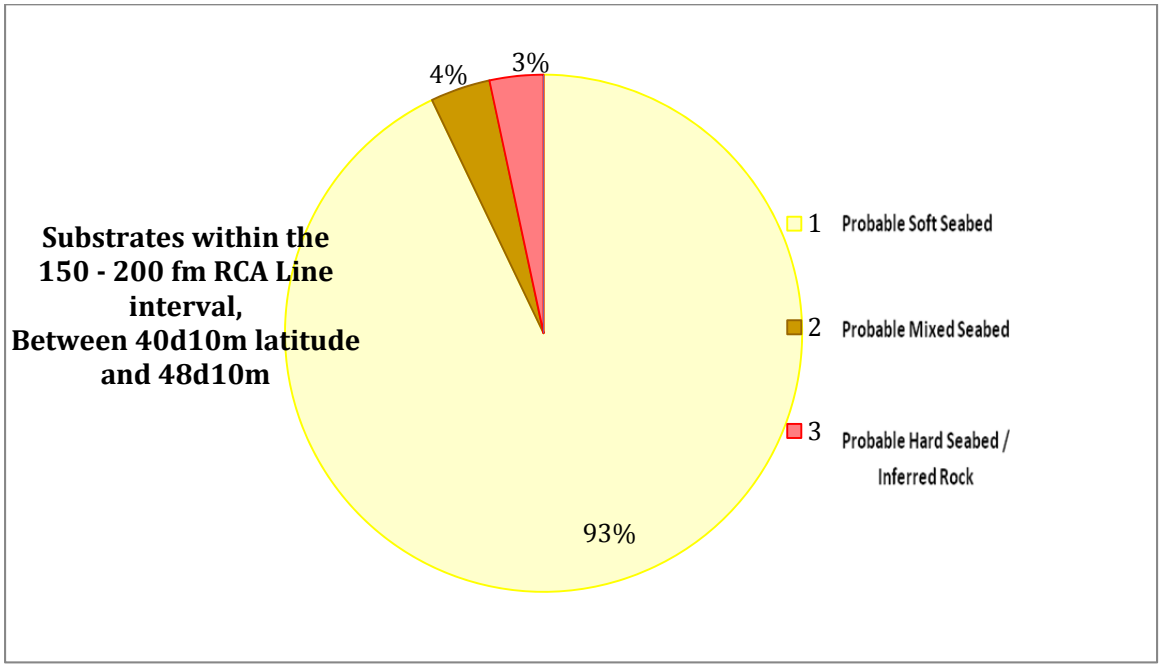


Figure 4-8: Substrates within the 150-200 fathom line interval, between 40° 10' N. latitude and 48° 10' N. latitude, and estimated substrate (seabed) types soft, mixed, and hard.

Table 4-5: Comparison of probable substrate type by 150-200 fathom range, square miles, and percent substrate type between 40° 10' N. latitude and 48° 10' N. latitude, including probable substrate (seabed) types soft, mixed, and hard.

Substrate Type	Fathom Range	Sq Miles	% Substrate
Probable Soft Seabed	150 - 200 fm	885	92.89
Probable Mixed Seabed	150 - 200 fm	35.69	3.75
Probably Hard Seabed / Inferred Rock	150 - 200 fm	32	3.36

The seaward area from 40° 10’ N. latitude to 45° 46’ N. latitude, 150-200 fm (Figure 4-9, below) within the proposed action area is comprised primarily of soft substrate (greater than 90 percent), which recovers from bottom trawl gear in a shorter amount of time compared to other substrate types (Table 4-1, above).

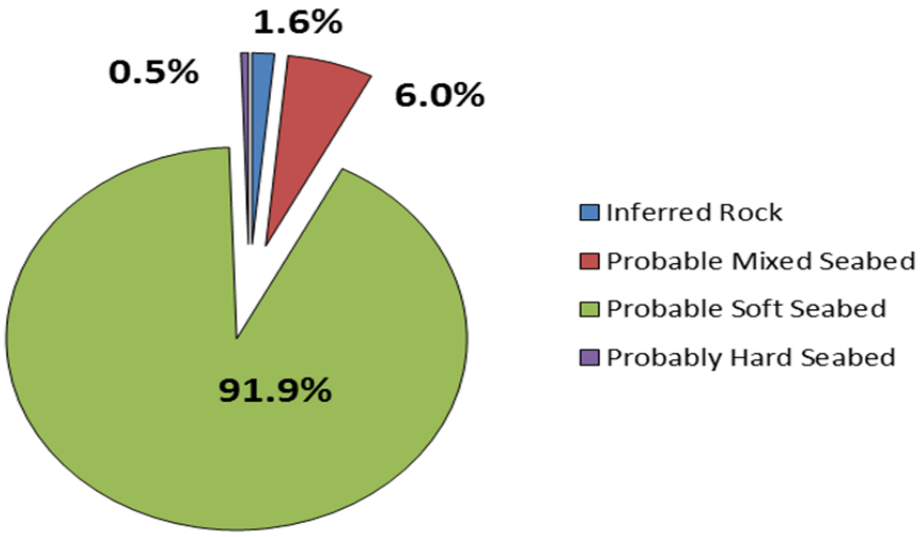


Figure 4-9: Proportional distribution of different substrate types in the area between the 150 and 200 fathom RCA boundaries, between 40° 10’ N. lat. and 45° 46’ N. lat.

The seaward area from 45°46’ N. lat. to 48°10’ N. lat. 150-200 fm (Figure 4-10, below) within the proposed action area is also comprised primarily of soft substrate (greater than 95 percent), which recovers from bottom trawl gear in a shorter amount of time compared to other substrate types (Table 4-1, above).

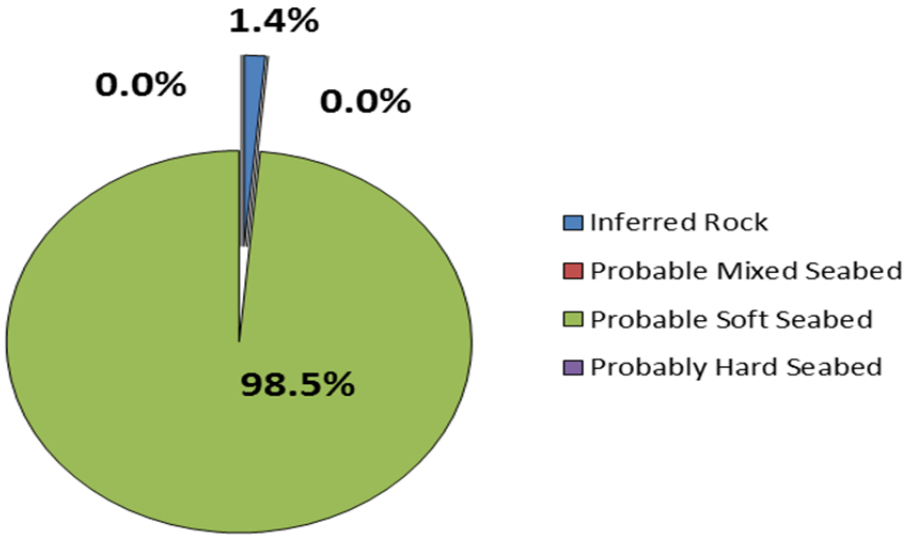


Figure 4-10: Proportional distribution of different substrate types in the area between the 150 and 200 fathom RCA boundaries, between 45°46’ N. lat. and 48°10’ N. lat.

4.7 Current Habitat as Affected by Fishing Gear

The impacts of specific fisheries can vary widely depending on the characteristics of the gear and fleet (*Kaplan et al., 2012*). The effects of fishing on EFH are described in detail in the Amendment 19 EFH EIS and subsequent documents generated by the ongoing EFH review. Generally, on the West Coast, benthic habitats are most disturbed by bottom trawl gear (e.g., groundfish and pink shrimp), and to a lesser extent, fixed gear. Some of the areas containing substrate types described above by proportion estimated in each RCA depth interval was closed to specific gear types through Amendment 19. See Figure 4-11 and Figure 4-12, below. For a complete depiction of all EFH closures established through Amendment 19 see Figure 4-2, above.

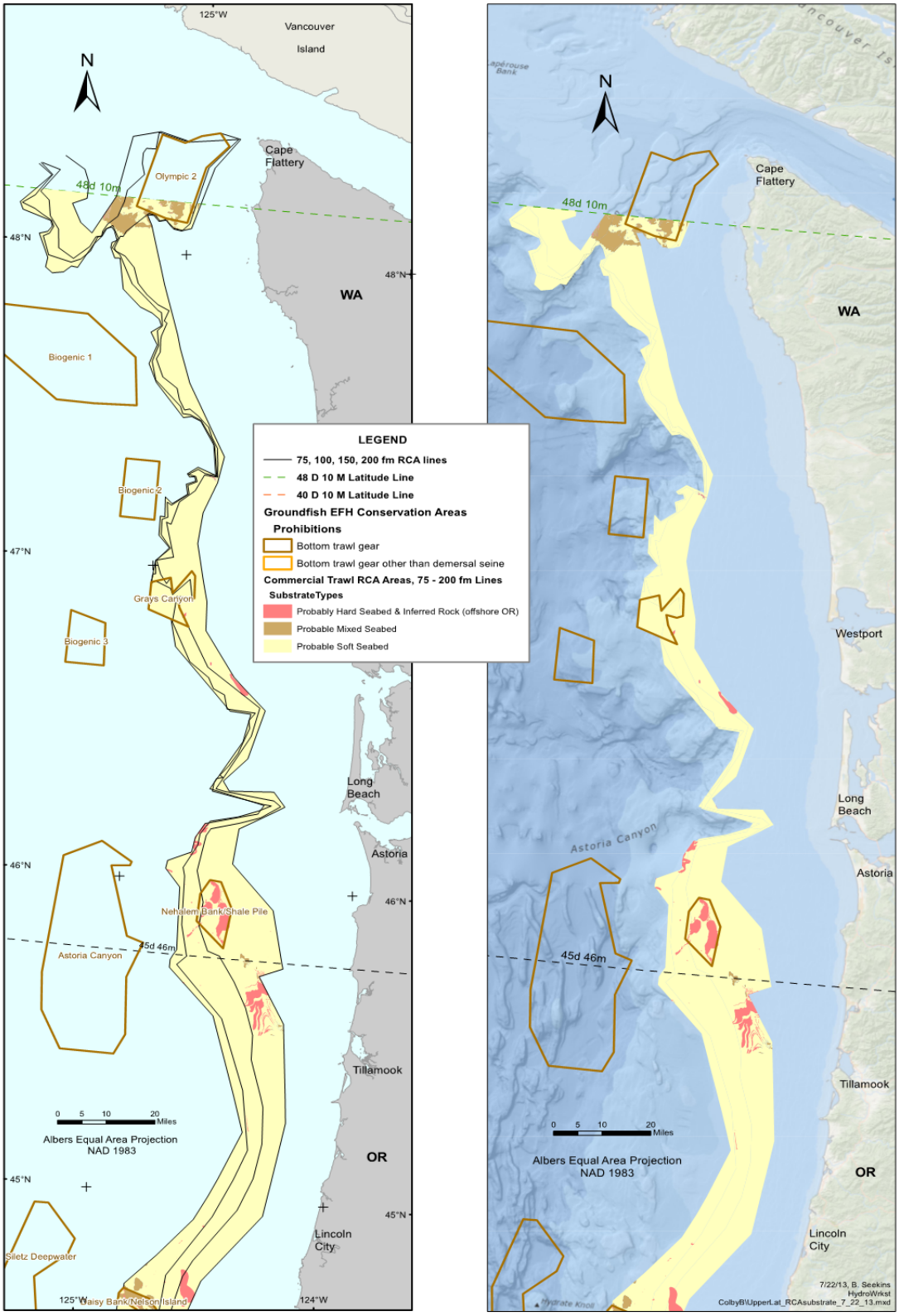


Figure 4-11. Proposed action area with selected RCA areas, interval by fm, 45° 46’ N. latitude to 48° 10’ N. latitude. Interval by fathom areas is represented in 75, 100, 150 and 200 fathom lines.

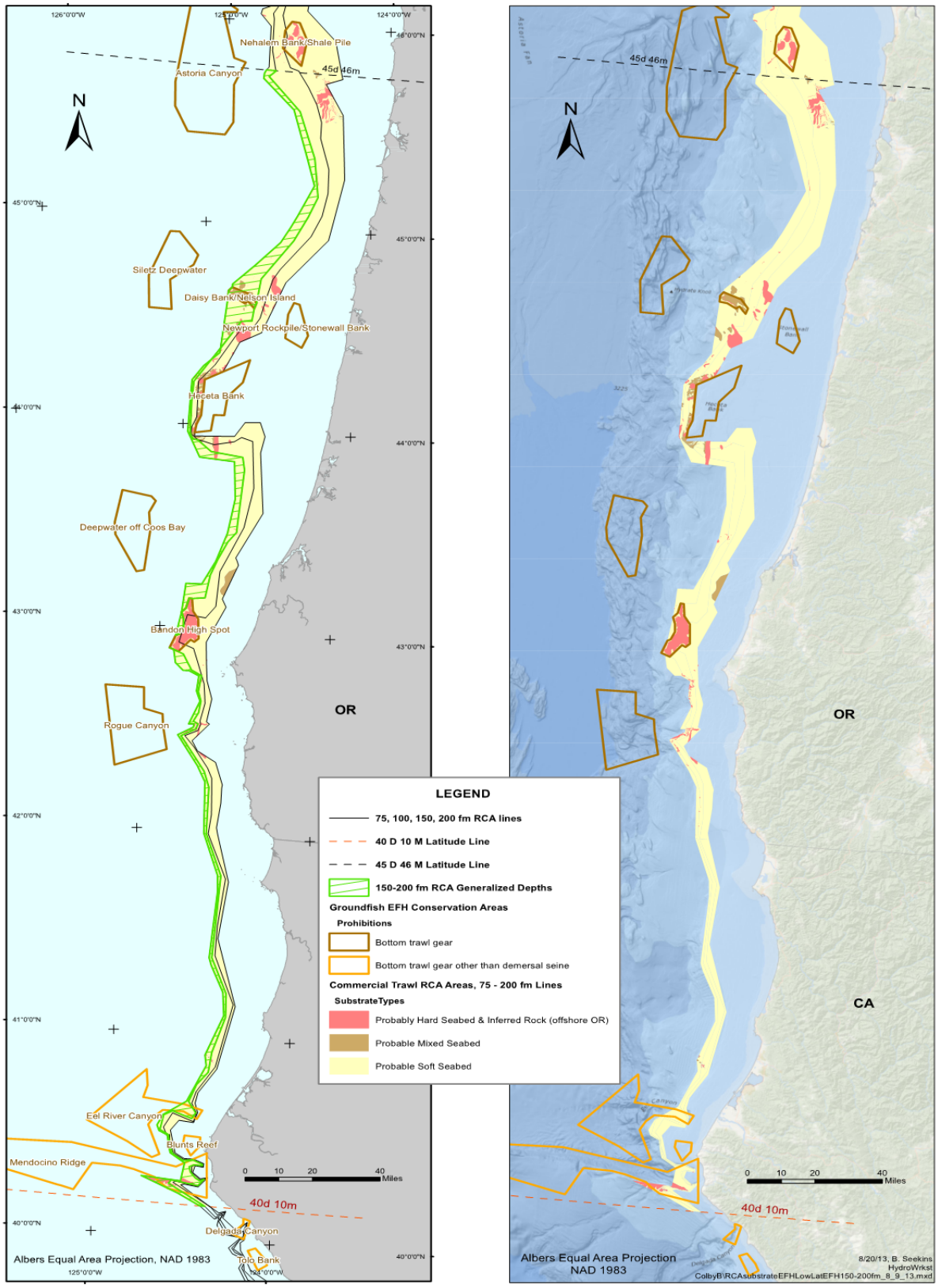


Figure 4-12: Proposed action area with selected RCA areas, interval by fm, 40° 10' N. latitude to 45° 43' N. latitude. Interval by fathom areas is represented in 75, 100, 150 and 200 fathom lines. 150-200 fm RCA Generalized depth zone (green polygon border) represents the seaward area in Alternative 2 that would remain closed to bottom trawling, unlike in Alternative 1.

4.7.1 Current Habitat as Affected by Groundfish Bottom Trawl Gear

Bottom trawling involves the towing of a funnel shaped net or nets behind a fishing vessel, which use "doors" to spread the mouth of the net. The trawl gear varies depending on the species sought and the size and horsepower of the boats used to fish the gear on the bottom. The mouth of trawl nets is spread horizontally in the water column by the use of two doors located one on each side of the net, forward and outward of the net. The doors, generally made of metal, are pushed apart and down by hydrodynamic forces and by their own weight, and some increase their spread by bottom friction. Fishermen choose trawl doors based on the horsepower of their vessel. Of the major components, trawl doors affect the smallest area of seabed, though trawl door marks are the most recognizable and frequently observed effect of trawls on the seabed. The trawl net is wide at the mouth tapering to an intermediate piece attached to the codend, the bag that collects the fish. The mesh sizes for the net and cod-end are regulated to allow undersized species to escape during fishing. The bottom contact rate in Midwater trawl fisheries for Pacific Whiting or pelagic rockfish is already understood to be very low (8 percent or less) in the whiting fishery and lower still in the pelagic rockfish fishery (7 percent or less), therefore midwater trawl gear habitat impacts are anticipated to be less than that by bottom trawl vessels.

The top of the mouth of the net is called the headrope (headline or floatline). The headrope usually overhangs the footrope to ensure that fish disturbed by the groundrope do not escape upwards, but selective flatfish nets have a cutrope to allow overfished rockfish an opportunity to escape, while flatfish will continue to be herded into the net. Only selective flatfish trawl gear (which utilizes small footropes) is required shoreward of the 100 fathom RCA line, and large footrope gear seaward of the 100 fathom line (although in practice seaward of the western trawl RCA boundaries) may not exceed 19 inches in diameter. The footrope or groundrope is directly attached to the lower leading edge of the mouth of the net. The footrope may be weighted with chain or may be rope-wrapped cable when used on a soft bottom. The footrope may contain boulders, rubber disks, or rubber rollers (also called bobbins) attached to the footrope under the center and wing sections of the net, to allow the net to ride over obstacles.

Two or more riblines are used on bottom trawl nets and midwater trawl nets. The riblines go fore and aft in the net to provide strength to the net. Bottom fish trawl nets are attached by sets of bridles (upper and lower bridles) to the doors, or may be attached to mud gear, which in turn is attached to the doors. Bridles are made of wire rope (also called cable). They function to hold the net open as it is towed and help herd fish into the path of the trawl net. The bridles are cables that connect the trawl doors to the trawl net. The bottom bridle may be in contact with the seabed for a part of their distance.

The intermediate of the net is the section where the net begins to funnel into the cod-end. The intermediate section of the net is often where bycatch reduction devices (BRDs), special net webbing for halibut and salmon, or flexible plastic rockfish excluders are integrated. The cod end is the last section of the net, which contains the nets' contents. As the net is retrieved back to the fishing vessel rear deck by two powerful winches on each side of the starboard and port sides of the vessel, a large steel hoist extending across and above the back deck is firmly affixed to the back of the vessel. This allows the intermediate section of the net to be hoisted above the vessel, ultimately resulting in the cod end of the net being brought aboard, and its contents being dumped on deck.

RCA configurations have dictated where groundfish bottom trawl gear could be fished north of 40° 10' N. latitude since 2002 (Table 4-6). Total estimated trawl effort from 2002 to 2009 was 436,899 tow-hours across the four trawl fisheries evaluated (*Guy et al., 2013*). Pink shrimp and groundfish

trawling accounted for most of the west coast trawl effort (54% and 25% of hours) (*Guy et al., 2013*). As shown in Table 4-6, below, some areas that would be open under the alternatives have been opened to trawling intermittently throughout the year in the recent past. However, the area that would remain closed under Alternative 2, 150 to modified 200 fm from 40° 10' N. latitude to 45° 46' N. latitude has not been opened to bottom trawling since October 2004, with the exception of a small area that was opened for four summer months in 2007 (45° 03' N. latitude to 45° 46' N. latitude).

Table 4-6: Yellow shading indicates area not trawled since October 1, 2004 (North of 40° 10' N. latitude), with extra emphasis provided in red shading to highlight the brief incursion from 250 fm to 150 fm as far south as 45° 03' N. latitude between April 1, 2007 to August 1, 2007.

Year	Area (North of 40°10')	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2001	North of 40°10'	N/A, PFMC (Council) introduced Cowcod Conservation Areas south of 40°10'											
2002	North of 40°10'	N/A, PFMC (Council) retained Cowcod Conservation Areas south of 40°10'								Shore-250	100-250	100-250	100-250
2003	North of 40°10'	100-m250		100-250		50-200		75-200		50-200		0-m200	
2004	North of 40°10'	75-m200		60-200		60-150		75-150			0-250		
2005	North of 40°10'	75-m200		100-200							0-250		
2006	North of 40°10'	75-m200		75-200				100-250		75-250		75-m250	
	North of 48°10'	75 - m250		75 - 250		0 - 150				0 - 200	75 - 200	75 - m200	
	48°10' - 46°38'					75 - 150				75 - 200			
	46°38' - 46°16'					60 -150				60 -200			
	46°16' - 45°03'					75 - 150				75 - 200			
	45°03' - 43°20'					75 - 200							
	43°20' - 42°40'	75-m250		75 - 250		0 - 200					75 - 200	75 - m200	
2007	42°40' -40°10'					75 - 200							
	North of 48°10'	0 - m200		0 - 200		0 - 150						0 - m200	
	48 10 - 46 38.17	75 - m200		60 - 200		60 - 150					75 - 150	75 - m200	
	46 38.17 - 46 16			60 - 200				60 - 150					
	46 16 - 45 46			75 - 200		75 - 150				75 - 200			
	45 46 - 43 20.83	75 - m200		75 - 200								75 - m200	
	43 20.83 - 42 40.50	0 - m200		0 - 200								0 - m200	
2008	42 40.5 - 40 10	75 - m200		75 - 200		60 - 200					75 - 200	75 - m200	
	North of 48°10'	0 - m200			0 - 200	0 - 150				0 - 200		0 - m200	
	48°10' - 45°46'	75 - m200			75 - 200	75 - 150		100 - 150		75 - 200		75 - m200	
2009	45°46' - 40°10'	75 - m200			75 - 200	75 - 200		100 - 200		75 - 200		75 - m200	
	North of 48°10'	0 - m200		0 - 200		0 - 150				0 - 200		0 - m200	0 - 250
	48°10' - 45°46'	75 - m200		75 - 200		75 - 150		100 - 150		75 - 200		75 - m200	75 - 250
2010	45°46' - 40°10'	75 - m200		75 - 200		75 - 200		100 - 200		75 - 200		75 - m200	75 - 250
	North of 48°10'	0 - m200		0 - 200		0 - 150				0 - 200		0 - m200	
	48°10' - 45°46'	75 - m200		75 - 200		75 - 150		100 - 150		75 - 150			
2011	45°46' - 40°10'	75 - m200		75 - 200		75 - 200		100 - 200		75 - 200		75 - m200	
	North of 48°10'	0 - m200		0 - 200		0 - 150				0 - 200		0 - m200	
	48°10' - 45°46'	75 - m200		75 - 150		100 - 150						75 - 150	
2012	45°46' - 40°10'	75 - m200		75 - 200		100 - 200						75 - m200	

Based on the table above (Table 4-6), the recovery index (Table 4-1), and various fishery impacts on the distribution of substrate types within the RCA depth line intervals (75-100 fm, 150 to 200 fm), only benthic habitat between 40° 10' N. latitude to 45° 46' N. latitude (150 to modified 200 fm) may have recovered from groundfish bottom trawl gear, assuming areas that are opened to trawling are in fact being extensively trawled.

75-100 fm, 40° 10' N. latitude to 48° 10' N. latitude: Within this depth interval (75-100 fm), the substrate types are approximately 90 percent soft, 10 percent mixed and hard substrates. Based on the EFH synthesis report habitat recovery table described above (Table 4-1), it would take an estimated 2.8 years for the hard and mixed substrate areas to recover if closed to all bottom trawling activity. However, it would take one year for the soft areas to recover, which comprise 90 percent of the area in the 75-100 fathom range. Under the no-action RCA configuration, the area between 40° 10' N. latitude and 48° 10' N. latitude from 75-100 fm is currently open to bottom trawling in periods 3, 4, and 5 (May through October). Accordingly, if it is assumed that bottom trawling occurs in these areas when open, then there has not been sufficient time for recovery to occur in the areas that have been impacted. Observed groundfish bottom trawl effort distribution by trawl hours, depth and latitude are described in Figure 4-13 and Figure 4-14, below. The observed groundfish bottom trawl effort between 75 and 100 fm, particularly above 43° N. latitude, indicates this area is heavily utilized. The area between 40° 10' N. latitude and 43° N. latitude, 75 fm to 100 fm is less frequently trawled by groundfish bottom trawl gear, while other bottom trawl gear such as pink shrimp bottom trawl gear (described below) frequently occurs south of 43° N. latitude in this depth range.

150-200 fm, 45° 46' N. latitude to 48° 10' N. latitude: Within this depth interval (150 to 200 fm, 45° 46' N. latitude to 48° 10' N. latitude), the substrate types are approximately 98.5 percent soft, and 1.4 percent mixed and hard substrates. Based on the EFH synthesis report habitat recovery table described above (Table 4-1), it would take an estimated 2.8 years for the hard and mixed substrate areas to recover if closed to all bottom trawling activity. However, it would take one year for the soft areas to recover, which comprise 98.5 percent of the area in the 150 to 200 fathom range, 45° 46' N. latitude to 48° 10' N. latitude. Under the no-action RCA configuration, the area between 45° 46' N. latitude to 48° 10' N. latitude from 150 to 200 fm is currently open to bottom trawling in periods 2-6 (March through December 31). Accordingly, if it is assumed that bottom trawling occurs in these areas when open, then there has not been sufficient time for recovery to occur in the areas that have been impacted. The observed effort from 2005 to 2011 demonstrates that open groundfish bottom trawl habitat between 150 and 200 fm (Figure 4-13 and Table 4-7, below), above 45° 46' N. latitude is currently utilized.

150 to 200 fm, 40° 10' N. latitude to 45° 46' N. latitude: For the area that has been closed since 2004 (within 150- modified 200 fm, 40° 10' N. latitude to 45° 46' N. latitude), having been largely closed for almost 9 years, it appears that even the habitat types (Table 4-1) with potentially longer recovery (e.g., slope sponge maximum estimated recovery time of 10.5 years) would have had some opportunity to recover. There was a small area between 45° 03' N. latitude to 45° 46' N. latitude that was opened to groundfish bottom trawling April 1, 2007 to August 1, 2007 (Table 4-6, above). However, it has been approximately six years since that narrow area has been opened, longer than the estimated bottom trawl recovery times of 2.8 years. Therefore, throughout this environmental assessment, the two areas (40° 10' N. latitude to 45° 03' N. latitude and 40° 10' N. latitude to 45° 46' N. latitude) will be referred to as one area that has had a chance to recover from bottom trawl gear from 40° 10' N. latitude to 45° 46' N. latitude, 150 to modified 200 fm. The observed effort from 2005 to 2011 demonstrates that benthic habitat between 150 and modified 200 fm (described in Figure 4-13, below), 40° 10' N. latitude to 45° 46' N. latitude, is not generally utilized due to the RCA closure. Some effort that may be showing up in this latitudinal depth zone may be a result of differences in way points in the federal register and the actual depth contours, or allowed modified petrale cut-outs, which enable fishermen to access limited areas of soft substrate to access target species. In this latitudinal range, effort is heavier outside of 200 fm (Figure 4-13 and Table 4-7, below).

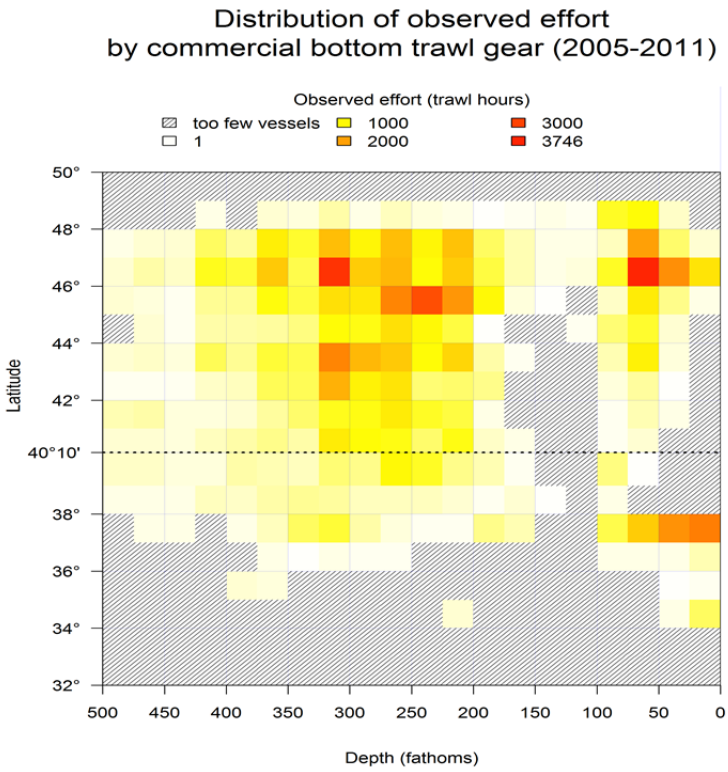


Figure 4-13: WCGOP distribution data of bottom trawl observed trips from 2005-2011, by latitude, longitude, and effort hours under tow.

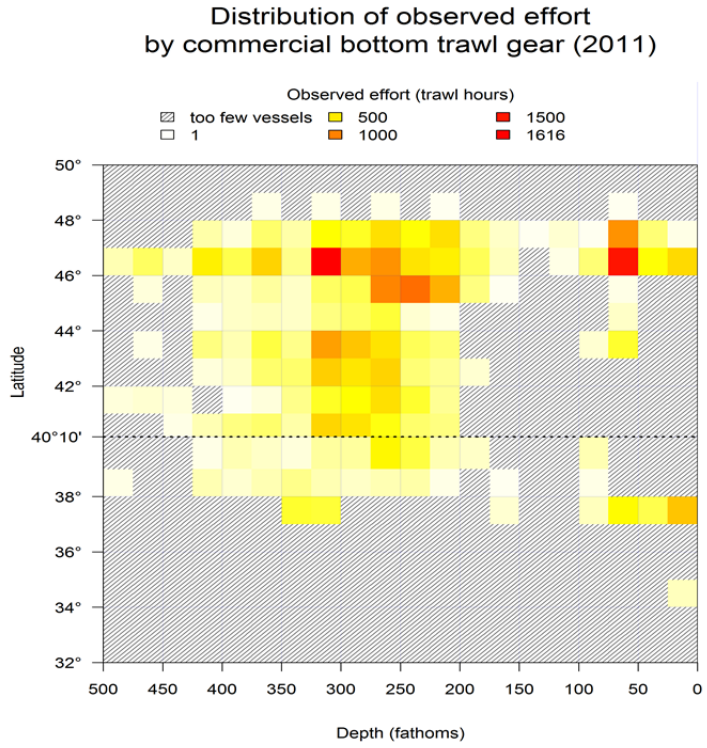


Figure 4-14: WCGOP distribution data of bottom trawl observed trips during 2011, by latitude, longitude, and effort hours under tow.

Inferences from observer data may have certain limitations, such as the possibility that an observer effect may be occurring when an observer is present onboard the vessel. Therefore, vessel practices on unobserved trips may be different to some extent, and subsequently, assumptions on

spatial effort may be limited. However, since the inception of the trawl rationalization program in 2011, with the 100 percent monitoring requirement, observer effects are not a concern. Table 4-7 (below) demonstrates the observer coverage rates from 2002 to 2010, north of 40° 10' N. latitude, which ranged from 13 to 24 percent. Cells showing tiny amounts of effort (Figure 4-14, above) in the trawl RCA could have a variety of explanations. It could be errors in the database, unintentional incursions, or the fact that the RCA boundary is like a big polygon, such that there could be locations near the boundary where a recorded actual average depth could vary from waypoints defined in regulation, which are designed to simplify compliance and enforcement.

Table 4-7: Non-whiting Observer Coverage Rates, 2002-2010 (pre-IFQ). Total trips, tows, vessels and groundfish landings observed in the limited entry groundfish bottom trawl fishery, 2002-2010. Coverage rates are computed as the observed proportion of total FMP groundfish landings (excluding Pacific hake), summarized from fish ticket landing receipts. Source: NWFSC

http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/bottom_trawl.cfm#coverage

	Observed				Fleet Total	Coverage Rate
Management Area / Year	# of trips	# of tows	# of vessels	Groundfish landings (mt)	Groundfish landings (mt)	% landings observed
North of 40° 10' N Lat						
2002	432	2567	93	1940.2	15369.9	13%
2003	316	1791	95	2076.3	14185.9	15%
2004	444	2697	75	3302.0	13971.0	24%
2005	396	2881	83	3573.8	16216.5	22%
2006	365	2506	70	2979.9	15378.4	19%
2007	283	2054	73	2890.4	17893.7	16%
2008	356	2727	83	4426.2	21257.7	21%
2009	484	3814	85	5425.7	23373.1	23%
2010	287	2257	72	3739.8	19825.4	19%

The RCAs were implemented to reduce fishing effort in areas where overfished species abundance is highest. The footrope restrictions (gear) are a bit different in that they reduce fishing effort in specific habitat. Before the first RCAs were required via Darkblotch Conservation Areas (DBCA), trip limits were instigated to control rockfish catch, originally referred to as "Sebastes complex limits." Some studies suggest that the inception of trip limits had substantially contributed to the reductions in landed rockfish catch, before the inception of RCAs. In 2008, Hannah demonstrated that the establishment of maximum trawl footrope diameter restrictions in 2000 helped to control rockfish catch. Reductions in rockfish catch limits prior to 2000 had already reduced trawl activity within hard substrate areas, confounding the benefits of reduced trip limits and footrope diameter restrictions (*Hannah, 2008*).

In 2002, the Council and NMFS prohibited the use of roller gear, which was the practice of running large tires through the center of the footrope, and had allowed fishermen to access hard and medium (including boulder/sand or boulder/mud) substrates. Additionally, the Council restricted footrope bobbin diameters to 19 inches. However, relatively few fishermen used large footropes (industry representative, personal communication, June 2013) prior to the ban. Although footropes greater than 19 inches are not permitted inside of the 100 fathoms, in all practicality the prohibition results in footrope greater than 19 inches not being allowed shoreward of the trawl seaward RCA boundaries, which currently ranges from 150 to 200 fathoms.

Prior to the first RCA, trawling was not spatially limited (including by currently prohibited "roller" gear), and during this time some impacts to habitat may have occurred which may take decades (or longer) to fully recover when considering large epibenthic habitat, such as large corals or sponges. A summary of current groundfish bottom trawl fishery regulations is shown in Table 4-8 (below). A few particular items of interest are:

- Selective flatfish trawl gear is allowed shoreward of the trawl RCA.

- Large footrope (8-19 inches) is prohibited seaward of 100 fathoms technically without the trawl RCA, small footrope would be allowed in the "core" trawl RCA (100-150 fm).
- Pink shrimp bottom trawl gear is currently allowed in the trawl RCA, but logbook data suggests that effort does not occur outside of 150 fathoms (see 4.7.3 Current Habitat as Affected by Pink Shrimp Bottom Trawl Gear, below).

Table 4-8: Groundfish bottom trawl gear restrictions allowed under current West Coast groundfish regulations.

Groundfish Re gulations	Bottom Trawl					
	Bottom Trawl				Non-Groundfish Trawl a/	
	Small footrope		Large footrope			
	Selective flatfish	Footrope <8 inches	Footrope 8-19 inches	Footrope >19 inches	Pink Shrimp	Footrope >19 inches
North of 40º10'						
Shorward of Trawl RCA	Yes	No	No	No	Yes	No
Within Trawl RCA	No	No	No	No	Yes	No
Seaward of Trawl RCA	Yes	Yes	Yes	No	Yes	No
Non-groundfish trawl RCA					Yes	No
EFH - No bottom trawl, other than EFH - No bottom trawl	No	No	No	No	No	No
EFH - No bottom contact	No	No	No	No	No	No
EFH- Shoreward of 100 fm	No	No	No	No	No	No
EFH -Seaward of 700-fm	No	No	No	No	No	No

a/ State imposed gear restrictions are not shown in this table and may be more restrictive than federal restrictions.

4.7.2 Current Habitat as Affected by Groundfish Fixed Gear

Bottom longline gear fits into two categories: gear that targets fish living directly on the bottom (halibut, cabezon, lingcod etc.) and gear that targets fish living very near the bottom (sablefish, rockfish etc.). Marking buoys, buoy lines and anchors are the same for both types of bottom longline. Additionally hook spacing and size, gangion size and length can also be the same. The difference in longlines for fish living directly on the bottom as opposed to fish living near the bottom comes between gangions and the groundline and in the composition of the groundline itself.

The longline is marked on both ends with a cane flagpole with a radar reflector and a flotation buoy. Below the buoys the buoy line (30-50 fm longer than the water depth) travels from the surface down to the anchor on the bottom. Groundline is used between the anchors, and gangions are snapped or tied to the groundline with the baited hooks at the opposite end. Weights of one to five pounds are sometimes attached to the groudline either to speed sinking rate through upper waters that might house non-desired species, or when fishing uneven bottom contours. A series of weights are used along the groundline to sink the groundline to the bottom. The floats have enough buoyancy to lift the groundline, hooks and gangions, but not enough to hold up the weights. The principal components of the longline that can produce effects on the seabed are the anchors or weights, the hooks and the mainline. If the hauling vessel is not above the part of the line that is being lifted, the line, hooks and anchors can be pulled across the seabed before ascending. If the

hooks and line snare exposed organisms they can be injured or detached.

Pots are baited boxes set on the ocean floor to catch various fish and shellfish. They can be circular, rectangular or conical in shape. All pots contain entry ports and escape ports that allow undersized species to escape. The pots used for the sablefish pot fishery are highly selective for sablefish and are fished off a long-line in series (a set of pots) at various depths. They are generally fished in waters up to 600 fm, though sometimes as deep as 760-800 fm. Up to 50 pots are attached to each groundline line. The groundline is usually 3⁄4 inch polypropylene (ranging from 5/8" to 1 1/8"). Pots are spaced every 15 to 40 fm along the line, with 20 fm being average. An anchor weighs each end of the line. Pots are set and retrieved using line haulers and/or drums.

Whereas bottom trawl fishing vessels will typically try to avoid areas of hard and mixed boulder substrates, fixed gear is very effective at accessing these areas. Limited evidence suggests that longline gear may entangle and pull large sponge and coral from boulder or rocky substrate, and that target species are abundant in these areas. Fixed gear impacts on soft substrate are expected to be minimal. The sablefish longline and near-shore rockfish longline fisheries together set an estimated 86.2 million hooks from 2002 to 2009 (*Guy et al., 2013*). The sablefish longline fishery set the majority of hooks (77%), most in the shelf-break domain (92%) (*Guy et al., 2013*). Table 4-9, below depicts the non-trawl (i.e., fixed gear) RCA configurations overtime.

Table 4-9: Fixed gear RCA depth boundaries by year and month, 2002-2013, including inseason changes. Emphasis in yellow shading represents historical fixed gear RCAs in the trawl RCA proposed action area (fm).

Year	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	North 46 16	shore - 100 fm											
	43 00 - 46 16	30 - 100 fm											
	42 00 - 43 00	30 - 100 fm											
	40 10 - 42 00	20 fm depth contour - 100 fm											
	34 27 - 40 10	30 fm - 150 fm line											
	South 34 27 (+ islands)	60 fm - 150 fm line (also applies around islands)											
2012	North 46 16	shore - 100 fm											
	43 00 - 46 16	30 - 100 fm											
	42 00 - 43 00	20 - 100 fm											
	40 10 - 42 00	20 fm depth contour - 100 fm											
	34 27 - 40 10	30 fm - 150 fm line											
	South 34 27 (+ islands)	60 fm - 150 fm line (also applies around islands)											
2011	North 46 16	shore - 100 fm											
	45 03 83 - 46 16	30 - 100 fm											
	43 00 - 45 03 83	30 - 125 fm (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100 fm											
	40 10 - 42 00	20 fm depth contour - 100 fm											
	34 27 - 40 10	30 fm - 150 fm line											
	South 34 27 (+ islands)	60 fm - 150 fm line											
2010	North 46 16	shore - 100 fm											
	45 03 83 - 46 16	30 - 100 fm											
	43 00 - 45 03 83	30 - 125 fm (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100 fm											
	40 10 - 42 00	20 fm depth contour - 100 fm											
	34 27 - 40 10	30 fm - 150 fm line											
	South 34 27 (+ islands)	60 fm - 150 fm line											
2009	North 46 16	shore - 100 fm											
	45 03 83 - 46 16	30 - 100 fm											
	43 00 - 45 03 83	30 - 125 fm (125 line reduced to 100 fm during directed halibut days)											
	42 00 - 43 00	20 - 100 fm											
	40 10 - 42 00	20 fm depth contour - 100 fm											
	34 27 - 40 10	30 - 150 fm											
	South 34 27 (+ islands)	60 fm - 150 fm											
2008	North 46 16	shore - 100 fm											
	40 10 - 46 16	30 - 100 fm											
	34 27 - 40 10	30 - 150 fm											
	South 34 27 (+ islands)	60 fm - 150 fm											
2007	North 46 16	shore - 100 fm											
	40 10 - 46 16	30 - 100 fm											
	34 27 - 40 10	30 - 150 fm											
	South 34 27 (+ islands)	60 fm - 150 fm											
2006	North 46 16	shore - 100 fm											
	40 10 - 46 16	30 - 100 fm											
	34 27 - 40 10	30 - 150 fm					20 - 150 fm			30 - 150 fm			
	South 34 27 (+ islands)	60 fm - 150 fm											
2005	North 46 16	shore - 100 fm											
	40 10 - 46 16	30 - 100 fm											
	34 27 - 40 10	30 - 150 fm					20 - 150 fm			30 - 150 fm			
	South 34 27 (+ islands)	60 fm - 150 fm											
2004	North 46 16	shore - 100 fm											
	40 10 - 46 16	30 - 100 fm											
	34 27 - 40 10 (+ islands)	30 - 150 fm					20 - 150 fm			30 - 150 fm			
	South 34 27 (+ islands)	60 fm - 150 fm											
2003	North 46 16	shore - 100 fm										shore - 200 fm	
	40 10 - 46 16	27 - 100 fm										shore - 150 fm	
	34 27 - 40 10	20 - 150 fm											
	South 34 27 (+ islands)20	20 - 150 fm								30 - 150 fm			
2002	South 40 10	CLOSED > 20fm (exceptions: sablefish, S Thorny and slope RF)											

75-100 fm, 40° 10' N. latitude to 48° 10' N. latitude: Due to the fixed gear RCAs, (Table 4-9, *above*), there is no substantial fixed gear effort shoreward of the 100 fathom depth contour in this depth zone (Figure 4-15, below). Within this depth interval (75-100 fm), the substrate types are approximately 90 percent soft, 7 percent mixed, and 3 percent hard substrate. Based on the EFH synthesis report habitat recovery table described above (Table 4-1), it would take an estimated 0.1 year for hard substrate areas, and 0.4 year for the mixed and soft substrate areas impacted by fixed gear to recover if closed to all fixed gear activity.

150-200 fm, 45° 46' N. latitude to 48° 10' N. latitude: There is substantial fixed gear effort seaward of the 100 fathom depth contour in this area (Figure 4-15, below). Within this depth interval (150-200 fm), the substrate types are approximately 98.5 percent soft, 1.4 percent mixed, and a negligible amount of hard/rock substrate (Figure 4-8). Based on the EFH synthesis report habitat recovery table described above (Table 4-1), it would take an estimated 0.1year for hard substrate areas, and 0.4 year for the mixed and soft substrate areas impacted by fixed gear to recover if closed to all fixed gear activity.

150 to 200 fm, 40° 10' N. latitude to 45° 46' N. latitude: Due to the fixed gear RCAs, (Table 4-9, *above*), there is substantial fixed gear shoreward of the 100 fm depth contour in this area (Figure 4-15, below). Within this depth interval (150-200 fm), the substrate types are approximately 91.9 percent soft, 6 percent mixed, and 2 percent hard/rock substrate (Figure 4-8, Table 4-9, and Table 4-5). Based on the EFH synthesis report habitat recovery table described above (Table 4-1), it would take an estimated 0.1 year for hard substrate areas, and 0.4 year for the mixed and soft substrate areas impacted by fixed gear to recover if closed to all fixed gear activity. However, disruption to biogenic habitat such as coral or sponges where fixed gears are able to access untrawlable hard or mixed areas may take longer to recover.

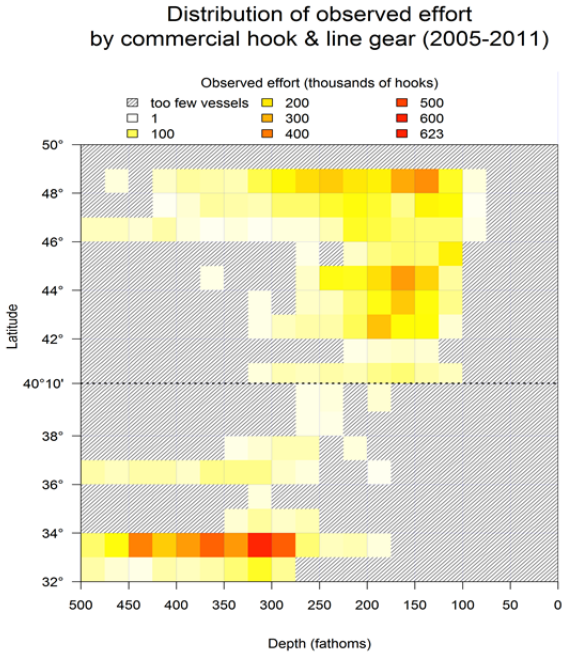


Figure 4-15: Observed 2005-2011 longline fixed-gear effort by depth (fm) and latitude. Heat cell units in thousands of hooks observed.

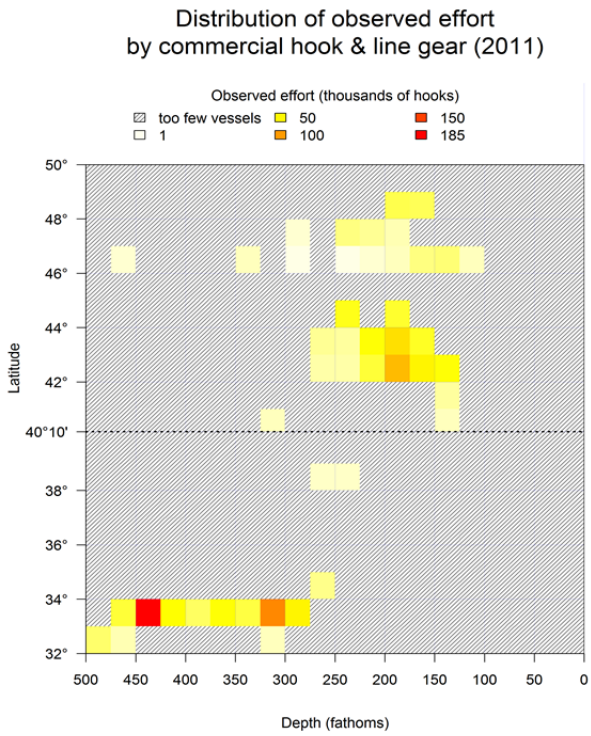


Figure 4-16: Observed 2011 longline fixed-gear effort by depth (fm) and latitude. Heat cell units in thousands of hooks observed.

Figure 4-13 and Figure 4-14 (above) may help to provide a rough contextual sense of longline fixed gear effort within the trawl RCA depth/latitude range (heat cell units are described as number of observed hooks set), particularly that within the "core" trawl RCA (100-150 fm) and seaward of the trawl 150 fm RCA boundary from 2005 to 2011.

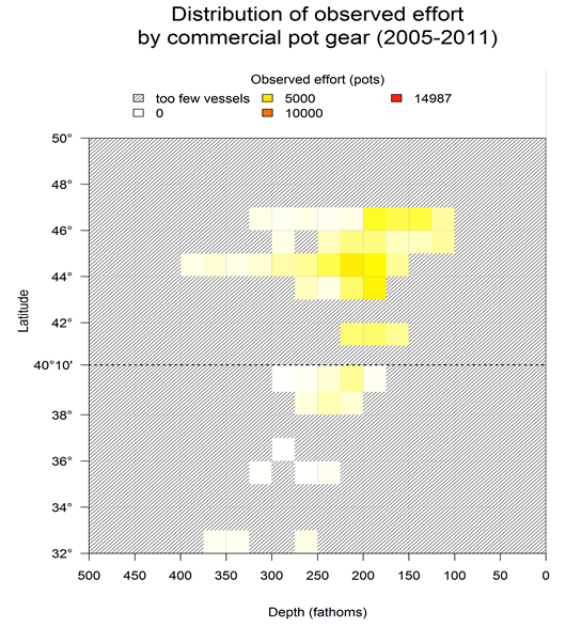


Figure 4-17: Observed 2005-2011 groundfish pot fixed-gear effort by depth (fm) and latitude. Heat cell units in numbers of pots observed.

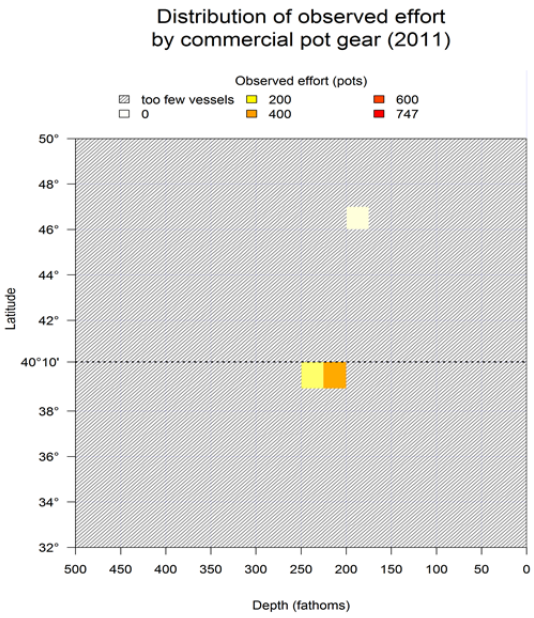


Figure 4-18: Observed 2011 groundfish pot fixed-gear effort by depth (fm) and latitude. Heat cell units in numbers of pots observed.

Figure 4-15 and Figure 4-16 demonstrate that a substantial amount of fixed gear effort occurs within and seaward of the trawl RCA, some of which may be on mixed or hard substrate areas that are untrawlable. Pot fixed gear effort is consistently in more narrow, upper slope depths, 150-250 fm (Figure 4-17, Figure 4-18, above). This fishing behavior is likely due to sablefish abundance.

4.7.3 Current Habitat as Affected by Pink Shrimp Bottom Trawl Gear

The pink shrimp trawl fishery includes vessels using non-groundfish trawl gear (previously called "exempted" trawl gear), which is gear other than the Pacific Coast groundfish trawl gear that is authorized for use with a valid groundfish limited entry permit endorsed for trawl gear. Non-groundfish trawl gear includes trawl gear used to fish for pink shrimp, ridgeback prawn, California halibut south of Pt. Arena, and sea cucumbers south of Pt. Arena.

The pink shrimp trawl fishery commonly uses a four seam net in a box trawl design. A single rigged shrimp vessel may use the same doors that are used by groundfish trawl vessels, while a double rigged shrimp vessel uses doors that are typically much larger than those used by groundfish trawlers. Of the major components, trawl doors affect the smallest area of seabed, though trawl door marks are the most recognizable and frequently observed effect of trawls on the seabed. The footropes used in pink shrimp trawling are not protected with any rollers or bobbins or other gear and are generally rigged to run about 12-18 inches off the bottom (31-46 cm). That is, the footrope of shrimp nets is not designed to contact the bottom. A groundline with disks or bobbins that are two to five inches (5 cm-13 cm) in size may be suspended below the footrope by ladder chains that drag along the bottom, which helps to prevent the footrope from digging into the bottom. The bridles are cables that connect the trawl doors to the trawl net. The bottom bridle may be in contact with the seabed for a part of their distance. Additional detail about the various gears used off the Pacific Coast can be found in chapter 3 of the EFH EIS.

Pink shrimp bottom trawling is allowed, and occurs, within the groundfish trawl RCA. Bycatch Reduction Devices (BRDs) have been required since 2001, and have greatly reduced finfish catch (including overfished species)(Figure 4-19, below). Pink shrimp bottom trawl fisheries are now

well documented as having negligible overfished rockfish species bycatch. BRDs are effective at nearly eliminating rockfish bycatch into the cod-end (Figure 4-19).

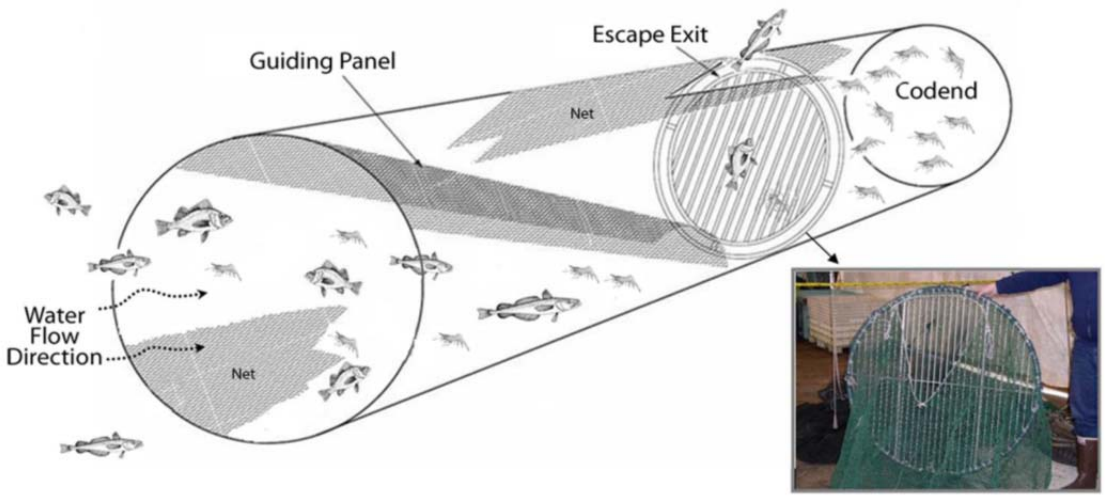


Figure 4-19: Diagram of a finfish excluder used in pink shrimp bottom trawl nets. Source: Frimodig et al., 2009, NMFS 2009.

Recent annual pink shrimp bottom trawl effort by depth suggests that hauls outside150 fm are not documented (Table 4-10). Additional WCGOP data from NWFSC staff suggests that the majority of observed effort occurs between 50 to 110 fm (Figure 4-20, Figure 4-21). Oregon State logbook data, (Table 4-10, below) suggests that there are a fair number of logged sets within depths between 60 to 120 fm, ranging from approximately 40 to 150 fm. Washington logbook data may suggest similar trends (Table 4-10). VMS data of all trips may help determine if that there is any sampling bias or observer effect in fishing locations, and to better determine the spatial extent of shrimp trawling impacts on benthic habitat.

Table 4-10: History of pink shrimp trawl effort from state logbook records in max depth (fm) and total number of recorded hauls. CDFW has not been able to do much with their shrimp and prawn logs in recent years due to a lack of data entry personnel (*Peter Kalvass, CDFW, Personal Communication*).

RECENT PINK SHRIMP TRAWL EFFORT (depth)

State	Year	max depth (fm)	hauls
Washington	2012	142	3,531
	2011	105	2,495
	2010	N/A	N/A
Oregon	2012	148	9,657
	2011	117	9,736
	2010	122	8,220
California	N/A	N/A	N/A

75-100 fm, 40° 10' N. latitude to 48° 10' N. latitude: Available observer data (Table 4-10, Figure 4-20, Figure 4-21) suggest that there is a high degree of pink shrimp trawl effort in the 75 to 100 fathom depth zones, and therefore, impacts by pink shrimp bottom trawl gear are expected. Within this depth interval (75-100 fm), the substrate types are approximately 90 percent soft, 10 percent mixed and hard substrates. Based on the EFH synthesis report habitat recovery table described above (Table 4-1), it would take an estimated 2.8 years for the hard and mixed substrate areas to recover, and one year for soft habitat to recover if closed to all groundfish bottom trawling activity. However, estimates of recovery may be different between pink shrimp trawl gear compared with groundfish bottom trawl gear.

100-150 fm, 40° 10' N. latitude to 48° 10' N. latitude: Although this depth zone would not be opened under any of the alternatives analyzed, it may be useful to consider the amount of pink shrimp trawling occurring within this area when considering the impacts of groundfish trawling activities. ODFW logbook data (Table 4-10, Figure 4-20, Figure 4-21) suggest that there may be pink shrimp trawl effort in this depth zone, although WCGOP data (Table 4-10) suggest that shrimp trawl effort in this area is negligible between 100-125 fm, from 43° N. latitude to 46° N. latitude.

150-200 fm, 40° 10' N. latitude to 48° 10' N. latitude: Available observer and logbook data (Table 4-10, Figure 4-20, Figure 4-21) suggest that there is no pink shrimp trawl effort in the 150 to 200 fathom depth zones.

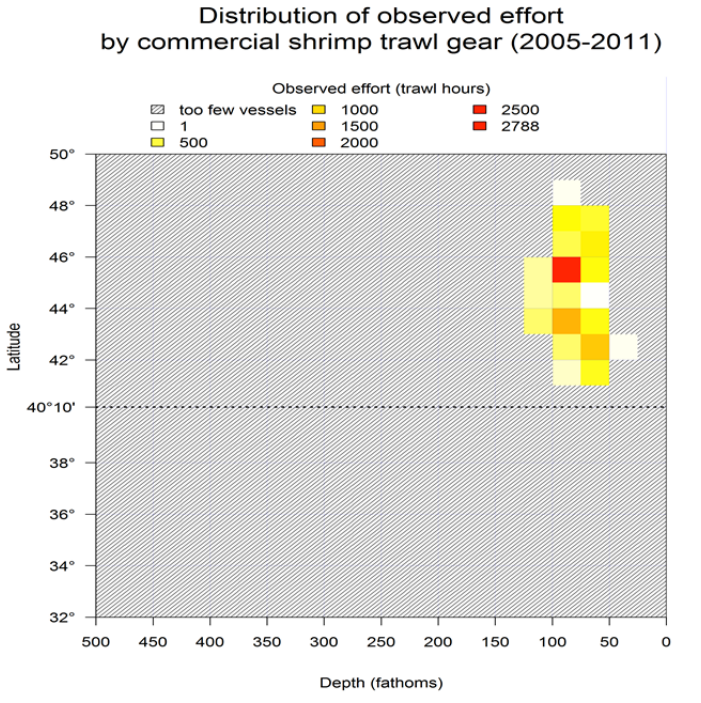


Figure 4-20: WCGOP distribution data of Pink Shrimp trawl observed trips from 2005-2011, by latitude, longitude, and effort hours under tow.

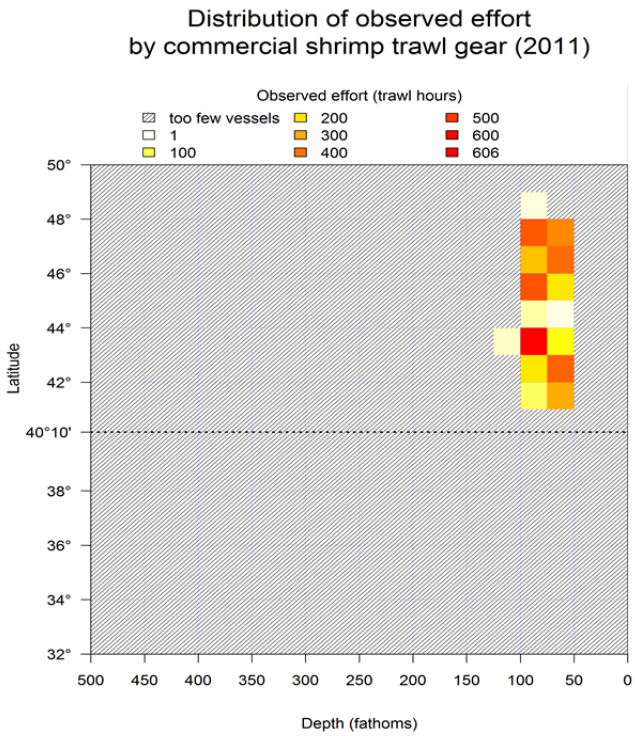


Figure 4-21: WCGOP distribution data of Pink Shrimp trawl observed trips from 2005-2011, by latitude, longitude, and effort hours under tow.

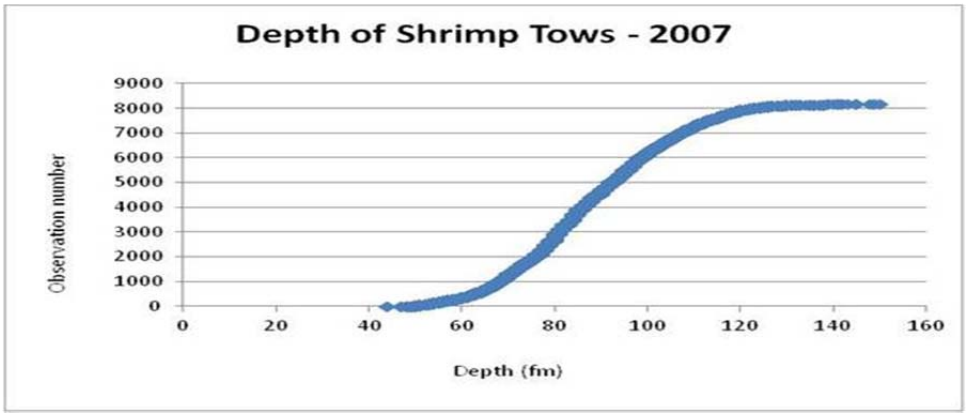


Figure 4-22: Oregon Department of Fish and Wildlife (ODFW) depth of shrimp tows compared with the number of observations in various recorded depths from ODFW logbooks.

Given the relatively low observer coverage rate of 4-14 percent between 2004 and 2011 (Table 4-11, below), as well as the secondary role BRDs may have in filtering large coral or sponges species, other inferences regarding pink shrimp bottom trawl impacts on groundfish EFH may be limited.

Table 4-11: Observer Coverage Rates. Total trips, tows, vessels and pink shrimp landings observed in the pink shrimp trawl fishery. Coverage rates are computed as the observed proportion of total pink shrimp landings, summarized from fish ticket landing receipts. Blank cells represent unobserved years. Source: WCGOP,

	Observed				Fleet Total	Coverage Rate
Year	# of trips	# of tows	# of vessels	Pink shrimp landings (mt)	Pink shrimp landings (mt)	% landings observed
2002					25374.8	
2003					13886.6	
2004	57	1026	22	583.3	8974.3	**6%**
2005	38	509	23	424.7	10861.9	**4%**
2006					8399.8	
2007	63	951	30	672.7	10935.0	**6%**
2008	55	840	31	805.8	15374.6	**5%**
2009	59	708	36	881.6	14412.2	**6%**
2010	126	1654	51	2365.3	20327.2	**12%**
2011	186	2579	57	4103.8	29459.9	**14%**

http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/shrimp_trawl.cfm

4.7.4 Current Habitat as Affected by Dungeness Crab Pot Gear

Pot gear has been documented in various literature sources as having some impact to benthic habitat and sensitive coral, sponge, and sea whip species, although data are limited. The coastal states of Washington (WDFW), Oregon (ODFW), and California (CDFW) manage Dungeness crab fisheries. Available Washington and Oregon state logbook data (Table 4-12, below) suggests negligible impacts in the shoreward 75 fm to 100 fm, and 150-200 fathom depth areas between 40° 10' N. latitude and 48° 10' N. latitude.

Table 4-12: WA, OR, CA Dungeness crab pot gear sets by depth. Washington notes: Max pots that could be fished in 2011/12 if all of the vessels that made at least one landing fished all of their pots: 80,200. Oregon notes: Used averages for all available seasons of logbook data (07-08, 09-10, and 10-11). Average of max pots that could be fished if all of the vessels that made at least one landing fished all of there pots (by season): 117,900. Trend of increasing pots/season (from 114,400 to 121,900) and depth of fishing (75-100 fm bin from 0.21% to 0.5 %) over seasons.

CRAB			
Depth	Washington	Oregon	California (North of 40° N. lat.)
75-100 fathoms	2.1% ~ 1,684 pot max	0.33% ~ 391 pot max	N/A
100-150 fathoms	0.7% ~ 561 pot max	0.01% ~ 8 pot max	N/A
150-200 fathoms	0	0	N/A

Information is not collected for Dungeness crab in California; logs are not required. Rock crab effort would be negligible in the region north of 40° 10' N. latitude. However, CDFW staff report heavy Dungeness crab effort north of 40°10 N. latitude, but from what is known of the fishery, very little of it would be deeper than 70 fm, (Peter Calvass, CDFW, Personal Communication). Impacts to overfished species are not expected in this fishery due to the selectivity of the gear (*2013-2014 FEIS*, *Appendix B*).

4.7.5 Current Habitat as Affected by Spot Prawn Pot Gear

Pot gear has been documented in various literature sources as having some impact to benthic habitat and sensitive coral, sponge, and sea whip species, although data are limited. The spot prawn fishery is a state-permitted fishery that uses trap gear in Washington, Oregon, and California. Spot prawns inhabit rocky or hard bottoms including coral reefs, glass sponge reefs, and the edges of marine canyons. Spot prawns are hermaphroditic, with males maturing and metamorphosing to females around age four. Older females are the primary target of the fishery. The use of trawl gear to target spot prawns was phased out in all three states during the early 2000s due to catch of groundfish and undersized male spot prawns. In Washington spot prawn trawling

was phased out in 2002 and closed in 2003, with fishermen allowed to transition to pot gear. In Oregon, spot prawn trawling was phased out and closed in 2004, with fishermen allowed to transition to pot gear. Off Oregon, catch per unit effort for spot prawns is much lower using pot gear, and much of the commercial effort has died out since 2004. Fishing grounds for spot prawns off Washington and Oregon are far offshore, sometimes 30 miles or more. This makes recreational fishing impractical. Washington logbook data estimates that 87.5 percent of spot prawn effort may occur in the 75-100 fm depths, while 12.5 percent occur in the 100-150 fm depths (Dan Ayres, Personal Communication, WDFW). California does not have any spot prawn trap effort in the action area; the region between 40° 10' N. latitude and 42° N. lat. (Peter Calvass, CDFW, Personal Communication).

4.7.6 Current Habitat as Affected by NMFS Bottom Trawl Surveys

NMFS conducts annual surveys of West Coast species abundance using bottom trawl gear, information of which is used for fisheries independent stock assessments, and cataloguing of species occurrences for fishery management units in and out of the Groundfish FMP. Samples are collected by trawling within randomly selected cells for a target fishing time of 15 minutes at a target speed of 2.2 knots (*Keller et al., in prep., 2013*). In order to answer the question of actual groundfish trawl survey impacts (*on habitat*) most accurately, one would have to map at the actual track lines of successful tows and calculate the total trawled area, taking into account any overlaps (*Whitmore, personal communication, July, 2013*). Impacts from NWFSC groundfish surveys (Figure 4-23, Figure 4-24, below) are expected to be negligible, especially in context of the valuable information on target and non-target stock assessments these surveys provide the Council and the Agency in their decision-making. Because of the depth stratification used in the groundfish survey design, the greatest number of stations occurred in the region periodically closed to commercial bottom trawling (47980 km^2), despite the greater area of the region open to fishing (77058 km^2) (*Keller et al., in prep., 2013*).

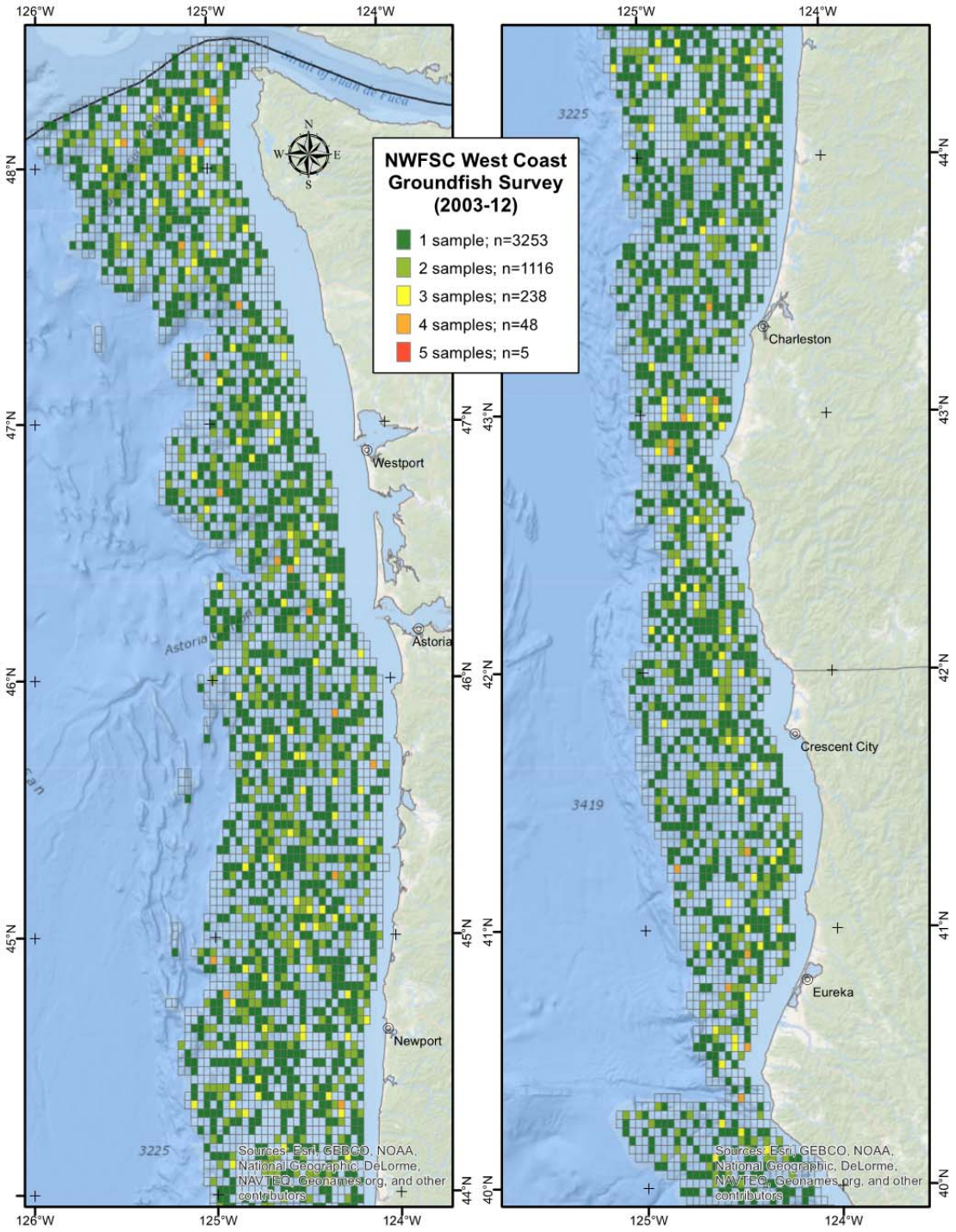


Figure 4-23: Map of the number of times per survey grid cell a successful tow was made by NWFSC West Coast Groundfish surveys (2003 to 2012). Inferences of NWFSC survey impacts within the proposed action area may be limited, as tow of average length covers <1% of the total cell area. However, this graphic is intended merely to offer a conceptual sense of potential impacts.

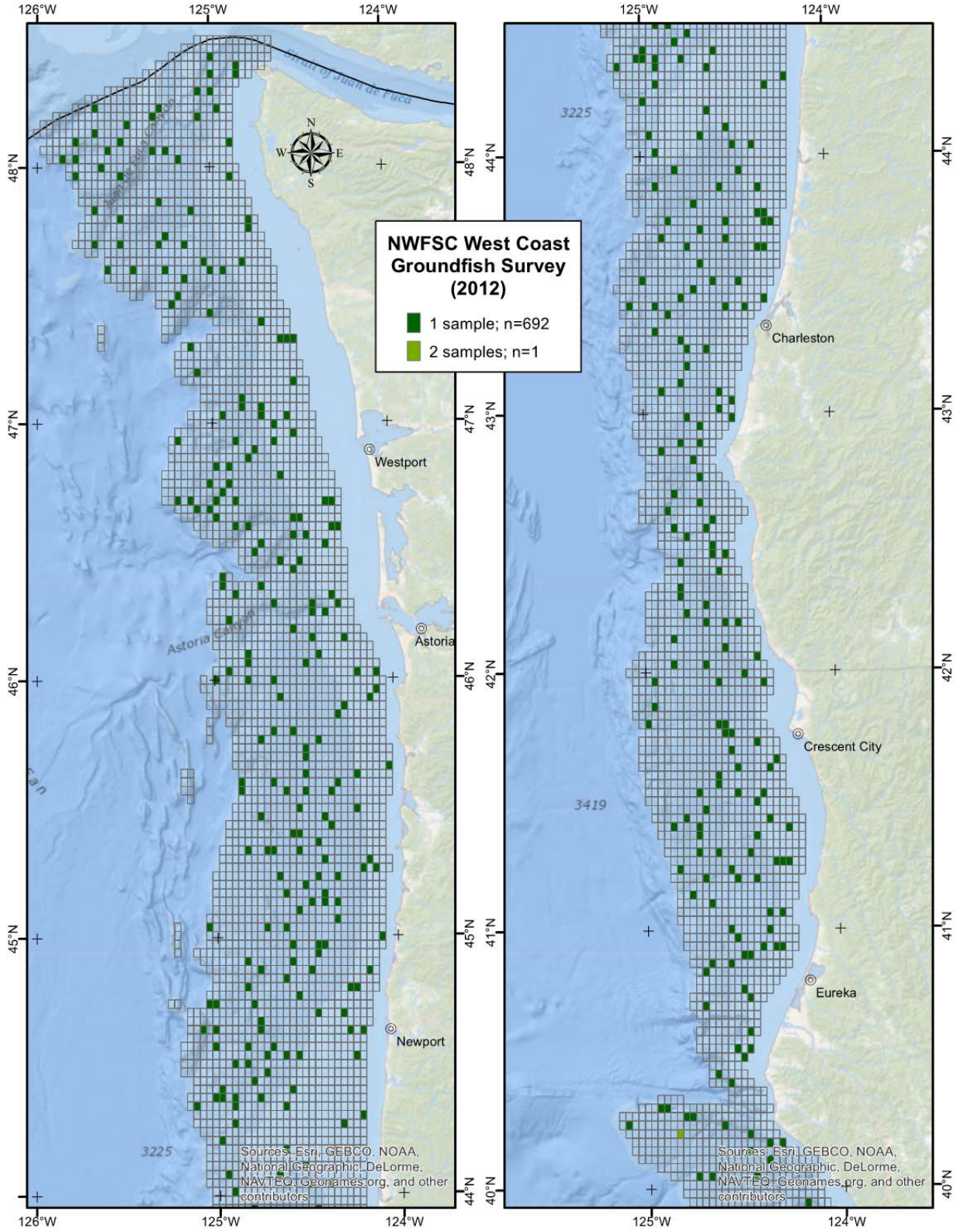


Figure 4-24: Map of the number of times per survey grid cell a successful tow was made by NWFSC West Coast Groundfish surveys (2012). Inferences of NWFSC survey impacts within the proposed action area may be limited, as tow of average length covers <1% of the total cell area. However, this graphic is intended merely to offer a conceptual sense of potential impacts.

4.8 Biological Resources

4.8.1 Groundfish Target Species

More than 90 species are managed under the Groundfish FMP (Table 4-13, below). 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.

Table 4-13: Latitudinal and depth distributions of groundfish species (adults) managed under the FMP. Source: 2013-14 Groundfish Harvest Specification FEIS, Chapter 3: Affected Environment.

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
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

Common Name	Scientific Name	Latitudinal Distribution		Depth Distribution (fm)	
		Overall	Highest Density	Overall	Highest Density
Darkblotched rockfish	*Sebastes crameri*	N. 33º N lat.	N. 38º N lat.	16-300	96-220
Dusky rockfish	*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)).

These species vary greatly in life history, relative abundance, and their spatial and temporal distribution. Spatial distribution of rockfish is highly linked to depth, and therefore most rockfish species are split into one of three depth-based categories; nearshore, shelf and slope. Flatfish species are most concentrated on the continental shelf, but vary in depth distribution depending on the specie. Roundfish vary in depth distribution and targeted roundfish species are discussed in more detail below. Most shark and skate species are not targeted and are caught incidentally with other groundfish species. Most shark and skate species in the FMP

are widely distributed across depths, except for California skates and Leopard sharks, which are most highly concentrated in the nearshore waters.

Additional information on target groundfish species is presented below; additional detailed information for all groundfish species can be found in Chapter 3 of the 2013-2014 Biennial harvest specifications and management measures FEIS (NMFS 2012).

Annual catch limits are established through the biennial harvest specifications and management measures. Under the Shorebased IFQ Program all catch of IFQ species (retained or discarded, target and non-target) must be covered by quota pounds. Fishermen are individually accountable for their catch of individual species (or stock complexes), and are subject to a 100 percent monitoring requirement. Non-IFQ species are managed with trip limits.

There are prominent species that are primary economic drivers for IFQ vessels using bottom trawl gear, and under trawl rationalization, underutilized species may have an increased opportunity for improved marketability. There have been several notable changes in attainment by species, between 2011 and 2012 (Matson, 2013). The largest increases in attainment include the following: minor slope rockfish, south of 40°10' N. lat., up 19 percent; Pacific cod, up 13 percent; canary rockfish, up 13 percent; minor shelf rockfish, south of 40°10' N. lat., up 10 percent; and minor slope rockfish, north of 40°10' N. lat., up nine percent. The largest decreases in attainment include the following: sablefish south of 36° N. lat., down 42 percent, and shortspine thornyheads south of 34°27' N. lat., down 16 percent; yelloweye rockfish attainment was down four percent.

Rockfish Life History

Larvae and pelagic juveniles of many rockfish species live in the upper 55 fm (100 m) of the water column for one to several months before settling to benthic habitats (*Johnson et al., 2001*). Timing and magnitude of recruitment could be influenced by either passive ocean transport or active swimming of pelagic or newly settled juveniles (*Johnson et al., 2001*). Density and size of fishes increasing with depth has been observed for some rockfish species within their range (*Johnson et al., 2001*). Video analysis has suggested that juvenile and adult rockfishes may be more abundant on the seafloor rocky ridge areas than on the surrounding sandy flats (*Rooper et al., 2010*). While on bottom, all rockfishes were found in rocky ridge habitats and rarely on sandy flat seafloor. Rockfishes in the water column were found predominantly over the rocky ridges rather than over the flats (*Rooper et al., 2010*). On the US West Coast, daytime pelagic behavior of rockfish is not as common, whereas nighttime forays into the water column are more prevalent (*Rooper et al., 2010*).

Juveniles

Juvenile habitats are important to determining recruitment to adult fish populations through density dependence that occurs in nursery areas (*C.N. Rooper et al., 2007*). Juvenile POP have been found to exist predominantly in mixed sand and boulder substrata to the exclusion of most other habitat types (*C.N. Rooper et al., 2007*). An

examination of large-scale patterns of juvenile and adult POP distribution indicates that juveniles use shallower depth zones on the continental shelf (C.N. Rooper et al., 2007). Geographic separation has been observed in POP: juvenile POP use nursery habitats that are different from adult POP (*C.N. Rooper et al., 2007*). Juvenile POP were associated with upright sponges or corals attached to the seafloor, cobble with a coral and sponge assemblage, crevices, or in one case a tangle of derelict longline gear (*C.N. Rooper et al., 2007*). C.N. Rooper et al., (2007) found very specific habitat preferences for juvenile POP for mixed sand-boulder substratum compared to other available substratum types. Distinct juvenile nursery areas appear to be a common feature in marine fish populations, the case of juvenile POP, although unique in terms of their specific habitat requirements, may be mirrored in most commercial fish species (*C.N. Rooper et al., 2007*).

Nearshore species

Recent ROV observations have concluded the following: highest densities of small benthic rockfishes observations suggested that shallow, rocky portions of Heceta Bank were important nursery areas from juvenile rockfishes (*Tissot et al, 2008*); shallow diagonal rock ridges (less than 55 fm deep), dominated mostly by a mixture of deep cobbles and small boulders, were important habitats for some fishes, especially juvenile rockfishes. Outcrop ridges on the shallower bank tops, and the cobble-boulder fields, represented important habitats for species of rockfish and other groundfish (*Tissot et al, 2008*).

Common groundfish target species in the nearshore environment are kelp greenling, lingcod, black rockfish, China rockfish, copper rockfish, cabezon and blue rockfish. Overfished rockfish species such as young-of-the-year yelloweye and canary rockfish are encountered in nearshore environments.

Prominent Nearshore Target Species
Lingcod- Lingcod are abundant on the West Coast, and inhabit mostly nearshore and shelf areas. At certain times of the year, these species are in high abundance in predictable areas and are targeted by bottom trawl vessels.
Sanddabs- Pacific Sanddabs are a marketable flatfish that inhabit soft nearshore substrate. Other marketable flatfish are commonly encountered in all soft substrates.

Shelf Species

Common groundfish target species in the shelf environment are vermillion, chilipepper, redstripe, and yellowtail rockfish. Flatfish species are primarily found on the shelf, but vary in depth distribution (2013-2014 FEIS). In addition, overfished rockfish such as cowcod, yelloweye, canary rockfish, and bocaccio (south of 40° N. latitude) spend the majority of their adult life stages in the shelf depths. Canary rockfish may migrate longer distances, and in larger schools than cowcod and yelloweye rockfish, which exhibit higher site fidelity. Petrale sole flatfish are currently designated as an overfished species, but are scheduled to be rebuilt in 2014 based on the results of a recent STAR panel stock assessment review (2013). Petrale sole exhibit a seasonal pattern of migration, following

increased prey availability onto the shelf in the summer months, while migrating in deep slope areas during the winter to form deep spawning aggregations.

Prominent Shelf Target Species

Yellowtail rockfish- Yellowtail rockfish are a very marketable rockfish found in bottom and midwater groundfish trawl fisheries. Yellowtail biomass is healthy on the West Coast, and temporal and spatial schooling patterns can be somewhat predictable for fishing vessels in their targeting efforts.
Pacific Cod- Pacific cod are found on the West Coast, but are more commonly found on the northern West Coast, and strong migrations of Pacific Cod can be intermittent, as the West Coast is on the outer range of the species, which has extremely high abundances in Canadian and Alaskan waters. Large aggregations of Pacific cod can be found in nearshore or shelf sand or mud substrates.

Petrale- Petrale sole, an overfished species likely to be declared rebuilt by the end of 2014, can be found in abundance in shelf waters in summer months. Petrale sole are the most prized flatfish and marketable species among the West Coast sole species.

The petrale sole OFLs of 2,711 mt for 2013 and 2,774 mt for 2014 are based on the F_{MSY} harvest rate proxy of $F_{30\%}$ as applied to the estimated exploitable biomass from the 2011 stock assessment.

A recent coastwide stock assessment was prepared for petrale sole rockfish (a category 1 stock) in 2013. Impacts from the proposed action alternatives on petrale sole are not expected to increase in 2014, as petrale sole are an IFQ species. Compared to other West Coast groundfish gear types, Petrale sole is encountered most frequently using bottom trawl gear, although trace catches using other groundfish gear types of this stock can be negligible. The 2012 stock assessment and rebuilding analysis projected the petrale sole biomass to be at 22 percent of its unfished biomass and showing strong progress towards rebuilt status.

The highest depth distribution density of petrale sole (Table 4-13) is between 10 to 250 fm (highest density between 160 to 250 fm, with a coastwide latitudinal distribution density (Table 4-13). Petrale sole is managed as an IFQ species.

Petrale sole status quo RCA boundaries include a modified 200fm line in periods 1 and 6, which is designed to provide access to petrale sole. Petrale sole, an overfished species which is managed by the Council as a target species, is likely to be declared rebuilt by the end of 2014, and can be found in great abundance in slope waters during winter months while forming dense spawning aggregations. Under a rationalized trawl fishery, with individual accountability, the risk of exceeding the petrale sole trawl allocation or ACL is lower than under cumulative trip limit management, even if areas opened under the proposed action alternatives have higher spawning aggregations. Because of the lowered risk under a rationalized fishery structure, petrale catch can be accommodated.

English sole- English sole are abundant in shelf waters, stocks are healthy, and make up

an important component of bottom trawl catch. Lingcod- Lingcod are abundant on the West Coast, and inhabit mostly nearshore and shelf areas. These species can be targeted by bottom trawl vessels in dense aggregations.

Slope species

Common groundfish target species in the slope environment are Dover sole, shortspine and longspine thornyheads, sablefish, and various other flatfish species, such as rex sole and bank rockfish. Shortraker rockfish, a long-lived data-poor species is encountered in slope depths. Other slope species include aurora, rougheye, splitnose, and blackgill rockfish. Adult overfished slope rockfish such as darkblotched and Pacific ocean perch (POP) are found in slope depths.

Prominent Slope Target Species

The DTS complex is a primary economic driver for the IFQ bottom trawl fishery. These species inhabit soft slope mud and sand substrates, can be found in abundance, and ex-vessel price per pound on these species is high.

Dover sole (*below*)- Dover sole are an abundant flatfish in deeper shelf and upper slope depths. Dover sole are abundant in soft substrates, and their marketability has been increasing in recent years.

Shortspine and Longspine Thornyheads (*below*)- Longspine thornyhead are more abundant in the deeper waters characteristic of the area open to commercial bottom trawling while shortspine thornyhead were significantly more abundant in the continuously closed area of the RCA after accounting for depth (*Keller, et al., in prep., 2013*). The thornyhead subgroup exhibited significantly greater catch in both the open and closed areas relative to the periodically closed area depth (*Keller, et al., in prep., 2013*).

Sablefish (*below*)- Sablefish are an important species and migrate long distances throughout the West Coast slope and shelf habitats, with some vertical migration between seasons (larger fish on the shelf in summer months). Sablefish prices saw record ex-vessel prices in recent years, but even during periods of low market prices, make up an important component in all groundfish vessels, and their profitability.

4.8.1.1 *Other target species*

Compared to other West Coast groundfish gear types, Longnose skate are encountered most frequently in bottom trawl gear. The highest depth distribution density of Longnose skate (Table 4-13, above) is between 30 to 340 fm, and the highest latitudinal distribution density (Table 4-13, above) is north of 46° N. latitude. Longnose skate is managed as a separately managed species under an unlimited trip limit structure for the bottom trawl sector, but is not managed as a separately managed IFQ target species. If determined necessary by the Council, trip limits may be established for longnose skate through inseason action. Under single species management, a trip limit structure if needed, will reduce the risk of exceeding the longnose skate trawl harvest guideline or overall ACL/OFL for this species is low, even if areas opened under the proposed action alternatives have high longnose skate abundance. Because of longnose skate individual management (and potential trip limits if needed) coupled with the 100 percent monitoring requirement (including discards) under a rationalized fishery structure, any increased Longnose skate catch can be accommodated. An ACL of 2,000 mt is well below the 2013 and 2014 ABCs for the stock of 2,774 mt and 2,692 mt. The proposed ACL is 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 stock assessment. The west coast longnose skate stock was assessed in 2007. The spawning stock biomass was estimated to be at 66 percent of its unfished biomass at the start of 2007. 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.

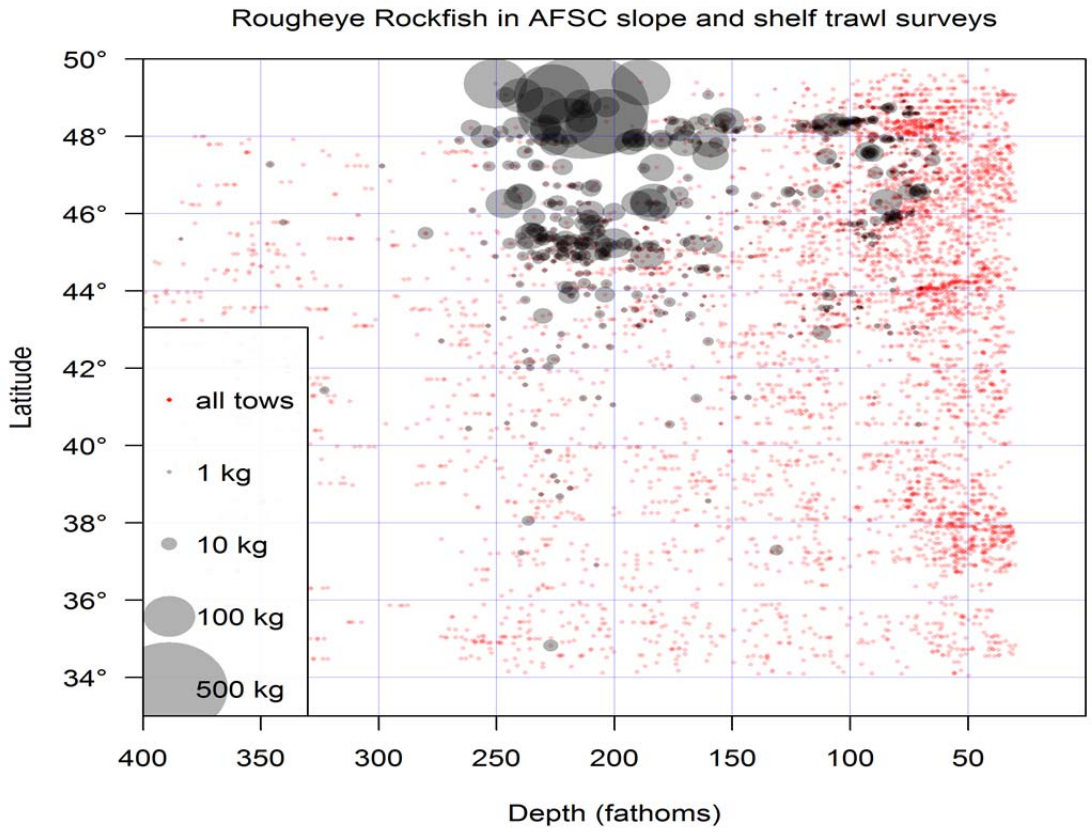
Spiny Dogfish- A coastwide stock assessment was prepared for spiny dogfish in 2011. Spiny Dogfish (a category 2 stock) shark is encountered using groundfish bottom trawl gear. Compared to other West Coast groundfish gear types, Spiny Dogfish are encountered most frequently in bottom trawl gear, although fixed gear catches of this stock are high as well. Spiny dogfish contributes 2,980 mt in 2013 and 2,950 mt in 2014 to the other fish complex OFLs. Spiny dogfish contributions to the other fish complex OFLs are based on the F_{MSY} harvest rate proxy of F_{45}% as applied to the estimated exploitable biomass from the 2011 stock assessment. Spiny dogfish is managed within the other fish complex. The 2011 assessment indicated that spiny dogfish stock was healthy with an estimated spawning biomass at 63 percent of its unfished biomass. The highest depth distribution density of Spiny Dogfish (Table 4-13, above) is between 0 to 190 fm, with a high coastwide latitudinal distribution density (Table 4-13above). Dogfish shark is managed within the other fish complex, under a trip limit structure for the bottom trawl sector, but is not managed as an IFQ target species. Because of dogfish shark trip limits coupled with the 100 percent monitoring requirement (including discards) under a rationalized fishery structure, any increased dogfish catch can be accommodated, and there is lowered risk of exceeding the ACL/OFL for this species by the proposed action alternatives.

Minor slope complex north (north of 40° 10’ N. latitude)- Rougheye and shortraker rockfish, as it pertains to the proposed action, are managed within the minor slope

complex north. Trip landing and frequency limits have been designated as routine (may be adjusted through a one-meeting inseason action) for the Minor slope complex. The Minor slope north complex is managed as an IFQ complex with a single ACL/OFL. The Council advisory Groundfish Management Team (GMT) and the Agency have identified that Blackgill, Rougheye, and Shortraker rockfish have catch control concerns, and reorganization of the Minor slope complexes (north as it pertains to the proposed action) are being analyzed and will be considered by the Council.

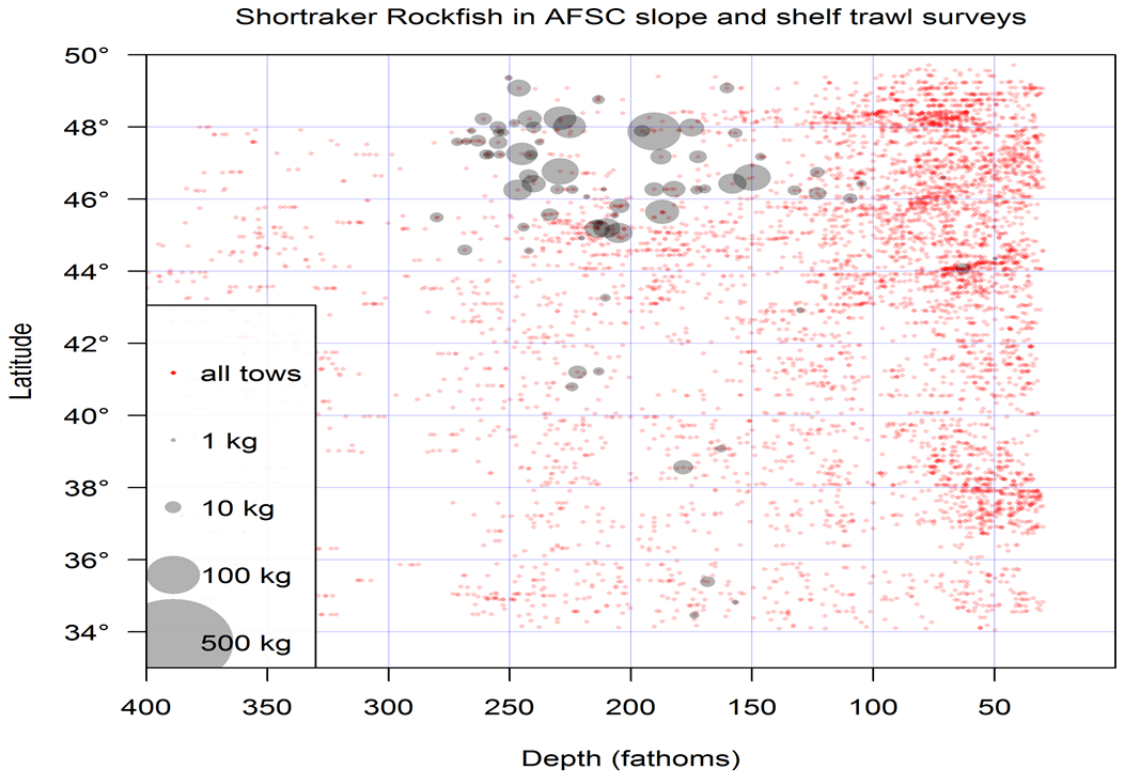
Rougheye rockfish- A coastwide stock assessment was prepared for rougheye rockfish (a category 2 stock) in 2013. Compared to other West Coast groundfish gear types, Rougheye rockfish are encountered most frequently using bottom trawl gear, although whiting midwater trawl and fixed gear catches of this stock can be high as well. Newly revised estimates for rougheye rockfish estimate 206 mt of OFL contributions to the Minor slope North complex OFLs of 1,804 mt in 2015, or compared to the Minor slope North complex OFLs of 1,553 mt in 2014. The 2013 assessment indicated that the rougheye rockfish stock was healthy with an estimated spawning biomass at 47 percent of its unfished biomass. The highest depth distribution density of rougheye rockfish (Table 4-13, above) is between 27 to 250 fm, with a coastwide latitudinal distribution density strongest north of 40° 10' N. latitude (Table 4-13, above, Table 4-14, below).

Table 4-14: (below): AFSC survey database catch of Rougheye rockfish in shelf and slope surveys (kg), by depth (fm) and latitude.



Shortraker rockfish- A coastwide stock assessment has not been prepared for shortraker rockfish (a data-poor stock) in 2014. Compared to other West Coast groundfish gear types, Shortraker rockfish are encountered most frequently using bottom trawl gear, although whiting midwater trawl and fixed gear catches of this stock can be high as well. Shortraker rockfish are estimated to contribute 18.7 mt of OFL contributions to the Minor slope North complex OFL of 1,553 mt in 2014. The highest depth distribution density of shortraker rockfish (Table 4-13, above & Table 4-15, below) is between 110 to 220 fm, with a coastwide latitudinal distribution density strongest north of 40° 10' N. latitude (Table 4-13, above & Table 4-15, below).

Table 4-15 (below): AFSC survey database catch of Shortraker rockfish in shelf and slope surveys (kg), by depth (fm) and latitude.



Blackgill rockfish- Beginning in 2013, Blackgill rockfish are managed under a new sorting requirement so that mortality can be accounted against a new species-specific blackgill rockfish harvest guideline (HG) species specific harvest guideline for the area south of 40□10'□N. Latitude, and is sorted in the bottom trawl fishery (beginning in 2013). A stock assessment was prepared in 2011 for the portion of the blackgill rockfish stock south of 40□ 10'□N. Latitude.

Although blackgill rockfish 2013 harvest has been dramatically reduced by the Council's decision to implement a blackgill sublimit within the Minor slope south limit for the fixed gear sectors, no harvest reduction for the trawl sectors has occurred. Since the vast majority of the biomass abundance and commercial catch is well below 40° 10' N.

latitude, impacts from the proposed action alternatives are expected to be negligible.

4.8.2 Non-target Species, including overfished groundfish

4.8.2.1 Overfished Groundfish Species

The RCAs were intended, and have been used over the last 11 years, to limit catch of rebuilding rockfish stocks. The RCAs were established and used to close and open areas in a frequent, time-varying manner. Over the history of RCAs being in place, inseason changes to their boundaries have been made frequently, with accompanying analysis, to enable catch of target species, while at the same time, keeping bycatch of rebuilding stocks within established catch limits to facilitate timely rebuilding.

Catch of current rebuilding groundfish species has been much lower on average during the first two years of the IFQ program, compared with the previous two years. Total annual catch of over fished rebuilding species 2011 and 2012 in the Shorebased IFQ Program decreased compared to 2009-2010 levels (*Source, WCGOP Groundfish Mortality Report 2009-2010, and the Shorebased IFQ Program, Vessel Accounts System 2011-2012*):

60% decrease for yelloweye rockfish bycatch.
89.6% decrease for cowcod rockfish bycatch (South of 40°10' N. latitude).
37.8% decrease for canary rockfish bycatch.
56.7% decrease for bocaccio rockfish bycatch (South of 40°10' N).
68.1% decrease for Pacific ocean perch bycatch (North of 40°10' N).
68% decrease for Darkblotched rockfish bycatch.
32.8% decrease for Petrale[2] sole bycatch.

Based on an analysis of the potential for incidental catch of overfished species occurring as a result of the proposed action, canary rockfish, darkblotched rockfish, and POP have the greatest potential for increased catch. These species descriptions are summarized from the 2013-2014 Harvest Specifications and Management Measures EIS. More details can also be found in the stock assessments.

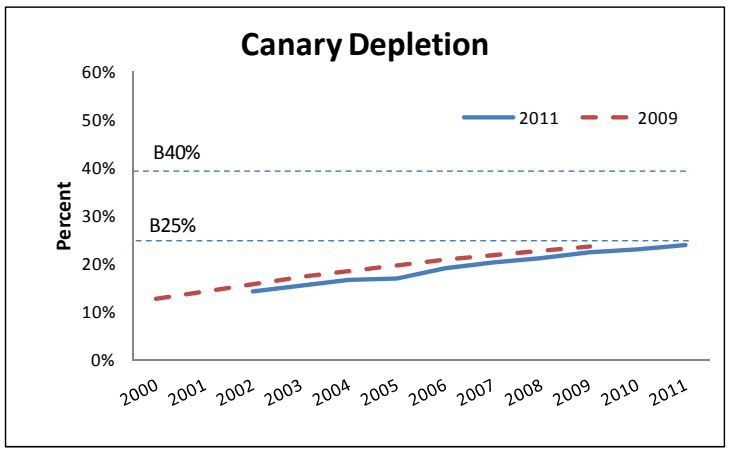
Canary Rockfish

Wallace and Cope (2011) prepared a coastwide stock assessment update for canary rockfish. Based on a 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

[2] Petrale sole harvest is close to being rebuilt (estimated 2014), and is currently managed as a target stock.

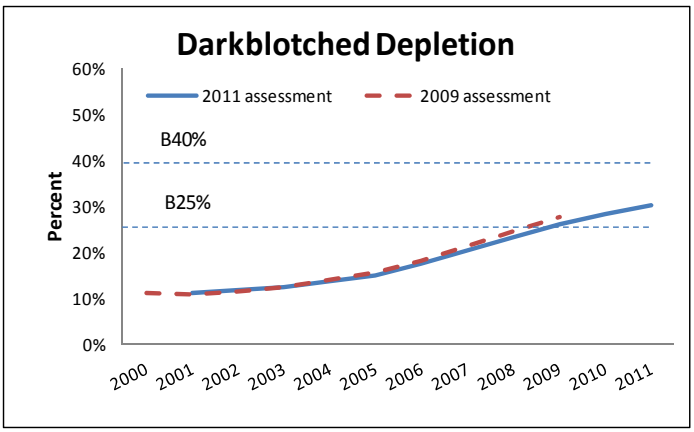
in harvest and above-average recruitment in the preceding decade. However, this trend is very uncertain.

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).



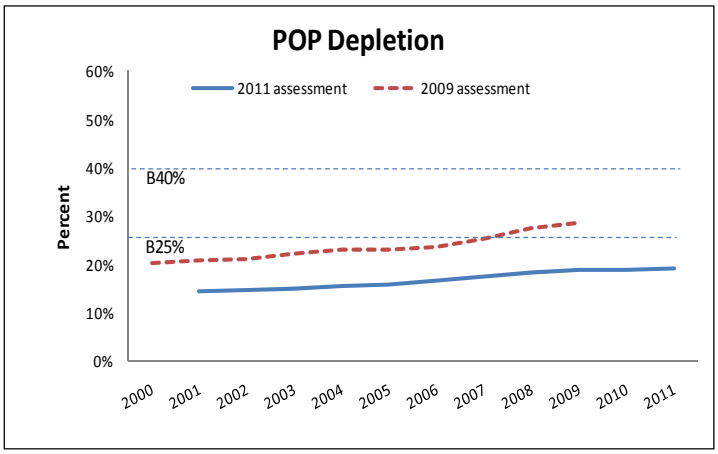
Darkblotched Rockfish

Stephens et al. (2011) prepared a stock assessment update for darkblotched rockfish in the U.S. Vancouver, Columbia, Eureka and Monterey areas. The darkblotched rockfish population in these areas was modeled as a single stock. 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 B40%. 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.



Pacific Ocean Perch

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. 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.



4.8.2.2 Non-target Species (not overfished)

Most shark and skate species are caught incidentally while trawl vessels target other groundfish species. Most shark and skate species in the FMP are widely distributed across depths, except for California skates and Leopard sharks, which are most highly concentrated in the nearshore waters. Additional detailed information on non-target groundfish species can be found in Chapter 3 of the 2013-2014 Biennial harvest specifications and management measures FEIS (NMFS 2012).

Some flatfish species, including some species that are in the groundfish FMP and some that are not, are caught incidentally by vessels targeting other groundfish species and are

most vulnerable to the groundfish bottom trawl fishery.

Pacific halibut (*Hippoglossus stenolepis*) is a bottom-dwelling, right-eyed flatfish species. 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 (NMFS 2012). Pacific halibut catch has been restricted in the trawl fisheries through the issuance of bycatch allowances.

California halibut (*Paralichthys californicus*) are a left-eyed flatfish. They range from Northern Washington to southern Baja California, Mexico, (Eschmeyer, et al., 1983), but are most common south of Oregon. California halibut are taken incidentally in the groundfish fishery, but are most vulnerable to groundfish bottom trawl gear. Harvest of California halibut in the groundfish bottom trawl fishery has averaged 46 mt from 2007-2010, while catch in the non-trawl groundfish fishery has averaged less than 3 mt during the same time period (NMFS 2012).

Coastal pelagic species, such as smelt and herring, are taken incidentally in the groundfish fishery, and are believed to be most vulnerable to midwater trawl gear, with incidental take of coastal pelagic species documented in the midwater whiting fisheries. Given that coastal pelagic species are not associated with the ocean bottom, interactions with the groundfish bottom trawl fishery are expected to be minimal (NMFS 2012). Additional information on catch of coastal pelagic species in the midwater trawl fishery is available in Chapter 3 of the 2013-2014 Biennial harvest specifications and management measures FEIS (NMFS 2012).

Greenlings (other than kelp greenling), are caught incidentally with vessels targeting nearshore rockfish (NMFS 2012). Ocean whitefish are harvested using non-trawl gear, and are not generally caught incidentally in the groundfish bottom trawl fishery (NMFS 2012). California sheephead are not caught in the Shorebased IFQ Program, and additional information on bycatch of California sheephead is not available.

Highly migratory species, such as marlin, tuna and non-FMP sharks are largely pelagic, open ocean species. These species are very infrequently caught in groundfish directed fisheries off Washington and Oregon. In California, fisheries targeting groundfish occasionally take highly migratory species. In 2009, about 100 kg of albacore were taken incidentally with groundfish trolling (non-trawl gear) for sablefish and rockfish. Thresher sharks are incidentally taken in trawl gear (HMS SAFE Document, 2010).

4.8.3 Invertebrates

Various types of bottom-dwelling invertebrates occur in the action area including crab, shrimp, coral and sponges. These include Dungeness crab, tanner crab, pink shrimp, ridgeback prawns, spot prawns, sea cucumbers, coral, and sponges.

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. 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. Additional detailed information regarding these invertebrates can be found Chapter 3 of the 2013-2014 Biennial harvest specifications and management measures FEIS (NMFS 2012).

Additional information regarding structure-forming invertebrates, including corals, sponges and sea whips, is provided below.

4.8.3.1 **Coral**

Coral species are most often observed in hard substrate, with some minor occurrences in mixed substrate on boulders; on mixed substrate, most are less than 30-50 cm in height. Coral species are not commonly found in sandy or mud substrate. In one ROV study off the West Coast of northern British Columbia, over half of primnoid corals over 30 cm tall had associated rockfish, less than 2% of the seafloor had large coral, and small coral had no associated rockfish, and no rockfish were associated with short corals between 10 and 30 cm height (Du Preez & Tunnicliffe, 2011).

Through stomach content analyses, Husebo et al. (2002) found rockfish are not linked to coral sites through feeding habits and suggest the physical structure of corals attracts rockfish, rather than some biological attribute (Du Preez & Tunnicliffe, 2011). Oceanographic factors, such as El Ninõ events could affect larval survival of octocorals (Troffe et al, 2005). Studies suggesting deep-sea coral reefs may be decades to hundreds of years old (Etnoyer and Morgan, 2003). Retrospective analysis and isotope dating techniques for Primnoa resdaeformis suggest that a 5 cm diameter sample may be as old as 500 years (Etnoyer and Morgan, 2003). Andrews (2002) estimated growth rates of 1.74 cm per year in height, suggesting the largest limb studied took approximately 112 yrs to grow from its initial settlement to a total height of 197.5 cm (Etnoyer and Morgan, 2003). Many benthic features sensitive to trawling, such as corals, have long since been impacte, and each vessel trawls the same set of "shots" year after year amounting to 10% of the total bottom (Hilborn, 2007). NMFS' bottom trawl survey has caught several coral species during their research surveys. Most of the corals encountered in those activities are Pennatulaceans, both in quantity and in frequency (Table 4-16). However, some coral species may have escaped damage from trawl gear, which could potentially be impacted by the proposed action.

Table 4-16: General statistics on deep corals sampled during National Marine Fisheries Service (NMFS) bottom trawl surveys, which were conducted off the coasts of Washington, Oregon and California by the Alaska and Northwest Fisheries Science Centers between 1980 and 2005. A total of 10,526 trawl catch records were queried. Source: Whitmire and Clark, 2007, NMFS.

	# Trawls with Corals	% Trawls with Corals	% Coral Records
Pennatulaceans	1683	16.00%	74.50%
Gorgonians	202	1.90%	8.90%
Antipatharians	197	1.90%	8.70%
Alcyonaceans	150	1.40%	6.60%
Scleractinians	26	0.20%	1.20%
Stylasterids	1	<0.1%	<0.1%
Total	2259		100.00%

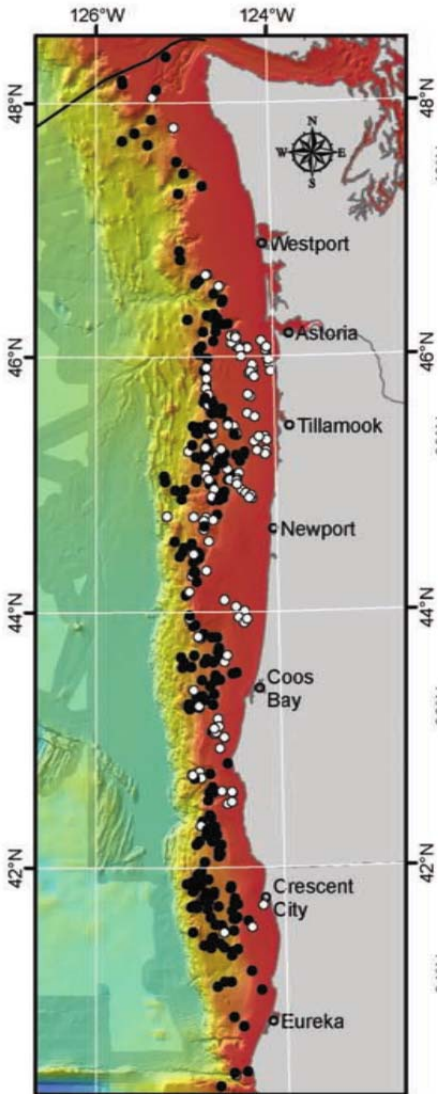


Figure 4-25: Map showing locations of deep coral bycatch recorded by fishery observers in the West Coast Groundfish Observer Program. All observed trips and gear types from August 2001 – August 2004 were queried. Due to limitations of specific identifications, coral bycatch was grouped into two classes: 1) gorgonians and stony corals, and 2) pennatulaceans. Point symbols represent start locations of bottom trawls or longline and pot sets. Source: Whitmire and Clark, 2007, NMFS.

For the most part, corals in the region do not build reefs with observations of only *L. pertusa* in the Olympic Coast National Marine Sanctuary (Whitmire and Clark, 2007, NMFS.). Although associations of corals with other invertebrates and fishes have been reported, there is no direct evidence that any of these represent obligate relationships between taxa (Whitmire and Clark, 2007, NMFS.). Much of the recent information on the regional zoogeography of higher-level coral taxa was collected during bottom trawl surveys (Whitmire and Clark, 2007, NMFS.). More detailed information, but in a limited geographic scope, has been collected using submersibles, remotely operated vehicles (ROVs) and more recently, autonomous underwater vehicles (AUVs). Information on

the distribution of corals as well as monitoring fishing impacts can be gleaned from information collected by fisheries observers (Whitmire and Clark, 2007, NMFS.). General statistics on deep corals sampled during National Marine Fisheries Service (NMFS) bottom trawl surveys, which were conducted off the West Coast by the Alaska and Northwest Fisheries Science Centers between 1980 and 2005 have enabled cataloguing of coral species. Additionally, locations of deep coral bycatch have been recorded by fishery observers in the West Coast Groundfish Observer Program and have been mapped (Figure 4-25). With fishery management measures (e.g., area closures, gear restrictions), the risk posed by bottom trawling has been significantly reduced (Whitmire and Clark, 2007, NMFS.).

4.8.3.2 **Sponges**

As mentioned above, sponge species are often observed with coral species mostly in hard substrate, with some minor occurrences in mixed substrate on boulders, and among those, most are less than 30-50 cm in height. Sponge species are not commonly found in sandy or mud substrate. Oceana has documented the presence of barrel, foliose, mound, branching, shelf, and vase sponges in 16 of 17 ROV dive sites (Cape Arago, Coquille Reef, Orford Reef) off the West Coast (Enticknap et al., 2013). Branching sponge was the most commonly observed morphology, followed by foliose and mound (Enticknap et al., 2013). Over 50% of the frames analyzed for the offshore cape arago site had branching sponges (Enticknap et al., 2013). Barrel, shelf, and vase sponges were the least observed morphologies (Enticknap et al., 2013). Inshore reefs at Cape Arago, Coquille, and Orford all have similar compositions of and sponges (Enticknap et al., 2013). In ROV surveys off the West Coast of northern British Columbia, the majority of rockfish (80%) occurred with sponges 50 cm in height (Du Preez & Tunnicliffe, 2011).

Table 4-17: Frequency of occurrence, depth, and latitudinal ranges for fish and invertebrate species, grouped by family (or higher taxonomic classification), caught during the 2005 NWFSC slope/shelf survey. Source, NOAA Technical Memorandum NMFS-NWFSC-93, 2008.

Family and scientific name	Common name	Frequency of occurrence (No. hauls)	Depth (m)			Latitudinal range (dd)	
			Min.	Max.	Mean	South	North
Porifera (phylum)							
Hexactinellida	Glass sponge unident.	2	937	1,063	1,000	33.75	43.58
Porifera	Sponge unident.	154	61	1,230	476	32.54	48.42
Porifera	Vase sponge unident.	9	70	984	450	32.72	45.20
Acanthascus sp.	Chimney sponge unident.	7	127	1,088	444	33.61	47.26
Aphrocallistes vastus	Clay pipe sponge	61	97	1,098	584	32.72	47.87
Chonelasma calyx	Goblet sponge	3	510	581	548	33.37	40.68
Farrea convolulus	Crusty tube sponge	5	307	1,083	768	32.94	47.68
Hyalonema sp.	Fiber optic sponge unident.	20	502	1,140	872	32.62	47.68
Leucandra heathi	Spiny vase sponge	1	256	256	256	44.63	44.63
Rhabdocalyptus sp.	Cloud sponge unident.	11	307	838	579	32.73	46.06
Staurocalyptus sp.	Spiny vase sponge unident.	15	336	1,140	680	32.73	47.69
Suberites ficus	Hermit sponge	1	87	87	87	33.84	33.84
Tethya sp.	Ball sponge unident.	6	71	826	358	32.72	34.38

Table 4-18: Summary of coral and sponge bycatch metrics for observed tows using bottom trawls as part of the West Coast Groundfish Observer Program (WCGOP), comparing two time periods: "Before" (3 Jan 2002 – 11 Jun 2006) and "After" (12 Jun 2006 – 31 Dec 2010) implementation of Amendment 19 regulations[a/.]

	2000-2005				2006-2010				2000-2010			
Taxon	#	FREQ	Wt	CPUE (per 1,000 km)	#	FREQ	Wt	CPUE (per 1,000 km)	#	FREQ	Wt	CPUE (per 1,000 km)
Coral	319	2.00%	9,309	49.00	335	1.80%	2,197	9.00	654	1.90%	11,507	27.00
Sea pen/ whip	198	1.30%	232	1.20	474	2.50%	145	0.59	672	1.90%	377	0.87
Sponge	469	3.00%	10,025	53.00	1,444	7.60%	45,383	190.00	1,913	5.50%	55,408	130.00
Grand Total	903	5.70%	19,567	100.00	2,003	10.50%	47,725	200.00	2,906	8.40%	67,292	160.00

a/ "#" denotes number of hauls; "FREQ" denotes ratio of hauls with positive catch of taxon to total hauls observed; "Weight" denotes catch (kg); "CPUE" denotes catch per unit effort (units: lb/1,000 km). Haul counts represent only those hauls where corals or sponges were present in the catch. Annual WCGOP coverage of the limited-entry trawl sector can be found online at: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/sector_products.cfm.

Not all bottom contact events shown for the bottom trawl fishery resulted in the capture of corals or sponges, as shown in Table 4-18 (above). During 2006-2010 the coral and sponge contact rate in the bottom trawl fishery sample was 10.5 percent of tows. Bottom trawling was conducted on the continental shelf and the continental slope, but was prohibited in the RCA during 2006-2010. Distribution data for corals and sponges show widespread patchy distributions (see Table 4-19, below). The bottom trawl data for 2006-2010 show a coral and sponge catch rate of 10.5 percent of tows (Table 4-18, above). Most (62%) areas of coral and sponge presence are located within the upper slope, with 28% and 10% of presence in the shelf and lower slope, respectively (EFH synthesis report, 2013, NMFS). Table 4-19, below summarizes coral and sponge taxa recorded during tows as part of the West Coast Groundfish Bottom Trawl Survey (WCGBTS, Table 4-18, above), in which prevalence of sponge (Porifera) catch per unit of effort was highest.

Table 4-19: Summary of coral and sponge taxa recorded during tows as part of the West Coast Groundfish Bottom Trawl Survey (WCGBTS), comparing two time periods: "Before" (2003-05) and "After" (2006-10). "#" denotes number of tows with recorded bycatch; "FREQ" denotes ratio of tows with catch to total tows recorded; "CPUE" denotes catch per unit of effort (units: kg/ha). Tow counts represent only those where corals or sponges were present in the catch. Taxa are listed in descending order of CPUE for combined time period.

	BEFORE			AFTER			BEFORE + AFTER		
	#	FREQ	CPUE	#	FREQ	CPUE	#	FREQ	CPUE
Porifera	359	21.7%	1,852.90	647	19.0%	2,297.41	1,006	19.9%	4,150.31
Hexactinosida	103	6.2%	810.13	295	8.7%	2,371.76	398	7.9%	3,181.89
Rossellinae	53	3.2%	154.01	91	2.7%	698.79	144	2.8%	852.80
***Suberites* spp.**	3	0.2%	425.77	9	0.3%	2.90	12	0.2%	428.67
***Hyalonema* spp.**	47	2.8%	49.17	95	2.8%	174.32	142	2.8%	223.49
Hexactinellida	17	1.0%	77.80	0	0.0%	0.00	17	0.3%	77.80
Pennatulacea	245	14.8%	16.18	417	12.3%	24.44	662	13.1%	40.62
Anthoptilum grandiflorum	98	5.9%	6.64	289	8.5%	30.58	387	7.7%	37.22
***Chrysopathes* spp.**	0	0.0%	0.00	31	0.9%	29.24	31	0.6%	29.24
Antipatharia	66	4.0%	23.85	25	0.7%	1.77	91	1.8%	25.61
***Halipteris* spp.**	0	0.0%	0.00	161	4.7%	13.11	161	3.2%	13.11
Gorgonacea	58	3.5%	2.56	82	2.4%	10.34	140	2.8%	12.90
Anthomastus ritteri	16	1.0%	3.09	69	2.0%	8.04	85	1.7%	11.13
Ptilosarcus gurneyi	28	1.7%	2.48	62	1.8%	5.64	90	1.8%	8.12
Alcyonacea	14	0.8%	0.89	15	0.4%	3.53	29	0.6%	4.42
***Anthomastus* spp.**	19	1.2%	3.00	11	0.3%	1.29	30	0.6%	4.29
Callogorgia kinoshitae	4	0.2%	0.06	22	0.6%	4.09	26	0.5%	4.15
***Umbellula* spp.**	23	1.4%	1.38	94	2.8%	2.47	117	2.3%	3.84
***Paragorgia* spp.**	6	0.4%	0.56	14	0.4%	2.68	20	0.4%	3.24
***Isidella* spp.**	1	0.1%	0.06	9	0.3%	3.05	10	0.2%	3.11
Scleractinia	4	0.2%	2.43	3	0.1%	0.14	7	0.1%	2.57
***Farrea* spp.**	5	0.3%	0.76	3	0.1%	0.85	8	0.2%	1.61
Anthoptilum murrayi	4	0.2%	0.06	29	0.9%	1.01	33	0.7%	1.07
Flabellidae	2	0.1%	0.03	9	0.3%	0.82	11	0.2%	0.84
Caryophylliidae	1	0.1%	0.09	5	0.1%	0.35	6	0.1%	0.45
***Bathypathes* spp.**	6	0.4%	0.05	25	0.7%	0.37	31	0.6%	0.42
***Keratoisis* spp.**	2	0.1%	0.41	0	0.0%	0.00	2	0.0%	0.41
Stylasteridae	1	0.1%	0.00	4	0.1%	0.37	5	0.1%	0.37
***Lillipathes* spp.**	3	0.2%	0.08	9	0.3%	0.20	12	0.2%	0.28
***Callogorgia* spp.**	1	0.1%	0.02	4	0.1%	0.17	5	0.1%	0.19
Pennatula phosphorea	1	0.1%	0.01	10	0.3%	0.10	11	0.2%	0.12
Acanthogorgiidae	0	0.0%	0.00	1	0.0%	0.01	1	0.0%	0.01
	749	**45.3%**	**3,434.45**	**1,554**	**45.7%**	**5,689.85**	**2,303**	**45.5%**	**9,124.30**
	1,652			**3,404**			**5,056**		

4.8.3.3 **Sea Whips**

Sea whips are pennatulacean octocorals that are broadly distributed across the continental shelf along the West Coast from depths of 10 to at least 500 fm (Figure 4-1). Sea whips have a relatively simple morphology consisting of a basal peduncle that serve to anchor

in soft sediment, and a vertical rachis extending distally from the peduncle (stem). The distal portion of the sea whip colony comprises a sheath-like tissue layer made up of multiple autozooid feeding polyps supported by an un-branched endoskeleton called an axial rod (Troffe et al, 2005). Juvenile sea whip density before and after trawling was not statistically significantly different (Troffe et al, 2005). For sea whips that are impacted by fishing gear, re-growth of young colonies may be slow at beginning life stages. Untrawled bottoms were strongly dominated numerically by 30–50 cm high sea pens (Stylatula spp.), which accounted for over 95% of all recorded invertebrates (Hixon and Tissot, 2007). However, at untrawled area, there was no correlation between sea-pen density and total fish density among transect segments (Hixon and Tissot, 2007). Sea pens do not provide an obvious biogenic habitat for demersal fishes (Hixon and Tissot, 2007).

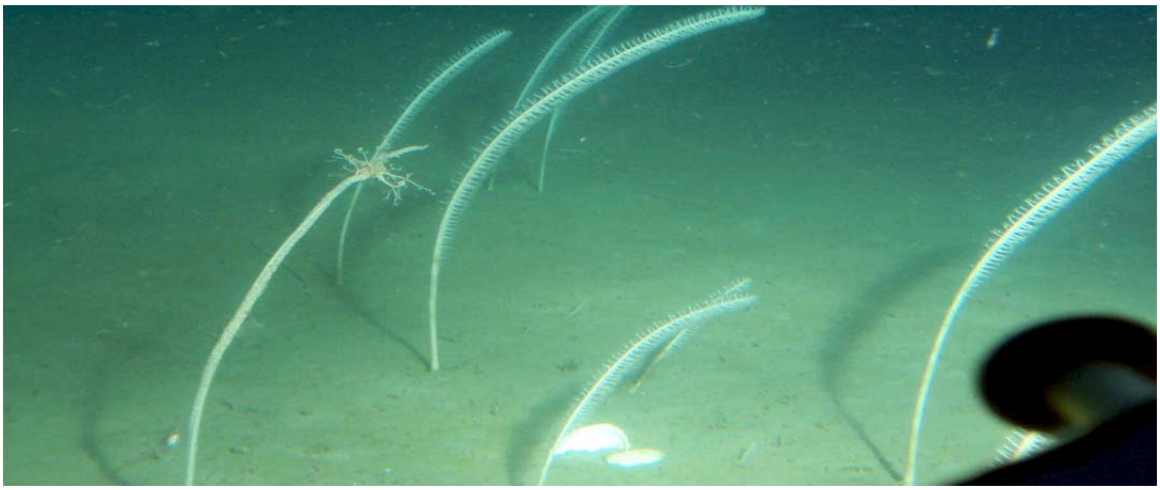


Figure 4-26: Picture of sea whips on soft substrate. (Source: http://www.afsc.noaa.gov/ABL/MESA/archives/effects%20of%20trawl%20on%20seawhips.htm)

4.8.4 Protected Species, including ESA Species

A variety of species are protected by Federal law (other than the MSA) with the objective of sustaining, or rebuilding their populations from critically depleted levels.

Species Protected by the Endangered Species Act, Marine Mammal Protection Act, and the Migratory Bird Treaty Act

NMFS issued Biological Opinions under the Endangered Species Act (ESA) on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999, pertaining to the effects of the Pacific Coast groundfish fisheries on Chinook salmon (Puget Sound, Snake River spring/summer, Snake River fall, upper Columbia River spring, lower Columbia River, upper Willamette River, Sacramento River winter, Central Valley spring, California coastal), coho salmon (Central California coastal, southern Oregon/northern California coastal), chum salmon (Hood Canal

summer, Columbia River), sockeye salmon (Snake River, Ozette Lake), and steelhead (upper, middle and lower Columbia River, Snake River Basin, upper Willamette River, central California coast, California Central Valley, south/central California, northern California, southern California). These biological opinions have concluded that implementation of the Pacific Coast groundfish fishery is not expected to jeopardize the continued existence of any endangered or threatened salmonid species under the jurisdiction of NMFS, or result in the destruction or adverse modification of critical habitat.

NMFS issued a Supplemental Biological Opinion on March 11, 2006, concluding that neither the higher observed bycatch of Chinook in the 2005 whiting fishery, nor new data regarding salmon bycatch in the groundfish bottom trawl fishery required a reconsideration of its prior ''no jeopardy'' conclusion. NMFS also reaffirmed its prior determination that implementation of the Groundfish FMP is not likely to jeopardize the continued existence of any of the affected ESUs. Lower Columbia River coho (70 FR37160, June 28, 2005) and Oregon Coastal coho (73 FR 7816, February 11, 2008) were relisted as threatened under the ESA. The 1999 biological opinion concluded that the bycatch of salmonids in the Pacific whiting fishery were almost entirely Chinook salmon, with little or no bycatch of coho, chum, sockeye, and steelhead.

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. There are also several marine mammal species in the action area that are listed under the ESA (see NMFS 2012 FEIS for full list). With respect to species protected by the MMPA, the west coast groundfish trawl fisheries are Category III fisheries indicating a remote likelihood of, or no known, serious injuries or mortalities to marine mammals.

On December 7, 2012, NMFS completed a biological opinion concluding that the groundfish fishery is not likely to jeopardize non-salmonid marine species including listed eulachon, green sturgeon, humpback whales, Steller sea lions, and leatherback sea turtles. The opinion also concludes that the fishery is not likely to adversely modify critical habitat for green sturgeon and leatherback sea turtles.

An analysis included in the same document as the opinion concludes that the fishery is not likely to adversely affect green sea turtles, olive ridley sea turtles, or loggerhead sea Turtles, sei whales, North Pacific right whales, blue whales, fin whales, sperm whales, Southern Resident killer whales, Guadalupe fur seals, or the critical habitat for Steller sea lions.

The California current system supports a diverse array of seabird species. Species found on the west coast include resident species and transitory species (migrating or foraging). Several species of seabirds have had documented takes in the groundfish fishery, including black-footed albatross, common murres, other non-listed species, ESA-listed marbled murrelets and ESA-listed short-tailed albatross (for a full list of species see Table 3-19 and Table 3-20 in the NMFS 2012 FEIS). On November 21, 2012, the U.S.

Fish and Wildlife Service (FWS) issued a biological opinion concluding that the groundfish fishery will not jeopardize the continued existence of the short-tailed albatross. The (FWS) also concurred that the fishery is not likely to adversely affect the marbled murrelet, California least tern, southern sea otter, bull trout, nor bull trout critical habitat.

Table 4-20: List of West Coast Endangered and Threatened Species (not including Puget Sound Distinct Population Segment rockfish species).

West Coast Endangered Species	
MARINE MAMMALS	
Endangered:	Sperm whale (*Physeter macrocephalus*) Humpback whale (*Megaptera novaeangliae*) Blue whale (*Balaenoptera musculus*) Fin whale (*Balaenoptera physalus*) Southern Resident Killer whale (*Orcinus orca)* Sei whale (*Balaenoptera borealis borealis)* North Pacific right whales (*Eubalaena japonica*)
Threatened:	Guadalupe fur seal (*Arctocephalus townsendi*) Southern sea otter (*Enhydra lutris*) California Stock
SEABIRDS	
Endangered:	Short-tail albatross (*Phoebastria (Diomedea) albatrus*) California brown pelican (*Pelecanus occidentalis*) California least tern (*Sterna antillarum browni*)
Threatened:	Marbled murrelet (*Brachyramphs marmoratus*)
SEA TURTLES	
Endangered:	Green turtle (*Chelonia mydas*) Leatherback turtle (*Dermochelys coriacea*) Olive ridly turtle (*Lepidochelys olivacea*)
Threatened:	Loggerhead turtle (*Caretta caretta*)
SALMON	
Endangered:	Chinook salmon (*Oncorhynchus tshawytscha)* Sacramento River Winter; Upper Columbia Spring Sockeye salmon (*Oncorhynchus nerka)* Snake River Steelhead trout (*Oncorhynchus mykiss)* Southern California Coast Coho salmon (*Oncorhynchus kisutch)* Central California Coast
Threatened:	Coho salmon (*Oncorhynchus kisutch)* Lower Columbia River, Southern Oregon/Northern California; Oregon Coast Chinook salmon (*Oncorhynchus tshawytscha*) Snake River Fall, Spring, and Summer; Puget Sound; Lower Columbia; Upper Willamette; Central Valley Spring; California Coastal Chum salmon (*Oncorhynchus keta)* Hood Canal Summer; Columbia River Sockeye salmon (*Oncorhynchus nerka)* Ozette Lake Steelhead trout (*Oncorhynchus mykiss)* Puget Sound, South-Central California, Central California Coast, Southern California Coast, Snake River Basin, Lower Columbia, California Central Valley, Upper Willamette, Upper and Middle Columbia River, Northern California

4.9 Description of the Socio-economic Environment

4.9.1 Shorebased IFQ Program

The Shorebased IFQ fishery is managed with individual fishing quotas for most groundfish species, including whiting. Annually, quota pounds (QP) are allocated from the shorebased sector allocation based on the individual quota share (QS) of each QS owner. (QP is expressed as a weight and QS is expressed as a percent of the shorebased allocation for a given species or species group.) QP may be transferred from a QS account to a vessel account or from one vessel account to another vessel account. Vessel accounts are used to track how QP is harvested since QP is used to cover catch (landings and discards) by limited entry trawl vessels of all IFQ species/species groups. Shorebased IFQ catch must be landed at authorized first receiver sites. The IFQ whiting QS were allocated to a mixture of limited entry permit holders and shorebased processors. One non-profit organization received QS based on the ownership of multiple limited entry permits.

Although fixed gear and whiting (midwater trawl) groundfish fisheries are vital fisheries which make up a large portion of groundfish landings, the proposed action pertains to groundfish bottom trawl gear; therefore emphasis in this assessment is placed on groundfish bottom trawl gear and the non-whiting portion of the shorebased IFQ program. The number of non-whiting trawl vessels making at least one groundfish landing (Table 4-21, below) between 2005 to 2009 have ranged between 123 to 117, a declining trend over the years. It is expected that the number of non-whiting trawl vessels participating in the IFQ fishery may decrease to some extent after quota share trading is allowed starting January 1, 2014.

Table 4-21: Number of vessels making at least one groundfish landing each year by Port Group and Sector, 2005-2009. Source: 2011-2012 FEIS, Appendix F.

Year	2005	2006	2007	2008	2009
Nonwhiting trawl Vessels	123	122	121	120	117

The nonwhiting bottom trawl fishery has a variety of targets and strategies, 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 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 because their catch is debited to the IFQ sector's allocation through the QP held in a vessel's account.

The following summary of IFQ vessels utilizing "gear switching" provisions for fixed gear landings is excerpted from the Annual Catch Report for the Pacific Coast Groundfish Shorebased IFQ Program in 2012 (Matson, 2013, NMFS):

Proportion of sablefish landed with fixed gear (in 2012) has increased in the shorebased IFQ program compared with 2011. As a result, 58 percent of the revenue from sablefish

in this fishery is estimated to come from fixed gear (up ten percent from 2011), due to (IFQ) increases in landings using hook and line gear. These changes in gear use for sablefish translated in small overall changes to the distribution of aggregate landings of all groundfish species, and associated revenue among gear types for the entire non whiting fleet. Much lower prices were seen in 2012 for sablefish for hook and line, pot, and trawl gear, than during 2011. Fixed gear accounts for one fourth of the nonwhiting revenue in the fishery, although it currently makes up only seven percent of landings.

Five species accounted for just over 90 percent of ex-vessel revenue during 2006-2010: 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, as stated in the Annual Catch Report for the Pacific Coast Groundfish Shorebased IFQ Program in 2012 (Matson, 2013, NMFS):

Total catch of several valuable groundfish species in 2012 was less than 50 percent of the trawl allocation. Only 8 percent of the minor shelf rockfish complex north of 40°10' N. lat. was caught, leaving over 1 million pounds unharvested. Only 27 percent of the minor slope rockfish complex north of 40°10' N. lat. was caught, leaving over 1.3 million pounds unharvested. For flatfish, excluding petrale sole, no species had attainment of over 33 percent of the trawl allocation, with Dover sole being the highest. Over 33 million pounds of Dover sole was left unharvested in 2012. Only 21 percent of the trawl allocation of lingcod was caught in 2012, leaving over 3 million pounds of the allocation unharvested. Only 35 percent of the trawl allocation of Pacific cod was caught in 2012, leaving over 2.5 million pounds unharvested. Only 32 percent of the trawl allocation of yellowtail rockfish north of 40°10' N. lat. was caught, leaving over 4.5 million pounds unharvested.

Landings in the shorebased nonwhiting fleet were up slightly in 2012, at 101 percent of 2011 levels (40,892,262 pounds versus 40,610,190 pounds, respectively, Table 4-22). Revenue in 2012 maintained 92 percent of 2011 levels (30,452,763 dollars in 2012 versus 32,935,934 dollars in 2011), despite a .56-cent per pound drop in sablefish prices, a six percent decrease in sablefish landings and a 24 percent decrease in revenue from sablefish, or 4.2 million dollars (17,614,666 dollars in 2011 versus 13,356,592 dollars in 2012). (Matson, 2013, NMFS):

Monthly trajectories of landings and revenue, by both the non-whiting and shorebased whiting fleets for 2012 are also very similar to the previous year, although non-whiting landings and revenue in December of 2012 returned to levels similar to pre-IFQ. Landings and revenue during December 2011 spiked much higher than typical December levels (Table 4-22)(Matson, 2013, NMFS):

Considering the non-whiting fleet for the two years before and the two years after trawl rationalization (Table 4-22), revenues have been 12.5 percent higher, although annual landings have on average been 24.8 percent lower. Total monthly landings and revenue have been somewhat more variable throughout the year, in the first two years following trawl rationalization, than before it. (Matson, 2013, NMFS):

Table 4-22: Monthly landings (left) and revenue (right) during 2011 and 2012, for nonwhiting trips in the Shorebased IFQ Program. The "land % 2011" column expresses 2012 landings as a percentage of 2011 landings; the "rev % 2011" column expresses 2012 revenue in the same way. Source = paper and electronic landing receipt data (PacFIN and PSMFC, respectively), Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012, Matson 2013.

Non-whiting trips

Month	2011 landings	2012 landings	2011 revenue	2012 revenue	Land. % 2011	Rev. % 2011
Jan	1,324,638	1,490,200	902,457	1,142,266	112%	127%
Feb	2,564,693	2,404,286	1,719,893	1,658,043	94%	96%
Mar	3,360,889	3,332,948	1,991,797	2,120,942	99%	106%
Apr	3,942,465	5,080,809	2,443,745	3,165,779	129%	130%
May	3,884,997	4,415,608	2,395,262	2,744,210	114%	115%
Jun	4,446,585	3,280,997	3,293,042	2,402,746	74%	73%
Jul	3,258,118	3,204,170	2,312,914	2,433,846	98%	105%
Aug	3,785,242	4,150,441	3,122,361	3,194,306	110%	102%
Sep	3,310,686	3,832,257	3,715,231	3,598,502	116%	97%
Oct	3,601,682	3,857,524	4,618,719	3,348,731	107%	73%
Nov	2,467,760	2,976,381	2,531,797	2,438,940	121%	96%
Dec	4,662,435	2,866,641	3,888,717	2,204,455	61%	57%
Total	40,610,190	40,892,262	32,935,934	30,452,763	101%	92%

Table 4-23: Average monthly landings (left) and revenue (right) during 2009-2010 (green open circles, dashed lines), versus 2011-2012 (black squares, solid lines), for non-whiting trips in the Shorebased IFQ Program (limited entry non-whiting trawl fishery during 2009-10). Source = paper and electronic landing receipt data (PacFIN and PSMFC, respectively), Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012, Matson 2013.

Month	Ave. landings				Ave. revenue			
	2009-10	2011-12	S.E. 09-10	S.E.11-12	2009-10	2011-12	S.E. 09-10	S.E. 11-12
Jan	3,733,887	1,407,419	1,364,374	82,781	2,294,354	1,022,362	828,414	119,905
Feb	5,465,840	2,484,490	271,688	80,204	2,594,130	1,688,968	45,615	30,925
Mar	5,292,810	3,346,919	197,724	13,971	2,425,697	2,056,370	98,008	64,573
Apr	5,910,014	4,511,637	740,500	569,172	2,655,967	2,804,762	307,524	361,017
May	5,145,447	4,150,302	43,541	265,306	2,574,902	2,569,736	6,390	174,474
Jun	4,810,159	3,863,791	423,942	582,794	2,459,182	2,847,894	305,222	445,148
Jul	4,797,831	3,231,144	186,138	26,974	2,652,528	2,373,380	98,298	60,466
Aug	4,680,382	3,967,842	391,565	182,599	2,446,505	3,158,333	360,699	35,972
Sep	3,962,316	3,571,471	82,693	260,786	2,320,270	3,656,866	132,905	58,365
Oct	4,005,163	3,729,603	270,234	127,921	2,211,774	3,983,725	85,991	634,994
Nov	3,710,737	2,722,071	309,909	254,311	2,150,959	2,485,368	189,229	46,428
Dec	2,465,411	3,764,538	840,322	897,897	1,391,174	3,046,586	442,372	842,131
Annual	54,161,633	40,751,226	3,872,352	141,036	28,177,442	31,694,349	2,509,429	1,241,585

Vessel Accounts

The following license data and catch monitor plans do not include landings to determine if first receivers have actually received landings (or what type of landings) while they were licensed:

2011: 152 vessel accounts; 110 made IFQ landings
2012: 166 vessel accounts (total, but not all renewed/active); 108 made IFQ landings
2013: 172 vessel accounts (total, but not all renewed/active); 89 made IFQ landings*
(note: this is a low estimate; many vessels come in to fish in September).

4.9.2 Processor Sector

The number of companies that reported having processed fish on the West Coast has increased slightly from 23 companies in 2009, to 25 companies in 2010, and 26 companies in 2011.

First Receivers
The following license data and catch monitor plans do not include landings to determine if first receivers have actually received landings (or what type of landings) while they were licensed:

2011: 51 first receivers; 5 whiting; 35 non-whiting; 11 both (whiting and non-whiting)
2012: 55 first receivers; 6 whiting; 38 non-whiting; 11 both (whiting and non-whiting)
2013: 54 first receivers; 6 whiting; 36 non-whiting; 12 both (whiting and non-whiting)*
(note: this is a low estimate; many vessels come in to fish in September).

4.9.3 Communities

Federally managed Pacific groundfish fisheries occurring within the EEZ off the coasts of Washington, Oregon, and California establish the geographic context for the proposed action. West coast communities engaged in these fisheries are also part of the context (Figure 4-27). Although this is the affected area, the states manage the fisheries in the territorial sea to meet the goals and objectives of the Pacific Groundfish FMP. At some level, when access to healthy stocks is limited, communities are impacted (*2013-2014 FEIS*). The amount of allowable canary bycatch has socioeconomic impacts to fishing communities dependent on the shelf trawl fishery (i.e., shoreward of the RCA), (*2013-2014 FEIS*). Fishing communities are described in terms of the port groups used in the IO Pac model (*2013-2014 FEIS*).

Community characteristics have been thoroughly investigated in the 2007-2008, 2011-2012, and 2013-2014 FEISs.

Figure 4-27: The affected area, showing major coastal communities and management areas (NMFS 2012).

CHAPTER 5 ENVIRONMENTAL CONSEQUENCES

A large portion of the RCA that would be opened under the proposed action is already open to bottom trawling at specific periods during the year, has been opened in the recent past, or is open to pink shrimp trawling, fixed gear effort, and other fisheries (including midwater trawling bottom contact events), and non-fisheries related pressures. Therefore, the action is not expected to cause significant impacts when compared to No-Action. The portion of the proposed action (alternative 1) that would modify the RCA from a seaward boundary line between 40° 10' N. lat. and 45° 46' N. latitude approximating 200 fm to a line approximating 150 fm, during periods 1-6 (note that the modified 200 fm line is currently in place in periods 1 and 6), would open an area that has been closed to bottom trawling for a longer period of time (approximately nine years for most of the area). Fixed gear/longline effort on hard and medium substrate in this area has likely already impacted this habitat to some extent. Unintentional incursions into the RCA and groundfish research surveys also have the potential to alter habitat despite the closure. Although localized effects to physical and biological resources caused by groundfish bottom trawling would occur under the action alternatives, when the context and intensity is considered, the impacts are unlikely to be significant. The socioeconomic environment would likely be beneficially affected to some degree by the proposed action.

5.1 Physical Environment

5.1.1 Physical Oceanography

No-action, Alternative 1, and Alternative 2

None of the alternatives are expected have any impacts on physical oceanography because this proposed action will not affect natural phenomena such as upwelling, the North Pacific Gyre, Pacific decadal oscillation, global plate tectonics, and climate change, which are events that will continue to occur autonomously, regardless of groundfish bottom trawling within the West Coast exclusive economic zone.

5.1.2 West Coast Marine Ecosystems

No-action, Alternative 1, and Alternative 2

None of the alternatives are expected have significant impacts on West Coast marine ecosystems because this proposed action will not affect the fundamental integrity of food web linkages, or biodiversity of the California Current in general. Atlantis simulation models quantifying the effects of single fleets such as bottom trawl and fixed gear suggest they primarily have direct impacts on their target and bycatch species, and few indirect effects from these fleets extended through predator-prey links to other parts of the food web (*Kaplan et al., 2012*).

For other biodiversity and ecosystem function, no substantial change from No Action is expected because the majority of the area proposed to be open has been recently impacted by a combination of non-trawl gear, pink shrimp bottom trawl activity, and the groundfish bottom trawl fisheries and research. Any impacts to ecosystem function and biodiversity under both action alternatives 1 and 2 are anticipated to be minimal and similar to No-Action.

5.1.3 Essential Fish Habitat

Fish and other species rely on habitat characteristics to support primary ecological functions comprising spawning, breeding, feeding, and growth to maturity. Important secondary functions that may form part of one or more of these primary functions include migration and shelter. Most habitats provide only a subset of these functions. The type of habitat available, its attributes, and its functions are important to species productivity and the maintenance of healthy ecosystems. While we know that marine organisms require habitat, the relationship of habitat to population dynamics or ecological function is poorly understood.

Bottom trawling for groundfish is managed under the Pacific groundfish FMP. Fishing effects are generally limited to (1) removal of prey species, (2) direct removal of adult and juvenile groundfish, (3) contact with the bottom, and (4) effects resulting from loss of trawl gear, potentially resulting in impacts to bottom habitats and ghost fishing.

Specific offshore habitat types have been identified as ones most likely to be potentially negatively affected with implementation of any of the action alternatives compared to the No Action Alternative. These are discussed and analyzed in following sections.

No-action

Under the no-action alternative, impacts to groundfish EFH are not expected to change from the impacts that have been occurring in recent years.

All of the areas currently closed to groundfish bottom trawl gear would remain closed to vessels fishing with groundfish bottom trawl gear. This includes areas that have been

closed to groundfish bottom trawling for long periods of time. Benthic habitat in areas that have been closed for extended periods of time are more likely to have recovered, to some extent, from impacts from groundfish bottom trawling that occurred in this area before the trawl RCA was implemented. However, other marine activities (e.g. pink shrimp trawling) are allowed inside the trawl RCA. Those activities, where they occur, could hinder recovery of benthic habitat, despite the overlapping trawl RCA closure. No-Action would not change the relative benefits of the trawl RCA closure to benthic habitats, or change the relative negative impacts to benthic habitats from other marine activities. If all of the areas currently open to groundfish bottom trawl gear remain open to fishing with groundfish bottom trawl gear, recovery of benthic habitat in those areas will continue to be hindered.

Specifically, the No-Action alternative would maintain trawl RCA boundaries of either 75fm-200fm or 100fm-150fm depending on the time of year. Groundfish bottom trawling would continue to be prohibited inside the trawl RCA, and effort would continue to be limited to areas seaward and shoreward of the trawl RCA. Under the No Action alternative, shoreward effort would likely continue to be concentrated in depths of 75fm-100fm between 42°N. lat. and 48°N. lat. (Figure 4-13). Under the No Action alternative, seaward effort would likely continue to be concentrated in depths of 175 fm-375fm (Figure 4-13). In the areas that have been open, regardless of substrate type, it is unlikely that there has been sufficient time for recovery because impacts of the groundfish bottom trawl fishery are ongoing in these areas. The No-Action alternative is not anticipated to change impacts to groundfish EFH of other marine activities that occur in the action area, including; fixed gear fishing for groundfish; pot fishing for groundfish; bottom trawling for pink shrimp; and bottom trawl surveys.

Fixed gear fishing for groundfish would continue to access mixed and hard substrate areas that may be untrawlable. Groundfish fishing with fixed gear would continue to be concentrated in depths between 100fm-225fm, between 42°N. lat. and the U.S.-Canada border (Figure 4-15). Pot fishing for groundfish can access mixed and hard substrate areas that may be untrawlable. Groundfish fishing with pot gear is concentrated in depths between 125fm-250fm, between 43°N. lat. and 47°N. lat. Therefore, fixed gear and pot gear fishing for groundfish would continue to be concentrated, in part, in the areas that are closed by the trawl RCA under the No-Action alternative.

Bottom trawling for pink shrimp would continue to be concentrated in depths between 50fm-125fm between 41°N. lat. and 48°N. lat. Most of the pink shrimp bottom trawl effort occurs shoreward of the trawl RCA, but some effort does occur deeper than 75 fm and 100fm. Bottom trawling in the groundfish surveys would continue as they have since 2003 under the No-Action alternative; survey tows would occur throughout the trawlable habitat inside the trawl RCA with the location selected at random. Therefore, some benthic habitats remaining closed under the No Action alternative would continue to be impacted by pink shrimp bottom trawl gear and the groundfish bottom trawl survey.

There have been few attempts to quantitatively estimate the effects of particular gear types on a broad suite of ecosystem attributes and to understand how those effects

interact (Kaplan et al., 2012). However, a spatial evaluation of the effectiveness of management measures examined bottom trawl vessel logbook data to conduct a quantitative analysis of the changes in the spatial distribution of trawl fishing effort that resulted from the new management approach enacted in 2000 (*Hannah, 2008*). The results of that evaluation determined that footrope restrictions, in combination have had a substantial effect in reducing rockfish bycatch. No changes to gear restrictions are considered as part of this proposed action; therefore, the differential impacts of bottom trawl gear footrope size and other aspects of gear configurations are not anticipated to vary between any of the alternatives.

Therefore, the No-Action alternative is not expected change current groundfish fishery effects on groundfish EFH.

Alternative 1

Alternative 1 is anticipated to have a slightly higher degree of potential impact (in terms of substrate recovery rates) on EFH as described in the EFH EIS, EFH five year review, and EFH synthesis documents. Certainly, bottom trawling dramatically reduces the diversity of some kinds of habitat, particularly corals, but in other habitats, such as mud and sand bottoms, the impact on ecosystem structure and function is much less (Hilborn, 2007). Some areas that have been closed for long periods of time may have had a chance for benthic habitat recovery. The seaward area between the 150 fm and the modified 200 fm lines between 40° 10' N. lat. to 45° 03' N. lat. has not been trawled by commercial groundfish bottom trawl gear since October 2004. This depth range between 45° 03' N. lat. to 45° 46' N. lat. has not been trawled by commercial groundfish bottom trawl gear since August 2007.

Alternative 1 would open these areas to commercial groundfish bottom trawling. Therefore, impacts to groundfish EFH under Alternative 1 are expected to be greater than the no-action alternative, or Alternative 2. However, no significant impacts to soft, mixed, or hard benthic habitats, or to the continued existence of non-structure forming benthic invertebrate species such as sponges, corals, and sea whips are expected under this alternative, when taking into consideration the broader untrawlable habitat EFH in the marine environment of the California Current within the West Coast EEZ that will continue to provide a natural refuge for sensitive species and habitats. It is expected that impacts to benthic species such as coral, sponges, and sea whip colonies have already largely occurred within trawlable fishing grounds, particularly in the height of bottom trawl effort between 1980 to 2000, since some coral species may live up to 100 years. The possibility that some trawlable areas may have escaped impact from higher effort prior to 2000 may exist, although it is expected that these areas are less trawlable with modern gear restrictions, and these sensitive areas will largely remain untrawled from historical effort (prior to RCA closures). Mitigation of a closed area should be carefully weighed against the potential for redistribution of fishing effort (Bellman et al, 2005). To the extent that virgin coral or sponge may be impacted by this action, no significant impacts are expected, considering the broader EFH conservation areas remaining within the marine environment of the California Current within the West Coast EEZ. Additionally, these areas are open to groundfish fixed gear (longline, pot) and non-

groundfish pot gear. Some research (Baer et al., 2010) found that bottom longlines can cause significant damage to sensitive habitats through entanglement, and ROV research surveys have observed fixed gear impacts on sensitive coral and sponge species (Brancato et al, 2007). Fixed gear vessels may target mixed and hard substrate areas seaward of 100 fm with some frequency of impact, as target species are accessible to fixed gear types, particularly on untrawlable grounds.

Given that bottom trawlers will likely seek to avoid untrawlable fishing grounds, bottom trawl activity in the most sensitive areas, even those that have not been trawled since October 2004, are not likely to incur any significant impacts. Effects to biological and physical resources from the proposed action alternatives (1&2) are not anticipated to involve unique or unknown risks because the actions are likely to redistribute some existing trawl effort, with expected similar impacts to other areas that have been trawled in the past. To the extent liberalized RCA configurations result in more dispersed effort over a larger area, intensity of localized effects could be reduced. Although unlikely, it is possible that some large coral or sponge species have survived many years of targeting effort in nearshore, shelf, and slope substrates before regulatory changes to rockfish trip limits coupled with footrope restriction, and RCAs (trawl and non-trawl) in prime trawlable habitat near mixed or hard substrates. It is also feasible that even with footrope restrictions, rare encounters with hard or boulder/mixed habitat may occur.

The shoreward area from 40° 10’ N. lat. to 48° 10’ N. lat., 75 fm to 100 fm is not expected to have recovered, as these areas are being trawled throughout much of the year by pink shrimp trawl gear and groundfish bottom trawl gear throughout portions of each year under No-action activities.

Alternative 2

Under Alternative 2, effects on habitat are both predicted to be inconsequential, as commercial groundfish bottom trawling already occurs within the shoreward area (75-100 fm) between 40° 10’ N. lat. to 48° 10’ N. lat., and the seaward area (150-200 fm) between 45° 46’ N. lat. to 48° 10’ N. lat. at some point in the year (including the area trawled within modified petrale cutouts). Therefore, impacts are expected to be similar between no-action and alternative 2.

As described in chapter 3, some of the areas that would be opened under alternative 1 would allow trawling in an area that has been closed since 2004, and to a lesser extent, 2007, but these areas would remain closed under this proposed Alternative. 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 (NMFS 2012). However, with this proposed action reducing the size of the RCA could potentially moderate fishing intensity in other areas as existing effort distributes, potentially diluting the impact to currently open areas. Some reductions in fleet size are also expected in the coming years (potentially aided in part from further quota share trading options that will be allowed as of January 1, 2014).

The liberalized RCA structure proposed in alternatives 1 and 2 would allow trawling in areas with benthic substrate and habitat characteristics typical of areas currently subject to trawl effort. Alternative 2, would maintain a temporary closure between 40° 10' N. latitude and 45 46' N. latitude, from 150 to m200 fm.

Effects to biological and physical resources from the proposed action alternatives (1&2) are not anticipated to involve unique or unknown risks because the actions are likely to redistribute some existing trawl effort, with expected similar impacts to other areas that have been trawled in the past. To the extent liberalized RCA configurations result in more dispersed effort over a larger area, intensity of localized effects could be reduced. Although unlikely, it is possible that some large coral or sponge species have survived many years of targeting effort in nearshore, shelf, and slope substrates before regulatory changes to rockfish trip limits coupled with footrope restriction, and RCAs (trawl and non-trawl) in prime trawlable habitat near mixed or hard substrates. It is also feasible that even with footrope restrictions, rare encounters with hard or boulder/mixed habitat may occur.

Areas that have been closed to commercial groundfish bottom trawl gear for a long period of time may have had a chance for benthic habitat recovery. Alternative 2 will keep those areas closed; therefore, only marginally increased impacts to EFH are expected compared to the no-action alternative, specifically in the seaward area from 40° 10' N. lat. to 45° 46' N. lat., 150 fm to m200 fm.

No significant impacts to soft, mixed, or hard benthic habitats, or to benthic invertebrates sponges, corals, and sea whips are expected under this alternative, especially when taking into consideration that these species will continue benefit from untrawlable refuges within the marine environment of the California Current within the West Coast EEZ. It is expected that impacts to coral, sponges, and sea whip colonies have already occurred within trawlable fishing grounds, particularly in the height of bottom trawl effort between 1980 to 2000, since some coral species may live up to 100 years. The possibility that some trawlable areas may have escaped impact from higher effort prior to 2000 may exist, although it is expected that these areas are less trawlable with gear restrictions, and these areas will largely remain untrawled. To the extent that virgin coral or sponge may be impacted by this action, no significant impacts are expected, especially when taking into consideration the broader EFH within the marine environment of the California Current within the West Coast EEZ. Given that bottom trawlers will likely seek to avoid untrawlable fishing grounds, bottom trawl activity in the most sensitive areas are not likely to incure any significant impacts.

The shoreward area from 40° 10' N. lat. to 48° 10' N. lat., 75 fm to 100 fm is not expected to have recovered, as these areas are being trawled throughout much of the year by pink shrimp trawl gear and groundfish bottom trawl gear throughout portions of each year under No-action activities.

5.1.4 Biological Resources

The No-action, Alternative 1, and Alternative 2 proposed actions are not anticipated to have any substantial effect on biological resources in the nearshore, shelf, and slope regions of the California Current Ecosystem. Many heavily trawled regions of the world, particularly in areas where there is an abundance of soft substrate, continue to demonstrate record biomass abundance of target species. To the extent that the alternatives under consideration affect target and non-target species, these species will continue to be managed conservatively. Additionally, annual catch limits are established through the biennial harvest specifications and management measures. Under the Shorebased IFQ Program all catch of IFQ species (retained or discarded), including vessels using groundfish bottom trawl gear, must be covered by quota pounds. Fishermen are individually accountable for their catch of individual species (or species within a stock complex), and are subject to a 100 percent monitoring requirement. Non-IFQ species are managed by groundfish trip limits. Therefore, the proposed action is not expected to impact the sustainability of any target or non-target species.

5.1.4.1 Groundfish Target Species

No-action

All of the alternatives, including No-Action, would continue to allow the targeting of groundfish in the shorebased trawl IFQ program with 100 percent observer coverage and 100 percent dockside monitoring, with all catch of IFQ species required to be covered by quota pounds. The amount of quota pounds available each year is a result of the allocations established through the FMP and the 2013-2014 harvest specifications and management measures. The harvest specifications, including annual catch limits (ACLs), are established based on the best scientific information available about stock status and would not change as result of the proposed action. Under all of the alternatives, including the No Action alternative, the groundfish bottom trawl fleet would continue to be held to individual accountability from the IFQ program, which after two years of successful implementation has demonstrated that quota pounds can be managed within IFQ sector allocations and ACLs for target species.

With the poor sablefish market of the past two years (although still the most valuable species per pound in the fishery), and continued reduction in the northern sablefish ACL, there is evidence that fishermen have shifted some effort to other target species to compensate (*Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012, Agenda Item D.2.a, April, 2013 PFMC meeting*). Either Alternative 1 or 2 could make such a shift easier for fishers, according to the species cited in industry rationale (bycatch analysis section). There were increases in revenue from species such as yellowtail rockfish, Pacific cod, petrale sole, lingcod, and Dover sole from 2011 to 2012 in the IFQ program, together with a substantial drop in sablefish revenue (*Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012, Agenda Item D.2.a, April, 2013 PFMC meeting*). These species were cited as targets in the areas requested for opening by industry (bycatch analysis section).

In those southern ports, fishermen could still fish the seaward area between 150 and 200 fm using fixed gear, under the gear switching provision of IFQ regardless of this potential action. If the area is not opened to trawling, it is conceivable that fishermen may do so, to access some of the higher value targets that are often landed with fixed gear such as lingcod, sablefish, and Pacific cod (these species were cited in industry rationale). Given sufficient motivation to diversify their catch among species, it is conceivable that effort in the seaward area (150-200 fm, 40°10' to 45°46') could increase by use of fixed gear rather than trawl gear, even without the implementation of Alternative 2, under gear switching provisions in the IFQ program, especially upon recovery of sablefish markets and ex-vessel prices. However, this is speculative.

Impacts to target species under the no-action alternative are expected to continue in a similar manner to what has been seen since the implementation of the Shorebased IFQ Program in 2011. Vessels will continue efforts to maximize their harvest of target species quota pounds, and keep their bycatch of overfished species low. Additionally, beginning in 2014, quota shares will become transferrable and this might promote higher utilization of target species quota pounds.

Specifically, access to lingcod, sanddabs, yellowtail rockfish and Pacific cod in the nearshore and shelf areas could continue to be somewhat limited by the shoreward boundary of the trawl RCA remaining at the 75 fm line for some parts of the year under the No Action alternative. Access to petrale sole, English sole, Dover sole, sablefish and thornyheads in the shelf and slope areas continue to be somewhat limited by the seaward boundary of the trawl RCA remaining at the 200 fm line for some parts of the year under the No Action alternative.

If no new areas are opened to allow bottom trawling for IFQ species, fishermen that feel most affected may have increased incentives to sell their quota, or perhaps even switch to non-trawl gears to harvest their IFQ under the Shorebased IFQ Programs gear switching provisions. Vessels harvesting IFQ using non-trawl gears can currently fish seaward of the 100 fm line; in areas that would remain closed to bottom trawling under the No Action alternative. However, the extent of the motivation for these types of changes in behavior is unknown.

Alternative 1

The most likely potential impacts to target species under the action alternatives are higher attainment of the trawl allocation. Levels of attainment of the trawl allocation for target groundfish species would likely be highest for Alternative 1. Alternative 1 is likely to increase attainment of prominent species such as English sole, lingcod, Pacific cod, Pacific sanddabs, yellowtail rockfish, rex sole, and other target species including the dover, thornyhead, sole (DTS) complex. Shortspine thornyhead would not be adversely affected by losses in biogenic structures such as sponges and corals and could even concentrate in areas of localized trawling or areas of low biogenic structure density (Du Preez & Tunnicliffe, 2011). Greater access to fishing grounds should increase benefit to the nation for food supply. When considering trawl RCAs, it may also be worthwhile to

consider the larger volume and greater diversity of healthy groundfish stocks that can be intercepted uniquely by bottom trawl gear. Bottom trawl gear is able to intercept a wide variety of healthy species, (mostly various flatfish) which are encountered less commonly using all other well-tested groundfish gear types. Figure 5-1 (below) illustrates volume of fish landed on the West Coast in 2011 (under the no-action alternative), bottom trawl gear landed catch (17,232 mt) was substantially higher than that seen with fixed gear groundfish gears (1,188 mt). Table 5-1 illustrates the estimated substrate miles (by substrate type that would be accessed to bottom trawl fishing gear year round under Alternative 1 (3,042 sq. mi.), most of which is still open to bottom trawling activity at different periods throughout the year. In addition, this alternative would maintain 1,374 square miles of trawl RCA closed to bottom trawling (

	100-150fm
Soft	1289
Mixed	47
Hard	38
Total	1374

Table 5-2).

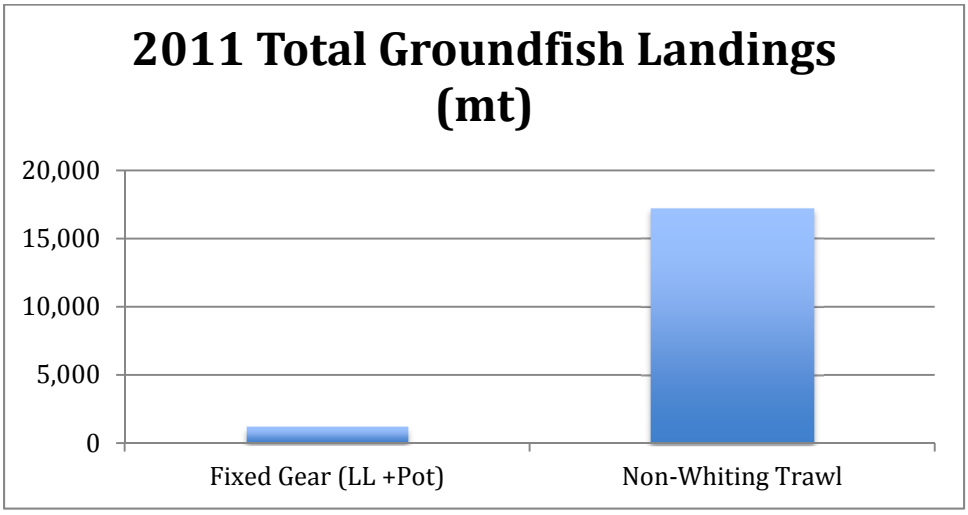


Figure 5-1. 2011 Fixed gear (longline and pot) groundfish landings and non-groundfish whiting trawl total landings (mt). Fixed Gear Source: 2011 TM report.

Alternative 1, Estimated Substrate Square Miles (not including EFH/GCA)

	75-100 fm	150-200fm	Total
Soft	1882	885	2767
Mixed	63	36	99
Hard	144	32	176
Total	2089	953	3042

Table 5-1: Estimated Substrate Square Miles within Alternative 1. Note: the majority of the shoreward area, and the seaward area north of 45° 45' N. lat. is area is already open throughout much of the year under the No-action Alternative.

	100-150fm
Soft	1289
Mixed	47
Hard	38
Total	1374

Table 5-2: Estimated Substrate Square Miles maintained as Rockfish Conservation Areas under Alternative 1

Alternative 2

The most likely potential impacts to target species under the action alternatives are higher attainment of the trawl allocation than would be expected under the no-action alternative. Alternative 2 opens some areas that have been intermittently closed, but not as much new areas as Alternative 1. Impacts to target species under Alternative 2 are anticipated to be similar to that described in Alternative 1, although to a lesser degree because depths between 150 fm and m200 fm would remain closed between 45°46' N. lat. and 40°10' N. lat.

5.1.4.2 **Non-target Species, Including Overfished Groundfish**

Since 2002, NMFS has used large-scale, depth-based, RCA closures to reduce catch of overfished rockfish in fisheries that take and retain groundfish, directing harvest of healthy stocks to areas that remained open.

5.1.4.2.1 Overfished Species

No Action

Over the history of the RCA, inseason changes to its boundaries have been made frequently, with accompanying analysis, to enable catch of target species, while at the same time, keeping bycatch of rebuilding stocks within established catch limits to facilitate timely rebuilding. Under the No Action alternative, the RCA is anticipated to keep bycatch of rebuilding stocks lower then Alternative 1 or Alternative 2.

Under all of the Alternatives (including the No-Action alternative), the important watershed changes to the trawl fishery under trawl rationalization mean that any of the alternatives presented in this environmental assessment present a relatively low risk to ACL accountability and rebuilding. These changes to the fishery include the individual accountability of catch shares management, as well as the advent of precise, near real-time data in the NMFS Vessel Account System, which accompanies this fishery, the West Coast Shorebased IFQ Program, in particular. This vessel accounts data system is a tool with which NMFS and the Council can both stay informed of daily changes in catch

and attainment, which enables a quick response to a potentially crucial groundfish conservation situation. This is dramatically faster than using pre-rationalization data previously allowed. Traditional landings data has an average lag time of three month, while observer data typically took up to one year to make discard estimates available.

Alternative 1

To assess the potential impacts of the alternatives on overfished groundfish species, NMFS undertook an analysis of relevant fishery-dependent data from logbooks, observer records, as well as paper and electronic landing receipts encompassing the past eight years.

Analysis of annual trawl bycatch rates (fishery-dependent, weighted average annual rates calculated from a combination of logbook, fish ticket, and observer data from five years previous to trawl rationalization), indicates that the probability of encountering canary rockfish (a main limiting bycatch species on the shoreward side) and darkblotched rockfish (historically, a primary limiting bycatch species on the seaward side), and Pacific ocean perch (another limiting bycatch species on the seaward side) will likely be higher than if the status quo boundaries remained in place.

However, analysis of post-rationalization haul-level observer data, as well as aggregate total catch data from the two years before and the two years after trawl rationalization does not suggest any obvious danger of either extreme catch events, or accumulated aggregate high catch of rebuilding species that would exceed the trawl allocation, by adopting proposed changes to the RCA boundaries. For example, during 2011 the largest hauls of canary rockfish and darkblotched rockfish, both traditionally strong limiting influences on attainment of target species in the trawl fishery, were just 1.21 percent, and 0.84 percent of each of their annual trawl allocations, respectively. Also, several liberalizing changes to the trawl RCA have already been made since 2011 without conservation incident under IFQ, and catch of rebuilding species remains much lower than during comparable pre-IFQ years.

Attainment of rebuilding species was low under IFQ management in 2011 (Agenda Item F.6.b, Supplemental NMFS Report: *West Coast Groundfish IFQ Fishery Catch Summary for 2011: First Look*), at 14 percent, 36 percent, 39 percent and 10 percent respectively. It was also low during 2012, after other shoreward and seaward line changes to the trawl RCA were made during 2011 and early 2012. Attainment rates for these same species in 2012 were: 28 percent, 36 percent, 45 percent and 6 percent, respectively (Agenda Item D.2.a, April, 2013 PFMC meeting, *Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012*). Total catch of currently rebuilding species under IFQ was lower in 2011 than 2010 (pre-IFQ management).

Although catch and attainment has increased for rebuilding species between 2011 and 2012, attainment of all rebuilding species (except petrale sole, which is managed as a target species under the rebuilding program) is well below the sector allocation, after two years of IFQ management; average annual total catch of these rebuilding species is substantially lower for 2011 and 2012 than 2009 and 2010 (Figure 5-4, Table 5-4).

Given the results of the bycatch analysis, consideration of change of management style from cumulative landing limits to IFQ, the precise individual accountability that this new management brings, and the continued availability of accountability measures under the new system, Alternative 1 specifically should pose little risk to rebuilding species by way of individual fishers staying within their allocations, and the IFQ program staying within the trawl allocations of rebuilding species. Alternative 1 should provide additional fishing opportunity for valuable target species, with little conservation risk to rebuilding stocks of groundfish.

Analysis

We analyzed three different data sets to gain insight into the potential effects of the proposed RCA boundary change on catch of rebuilding rockfish species: 1) Historical time-weighted average bycatch rates for rebuilding stocks. These latitude and depth-specific bycatch rates were derived from a combination of trawl logbooks and landings, both from the Pacific Fisheries Information Network (PacFIN) database, as well as observer data from the West Coast Groundfish Observer Program (WCGOP) of the NMFS Northwest Fishery Science Center (NWFSC), which covered the years 2006 through 2010. These data cover years before trawl rationalization, and were previously used as inputs for the trawl bycatch forecasting model, the primary tool for management of the groundfish bottom trawl fishery before IFQ management began in 2011. 2) The second data set consisted of total catch and attainment data for rebuilding stocks in the limited entry trawl sector, for two years before IFQ management, during 2009 and 2010, and the first two years of IFQ management, in 2011 and 2012; these historical total catch data were provided by WCGOP. Total catch data from the NMFS IFQ Vessel Accounts System were used for the first two years of IFQ management (2011 and 2012), in conjunction with the comparable WCGOP catch data. 3) Finally, the third data set was haul-level catch data from the IFQ program during 2011, from WCGOP. The 2011 fishing year was the most recent available at the time of this analysis. The 2012 haul-level data set will only be available in November of 2013.

We examined time-weighted average bycatch rates prior to rationalization from WCGOP, from 2006 to 2010, (Figure 5-2), which show increased bycatch rates of primarily canary rockfish, followed by darkblotched rockfish and Pacific ocean perch, in the area shoreward of 100 fm, versus the area shoreward of 75 fm; for yelloweye rockfish, the estimated bycatch rate is lower for the action alternatives. These data indicate that if the shoreward RCA were moved from 75 fm to 100 fm during periods 1, 2, and 6 of 2013 (Alternatives 1 and 2), that the probability of encountering canary rockfish, darkblotched rockfish, and Pacific ocean perch will likely be higher than under the No Action shoreward boundaries (Figure 5-2). Canary rockfish shows the largest change in historical bycatch rates on the shoreward side of the RCA. Canary rockfish is both distributed and managed as a rebuilding stock coastwide, including the area between 40°10’ and 48°10’ (PFMC SAFE 2008, Figure 5-2).

Similarly, if the seaward boundary is moved from the status quo configuration (Table 3-1) to the 150 fathom boundary year-round (under Alternative 1, Table 3-2), the

probability of encountering darkblotched rockfish and POP would be higher (Figure 5-2, Table 5-3). For the proposed seaward boundary moves, the data are shown in three strata, according to season.

These bycatch rates were available for major existing management areas only (i.e. from 40°10' to 48°10', 36° to 40°10', and 34°27' to 36° N. lat. Thus, the finer stratification necessary for a specific quantitative analysis of Alternative 2 was not possible using the currently available data. Thus, it is discussed in comparison with Alternative 1.

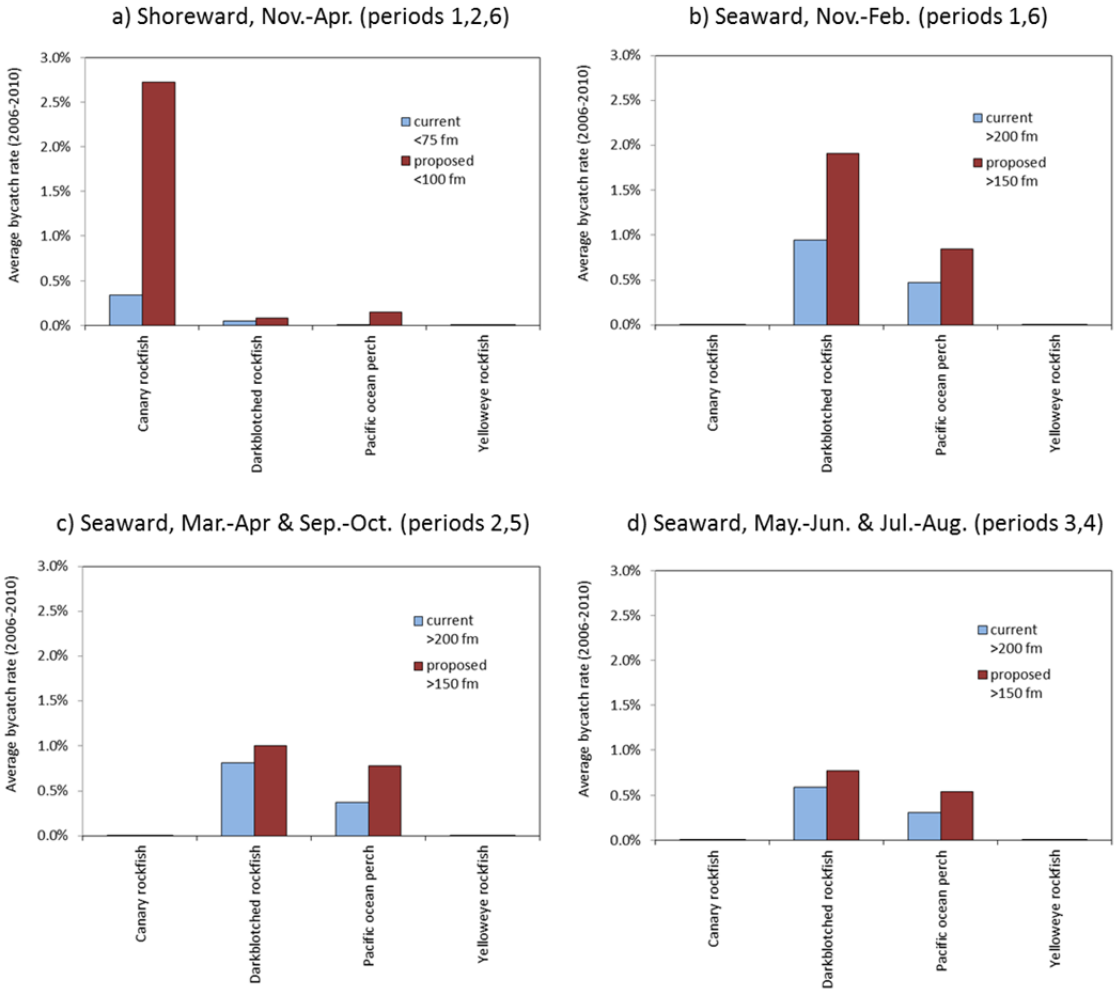


Figure 5-2: Comparison of historical time-weighted average annual bycatch rates of rebuilding species (2006-2010, prior to trawl rationalization), under the current RCA configuration (No Action), versus the proposed configuration (Alternative 1), for the area between 40°10' and 48°10' N. lat., during the seasons listed. A substantial difference in historical bycatch rates is indicated for canary rockfish with movement of the shoreward boundary, and for the seaward boundary, the largest absolute differences in bycatch rates are seen for darkblotched rockfish, and less so for Pacific ocean perch.

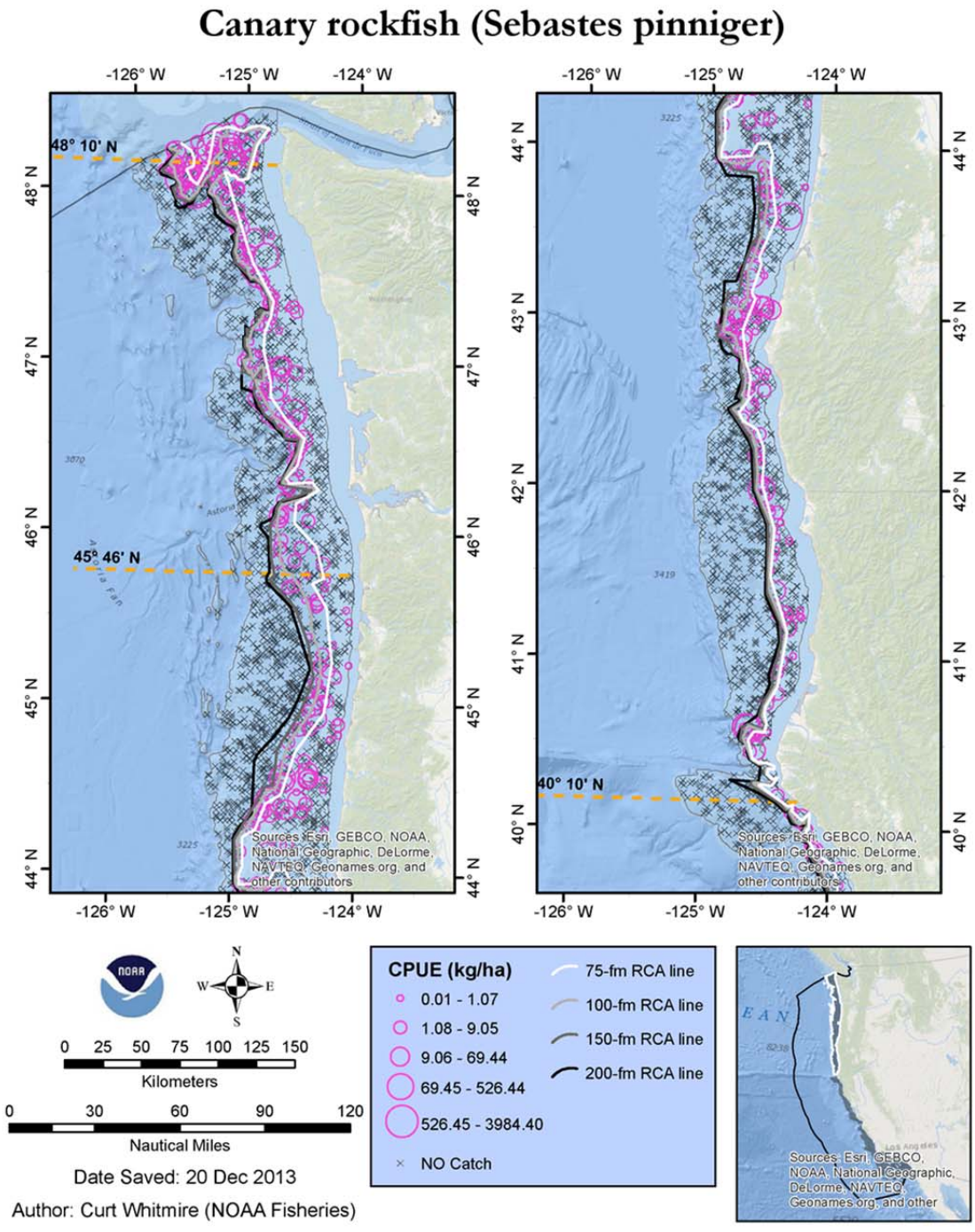


Figure 5-3. Map panels showing locations of standardized catch (units: kg/ha) of canary rockfish (Sebastes pinniger) recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of canary rockfish are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones.

Table 5-3: Historical time-weighted average annual bycatch rates of rebuilding species (2006-2010, prior to trawl rationalization), under the current RCA configuration (No Action), versus the proposed configuration (Alternative 1), for the area between 40°10' and 48°10' N. lat., during the seasons listed. A substantial difference in historical bycatch rates is indicated for canary rockfish with change in the shoreward boundary, and for the proposed seaward boundary change, the largest differences in bycatch rates are seen for darkblotched rockfish. The "proposed-current" field indicates the subtractive change in bycatch rate between areas (e.g. <100fm rate, minus <75fm rate).

a) Shoreward, November-April (periods 1,2,6)

Species	Current <75 fm	Proposed <100 fm	Proposed - current
Canary rockfish	0.3400%	2.7210%	2.3810%
Darkblotched rockfish	0.0496%	0.0793%	0.0297%
Pacific ocean perch	0.0005%	0.1509%	0.1504%
Yelloweye rockfish	0.0105%	0.0063%	-0.0042%

b) Seaward, average seasonal bycatch rates and standard deviation among seasonal rate estimates.

Species	Current >200 fm	S.D. >200 fm	Proposed >150 fm	S.D. >150 fm	Proposed - current
Canary rockfish	0.0021%	0.0020%	0.0022%	0.0015%	0.0001%
Darkblotched rockfish	0.7815%	0.1811%	1.2284%	0.4451%	0.4470%
Pacific ocean perch	0.3830%	0.0860%	0.7203%	0.0914%	0.3374%
Yelloweye rockfish	0.00013%	0.00006%	0.00027%	0.00025%	0.00013%

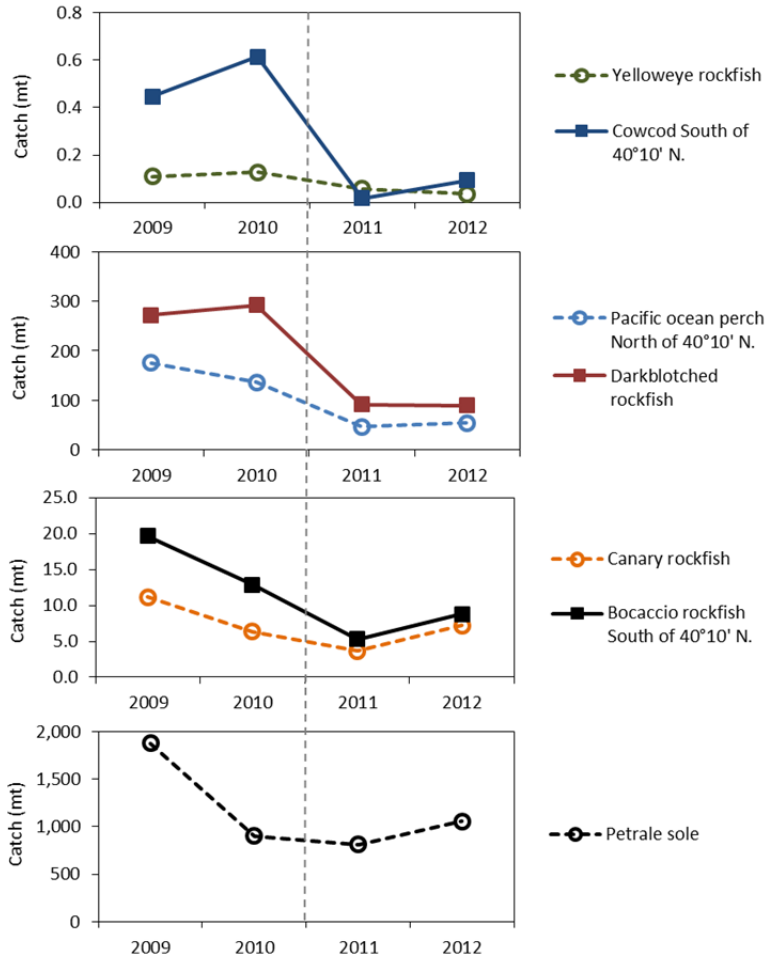


Figure 5-4. Total annual catch of rebuilding species from 2009 and 2010, in the limited entry (LE) trawl and shoreside whiting sectors, as well as 2011 and 2012, in the Shorebased IFQ Program, in metric tons. Source = WCGOP Groundfish Mortality Report (2009-2010) and the Shorebased IFQ Program, Vessel Accounts System (2011-2012). The grey, dashed, vertical line separates pre-IFQ years (left) from IFQ years (right) in this sector. The current IFQ program includes both LE trawl and shoreside whiting sectors. Taken from *Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012* (Agenda Item D.2.a, April, 2013 PFMC meeting).

Table 5-4: Total annual catch of rebuilding species from 2009 and 2010, in the limited entry trawl and shoreside whiting sectors, as well as 2011 and 2012, in the Shorebased IFQ Program, in metric tons. Two-year average catch, and average annual catch in 2011-12 as a percentage of that of 2009-10 is presented in the far right column ("post/pre IFQ"). Source = WCGOP Groundfish Mortality Report (2009-2010) and the Shorebased IFQ Program, vessel accounts system (2011-2012). The current IFQ program includes both LE trawl and shoreside whiting sectors. Taken from Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012 (Agenda Item D.2.a, April, 2013 PFMC meeting).

Species	2009	2010	2009-2010 avg.	2011	2012	2011-2012 avg.	post/pre %
Yelloweye rockfish	0.11	0.13	0.12	0.06	0.03	0.05	39.3%
Cowcod S. of 40°10' N.	0.45	0.61	0.53	0.02	0.09	0.06	10.4%
Canary rockfish	11.16	6.39	8.78	3.69	7.23	5.46	62.2%
Bocaccio rockfish S. of 40°10' N.	19.71	12.93	16.32	5.31	8.83	7.07	43.3%
Pacific ocean perch N. of 40°10' N.	175.41	136.55	155.98	46.01	53.59	49.80	31.9%
Darkblotched rockfish	272.32	291.84	282.08	90.84	89.64	90.24	32.0%
Petrale sole	1881.91	900.37	1391.14	811.76	1057.54	934.65	67.2%

Observer data

Shoreward boundary

On the shoreward side, we focused further analysis on canary rockfish, because it showed the largest bycatch rate, the largest absolute difference in rates, and because it has been an important limiting influence on attainment of valuable target species in shallow waters. We examined observer data from 2011 for canary-positive hauls, by depth and latitude for inference of likelihood of an extreme catch event (often referred to as a "disaster tow"), given the available data (Figure 5-5). During 2011, the shoreward trawl RCA was only at 100 fm during Period 4 (July and August); aside from exceptions in depth due to RCA line routes; note that Figure 4-2 reflects this. We see that more than 96 percent (575 of 599) hauls shallower than 100 fm yielded less than 50 pounds of canary rockfish; 98 percent (587 of 599) of hauls shallower than 100 fm were smaller than 100 pounds. Only eleven hauls yielded more than 100 pounds, and the largest one yielded 693 pounds. The average haul weight was 10.94 pounds, minimum was 0.01 pounds, and the standard deviation was 36.11 pounds.

The largest haul, of 693 pounds was 1.21 percent of the canary rockfish IFQ allocation (57,100 pounds) in that year, 2011, when the annual IFQ attainment of this species was 14 percent (28 percent in 2012). The distribution of canary rockfish catch by haul depth is shown in Figure 5-6.

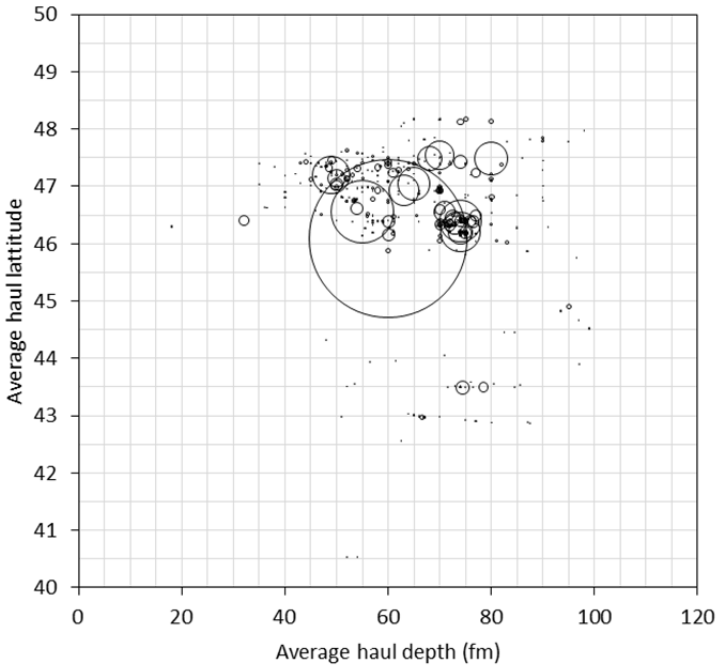


Figure 5-5. Relative weights of canary rockfish per haul using trawl gear, north of 40°10' N. lat., shoreward of the RCA, during 2011 under IFQ, plotted versus average haul latitude and average haul depth (fm); bubble width represents weight of canary rockfish per haul.

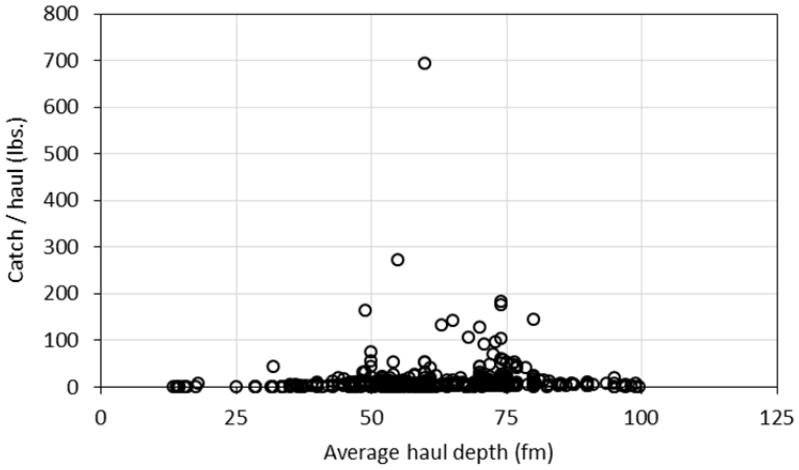


Figure 5-6. Distribution of canary rockfish catch by haul depth using trawl gear, north of 40°10' N. lat., shoreward of the RCA, during 2011 in the IFQ fishery.

These data, together with low catch of rebuilding species during the first two years of IFQ, suggest that the probability of an extreme catch event, or "disaster tow", i.e. one tow which would catch enough canary rockfish so that it would lead to exceeding the IFQ program allocation is relatively low, assuming similar fisher behavior as during 2011 and 2012.

The same shoreward boundary change was made for periods 3 through 5 during 2012 at the March 2012 Council meeting, without a subsequent conservation incident. It is important to note

that the difference in historical canary rockfish bycatch rates between the area shoreward of 75 fm versus shoreward of 100 fm was smaller for the boundary change in periods 3 through 5 (*Agenda Item F.6.b Supplemental GMT Report, March 2012*) than the one currently proposed.

Fishing behavior, and bycatch rates in these areas and time periods, could potentially be different than those observed during pre-IFQ, or during 2011 the first year of the program, given the variation in catch among months that was observed for many species within and between years under IFQ management so far.

Seaward boundary

On the seaward side, we focused more closely on darkblotched rockfish because it showed the largest difference in average bycatch rate from the current to the proposed boundary, and it has traditionally been a strong limiting influence on access to seaward target species in the trawl fishery. Although yelloweye rockfish also showed a high difference in historical bycatch rate between the current and proposed seaward boundaries, it shows one of the lowest catch rates, and attainment rates in the trawl fishery, at just six percent of the allocation, in 2012.

We examined observer data from 2011 for darkblotched-positive hauls, by depth and latitude for inference of likelihood of a "disaster tow", given the available data (Figure 5-7). During 2011, the seaward trawl RCA was at 150 fm during periods 3-6 (May through December), for the area between 45°46' and 48°10' N. lat.; aside from exceptions in depth due to RCA line routes; note that Figure 4-4 reflects this. It should also be noted that during 2011, the seaward boundary was at the modified 200 fathom line during periods 1 and 2, north of 40°10' N. lat. as well as during Period 6 (except between 45°46' and 48°10' N. lat., where it was at 150fm). The modified 200 fathom line is modified to exclude certain petrale sole areas from the RCA, and thus it allows access in some shallower areas than the regular 200 fathom line.

For darkblotched rockfish, we see that 94.5 percent (2520 of 2667) hauls deeper than 150 fm yielded less than 250 pounds of darkblotched rockfish; 98 percent (2616 of 2667) of hauls deeper than 150 fm were smaller than 750 pounds. Fifty-one hauls yielded more than 750 pounds, and the largest one yielded 4641 pounds (0.84 percent of the trawl allocation, which was 552,997 pounds). During 2011, the total attainment of darkblotched rockfish in the IFQ program was 36 percent (it was the same in 2012 as well). The average haul weight was 67.1 pounds, minimum was 0.0003 pounds, and the standard deviation was 281.20 pounds. The distribution of darkblotched rockfish catch by haul depth is shown in Figure 5-8.

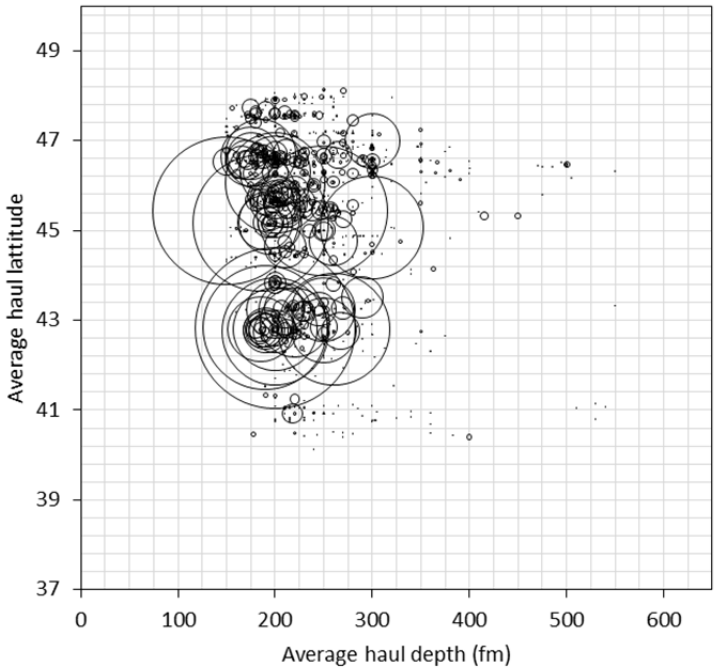


Figure 5-7. Relative weights of darkblotched rockfish per haul using trawl gear, north of 40°10' N. lat., seaward of the RCA, during 2011 under IFQ, plotted versus average haul latitude and average haul depth (fm); bubble width represents weight of canary rockfish per haul.

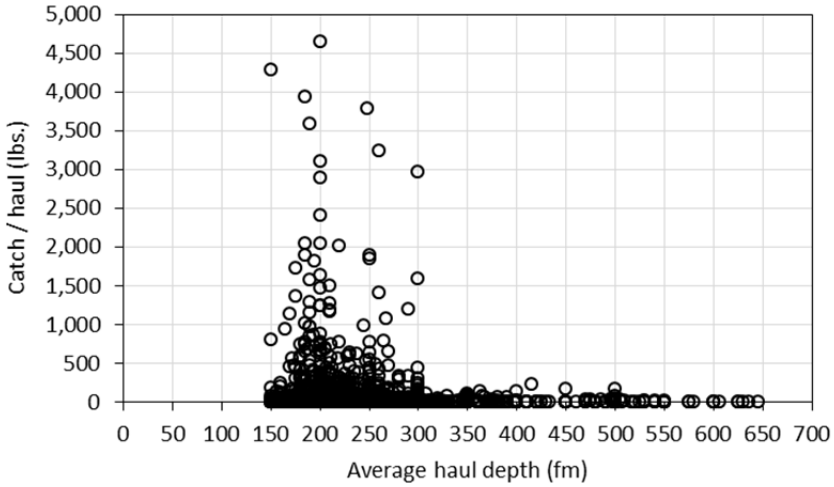


Figure 5-8. Distribution of darkblotched rockfish catch by haul depth using trawl gear, north of 40°10' N. lat., seaward of the RCA, during 2011 in the IFQ fishery.

IFQ management and accountability measures

Additionally, the current catch share management system of Individual Fishing Quotas provides sufficient controls to prevent exceeding either the trawl allocation or the Annual Catch Limit (ACL) for trawl-dominant species. This is accomplished by way of individual accountability of fishers themselves. Typical inseason accountability measures (AMs) still exist, which include inseason adjustment of RCA boundaries as routine inseason measure.

According to groundfish regulations, inseason accountability measures may be taken to prevent a trawl allocation or ACL from being exceeded, or to mitigate it. Under existing regulations at 50 CFR 660.140(a)(3), the Shorebased IFQ program may be restricted or closed as a result of projected overages within the Shorebased IFQ program. Area restrictions, season closures, or other measures can be used to prevent the shorebased IFQ sector from exceeding an ACL, OY, ACT or formal allocation. In addition, to prevent exceeding the ACL for a rebuilding stock such as canary or darkblotched rockfish, inseason action such as changes to the trawl RCA (e.g. push the seaward trawl RCA out to 250 fm for the remainder of the year to sharply restrict catch of darkblotched rockfish, or pull the shoreward trawl RCA into either 75 or 50 fm, or even to the shore, to sharply restrict catch of canary rockfish), maybe implemented quickly if necessary (50 CFR 660.60(c)). Other accountability measures, such as withholding surplus carryover of a species to restrict its catch in the coming year, are also available in the IFQ program.

Alternative 2

Under Alternative 2, unlike Alternative 1, the seaward boundary from 45°46' to 40°10' N. lat. would be established year-round as the modified 200 fathom. Under Alternative 1, the seaward boundary would also be moved from 40°10' to 45°46' N. lat., from the current mix of 200 fathom and modified 200 fathom lines throughout the year, to the 150 fathom line year-round. Thus, one would expect substantially less potential for an increase in bycatch of these two rebuilding species due to implementing Alternative 2 versus Alternative 1; both the area affected by Alternative 2 and the additional time that area would be open relative to No Action are much smaller. The distribution patterns of these slope species are also relevant. Darkblotched rockfish is distributed fairly evenly along the coast, north of 40°10', with its highest density being concentrated north of 38° N. lat. (PFMC SAFE 2008, Figure 5-9); which also supports Alternative 2 incurring substantially less bycatch of darkblotched than Alternative 1. However, Pacific ocean perch shows a much more northerly distribution pattern within the area between 40°10' to 48°10' N. lat., with its highest density north of 42° N. lat. (PFMC SAFE 2008, Figure 5-10). This suggests that Alternative 2, which makes a smaller seaward boundary change from 40°10' to 45°46', would show less decrease from Alternative 1, in terms of expected change in bycatch of POP than that of darkblotched rockfish. Alternative 2 includes a much smaller change to the seaward boundary than Alternative 1, and thus would be expected to exert substantially less influence on bycatch of slope species on the seaward side.

Making the changes according to Alternative 2, which changes the seaward area between 40°10' and 45°46' N. lat. to the modified 200 fm line year-round (rather than moving it to 150 fm) presents even less of a risk in terms of bycatch of slope rockfish rebuilding species, such as darkblotched rockfish or Pacific ocean perch, than Alternative 1 (moving boundaries in all areas requested by industry).

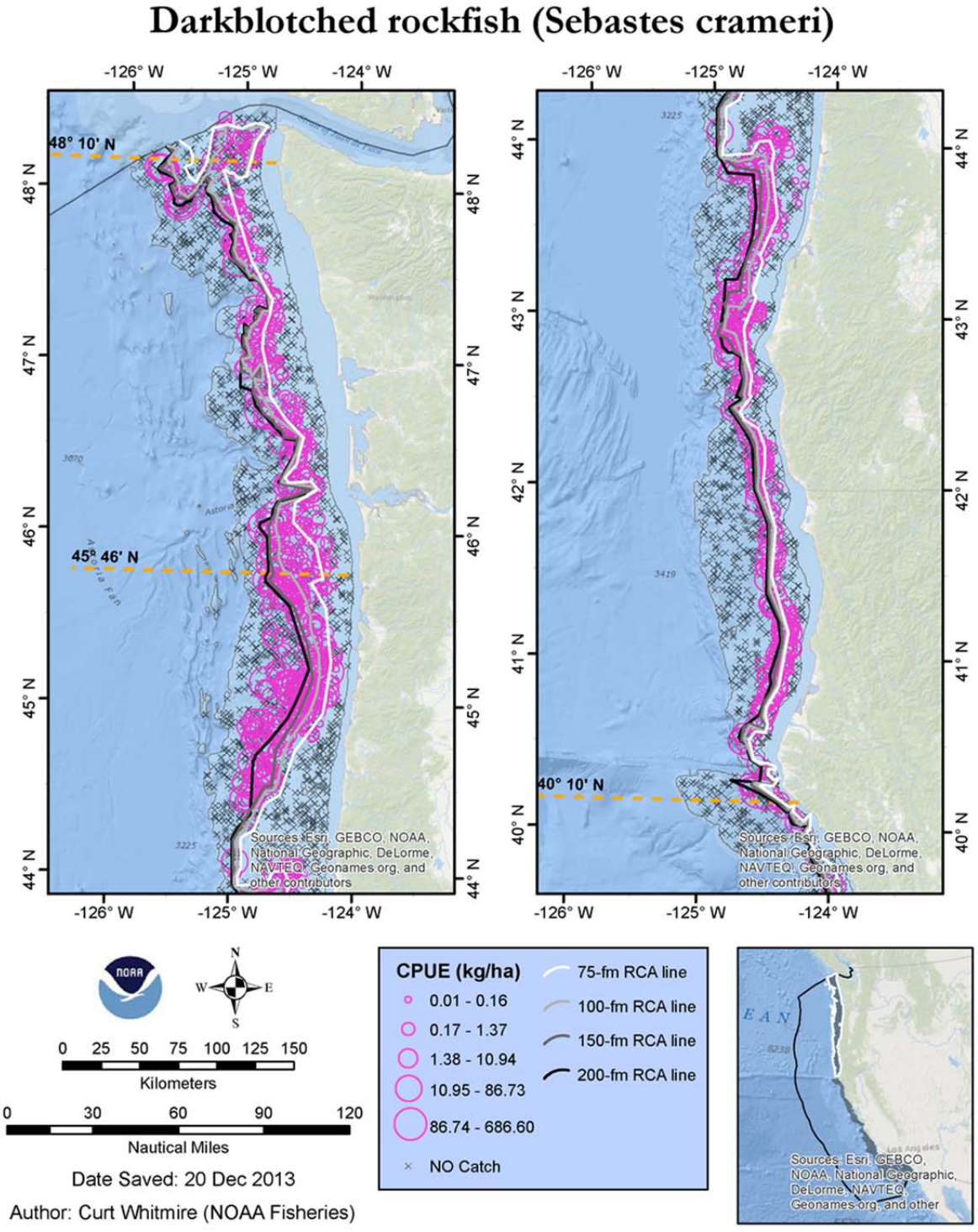


Figure 5-9. Map panels showing locations of standardized catch (units: kg/ha) of darkblotched rockfish (*Sebastes crameri*) recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of darkblotched rockfish are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones.

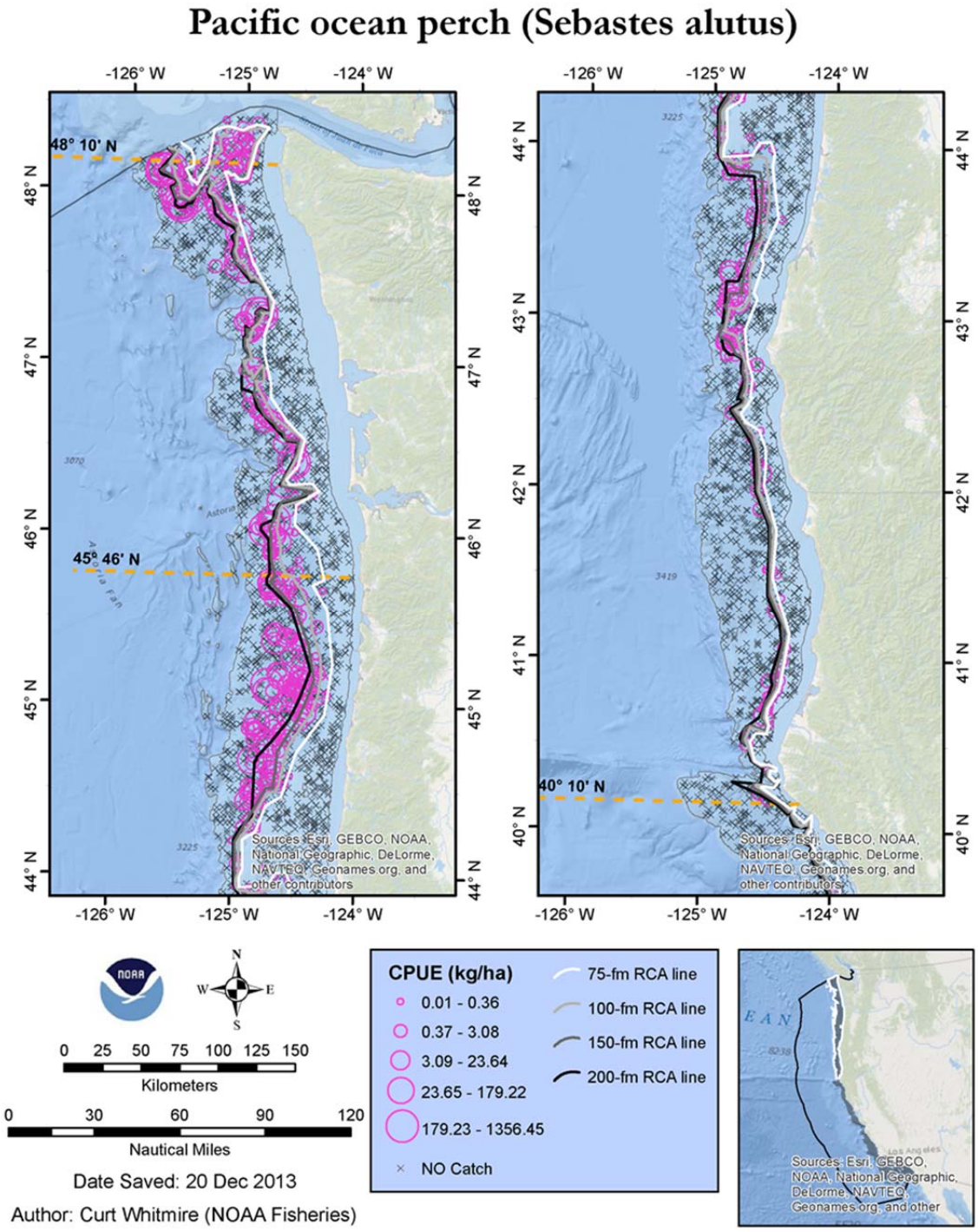


Figure 5-10. Map panels showing locations of standardized catch (units: kg/ha) of Pacific ocean perch rockfish (*Sebastes alutus)* recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of Pacific ocean perch rockfish are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones.

Other selected species of interest

Six additional species were selected as foci for analysis, in response to a request from members of the Pacific Fishery Management Council (the Council), at their September 2012 meeting. Those species were spiny dogfish shark (*Squalus acanthias*), longnose skate (*Raja rhina*), petrale sole (*Eopsetta jordani*), rougheye rockfish (*Sebastes aleutianus*), aurora rockfish (*Sebastes aurora*), and shortraker rockfish (*Sebastes borealis*). Petrale sole is of interest since it is currently categorized as an overfished stock, and is managed as a target species under a rebuilding plan. The other five species are important due to potentially high vulnerability to fishing mortality, because of their life history characteristics. For example, spiny dogfish sharks have low fecundity, long lifespan, internal fertilization, and a two-year gestation period, making them slow to recover from potential overfishing. The longnose skate, another elasmobranch, shares many of those life history traits. The other three species are slope rockfishes that are managed as part of species complexes; management as part of a complex, together with their long lifespan and low fecundity may make them more vulnerable to overfishing than those managed individually. These six species are all trawl-dominant in the groundfish fishery; this is evident from examining catch data among all sectors for 2002 through the present.

The alternatives propose opening different amounts of additional commercial trawl fishing areas, which are currently closed as part of the Rockfish Conservation Area (RCA). Alternative 1 would open the greatest amount of area compared to status quo, followed by Alternative 2. None of the alternatives appear to present great risk to the species in this analysis (but read caveats below), and the amount of risk generally varies according to the amount of new fishing area opened. The risk to each species also varies according its own spatial distribution of both encounters and catch per unit area (CPUE), where the newly opened area is (northern or southern area, and depth range), and the length of time proposed for the opening. However, there are caveats. These data are insufficient to reach a conclusion for shortraker rockfish, which scarcely appears in the survey. They may be inadequately represented by the trawl survey sampling due to some distributional or behavioral characteristic of the species, such as affinity for certain habitat. Rougheye rockfish encounters were relatively scarce in the survey data, though they appeared much more often than shortraker. Therefore the results should be interpreted with caution, as the distribution of this species may also not be well represented by these trawl samples, especially at fine scale. However, these are the best available data, and we have taken precautions to make appropriately limited inferences.

These six species vary in how they are managed. The range of management measures for these species includes the following: components of complexes, or individual species; with either individual trip limits, no limits at the species level, unlimited individual trip limits, or quotas in the IFQ fishery rather than trip limits.

Petrale sole and longnose skate are managed with individual annual catch limits (ACLs) and overfishing limits (OFLs), while spiny dogfish, aurora rockfish, rougheye rockfish, and

shortraker rockfish have contribution OFLs and are managed under an ACL established at the stock complex level. Over the most recent two years for which all-sector catch data are available under trawl rationalization, petrale sole and longnose skate harvests have stayed within their ACLs, while the three rockfish species have exceeded their contribution OFLs. Aurora and rougheye rockfish were assessed in 2013, and were determined to be above their target depletion levels (not overfished), with estimates of 64 and 47 percent of the virgin spawning stock biomass, respectively.

Analysis

Data from the Northwest Fisheries Science Center (NWFSC) Shelf-Slope Survey, years 2003-2012 were used as the primary source of information for this analysis. This source consists of tow-level data over many years, at a fine scale of depth and latitude.

Our general approach was to examine how frequently each species was encountered at specific depth ranges and areas (corresponding to RCA boundaries, and the areas specified in the alternatives, respectively), and when a species was caught, to investigate the relative sizes of mean CPUE estimates and associated among-tow variance within those strata.

We scrutinized encounter frequencies for each species, as proportion of hauls taken within each stratum. We calculated CPUE from those hauls, which were positive for each species. That is, for the hauls in which a particular species was caught, we calculated the weight of those fish in kilograms, divided by the area swept in hectares. We plotted and tabulated these values, along with measures of variance. We used two area strata: a northern area of from 40°10' N. latitude to 45°46' N. latitude, and a southern area from 45°46' N. latitude to 48°10' N. latitude. We used binned trawl depth as a proxy for RCA zone. Depth bins were constructed using actual depth of trawl (as provided by the NWFSC shelf-slope survey) in accordance to the RCA boundaries in question for this potential action. The bins used were as follows: less than 75fm, 75-100fm, 100-150fm, 150-200fm, 200-250fm, and greater than 250fm. The NWFSC provided GIS maps with CPUE of each species overlain as a bubble plot by location (both positive and zero hauls), along with the four most prominent RCA boundaries, and latitude lines pertinent to the analysis. Data were pooled across years of the survey to enable sufficient sample size to estimate mean CPUE, and encounter frequencies within the depth and area strata necessary for the analysis.

Additionally, we used a data product from the West Coast Groundfish Observer Program (WCGOP, of the NWFSC) containing annual estimates of total fishing mortality, discard, and landings for all observed species and sectors in the groundfish fishery, from 2002 through 2011. We also used the 2012 report on groundfish mortality from WCGOP (Bellman et al. 2013) and reports on the Pacific Coast Shorebased IFQ Program (Matson 2012, 2013) for much of the discussion.

No Action Alternative

This section describes relevant baseline information for each species, including their distributions of survey encounter frequency, CPUE among positive hauls, and relevant aspects of biology and management. Table 5-5 shows the total number of hauls, number of positive hauls for each species, and the encounter frequency for each species, as a proportion of total number of hauls within each depth and area stratum, showing those encounter frequencies in paneled column plots. Trends for the different species are apparent, and are discussed under the different alternatives.

Table 5-6, Table 5-7, and Table 5-8, as well as Figure 5-12 show the distribution of mean CPUE for positive tows, among depth and area strata for each species. Figure 5-13 through Figure 5-17 show bubble plots of relative CPUE values for positive tows, according to depth and latitude. Figure 5-18 through Figure 5-22 show GIS maps with CPUE of each species overlain as a bubble plot by location (both positive and zero hauls), along with the four most prominent RCA boundaries, and latitude lines pertinent to the analysis.

Petrale sole and longnose skate are managed as individual species, with their own ACL, ABC and ACL. Petrale sole is also an IFQ species category, managed under quotas. Spiny dogfish is managed as part of the Other Fish species complex. Aurora, rougheye, and shortraker rockfish, are managed as components of two species complexes: Minor Slope Rockfish North of 40°10', and Minor Slope Rockfish South of 40°10' N. latitude. These rockfish complexes area managed as IFQ species categories, with their own aggregate quotas.

Table 5-9 shows estimated fishing mortality, and harvest specifications for the six species of interest and applicable management areas, during the two most recent years with available data. Aurora, rougheye, and shortraker rockfish have exceeded their contribution OFLs for the most recent two years for which data are available.

Petrale sole

Petrale sole is reported to be found from the surf line to 550m, and adults migrate seasonally between deep winter spawning areas to shallower spring feeding grounds (Status of the Pacific Coast Groundfish Fishery, Vol. 1, 2008, PFMC, http://www.pcouncil.org/wp-content/uploads/SAFE_2008_March.pdf). Modified RCA boundaries exist to allow or deny access to those spring feeding grounds (e.g. modified 150fm, modified 180fm, and modified 200fm lines).

From these data, we see that the highest encounter frequencies of petrale sole (>0.95 of hauls in the north and south) were at depths shallower then 75fm during the time of sampling (Table 5-5, Figure 5-11). Encounter frequencies taper steadily downward from there with increasing depth, all the way to zero in the northern area and 0.002 in the southern area, at depths greater than 250fm. CPUE for petrale positive hauls follows a similar trend (Table 5-5, Table 5-6, Figure 5-11, Figure 5-12).

It is notable that the survey data were gathered from late May through mid-September, and so they likely present a biased picture toward a shallower distribution than if sampling had occurred during winter months as well, when petrale sole are occupying deeper waters (See Figure 5-13).

Spiny dogfish

The distribution of spiny dogfish CPUE can be characterized as generally shallow coastwide, with highest encounter frequencies and highest CPUE among positive hauls at shallower than 200fm (Table 5-5, Table 5-6, Figure 5-13). Encounter frequency is generally higher in the northern area, especially in shallow areas (<75fm and 75-100fm). The encounter frequency for spiny dogfish peaks at 0.745 in the 75-100fm depth range in the northern area, at 0.665 in the 100-150fm range in the southern area, and tapers of dramatically with increasing depth, to less than 0.02 in both areas.

Mean CPUE among positive hauls is substantially higher in the northern area, in large part due to infrequent, extreme catch events. These attributes are evident in Figure 5-14 and Figure 5-19. The vast majority of dogfish positive tows within each stratum yield little catch, with 75 percent of tows having a CPUE of 0.0008 kg/ha or less; 97.5 percent of hauls had a CPUE of 0.011 kg/ha or less. However, there are infrequent high catch events; the 99.5 percentile included tows with CPUE estimates of 0.075 kg/ha or higher, with a maximum of 1.248 kg/ha. This particularly uneven distribution produces very high among-haul variance estimates, with the highest CV values at nearly eight times the mean. These extreme catch events do not necessarily indicate specific areas of very high density, but likely reflect schooling behavior. Sex-specific migratory behaviors have been observed in the spiny dogfish (*S. acanthias*), a close relative of *S. suckleyi*, where individuals travel in dense groups, comprised of one sex, and are rarely found in mixed sex groups (Jensen, 1966; Ketchen, 1986; Taylor et al. 2013). Similar behavior has been anecdotally reported in *S. suckleyi*.

Longnose skate

Longnose skate has the most even distribution of both encounter frequency and CPUE of positive hauls, of the six species (Table 5-5, Table 5-6, Figure 5-11, Figure 5-12, Figure 5-15, Figure 5-20). Encounter frequency increases from the shallow toward the middle depth bins of 100-150 fm, to a peak of greater than 0.95 in both areas, and tapers off again toward greater depth, dropping sharply from the 200fm bin to the greater than 250fm bin (to 0.25 or less) in both the northern and southern areas. Sample sizes for CPUE estimates are consistently high across area and depth strata, and CVs for CPUE range from 80 to 140 percent of the mean, reflecting a relatively consistent CPUE among tows, within each stratum (Table 5-5, Table 5-6, Figure 5-11, Figure 5-12).

Aurora rockfish

Aurora rockfish is more frequently encountered in the southern area than the northern, and is found in deeper waters. Encounter frequency is highest within the 200-250fm range (0.58 northern, 0.85 southern) and drops sharply in neighboring depth bins. Mean CPUE among aurora positive hauls was twice as high in the 200-250fm bin in the South as in the same depth bin in the North (0.00025 kg/ha versus 0.0001 kg/ha, respectively). Sample sizes for CPUE estimates in many strata were very low, except for deepest strata in the southern region, thus many estimates are omitted from the tables (Table 5-5, Table 5-7). Also see Figures, (Figure 5-11, Figure 5-12, Figure 5-16, Figure 5-21).

Rougheye rockfish

Rougheye rockfish was encountered more frequently in the northern area than southern area. It showed a similar depth profile between areas. It appeared in more than half of the tows in the 100fm to 150fm and 150fm to 200fm ranges in the northern area, and in the southern area it appeared at a rate of 0.26 of tows across the same depth range. However, sample sizes were generally low for CPUE estimation across all depth by area strata, thus many estimates are omitted from the tables (Table 5-5, Table 5-7). Also see figures (Figure 5-11, Figure 5-17, Figure 5-22). Although the sample sizes are low within strata for making CPUE estimates, some general trends in relative CPUE by depth and area are evident (Figure 5-17, Figure 5-22).

Shortraker rockfish

Shortraker rockfish was very seldom encountered in the survey; it appeared in only five tows in total, all deeper than 150fm. It appeared with encounter frequencies ranging from 0.0028 to 0.0192. Thus, there are not enough samples for reliable CPUE estimation among positive hauls (Table 5-5, Table 5-7, Figure 5-11).

Alternative 1 –100fm-150fm RCA in both northern and southern areas

As a reminder, Alternative 1 consists of a reduction in size of the current RCA to between 100fm and 150fm throughout the northern and southern areas. Implementing Alternative 1 would result in changing the shoreward boundary in both the northern and southern areas during November through April from 75fm to 100fm. It would also mean changing the seaward boundary from the modified 200fm line to the 150fm line during January and February in the northern area, and during November through February in the southern area. It would also result in changing the seaward boundary from the 200fm line to the 150fm line during March through October.

Petrale sole

Under Alternative 1, changes are proposed to move the shoreward boundary from the 75fm line to the 100fm line, from November through April. According to the survey data, both the encounter frequency and CPUE in positive hauls are somewhat lower in the 75-100fm zone than the area shallower than 75fm (Table 5-5, Table 5-6, Figure 5-11, Figure 5-13). However, the proposed boundary change would take place outside the survey-sampling season. The expected encounter frequency and CPUE distributions would both likely shift to greater depths during November through April than reflected in the survey data, due to petrale sole's migration pattern (described under No Action). More adult fish are expected to be found at deeper spawning sites, and in transition zones during the period of the proposed change.

Alternative 1 would enable more access to petrale sole on the shoreward side of the RCA. On the seaward side, the proposed change would also enable additional access to petrale sole, likely to a greater degree than reflected in these data, due to the difference in survey sampling season, from the time of the proposed change to RCA boundaries, and petrale sole seasonal migration.

As mentioned under No Action, petrale sole is highly trawl dominant with 94 percent of the catch estimated to have come from the IFQ fishery in 2012. It is managed under individual fishing quotas, with full accountability for total catch and 100 percent observer coverage. Attainment of petrale in the IFQ fishery is very high, between 93 and 98 percent of all allowable quota pounds in recent years. Retention of this species has been between 98 and 99 percent under IFQ management.

Under the current system, judging from its performance during the first three years, it is unlikely that the trawl allocation of this species would be exceeded due to the proposed liberalizations to the RCA under Alternative 1.

Spiny dogfish

Alternative 1 would open up additional area for encounters with spiny dogfish, both on the shoreward and seaward sides of the current RCA. This species is managed with species-specific trip limits as part of the other fish complex, has a high discard rate (81 percent in shoreside bottom trawl sector in 2011) and is trawl dominant, with the majority of catch coming from shoreside non-hake bottom trawl, and shoreside hake trips.

Both the northern and southern areas show relatively high encounter frequencies with this species in the shoreward area which is proposed to be opened (Table 5-5, Figure 5-11). Mean CPUE is also substantially higher in that area, at depths between 75 and 100fm, compared to the zone currently open, at less than 75fm. The size and frequency of extreme catch events is higher in the proposed shoreward area as well. The highest outlier CPUE values occurred between 75 and 100fm, in the northern area (Table 5-6, Figure 5-12). Thus, one may reasonably expect to see a noticeable increase in catch of spiny dogfish in the northern area under Alternative 1. However, catch in the fishery is not necessarily expected to follow proportionately according to the higher

survey encounter rates and CPUE, since this species is rarely targeted, and most fishermen actively avoid it, whereas the survey strives to take a representative sample.

Encounter frequency and CPUE among positive hauls were both very low between 150 and 200fm, in both the northern and southern areas, so little impact is expected on this species from the proposed seaward change.

Spiny dogfish has stayed well within its contribution OFL in the past two years of available all-sector catch data, at 76 percent in 2011 and 38 percent in 2012.

Longnose skate

Alternative 1 would open additional area for encounters with longnose skate, both on the shoreward and seaward sides of the current RCA. This species is managed with trip limits (currently set to "unlimited"), has a relatively low recent discard rate (10.3 percent in shoreside bottom trawl sector in 2011) and is trawl dominant, with the majority of catch coming from shoreside non-hake bottom trawl sector. Longnose skate is managed under its own ACL, which was attained at a rate of 84 percent in 2011 and 73 percent in 2012.

Both the northern and southern areas show high encounter frequencies with this species in both the shoreward and seaward areas (0.914 and 0.942, respectively), which are proposed to be opened (Table 5-5, Figure 5-11). The current shoreward area is already open to 100fm from May through October.

One may reasonably expect to see a noticeable increase in catch of longnose skate in both northern and southern areas, in the seaward and shoreward areas under Alternative 1. However, catch in the fishery is not necessarily expected to follow proportionately according to the higher survey encounter rates and CPUE, since fishermen can potentially avoid the species, and given relatively low recent discard rates, reducing currently unlimited landing limits may work toward restricting catch if it is needed. High encounter rates throughout most commonly fished depth strata in both areas could indicate some difficulty for fishermen to avoid the species, and landing limits may increase discards. However, looking at CPUE for longnose positive hauls, catch rates are highest in intermediate depths, and taper off substantially in areas shallower than 75fm and deeper than 250fm, indicating a potential means of reducing encounters with this species.

Aurora rockfish

The highest encounter rates for aurora rockfish were in areas already open for trawling, from 200-250fm, in both the northern and southern areas. CPUE was higher in the southern area, although sample sizes for CPUE estimates were generally low, except in the 200-250fm zone in the southern area. This indicates that the proposed action under Alternative 1 is unlikely to have a substantial effect on catch of aurora rockfish.

Rougheye rockfish

Rougheye rockfish encounters were relatively scarce in the survey data. Therefore the results should be interpreted with caution, as the distribution of this species may not be well represented by these trawl samples, especially at fine scale. However, these are the best available data, and we have taken precautions to make appropriate inferences.

Rougheye rockfish encounter frequencies were highest in the 150-200fm, and the 200-250fm depth zones, and were similar between them, but encounter rates were higher in the northern area than the southern one (Table 5-5, Figure 5-11). Under Alternative 1, the shoreward change is expected to have a small effect on rougheye rockfish catch, judging from the distribution of positive tows, and CPUE by depth strata (Table 5-5, Table 5-8, Figure 5-11, Figure 5-17).

Sample sizes were critically low for estimating mean CPUE for positive hauls within many of these areas by depth strata. However, trends in relative CPUE by depth and area are evident (Figure 5-17, Figure 5-22), where the 150fm-200fm depth range appears to have substantially lower CPUE values than the 200fm-250fm depth range (figure 5-17). Thus, we pooled the data between areas to increase the sample size, and saw that same apparent difference in coastwide mean CPUE estimates for rougheye positive hauls (Table 5-8).The mean CPUE for the 150fm-200fm depth range (proposed for opening) is just one third that of the 200fm-250fm depth range, which is already open for fishing.

In the northern region, the proposed seaward change is only for January and February under this alternative. In the North, the frequency of rougheye-positive tows is only slightly higher in the 150fm-200fm zone, than the 200-250fm zone; in the 150fm-200fm depth range rougheye rockfish also shows approximately one third the mean CPUE of the neighboring seaward depth zone, which is currently open (Table 5-8). Thus, in the northern area, the effect of opening the new seaward area would not appear to be substantial, judging from these data.

In the southern area, encounter frequencies are roughly half that of the northern area, within the same depth stratum (150fm-200fm), but the new seaward area is proposed to be opened year-round. Thus the effect (as a change from status quo) of the new seaward boundary in the southern region could be as large or larger than that for the northern region.

Shortraker rockfish

Shortraker rockfish was very seldom encountered in the survey; it appeared in only five tows in total, which all occurred deeper than 150fm. It appeared with encounter frequencies ranging from 0.0028 to 0.0192. There are not enough samples for reliable CPUE estimation among positive hauls (Table 5-5, Table 5-7, Figure 5-11). Thus it is difficult to make any reliable inferences about the effects of the proposed action from these data, other than the species is rarely caught in the sampled areas, with the type of gear and fishing strategy used in the survey.

Alternative 2 – 100fm-150fm RCA in the northern area; 100fm to modified-200fm in southern area

While Alternative 1 would reduce the size of the current RCA to between 100 and 150fm throughout both northern and southern areas, Alternative 2 would make a more modest change to the seaward boundary in the southern area; it would result in an RCA of between 100 and 150fm in the northern area, and between 100fm and the modified 200fm line in the southern area. The seaward boundary in the southern area would change from the 200fm line to the modified 200fm line from March to October.

The same expectations exist for all species under Alternative 2 as for Alternative 1 in the northern area, since the proposed boundaries are the same. Only potential differences for the southern area are discussed for each species below.

Petrale sole

In the southern area, there would be less access into shallower areas of the 150fm-200fm zone via the seaward boundary of the RCA under Alternative 2 than Alternative 1. The modified 200fm line includes several small areas which allow incursion into that shallower area, which are intended to give increased access to petrale sole. The extent of advantage of those areas is not evident from the survey data (Figure 5-13), which were gathered primarily during June through September, when adult petrale sole tend to be toward the shallower end of their distribution.

Alternative 2 would result in more access to petrale sole during March through October than No Action, on both the shoreward and seaward sides of the RCA, but should result in less opportunity to catch petrale sole in the southern area than Alternative 1.

Spiny dogfish

In the southern area, there would be less access into shallower areas via the seaward boundary of the RCA under Alternative 2 than Alternative 1. Alternative 2 would result in less opportunity to catch spiny dogfish in the southern area during March through October than Alternative 1.

The expectations for access to spiny dogfish impacts are similar to those for petrale sole, under Alternative 2, only in that both species share relatively shallow distributions. However, the two species are very different biologically and in terms of their management. These differences include that spiny dogfish is managed for trawl catch under trip limits (petrale under quotas), it is primarily discarded (petrale is nearly all retained), catch of spiny dogfish is very unevenly distributed (petrale's CPUE distribution is much more even, without the extreme catch events seen in spiny dogfish), and spiny dogfish would take much longer to recover from overfishing than the productive petrale sole stock, due to the life history characteristics discussed under No Action.

Longnose skate and rougheye rockfish

There would be less access to longnose skate on the seaward side of the RCA, in the southern area under Alternative 2 than Alternative 1 during March through October, but more than No Action. Relatively high encounter frequencies and CPUE are seen the in the proposed area, although there are areas of similar encounter frequency and CPUE already open now.

Aurora rockfish

The peaks of aurora rockfish's encounter frequency and tow CPUE are seen in the southern area, between 200fm and 250fm. Areas that would be opened under either Alternative 2 or Alternative 1 show a much lower encounter frequency and CPUE than the seaward area that is currently open. Although since the area proposed to be opened on the seaward side in the southern area is smaller under Alternative 2 than under Alternative 1, the difference in impact is expected to be small between the two.

Shortraker rockfish

There are too few data to make inferences regarding this species under this alternative. See comments under Alternative 1.

Table 5-5. Total number of hauls, number of positive hauls for each species, and the frequency of encounter for each species, within each depth and area stratum. Data from the NWFSC Shelf-Slope Survey, years 2003-2012.

Area	Depth bin	N hauls	N dogfish	Freq. dogfish	N long-nose	Freq. long-nose	N petrale	Freq. petrale	N rough-eye	Freq. rough-eye	N aurora	Freq. aurora	N short-raker	Freq. short-raker
North	<75	401	227	0.56608	291	0.72569	382	0.95262	13	0.03242	0	0	0	0
	75-100	268	199	0.74254	245	0.91418	214	0.79851	44	0.16418	0	0	0	0
	100-150	108	73	0.67593	103	0.9537	64	0.59259	21	0.19444	1	0.00926	0	0
	150-200	52	29	0.55769	49	0.94231	5	0.09615	29	0.55769	7	0.13462	1	0.01923
	200-250	52	13	0.25	46	0.88462	1	0.01923	26	0.5	30	0.57692	1	0.01923
	>250	362	7	0.01934	65	0.17956	0	0	7	0.01934	16	0.0442	1	0.00276
South	<75	630	216	0.34286	416	0.66032	604	0.95873	4	0.00635	0	0	0	0
	75-100	212	141	0.66509	196	0.92453	189	0.89151	19	0.08962	0	0	0	0
	100-150	193	141	0.73057	186	0.96373	88	0.45596	14	0.07254	4	0.02073	0	0
	150-200	163	81	0.49693	148	0.90798	11	0.06748	43	0.2638	29	0.17791	0	0
	200-250	231	45	0.19481	195	0.84416	6	0.02597	60	0.25974	197	0.85281	2	0.00866
	>250	735	8	0.01088	185	0.2517	2	0.00272	5	0.0068	84	0.11429	0	0
Sum/Agg.		3407	1180	0.34635	2125	0.62372	1566	0.45964	285	0.08365	368	0.10801	5	0.00147

Figure 5-11. Paneled column plots illustrating relative encounter frequencies for each of the six species of interest, grouped by depth bin and area ("north" = 45°46' to 48°10', and "south" = 40°10' to 45°46'). See Table 5-5 for actual values. Data from the NWFSC Shelf-Slope Survey, years 2003-2012.

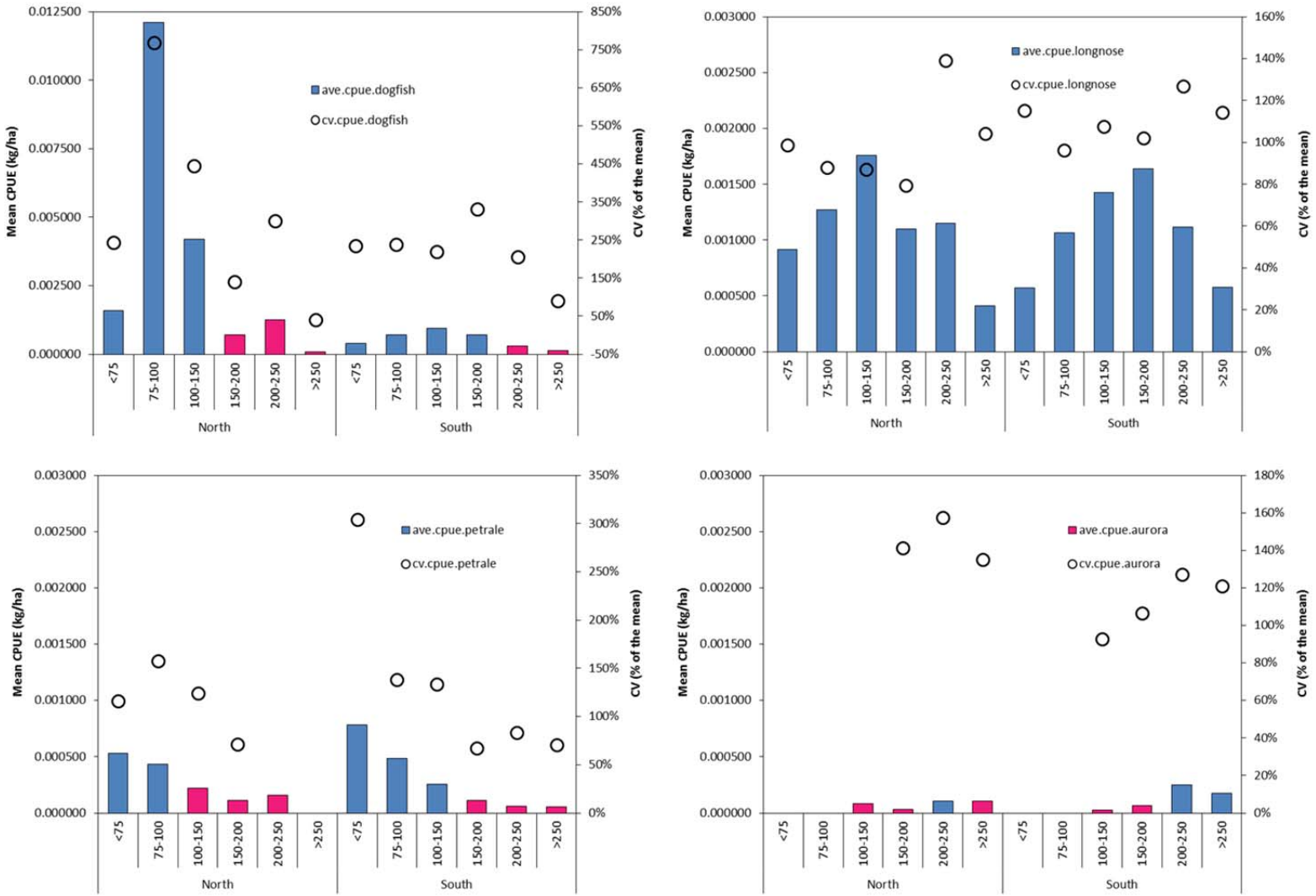


Figure 5-12. Mean survey trawl catch per unit effort (CPUE, kg/ha, axis limits vary), and among-haul coefficient of variance (CV, %, separate axis), of those hauls which were positive for spiny dogfish shark, longnose skate, petrale sole, or aurora rockfish (accordingly), by depth and area. Mean CPUE axes in charts for longnose skate, petrale sole, and aurora rockfish are magnified to more than 4X that of the spiny dogfish chart, to make them visually discernible. Estimates shown by pink columns were produced from a sample size of less than thirty hauls, and were omitted from the tables due to (Caption continued next page)

concerns for reliability, but were preserved in the chart to illustrate a potential trend which is consistent with literature and other data for these species. Survey CPUE of rougheye and shortraker rockfish are not presented here due to low sample sizes within these strata. The among-haul variance is presented as a CV (%), and on a separate axis, in order to fit it onto the same chart. Among-haul variation is especially high for spiny dogfish shark, where the standard deviation is often nearly eight times the value of the mean (shown by a CV of nearly 800%); CVs are routinely higher than 200 percent for this species, due to its spotty distribution. See text for explanation.

Table 5-6. Average survey bottom trawl catch per unit effort (CPUE, kg/ha), standard deviation (std. dev.), coefficient of variation (CV, %), and number of positive hauls (N) for each species. Estimates calculated from hauls that were positive for each species. Data from the NWFSC Shelf-Slope Survey, years 2003-2012. CPUE estimates for species with a sample size of less than 30 are not presented due to concerns of reliability. Estimates of CPUE with corresponding high among-haul CV (e.g. spiny dogfish shark), should be interpreted with caution. See text for explanation.

		Spiny dogfish shark				Longnose skate				Petrale sole			
Area	depth bin (fm)	Ave. CPUE dogfish	Std. Dev. CPUE dogfish	CV CPUE dogfish	N dogfish	Ave. CPUE longnose	Std. Dev. CPUE longnose	CV CPUE longnose	N longnose	Ave. CPUE petrale	Std. Dev. CPUE petrale	CV CPUE petrale	N petrale
North	<75	0.001603	0.003900	243%	227	0.000918	0.000907	99%	291	0.000532	0.000620	116%	382
	75-100	0.012101	0.093031	769%	199	0.001270	0.001116	88%	245	0.000433	0.000682	157%	214
	100-150	0.004198	0.018662	445%	73	0.001757	0.001532	87%	103	0.000224	0.000279	124%	64
	150-200	-	-	-	29	0.001096	0.000870	79%	49	-	-	-	5
	200-250	-	-	-	13	0.001149	0.001597	139%	46	-	-	-	1
	>250	-	-	-	7	0.000410	0.000427	104%	65	-	-	-	0
South	<75	0.000407	0.000959	236%	216	0.000571	0.000659	115%	416	0.000785	0.002385	304%	604
	75-100	0.000709	0.001691	239%	141	0.001066	0.001025	96%	196	0.000483	0.000669	139%	189
	100-150	0.000941	0.002061	219%	141	0.001428	0.001536	108%	186	0.000254	0.000339	134%	88
	150-200	0.000710	0.002346	330%	81	0.001638	0.001672	102%	148	-	-	-	11
	200-250	0.000308	0.000636	206%	45	0.001117	0.001416	127%	195	-	-	-	6
	>250	-	-	-	8	0.000579	0.000661	114%	185	-	-	-	2

Table 5-7. Average survey bottom trawl catch per unit effort (CPUE, kg/ha), standard deviation (std. dev.), coefficient of variation (CV, %), and number of positive hauls (N) for each species. Data from the NWFSC Shelf-Slope Survey, years 2003-2012. CPUE estimates for species with a sample size of less than 30 are not presented due to concerns of reliability. Estimates of CPUE with corresponding high among-haul CV (e.g. spiny dogfish shark) should be interpreted with caution. See text for explanation.

		Rougheye rockfish				Aurora rockfish				Shortraker rockfish			
Area	**Depth bin (fm)**	**Ave. CPUE rougheye**	**Std. Dev. CPUE rougheye**	**CV CPUE rough-eye**	**N rough -eye**	**Ave. CPUE aurora**	**Std. Dev. CPUE aurora**	**CV CPUE aurora**	**N long auror a**	**Ave. CPUE short-raker**	**Std. Dev. CPUE shortraker**	**CV CPUE short-raker**	**N short-raker**
North	<75	-	-	-	13	-	-	-	0	-	-	-	0
	75-100	.000056	.000078	1.394967	44	-	-	-	0	-	-	-	0
	100-150	-	-	-	21	-	-	-	1	-	-	-	0
	150-200	-	-	-	29	-	-	-	7	-	-	-	1
	200-250	-	-	-	26	0.000108	0.000171	1.576591	30	-	-	-	1
	>250	-	-	-	7	-	-	-	16	-	-	-	1
South	<75	-	-	-	4	-	-	-	0	-	-	-	0
	75-100	-	-	-	19	-	-	-	0	-	-	-	0
	100-150	-	-	-	14	-	-	-	4	-	-	-	0
	150-200	0.000178	0.000180	1.012580	43	-	-	-	29	-	-	-	0
	200-250	0.000713	0.001996	2.798910	60	0.000250	0.000318	1.271152	197	-	-	-	2
	>250	-	-	-	5	0.000176	0.000213	1.209410	84	-	-	-	0

Table 5-8. Average survey bottom trawl catch per unit effort (CPUE, kg/ha), standard deviation (std. dev.), coefficient of variation (CV, %), and number of positive hauls (N) for rougheye rockfish. Data have been pooled between areas to increase sample sizes and increase reliability of mean CPUE estimates. Data are from the NWFSC Shelf-Slope Survey, years 2003-2012. CPUE estimates for species with a sample size of less than 30 are not presented due to concerns for reliability. Estimates of CPUE with corresponding high among-haul CV should be interpreted with caution. See text for explanation.

Depth bin (fm)	Ave. CPUE rougheye	Std. Dev. CPUE rougheye	CV CPUE rougheye	N CPUE rougheye
<75	-	-	-	17
75-100	0.000055	0.000070	128%	63
100-150	0.000053	0.000059	111%	35
150-200	0.000234	0.000319	136%	72
200-250	0.000685	0.001760	257%	86
>250	-	-	-	12

Table 5-9. Estimated fishing mortality, and applicable harvest specifications for the six species of interest, and management areas, during the two most recent years available. Petrale sole and longnose skate are managed as individual species, with their own ACL, ABC and ACL. Petrale sole is also an IFQ species category, managed under quotas. Spiny dogfish is managed as part of the Other Fish species complex. The three rockfish species, aurora, rougheye, and shortraker rockfish, are managed as components of two species complexes: Minor Slope Rockfish North of 40°10', and Minor Slope Rockfish South of 40°10' N. latitude. These rockfish complexes area managed as IFQ species categories, with their own aggregate quotas.

Year 2011	Estimated fishing mortality	ACL	Percent of ACL	ABC	Percent of ABC	OFL or *contributing OFL*	% of OFL or *contrib. OFL*
Petrale sole	953.2	976	98%	976	98%	1,021	93%
Longnose skate	1,133.1	1,349	84%	2,990	38%	3,128	36%
Spiny dogfish	1,661.7	-	-	-	-	*2,200*	*76%*
Aurora rockfish N. 40°10'	20.7	-	-	-	-	*17.3*	*119%*
Aurora rockfish S. 40°10'	7.0	-	-	-	-	*29.4*	*24%*
Rougheye rockfish N. 40°10'	207.1	-	-	-	-	*78.3*	*265%*
Rougheye rockfish S. 40°10'	0.4	-	-	-	-	*0.5*	*72%*
Shortraker rockfish N. 40°10'	28.3	-	-	-	-	*22.0*	*128%*
Shortraker rockfish S. 40°10'	0.0	-	-	-	-	*0.1*	*0%*
Shortraker/rougheye rockfish N. 40°10'	0.3	-	-	-	-	*NA*	*NA*

Year 2012	Estimated fishing mortality	ACL	Percent of ACL	ABC	Percent of ABC	OFL or *contributing OFL*	% of OFL or *contrib. OFL*
Petrale sole	1,110.7	1,160	96%	1,222	91%	1,279	87%
Longnose skate	991.0	1,349	73%	2,873	34%	3,006	33%
Spiny dogfish	830.8	-	-	-	-	*2,200*	*38%*
Aurora rockfish N. 40°10'	20.1	-	-	-	-	*17.0*	*118%*
Aurora rockfish S. 40°10'	25.2	-	-	-	-	*29.4*	*86%*
Rougheye rockfish N. 40°10'	236.7	-	-	-	-	*78.0*	*303%*
Rougheye rockfish S. 40°10'	0.46	-	-	-	-	*0.5*	*92%*
Shortraker rockfish N. 40°10'	28.3	-	-	-	-	*21.8*	*130%*
Shortraker rockfish S. 40°10'	0.0	-	-	-	-	*0.1*	*0%*
Shortraker/rougheye rockfish N. 40°10'	38.5	-	-	-	-	*NA*	*NA*

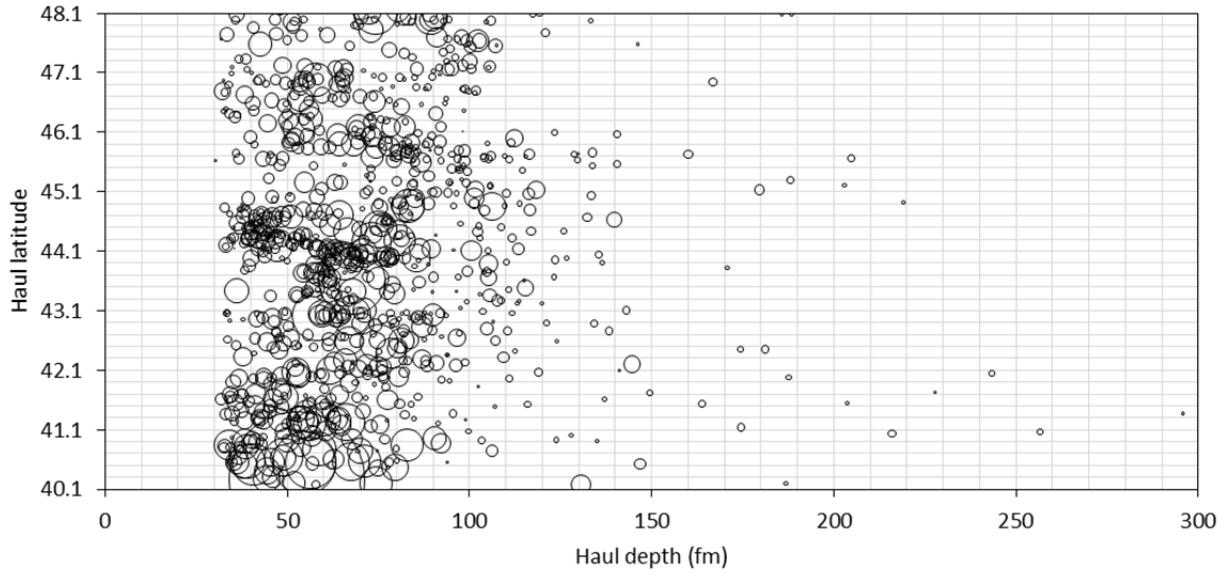


Figure 5-13. Bubble plot of survey haul CPUE by latitude and depth (fm) for petrale sole. Area of circles indicates relative value of CPUE per tow. Plots are constructed for comparison among tows, only within the same chart, not among different ones. Data from the NWFSC shelf-slope survey, years 2003-2012.

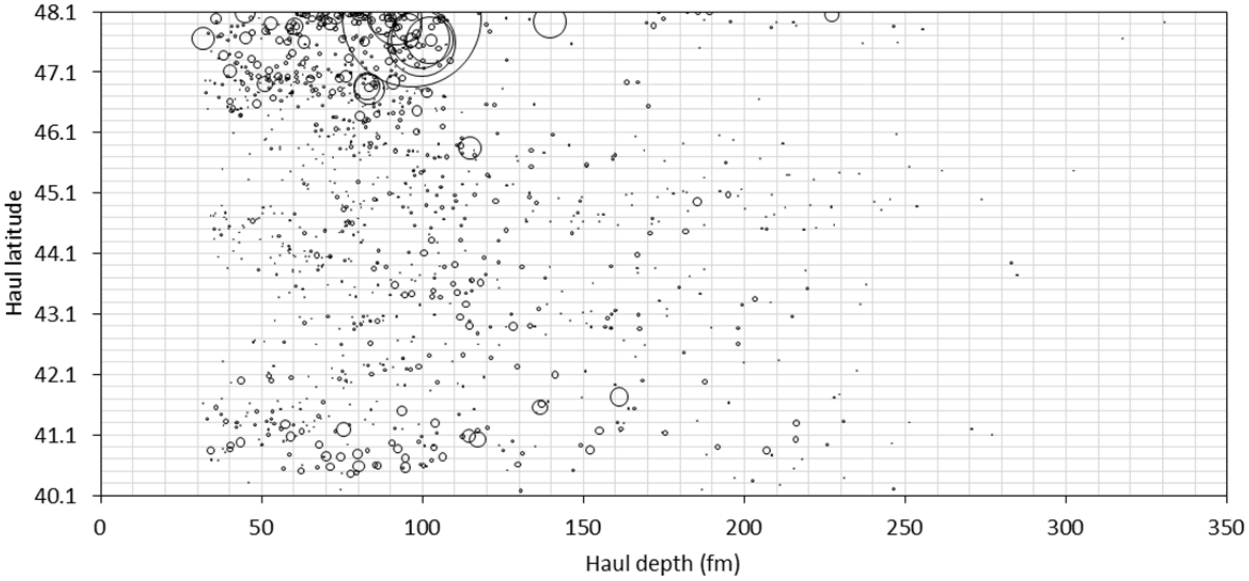


Figure 5-14. Bubble plot of survey haul CPUE by latitude and depth (fm) for spiny dogfish shark. Area of circles indicates relative value of CPUE per tow. Plots are constructed for comparison among tows, only within the same chart, not among different ones. Data from the NWFSC shelf-slope survey, years 2003-2012.

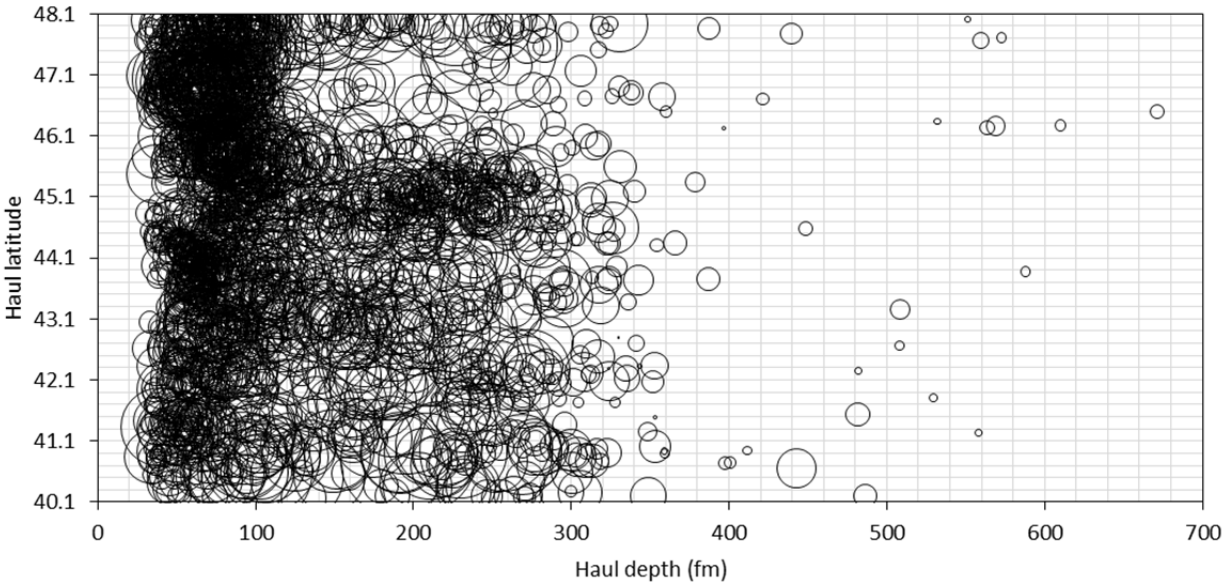


Figure 5-15. Bubble plot of survey haul CPUE by latitude and depth (fm) for longnose skate. Area of circles indicates relative value of CPUE per tow. Plots are constructed for comparison among tows, only within the same chart, not among different ones. Data from the NWFSC shelf-slope survey, years 2003-2012.

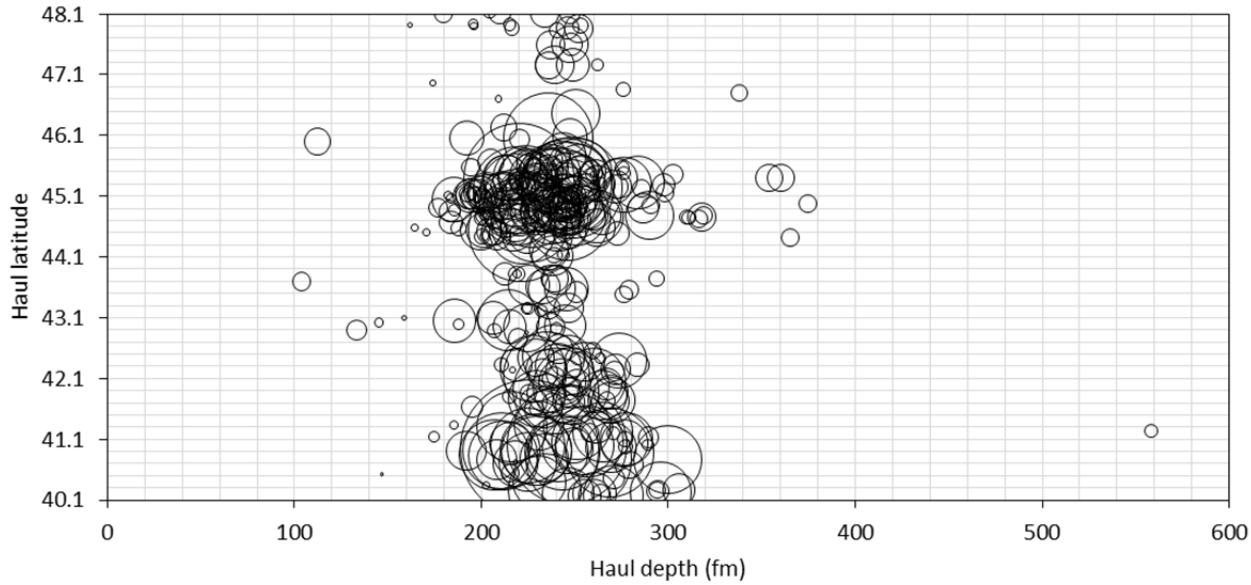


Figure 5-16. Bubble plot of survey haul CPUE by latitude and depth (fm) for aurora rockfish. Area of circles indicates relative value of CPUE per tow. Plots are constructed for comparison among tows, only within the same chart, not among different ones. Data from the NWFSC shelf-slope survey, years 2003-2012.

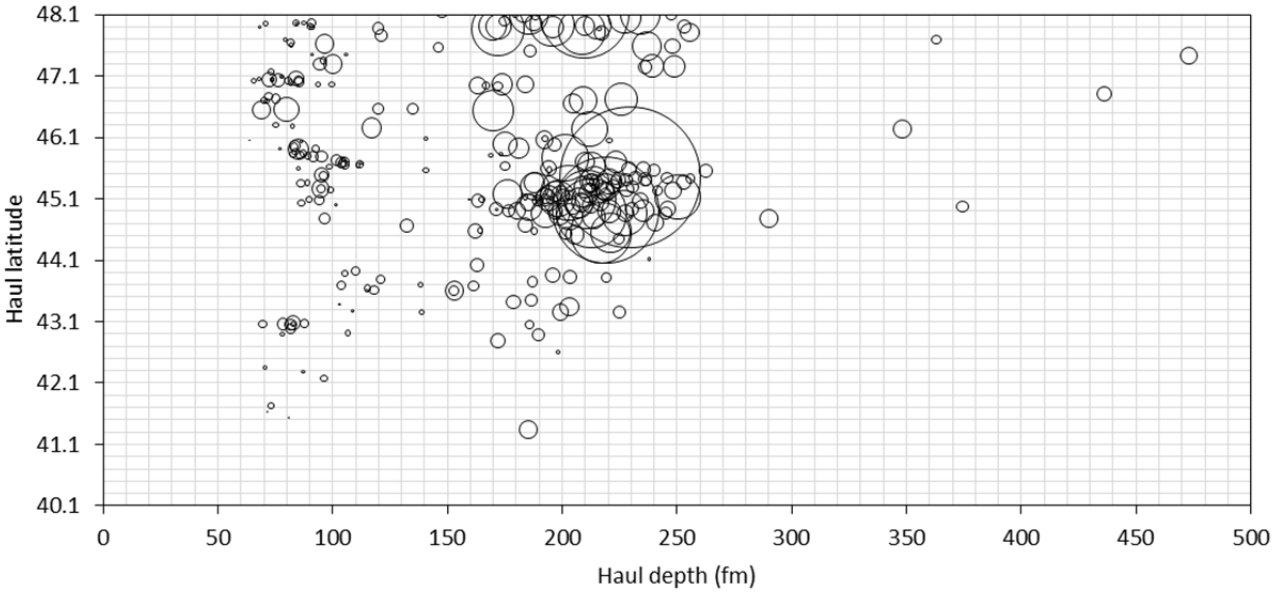


Figure 5-17. Bubble plot of survey haul CPUE by latitude and depth (fm) for rougheye rockfish. Area of circles indicates relative value of CPUE per tow. Plots are constructed for comparison among tows, only within the same chart, not among different ones. Data from the NWFSC shelf-slope survey, years 2003-2012.

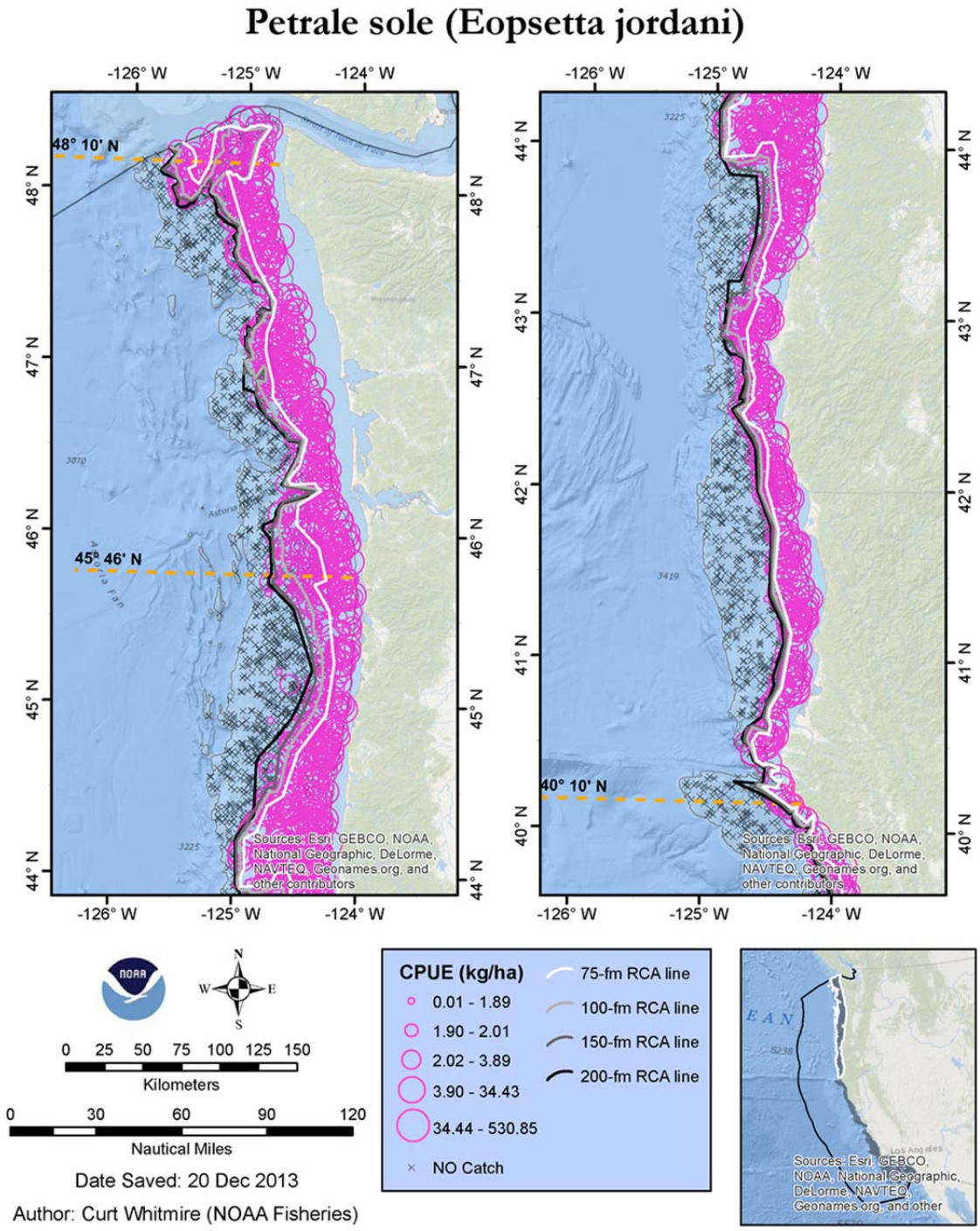


Figure 5-18. Map panels showing locations of standardized catch (units: kg/ha) of petrale sole (*Eopsetta jordani*) recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of petrale sole are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones.

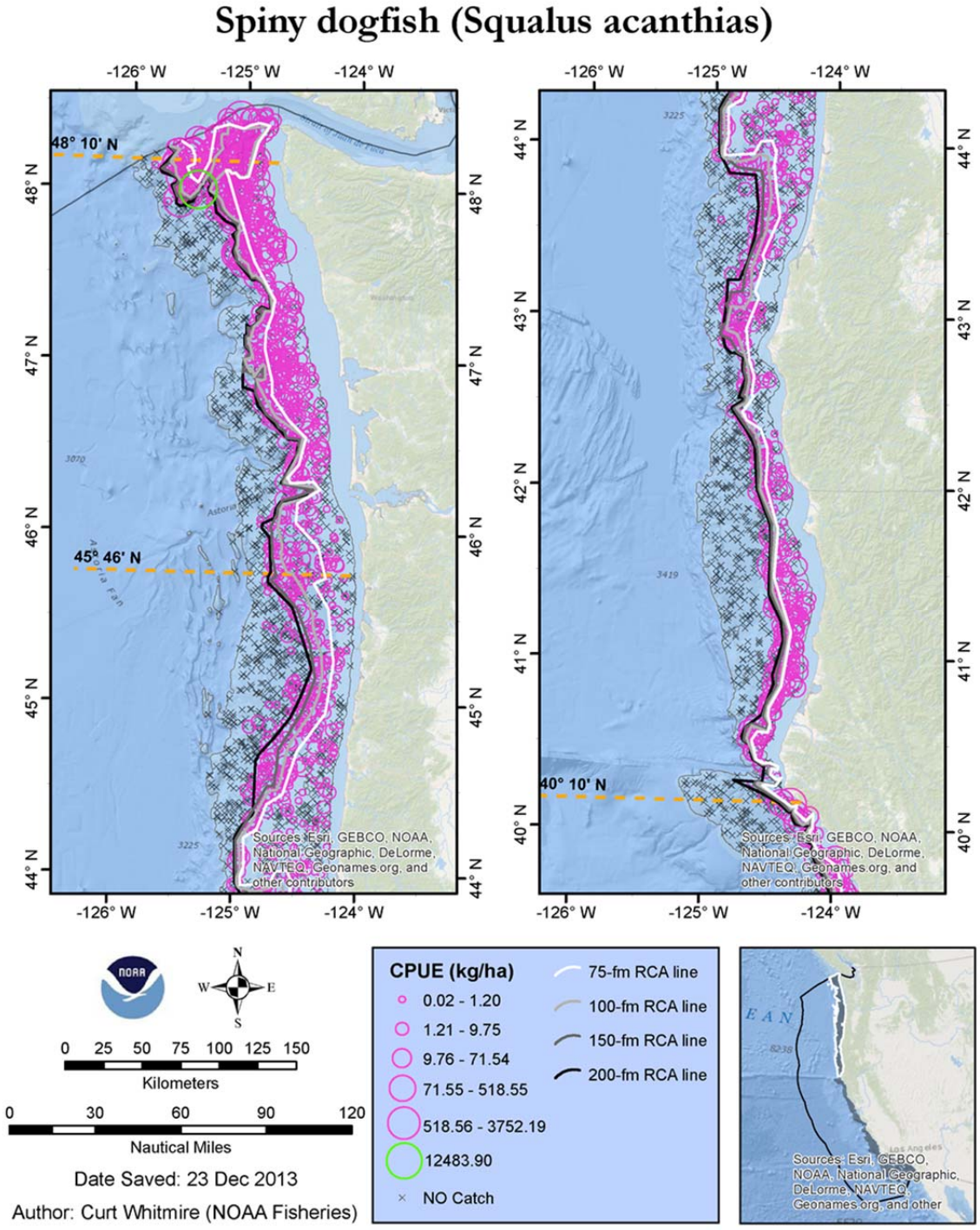


Figure 5-19. Map panels showing locations of standardized catch (units: kg/ha) of spiny dogfish shark (*Squalus acanthias*) recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of dogfish are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones."

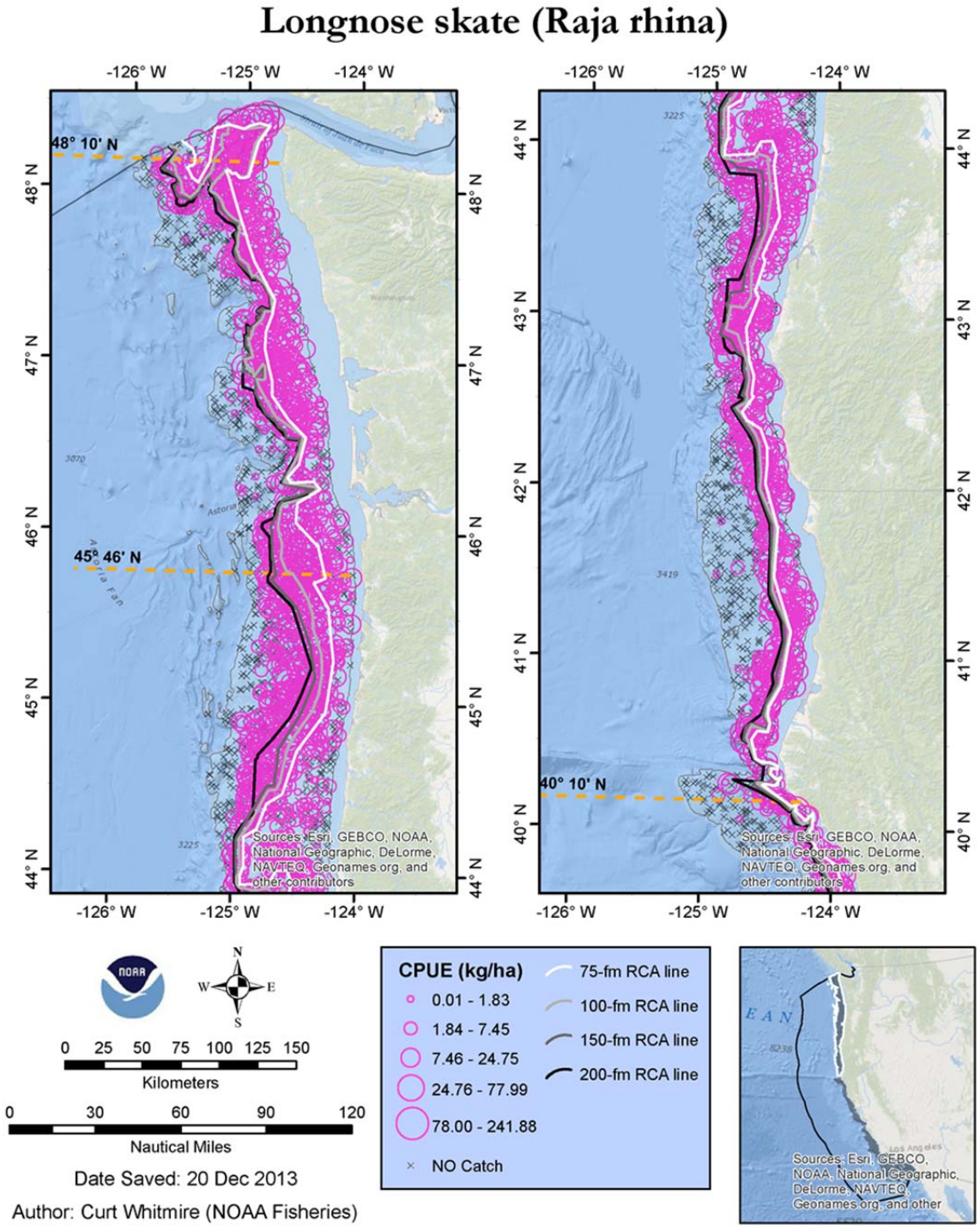


Figure 5-20. Map panels showing locations of standardized catch (units: kg/ha) of longnose skate (*Raja rhina*) recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of longnose skate are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones."

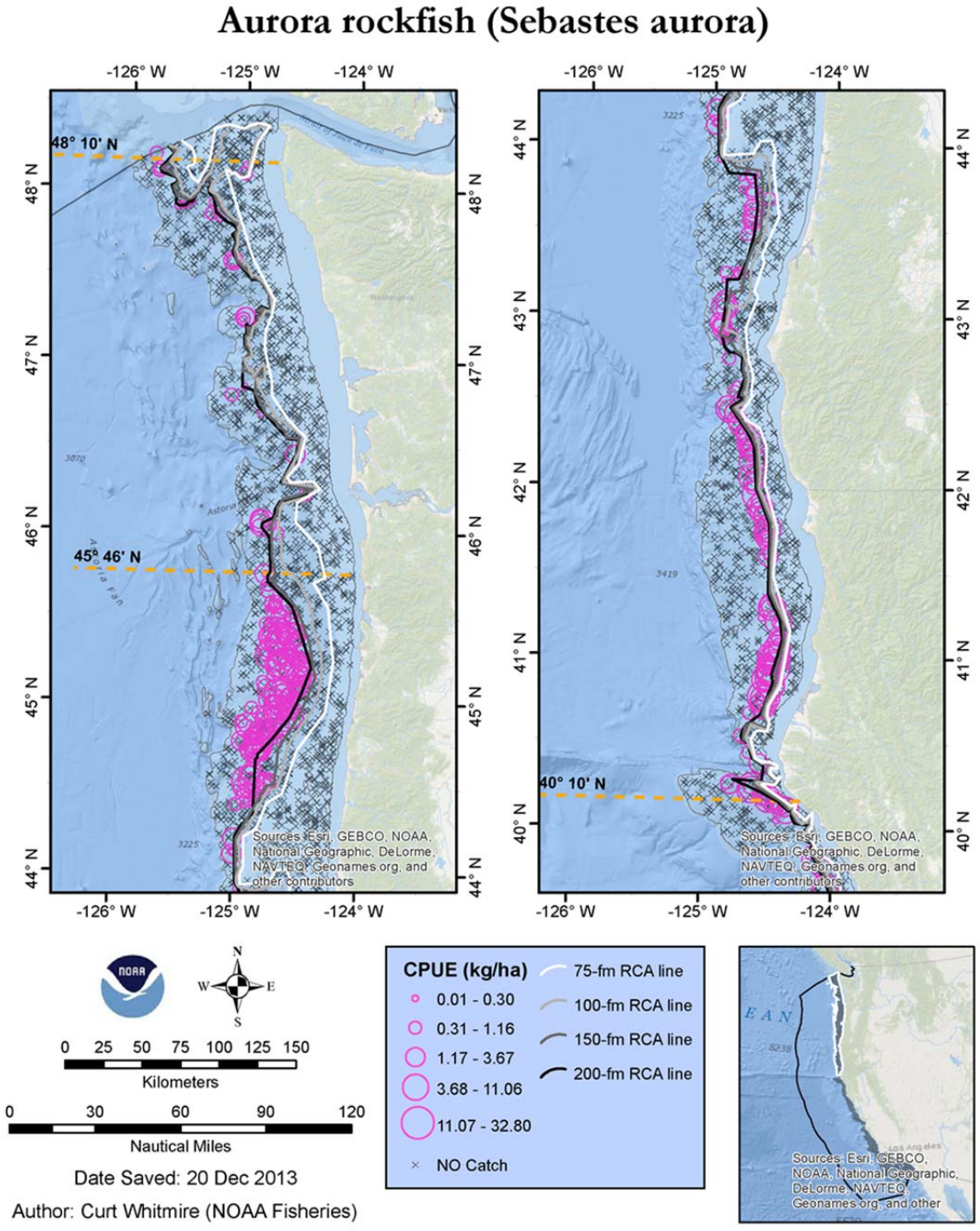


Figure 5-21. Map panels showing locations of standardized catch (units: kg/ha) of aurora rockfish (*Sebastes aurora*) recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of aurora rockfish are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones."

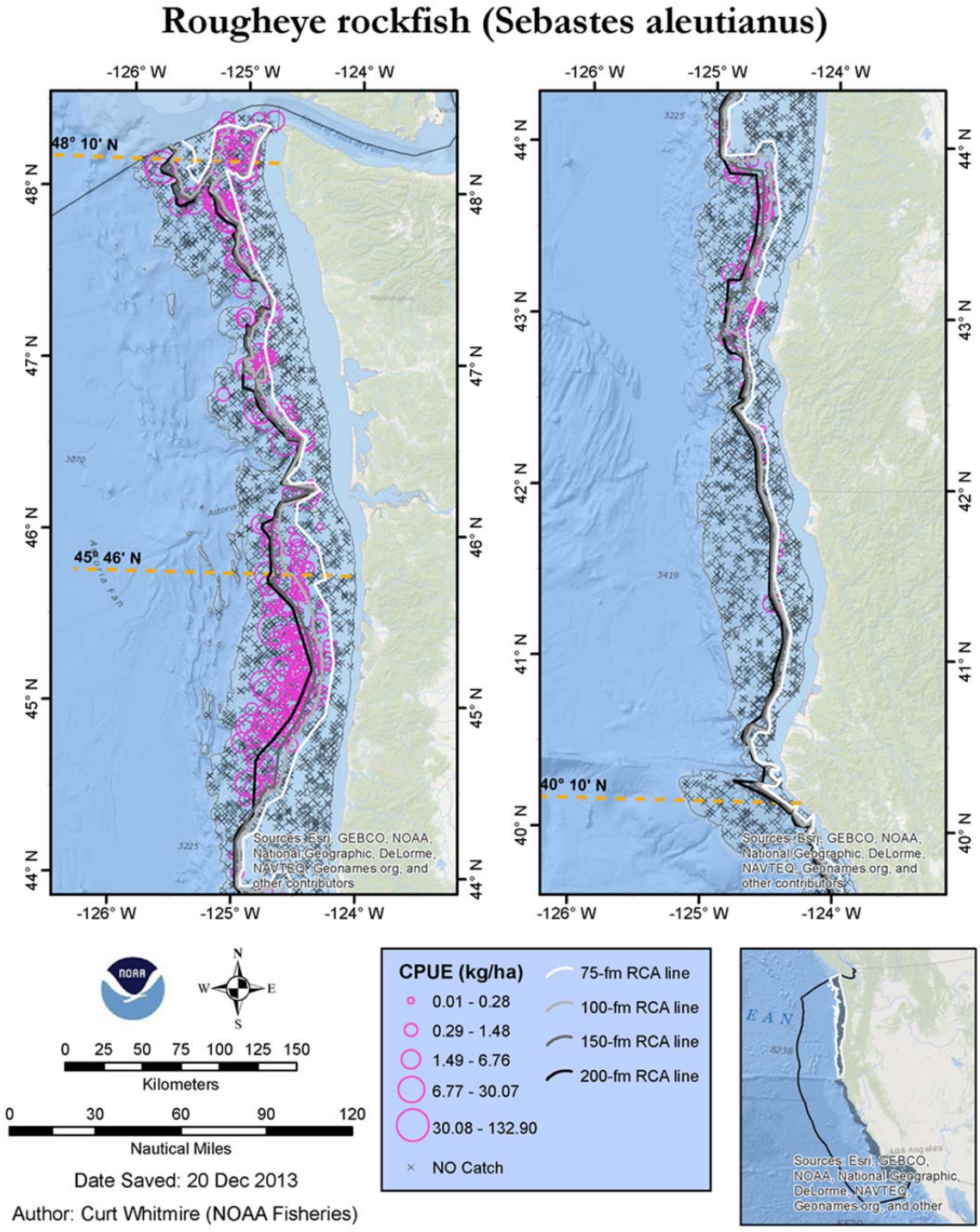


Figure 5-22. Map panels showing locations of standardized catch (units: kg/ha) of rougheye rockfish (*Sebastes aleutianus*) recorded during the NWFSC West Coast Groundfish Bottom Trawl Survey for years 2003-12 combined. Locations of survey tows with no catch of rougheye rockfish are symbolized by a small gray "x". Selected 2013 trawl rockfish conservation area boundaries are overlain in gray tones.

5.1.4.3 Bycatch of Other Non-target species

There is not anticipated to be a distinguishable difference among the No Action alternative, Alternative 1, and Alternative 2 on bycatch of non-groundfish, non-target species. Under all of the alternatives, the Shorebased IFQ Program will continue to be monitored with 100 percent monitoring requirement. Under either Alternative 1 or Alternative 2, overall fishing effort is not likely to increase or change significantly from No Action. Instead, some dispersal of existing effort is likely. Changes in effort location are difficult to predict but are not anticipated to increase impacts to incidentally caught non-groundfish species.

5.1.4.3.1 Invertebrates

No-action, Alternative 1, and Alternative 2

Invertebrate diversity richness was less on untrawled bottoms, and a greater diversity of epibenthic macroinvertebrates was documented in trawled areas (Hixon and Tissot, 2007). Any impact changes to corals, sponges, or other biogenic habitat is considered as mentioned as potential EFH considerations (see 4.3 Essential Fish Habitat, see 5.1.3 Essential Fish Habitat).

5.1.4.4 Protected Species, Including ESA listed species

No significant impacts are expected on listed species or their critical habitat outside of the scope of what has been analyzed in existing biological opinions. Any encounters by IFQ vessels will continue to be monitored with 100 percent monitoring requirement of the IFQ program. Gathered data will be utilized by the Council's newly forming Endangered Species Groundfish Workgroup to advise the Council on how to improve avoidance of protected species. Under the proposed action, overall fishing effort is not likely to increase or change significantly. Instead, some dispersal of existing effort is likely. Changes in effort location are difficult to predict but are not anticipated to increase impacts to non-target species, including listed species and marine mammals.

5.1.4.4.1 ESA-Listed Species

No action
The no-action Alternative is not expected to have substantial negative effects on any ESA-listed species occurring in the action area. The no-action Alternative would keep the same areas closed to bottom trawling that are currently closed. There would be no redistribution of current fishing effort; therefore, impacts to ESA-listed salmonids are not expected to increase above those considered in past biological opinions (NMFS 2012, NMFS 2009, NMFS 2006, NMFS 1999, NMFS 1996, NMFS 1993). NMFS has also consulted with the USFWS on the effects of operation of the groundfish fishery on listed species under USFWS jurisdiction in 2012. Additionally, catch per unit effort is not expected to increase under the no-action alternative; the number of hours bottom trawl gear is deployed would likely remain similar to that in recent years.

Continued operation of the groundfish fishery is not likely to adversely affect ESA-listed seabirds in the action area (USFWS 2012). Though trawl cables are a possible hazard to ESA-listed seabirds, no takes have been documented and no reasonable and prudent measures were recommended for vessels using bottom-trawl gear to harvest groundfish in the 2012 biological opinion (USFWS 2012). The no-action Alternative is not anticipated to change fishing behaviors such that it would increase chances for interactions with ESA-listed seabirds. Furthermore, investigations by Guy et al. (2013) suggest that any seabird interactions with non-whiting bottom-trawl groundfish fisheries are rare and not essential to the survival of rebuilding seabird species.

Continued operation of the groundfish fishery is not likely to adversely affect southern sea otters (USFWS 2012). The no-action Alternative will likely see a similar potential for indirect impacts to southern sea otters from recent years, although potentially less than that under Alternatives 1 and 2, as transiting time will be unaffected by keeping areas closer to shore closed which will not result in a change in boat traffic; the primary impact, though not a threat, to southern sea otters.

Continued operation of the groundfish fishery is not likely to adversely affect bull trout (USFWS 2012). The no-action alternative is not anticipated to change fishing behaviors such that it would increase chances for interactions with bull trout or their designated critical habitat.

Continued operation of the groundfish fishery is not likely to jeopardize the southern distinct population segment of eulachon (NMFS 2012). A majority of eulachon encounters in the groundfish bottom-trawl fishery occur off Oregon. The no-action alternative is not anticipated to change fishing behaviors such that it would increase chances for interactions with eulachon but is instead anticipated to experience similar impacts as the current fishing effort in recent years.

Continued operation of the groundfish fishery is not likely to jeopardize the southern distinct population segment of green sturgeon or adversely modify their designated critical habitat (NMFS 2012). The no-action alternative is not anticipated to change fishing behaviors such that it would increase chances for interactions with green sturgeon or their designated critical habitat. The no-action Alternative is not anticipated to displace and redistribute current fishing effort.

Continued operation of the groundfish fishery is not likely to jeopardize humpback whales (NMFS 2012). Under the no-action Alternative, the groundfish bottom trawl fishery should not vary from what has been seen in the recent past and no increased risk to humpback whales is anticipated.

Continued operation of the groundfish fishery is not likely to jeopardize leatherback sea turtles or adversely modify their designated critical habitat (NMFS 2012). The no-action alternative is not anticipated to change fishing behaviors such that it would increase chances for interactions with leatherback sea turtles or their designated critical habitat.

The no-action Alternative is not anticipated to displace or redistribute current fishing effort.

At their September 2012 meeting, formation of a West Coast Endangered Species Workgroup was explored and recommended by the Council. Further improvements in data collection for ESA-listed species will be recommended and continually updated upon formation of this workgroup, including from WCGOP 100 percent monitored trawl rationalization data.

Alternative 1, and Alternative 2
Neither of the action alternatives (1 or 2) are expected to have substantial negative effects on any ESA-listed species occurring in the action area.

Alternative 1 would open areas to bottom trawling that have been fairly consistently closed since 2004. However, it is unlikely that the redistribution of current fishing effort under either alternative will cause impacts to ESA-listed salmonids to increase above those considered in past biological opinions. Additionally, if catch per unit effort is increased under either of the action alternatives, the number of hours bottom-trawl gear is deployed could decrease, lowering impacts to ESA listed salmonids. Alternative 1 could see slightly higher catch per unit effort than Alternative 2 because it opens additional fishing areas.

Continued operation of the groundfish fishery is not likely to adversely affect ESA-listed seabirds in the action area (USFWS 2012). Though trawl cables are a possible hazard to ESA-listed seabirds, no takes have been documented and no reasonable and prudent measures were recommended for vessels using bottom trawl gear to harvest groundfish in the 2012 biological opinion (USFWS 2012). Neither of the alternatives is anticipated to change fishing behaviors such that it would increase chances for interactions with ESA-listed seabirds. Furthermore, investigations by Guy et al. (2013) suggest that any seabird interactions with non-whiting bottom trawl groundfish fisheries are rare and not essential to the survival of rebuilding seabird species.

Continued operation of the groundfish fishery is not likely to adversely affect southern sea otters (USFWS 2012). Alternative 1 may actually reduce the potential for indirect impacts to southern sea otters, as reductions in transiting time by opening areas closer to shore may result in a net decrease in boat traffic; the primary impact, though not a threat, to southern sea otters. Alternative 2 may also result in a small net decrease in boat traffic, but to a lesser effect than Alternative 1 compared to No-Action.

Continued operation of the groundfish fishery is not likely to adversely affect bull trout (USFWS 2012). Neither of the alternatives is anticipated to change fishing behaviors such that it would increase chances for interactions with bull trout or their designated critical habitat compared to No-Action.

Continued operation of the groundfish fishery is not likely to jeopardize the southern distinct population segment of eulachon (NMFS 2012). A majority of eulachon encounters in the groundfish bottom trawl fishery occur off Oregon. Alternative 1 would

open additional areas to bottom trawling off the entire Oregon coast. Alternative 2 would open additional shoreward areas off the entire Oregon coast but only off a portion of the coast at depths deeper than 150 fm. However, neither alternative is anticipated to change fishing behaviors such that it would increase chances for interactions with eulachon but is instead anticipated to displace and redistribute current fishing effort.

Continued operation of the groundfish fishery is not likely to jeopardize the southern distinct population segment of green sturgeon or adversely modify their designated critical habitat (NMFS 2012). Neither of the alternatives is anticipated to change fishing behaviors such that it would increase chances for interactions with green sturgeon or their designated critical habitat. Both alternatives are anticipated to displace and redistribute current fishing effort.

Continued operation of the groundfish fishery is not likely to jeopardize humpback whales (NMFS 2012). The 2012 biological opinion also issued a provisional take statement.

Continued operation of the groundfish fishery is not likely to jeopardize leatherback sea turtles or adversely modify their designated critical habitat (NMFS 2012). Neither of the alternatives are anticipated to change fishing behaviors such that it would increase chances for interactions with leatherback sea turtles or their designated critical habitat. Both alternatives are anticipated to displace and redistribute current fishing effort.

5.1.4.4.2 Marine Mammals and Sea Birds

No-action, Alternative 1, and Alternative 2
The groundfish bottom trawl fishery is a Category III fishery, where take of marine mammals is extremely rare (78 FR 23708, April 22, 2013). In addition, investigations by Guy et al. (2013) suggest that any seabird interactions with non-whiting bottom trawl groundfish fisheries are rare.

No change in impacts to these animals is projected for any of the alternatives compared to the baseline No Action Alternative, as overall effort is not expected to increase substantially from the proposed action alternatives but is instead anticipated to displace and redistribute current fishing effort. None of the action alternatives (1 or 2) are expected to have any discernible impact on marine mammals. Any incidental takes of marine mammals or seabirds (an extremely rare event in the groundfish bottom trawl fishery) will continue to be subject to 100% monitoring requirements in the trawl rationalization program.

At the June 2013 Council meeting, a draft EA was presented for consideration of a proposed recommendation to require groundfish vessels over 55' in length to use mandatory seabird streamer lines, which have been shown to dramatically reduce seabird take in the groundfish longline fisheries, and would pertain to IFQ vessels while utilizing gear switching provisions of the IFQ program. The Council reviewed the draft EA, and is expected to provide recommendations on this proposed action in the immediate future.

5.2 Socio-economic Impacts

5.2.1 Shorebased IFQ Program

No-action, Alternative 1, and Alternative 2

Summary

Either of the two action alternatives is expected to have some favorable economic impact for fishing vessels that harvest, purchase, or resell groundfish bottom trawl landings, within the area of this potential action compared to the No-action alternative. New opportunities for trawling on additional grounds (currently closed to this gear) may then translate into additional landings and revenue from those valuable target species which were specified in the industry rationale for this request (e.g. lingcod, Dover sole, yellowtail rockfish, petrale sole, etc). The amount of expected economic benefit should differ according to alternative, area and thereby principal port of landing. Both the seaward and shoreward proposed changes would mean more fishing opportunities closer to shore, and in areas that have not been trawled recently, which may result in economic benefits in the form of fuel savings from fishing closer to port, additional fish on newly opened grounds, or both.

None of the alternatives in the proposed action are expected to have a negative effect on fishing vessels, processors, or communities which are dependent on groundfish fishing, compared to the no-action alternative.

Differences among alternatives and areas

There are some differences among the alternatives, in their potential amount of economic benefit to different coastal communities. Either Alternative 1 or 2 is expected to benefit IFQ vessels using groundfish bottom trawl gear when fishing between 45° 46'and 48° 10' N. latitude, by opening additional areas to fishing on both the seaward and shoreward side of the existing (No Action) RCA configuration. However, under Alternative 2, vessels fishing in the area between 40° 10' N. latitude to 45° 46' N. latitude would see less of an increase in fishing opportunity on the seaward side.

At the same time, the difference in time of additional seaward fishing area access (and thereby potential for additional landings and revenue) between No Action and Alternative 1 is small for the northern area, while it is much larger for the southern area. Under Alternative 2, there is again a small difference (two months) in the northern area between No Action and Alternative 2, but no difference for the southern area; No Action and Alternative 2 are the same in this respect. There is no difference in the time of additional shoreward fishing access between the northern and southern areas, among any of the alternatives. Both action alternatives offer six months additional access in the shoreward area between 75 and 100 fm, compared with the No Action Alternative.

Differences in alternatives among ports and coastal communities

Medium to small ports between 45° 46' and 40° 10' N. lat., including Newport, Coos Bay, Brookings, Crescent City, and Eureka would stand to benefit from the increased

seaward opportunity of Alternative 1, but not from Alternative 2. The port with the highest revenue from IFQ landings is Astoria by far (Figure 5-23, Table 5-10), which would benefit equally from either Alternative 1 or 2, since it is north of 45° 46' N. lat., Table 5-11, shows the percentage distribution of revenue from non-whiting groundfish in the IFQ fishery between the northern and southern areas of this action during 2011 and 2012. Table 5-11 shows that the percentage of non-whiting IFQ revenue is very similar between the two areas considered in this action, for both 2011 and 2012, with the southern area showing slightly more revenue from non-whiting trips. For shorebased whiting landings, the northern area shows substantially more revenue than the southern area.

Considerations of species and gear type

With the poor sablefish market of the past two years (although still the most valuable species per pound in the fishery), and continued reduction in the northern sablefish ACL, there is evidence that fishermen have shifted some effort to other target species in order to compensate (*Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012, Agenda Item D.2.a, April, 2013 PFMC meeting*). Either Alternative 1 or 2 could make such a shift easier for fishers, according to the species cited in industry rationale (bycatch analysis section). There were increases in revenue from species such as yellowtail rockfish, Pacific cod, petrale sole, lingcod, and Dover sole from 2011 to 2012 in the IFQ program, together with a substantial drop in sablefish revenue (*Annual Catch Report for the Pacific Coast Groundfish, Shorebased IFQ Program in 2012, Agenda Item D.2.a, April, 2013 PFMC meeting*). These species were cited as targets in the areas requested for opening by industry (bycatch analysis section).

In those southern ports, fishermen could still fish the seaward area between 150 and 200 fm using fixed gear, under the gear switching provision of IFQ regardless of this potential action. If the area is not opened to trawling, it is conceivable that fishermen may do so, to access some of the higher value targets that are often landed with fixed gear such as lingcod, sablefish, and Pacific cod (these species were cited in industry rationale). Given sufficient motivation to diversify their catch among species, it is conceivable that effort in the seaward area (150-200 fm, 40°10' to 45°46') could increase by use of fixed gear rather than trawl gear, even without the implementation of Alternative 2, under gear switching provisions in the IFQ program, especially upon recovery of sablefish markets and ex-vessel prices. However, this is speculative.

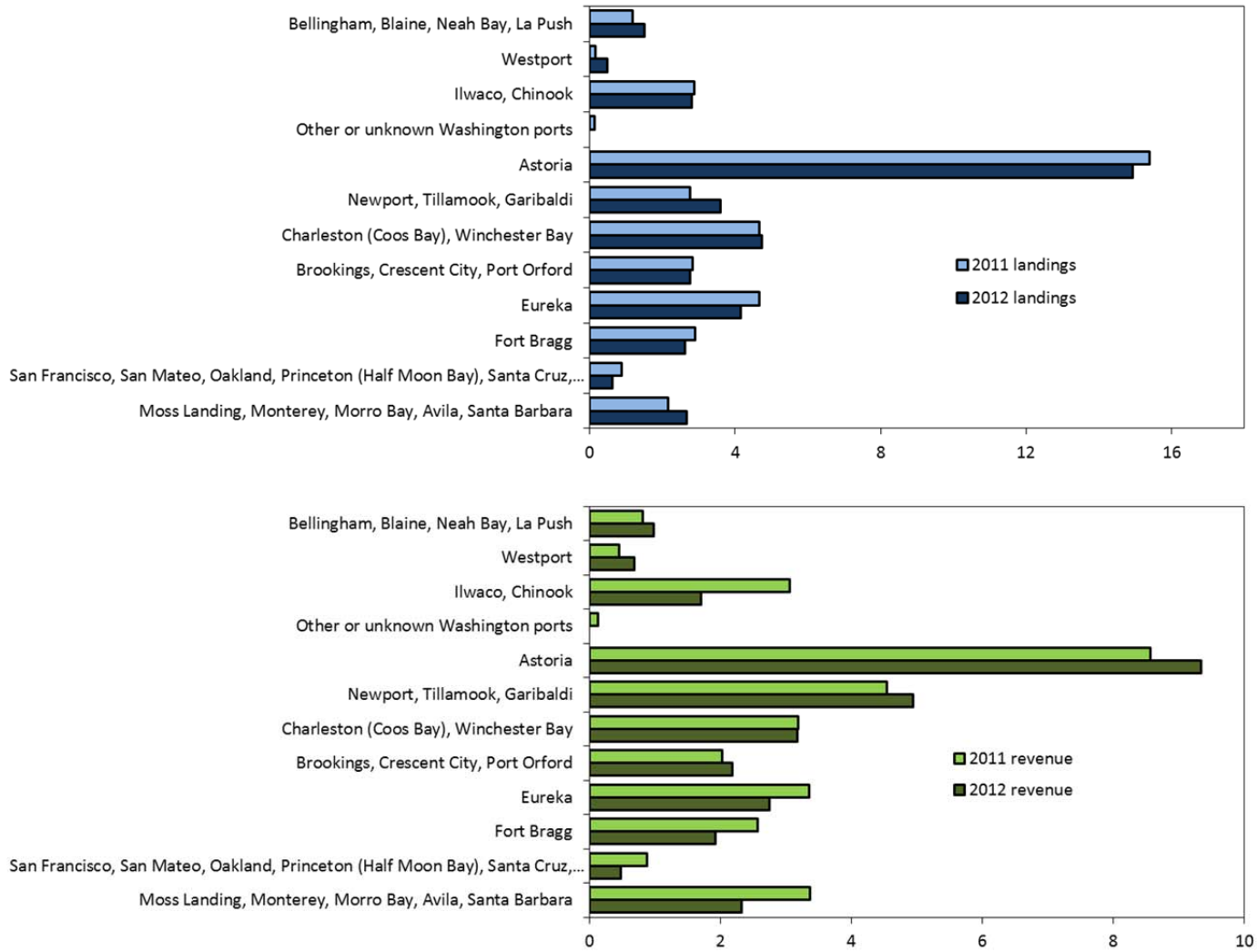


Figure 5-23: Landings and revenue by port group, for non-whiting trips, in the Shorebased IFQ Program. Port groups are arranged by latitude. Source = paper and electronic landing receipt data (PacFIN and PSMFC, respectively).

Table 5-10: Annual landings and revenue, distributed by port group, for non-whiting trips (top) and directed whiting trips (bottom), in the Shorebased IFQ Program, for 2011 and 2012. Port groups are arranged by latitude. Columns labeled "percent" express either 2012 landings or revenue (corresponding to the column appearing to left) as a percent of 2011 values. Columns labeled "dist." show the distribution of annual landings or revenue among port groups (%).

Port group (non-whiting trips)	2011 landings	2012 landings	2011 dist.	2012 dist.	Land. difference	Land. percent	2011 revenue	2012 revenue	2011 dist.	2012 dist.	Rev. difference	Rev. percent
Bellingham, Blaine, Neah Bay, La Push	1,185,687	1,500,658	3%	4%	314,971	127%	816,996	977,857	2%	3%	160,861	120%
Westport	162,774	494,278	0%	1%	331,504	304%	450,500	680,484	1%	2%	229,984	151%
Ilwaco, Chinook	2,882,683	2,809,640	7%	7%	-73,043	97%	3,051,630	1,700,006	9%	6%	-1,351,624	56%
Other or unknown Washington ports	130,220		0%	0%	-130,220	0%	127,621		0%	0%	-127,621	0%
Astoria	15,398,437	14,929,115	38%	37%	-469,322	97%	8,567,173	9,338,689	26%	31%	771,516	109%
Newport, Tillamook, Garibaldi	2,759,574	3,590,916	7%	9%	831,342	130%	4,538,783	4,935,313	14%	16%	396,530	109%
Charleston (Coos Bay), Winchester Bay	4,665,899	4,744,945	11%	12%	79,046	102%	3,187,748	3,171,837	10%	10%	-15,911	100%
Brookings, Crescent City, Port Orford	2,833,395	2,752,902	7%	7%	-80,493	97%	2,021,490	2,177,826	6%	7%	156,336	108%
Eureka	4,671,640	4,159,850	12%	10%	-511,790	89%	3,355,484	2,753,363	10%	9%	-602,120	82%
Fort Bragg	2,897,221	2,623,714	7%	6%	-273,507	91%	2,570,326	1,916,710	8%	6%	-653,616	75%
San Francisco, San Mateo, Oakland, Princeton (Half Moon Bay), Santa Cruz, Bodega Bay	869,663	621,684	2%	2%	-247,979	71%	878,513	476,211	3%	2%	-402,302	54%
Moss Landing, Monterey, Morro Bay, Avila, Santa Barbara	2,152,997	2,664,560	5%	7%	511,563	124%	3,369,670	2,324,466	10%	8%	-1,045,203	69%
Sum	40,610,190	40,892,262	100%	100%	282,072	101%	32,935,934	30,452,763	100%	100%	-2,483,170	92%

Port group (whiting trips)	2011 landings	2012 landings	2011 dist.	2012 dist.	Land. difference	Land. percent	2011 revenue	2012 revenue	2011 dist.	2012 dist.	Rev. difference	Rev. percent
Westport, Ilwaco, Chinook	50,597,855	37,654,325	25%	26%	-12,943,530	74%	5,700,215	5,848,889	25%	28%	148,674	103%
Astoria	94,478,623	52,460,824	46%	36%	-42,017,799	56%	10,537,842	7,786,722	46%	37%	-2,751,120	74%
Newport, Tillamook, Garibaldi, Charleston (Coos Bay), Winchester Bay	58,167,274	56,240,192	29%	38%	-1,927,082	97%	6,572,762	7,323,068	29%	35%	750,306	111%
Sum	203,243,752	146,355,341	100%	100%	-56,888,411	72%	22,810,819	20,958,679	100%	100%	-1,852,140	92%

Table 5-11: Ex-vessel revenue from shorebased non-whiting and whiting trips in the IFQ program, during 2011 and 2012, only for the area between 40° 10' N. latitude to 48° 10' N. lat. The "North" area includes ports Westport, Ilwaco/Chinook, "other or unknown Washington ports" and Astoria; the "South" area includes the ports Newport, Tillamook, Garibaldi, Charleston, Winchester Bay, Brookings, Crescent City, Port Orford, and Eureka.

Non-whiting trips	2011	2012	2011	2012
North	12,196,924	11,719,179	48%	47%
South	13,103,505	13,038,340	52%	53%
Sum	25,300,429	24,757,519	100%	100%

Whiting trips	2011	2012	2011	2012
North	16,238,057	13,635,611	71%	65%
South	6,572,762	7,323,068	29%	35%
Sum	22,810,819	20,958,679	100%	100%

In the industry request to move the shoreward and seaward boundaries of the trawl RCA, the GAP cited in public comment, in meeting with the GMT at the March and April 2013 meetings of the PFMC, as well as in their team statements (Agenda Item H.3.b, Supplemental GAP Report, March 2013; Agenda Item D.8.b, Supplemental GAP Report, April 2013), industry's need to gain additional access target species including Dover sole, petrale sole, and other flatfish in the shoreward area, which they estimate will increase otherwise low overall attainment in the fishery, and make fishing substantially more economically viable. They related that this would be accomplished through increased efficiency and reduced fuel costs for some species that could be accessed closer to shore, and fishing in areas of higher density for valuable target species. They spoke to trawl fishers' intent to use selective flatfish trawl gear in order to access these target species, and avoid canary rockfish, and other rebuilding rockfish species. The GAP stated they believe their complete request would also enable higher attainment of other valuable species including lingcod, true cod, yellowtail rockfish, particularly in the seaward area. The GAP also spoke about industry members' desire to exercise the individual accountability which is inherent in the Individual Fishing Quota (IFQ) program, and pointed out that several modifications to the RCA structure have already been made in the first two years of the program, while maintaining very low harvest levels of rebuilding species. Finally, industry members stated that more regular RCA boundaries make those boundaries easier to comply with and to enforce.

5.2.2 Processor Sector

No-action

There are no expected impacts to processor sectors from the no-action Alternative. The fishermen would continue to have the same access to fishing grounds as currently in place.

Alternative 1

There may be increased landings at processors expected from Alternative 1 to the extent fishermen are able to increase their attainment levels of underutilized species. Fishermen would gain increased access both shoreward and seaward of the current RCA between 40° 10’ N. lat. and 48° 10’ N. lat.

Alternative 2

There may be increased landings at processors expected from Alternative 2 to the extent fishermen are able to increase their attainment levels of underutilized species, although landings are expected to slightly less than those under Alternative 1. Fishermen would gain increased access both shoreward and seaward of the current RCA between 40° 10’ N. lat. and 48° 10’ N. lat., although somewhat less access seaward than under Alternative 1. Landings to processors south of 45° 46’ N. lat. may be less than those under Alternative 1.

5.2.3 Communities

No-action

There are no expected impacts to communities from the no-action Alternative. Fishermen would continue to have the same access to fishing grounds as currently in place, and therefore processors and communities are not anticipated to be affected differently than what is currently occurring.

Alternative 1

There may be increased landings in communities expected from Alternative 1 to the extent fishermen are able to increase their attainment levels of underutilized species. Fishermen would gain increased access both shoreward and seaward of the current RCA between 40° 10’ N. lat. and 48° 10’ N. lat., potentially benefitting processors. Therefore, communities are expected to indirectly benefit from Alternative 1.

Alternative 2

There may be increased landings in communities expected from Alternative 2 to the extent fishermen are able to increase their attainment levels of underutilized species, although opportunities are expected to slightly less than those under Alternative 1. Fishermen would gain increased access both shoreward and seaward of the current RCA between 40° 10’ N. lat. and 48° 10’ N. lat., potentially benefitting processors, although somewhat less than under Alternative 1. Landings to processors south of 45° 46’ N. lat. may be less than those under Alternative 1. Therefore, communities are expected to indirectly benefit from Alternative 2, although to some extent less than under Alternative 1, potentially for communities south of 45° 46’ N. lat.

5.3 Cumulative Impacts

The Council on Environmental Quality (CEQ) requires a cumulative effects analysis (40 CFR part 1508.7). The purpose of a cumulative effects analysis is to consider the combined effects of many actions on the human environment over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective, but rather, the intent is to focus on those effects that are truly meaningful. The following addresses the significance of the expected cumulative impacts as they relate to the federally managed groundfish fishery.

5.3.1 Consideration of the Affected Resources

In Chapter 3 (Status of the Affected Environment), the affected resources that exist within the non-whiting bottom trawl IFQ fishery environment are identified. Therefore, the significance of the cumulative effects will be discussed in relation to these affected resources listed below.

1. Physical Environment, including Ecosystem and Essential Fish Habitat
2. Biological Environment, including:
    - Groundfish
    - Non-target Species
    - Protected Species, including ESA, MMPA, and MBTA
    - Marine Mammals and Seabirds
3. Socioeconomic Environment

5.3.2 Geographic Boundaries

The analysis of impacts focuses on actions related to the harvest of non-whiting groundfish species. The core geographic scope for each of the affected resources listed above is focused on the Eastern Pacific Ocean (CHAPTER 4) north of 40° 10' N. lat. The coastal stocks of some groundfish species, such as blackcod, are highly migratory in nature, whereas other rockfish species have varying degrees of migratory behavior, with some species such as yelloweye rockfish exhibiting high site fidelity in offshore waters of Oregon, Washington, and Vancouver Island, Canada. For habitat, the core geographic scope is focused on EFH within the EEZ, and particularly within the areas for RCA boundary modification, (75 to 200 fm, 40° 10' N. lat. to 48° 10' N. lat.), but includes all habitat utilized by demersal (bottom dwelling) groundfish and non-target species in the Eastern Pacific Ocean. Rockfish species tend to be more localized although their young may distribute widely within the large California current system, and across different depth stratifications at different stages in their life history. For non-target species, those ranges may be expanded and would depend on the biological range of each individual non-target species in the Eastern Pacific Ocean. The core geographic scope for endangered and protected resources can be considered the overall range of these resources 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 most notably from Westport, Washington to Eureka, California.

5.3.3 Temporal Boundaries

The temporal scope of past and present actions for the affected resources is primarily focused on actions that have occurred after FMP implementation (1982) and more importantly, since implementation of the trawl rationalization program in 2011. For endangered species and other protected resources, the scope of past and present actions is on a species-by-species basis (CHAPTER 4) 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 focus of future actions for all affected resources extends through December 31, 2019, or longer if future actions are reasonably foreseeable.

5.3.3.1 Actions Other than the Proposed Action

5.3.3.2 Past, Present, and Reasonably Foreseeable Future Actions

Fishery-related Actions

The historical management practices of PFMC have resulted in positive impacts on the health of the groundfish stocks and demersal rockfish complex species. Numerous actions have been taken to manage the fisheries for these species through amendment and specifications actions. In addition, the nature of the fishery management process is intended to provide the opportunity for PFMC and NMFS to regularly assess the status of the fisheries and to make necessary adjustments to ensure that there is a reasonable expectation of meeting the objectives of the FMP and the targets associated with any rebuilding programs under the FMP. The statutory basis for Federal fisheries management is the Magnuson-Stevens Act. To the degree with which this regulatory regime is complied, the cumulative impacts of past, present, and reasonably foreseeable future Federal fishery management actions on the affected resources should generally be associated with positive long-term outcomes. Constraining fishing effort through regulatory actions can often have negative short-term socioeconomic impacts. These impacts are usually necessary to bring about long-term sustainability of a given resource, which should, in the long-term, promote positive effects on human communities, especially those that are economically dependent upon groundfish stocks and demersal rockfish complex species.

In addition, PFMC has developed harvest specifications for 2013 and 2014 for groundfish stocks, which was implemented in January 2013 by NMFS. It is noted that the levels of groundfish harvest are not expected to fluctuate dramatically in the near future for the short term (NMFS 2012), but ACLs for some demersal rockfish species may be slightly increased as overfished species continue upward trends in biomass from rebuilding plan consequences, and subsequently, are intercepted into the fishery. In the long term, it is important to evaluate the impacts on shares of total harvest allocated to entities rather than the allocation poundage.

There has likely been substantial habitat recovery within RCAs that have not been trawled within the 2.8 years or more (see Table 4-1, above), stemming from prohibition on bottom trawling and low ACLs for demersal rockfish complex species since 2002. Increased bottom trawling for demersal rockfish species within RCAs will result in occasional (but increased) gear contacts with bottom habitats, mixed and hard bottom habitat in particular, which is where demersal rockfish are typically found. Increased bottom trawling within the existing trawl RCAs could result from future modifications and refinments to RCA boundaries. However, there are

important disincentives associated with gear contact with mixed and hard demersal habitats due to various gear restriction implementations, which are demonstrated in Table 4-8. These include the high cost of net repair or replacement if the net is damaged and the reduced fishing efficiency and increased operating cost that occurs when the net makes contact with the mixed boulder or hard ocean bottom substrates. Gear restrictions have been implemented that further reduce the incentive to make bottom contact with bottom trawl gear on mixed and hard substrates including the small footrope requirement not to exceed 8 inches on all bottom trawl nets shoreward of 100 fm, and the requirement for bottom trawl large footrope not to exceed 18 inches. Catch share implementation is likely to consolidate fishing with fewer boats than in the past. This may result in further reduction in bottom trawl gear contacts with demersal habitats because the more efficient vessels will likely be doing most of the fishing and it is likely that the most efficient vessels may reduce effort on bottom contact.

PFMC and NMFS continue to work together on the trawl rationalization trailing actions. All of these actions are expected to increase benefits from the fishery and are not expected to appreciably interact with the action considered here, except as noted in the following list. Details on each action are available on the PFMC website (http://www.pcouncil.org/groundfish/fishery-management-plan/trailing-actions/). The main trailing actions are as follows:

*Trawl/Fixed gear permit stacking (*final PFMC action taken, not yet implemented) — This action allows fixed gear and trawl permits to be registered to the same vessel at the same time.

Gear Issues (under PFMC consideration, deliberations delayed) -- Gear issues include multiple gears on a trip, gear modifications to increase efficiency, and restrictions on areas in which gears may be used. Consideration on this issue has been delayed until September 2013.

Cost Recovery (PFMC action completed, not yet implemented) – Cost recovery will be implemented at the beginning of 2014 resulting in the collection of additional fees in amounts of 3 percent of exvessel value for the shoreside fishery. For details see: http://www.pcouncil.org/wp-content/uploads/H2a_ATT1_COSTRECOV_FNL_SEP2012BB.pdf. In the context of this additional cost, alternatives, which increase the efficiency of fishing operations from increased access to fishing grounds (alternative 1 and 2), may be more beneficial to stability in the industry than would be the case under the no-action alternative.

Risk Pools (PFMC action completed, not yet implemented) —PFMC has recommended a number of provisions to facilitate fishers working together in risk pools. These actions include providing a safe harbor from limits on the accumulation of control over QS.

Lender Safe Harbor from Control Rules (PFMC action completed, not yet implemented) --- This action clarified who qualifies for the lender safe harbor exception and the activities for which an exception is provided.

Whiting Season and Southern Allocation (PFMC action complete, not yet implemented) – This action will set a common start date for all shoreside fisheries which matches the start date for the

at-sea fishery (May 15) and eliminate the cap on early season harvest in the south. While not changing the total amount of trawling with midwater gear and total amount of the target species caught, it may alter the timing of that harvest, advancing some of the harvest by one month, and subsequently have some effect on the timing of bottom trawl fishing activities. The expected change in impact of the trawl season date movement as a result of the Rockfish Conservation Area regulations would be minimal.

Pacific Whiting Surplus Carryover Implementation (PFMC action completed) - This provision, which would allow up to 10 percent of unused whiting QP to be carried from one year to the next, has not been implemented due to legal criteria related to treaty issues with Canada. PFMC's SSC has determined that from a scientific perspective, the surplus carryover provision does not have a biological impact. On that basis, changes to the bottom trawl Rockfish Conservation Area boundaries would not have an interaction with this provision that would have any appreciable impact.

Electronic Monitoring as a Replacement for the 100 percent Observer Coverage Requirement (under PFMC consideration) — This proposal is under preliminary study, and options have yet to be developed. Interaction with this proposed Rockfish Conservation Area action will depend on the nature of the alternative monitoring system developed. If full retention is required with electronic monitoring, the combination of that requirement with the Rockfish Conservation Areas could affect the amount of small fish and nonmarketable fish brought to shore but will not alter estimated total mortality.

Furthermore, PFMC has adopted a Fishery Ecosystem Plan (FEP), which will broaden its current authority to species and issues not currently addressed in existing FMPs, including the groundfish plan. The scope of the plan is still under consideration. The guidance provided to the plan development team thus far has included:

1. Development of an FEP that would primarily be advisory in nature with the potential to expand in the future.
2. Amend existing FMPs to include management measures for forage fish as the Council deems appropriate.
3. Develop a list of species not included in any FMP and that are not being managed to define their trophic associations and ecological roles.
4. Complete an analysis of unmanaged species and potential processes for their management.

Implementation of an FEP could have positive environmental and biological impacts associated with forage fish and unmanaged fish protection. Such protections could accrue benefits to managed species such as groundfish, which depend on forage fish, and some unmanaged fish for their survival and reproduction. While adverse impacts on forage fish and unmanaged fish under either of the alternatives are expected to be minimal, actions taken under the FEP are expected to further benefit these resources, helping to offset any negative impacts. It could potentially have negative short-term socioeconomic impacts if actions taken to protect forage species and unmanaged species resulted in reduced harvest opportunity for managed species. In the context of regulations that may impose further restrictions on harvest, alternatives, which alleviate

production costs, may be more beneficial to stability in the industry than would be the case if harvest conditions were expected to remain stable.

In addition to the trawl trailing actions, PFMC and NMFS are evaluating the existing groundfish EFH designations to determine whether there is sufficient new information to warrant updating the existing EFH designations and whether additional measures to minimize adverse effects to groundfish EFH caused by fishing are practicable.

5.3.4 Non-fishing 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 affected 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, 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 may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these species 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 non-fishing perturbations.

In addition to guidelines mandated by the Magnuson-Stevens Act, 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 river and marine habitats.

For many of the proposed non-fishing activities to be permitted under other Federal agencies (such as offshore energy facilities, etc.), those agencies would conduct examinations of potential impacts on the affected resources. The Magnuson-Stevens Act (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 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 whatever, 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 U.S. Fish and Wildlife Service (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. 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.

The effects of climate on the biota of the California Current ecosystem have been recognized for some time. The El Niño/Southern Oscillation (ENSO) is widely recognized to be the dominant mode of interannual variability in the equatorial Pacific, with impacts throughout the rest of the Pacific basin and the globe. During the negative (El Niño) phase of the ENSO cycle, jet stream winds are typically diverted northward, often resulting in increased exposure of the west coast of the U.S. to subtropical weather systems. The impacts of these events to the coastal ocean generally include reduced upwelling winds, deepening of the thermocline, intrusion of offshore (subtropical) waters, dramatic declines in primary and secondary production, poor recruitment, reduced growth and survival of many resident species (such as salmon and groundfish), and northward extensions in the range of many tropical species. Concurrently, top predators such as seabirds and pinnipeds often exhibit reproductive failure. In addition to interannual variability in ocean conditions, the North Pacific seems to exhibit substantial interdecadal variability, which is referred to as the Pacific (inter) Decadal Oscillation (PDO).

Within the California Current itself, Mendelssohn, et al. (2003) described long-term warming trends in the upper 50 to 75 m of the water column. Recent paleoecological studies from marine sediments have indicated that 20th century warming trend in the California Current have exceeded natural variability in ocean temperatures over the last 1,400 years. Statistical analyses of past climate data have improved our understanding of how climate has affected North Pacific ecosystems and associated marine species productivities. Our ability to predict future impacts on the ecosystem stemming from climate forcing events remains poor at best.

5.3.5 Magnitude and Significance of Cumulative Effects

In determining the magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions, must be taken into account. The following section discusses the effects of these actions on each of the managed resources.

5.3.5.1 Physical Environment, including Habitat and Ecosystem

Those past, present, and reasonably foreseeable future actions, whose effects may impact habitat (including EFH) and the direction of those potential impacts and magnitude, are listed in Table 5-12, below. The direct and indirect negative actions described in Table 5-12are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those

impacts on habitat is expected to be limited due to a lack of exposure to habitat at large. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the magnitude of impact on habitat and EFH is unquantifiable. As described above (Section 5.3.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources and the habitat on which they rely prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of direct and indirect negative impacts in terms of magnitude that those actions could have on habitat utilized by resources under NMFS' jurisdiction.

Improvements over time in past fishery management actions taken through the FMP process have had a positive cumulative effect on habitat and EFH. It is anticipated that the future management actions will result in additional direct or indirect positive effects on habitat through actions which protect EFH for federally-managed species and protect ecosystem services on which these species' productivity depends. These impacts could be broad in scope. All of the affected resources are interrelated; therefore, the linkages among habitat quality and EFH, managed resources and non-target species productivity, and associated fishery yields should be considered. For habitat and EFH, there are direct and indirect negative effects from actions which may be localized or broad in scope; however, positive actions that have broad implications have been, and it is anticipated will continue to be, taken to improve the condition of habitat. There are some actions, which are beyond the scope of NMFS and PFMC management such as coastal population growth and climate change, which may indirectly impact habitat and ecosystem productivity. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to habitat have had a neutral to positive cumulative effect, minor to negligible in magnitude.

Table 5-12: Summary of the effects of past, present, and reasonably foreseeable future actions on habitat: direction, magnitude.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive, negligible**		
Agricultural runoff	**Direct Negative, negligible**		
Port maintenance	**Uncertain – Likely Direct Negative, negligible**		
Offshore disposal of dredged materials	**Direct Negative, negligible**		
Marine transportation	**Direct Negative, minor**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Direct Negative, negligible**		
Offshore Energy Facilities (wind, tidal, etc.)			**Potentially Direct Negative, moderate**
2013-2014 Biennial Harvest Specifications			**Positive, minor**
Trawl Rationalization Trailing Actions			**Uncertain – Likely Positive, minor**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, neutral to positive impacts on habitat, including EFH**		

5.3.5.2 Biological Environment

Those past, present, and reasonably foreseeable future actions, whose effects may impact groundfish resources and the direction of those potential impacts, are summarized in Table 5-13, below. The indirectly negative actions described in Table 5-13 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on the managed resources is expected to be limited due to a lack of exposure to the population at large. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on productivity of the managed resources is unquantifiable. As described above (Section 5.3.3.1), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources under NMFS' jurisdiction.

Improvements over time of past fishery management actions taken through the FMP have had a positive cumulative effect on the managed resources. It is anticipated that the future management actions, described in Table 5-13, will result in additional indirect positive effects on the managed resources through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which groundfish and demersal rockfish complex species productivities depend. In addition, past fishery management actions taken through the FMP process have had a positive cumulative effect on ESA-listed and MMPA-protected species through the reduction of fishing effort (potential interactions) and implementation of gear requirements. It is anticipated that the future management actions will continue to result in additional indirect positive effects on protected resources. The impacts and magnitudes of these future actions could be broad in scope, and it should be noted the biological resources are often coupled in that they utilize similar habitat areas and ecosystem resources on which they depend. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to the biological resources have had a positive cumulative effect.

Table 5-13: Summary of the effects of past, present, and reasonably foreseeable future actions on biological resources: direction, magnitude.

Action	**Past to the Present**	**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive, negligible**	
Agricultural runoff	**Indirect Negative, negligible**	
Port maintenance	**Uncertain – Likely Indirect Negative, negligible**	
Offshore disposal of dredged materials	**Indirect Negative, negligible**	
Marine transportation	**Indirect Negative, negligible**	
Installation of pipelines, utility lines and cables	**Uncertain – Likely Negative, negligible**	
Offshore Energy Facilities (wind, tidal, etc.)		**Uncertain – Likely Indirect Negative, moderate**
2013-2014 Biennial Harvest Specifications		**Indirect Positive, negligible**
Trawl Rationalization Trailing Actions		**Uncertain – Likely Positive, negligible**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, negligible to moderate impacts on the biological resources.**	

5.3.5.3 Socio-Economic Environment

Those past, present, and reasonably foreseeable future actions, whose effects may impact the soci-economic environment and the direction of those potential impacts, are summarized in Table 5-14: below. The indirectly negative actions described in Table 5-14 are localized where they occur. Therefore, the magnitude of those impacts on the managed resources is expected to be limited due to a lack of exposure to the population at large. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on productivity of the managed resources is unquantifiable. As described above (Table 5-14), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources under NMFS' jurisdiction.

Past fishery management actions taken through the FMP have had a positive cumulative effect on the managed resources. It is anticipated that the future management actions, described in Table 5-14,will result in additional indirect positive effects on the managed resources through actions, which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which groundfish and demersal rockfish complex species productivities depend. In addition, past fishery management actions taken through the FMP process have had a positive cumulative effect on ESA-listed and MMPA-protected species through the reduction of fishing effort (potential interactions) and implementation of gear requirements. It is anticipated that the future management actions will continue to result in additional indirect positive effects on protected resources. The impacts of these future actions could be broad in scope, and it should be noted the biological resources are often coupled in that they utilize similar habitat areas and ecosystem resources on which they depend. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to the biological resources have had a positive cumulative effect.

Table 5-14: Summary of the effects of past, present, and reasonably foreseeable future actions on human communities: direction, magnitude.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive, negligible**		
Agricultural runoff	**Indirect Negative, negligible**		
Port maintenance	**Uncertain – Likely Mixed, negligible**		
Offshore disposal of dredged materials	**Indirect Negative, negligible**		
Marine transportation	**Mixed, moderate**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Mixed, negligible**		
Offshore Energy Facilities (wind, tidal, etc.)			**Uncertain – Likely Mixed, moderate**
2013-2014 Biennial Harvest Specifications			**Indirect Positive, negligible**
Trawl Rationalization Trailing Actions			**Uncertain – Likely Positive, negligible**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, negligible to moderate impacts on human communities**		

5.3.6 Proposed Action on all of the Affected Resources

The magnitude and significance of the cumulative effects, which include the additive and synergistic effects of the proposed action, as well as past, present, and reasonably foreseeable future actions, have been taken into account throughout this section.

Impacts to the physical environment are between slightly negative to neutral compared to the No Action Alternative, and minor in magnitude as currently managed given gear restrictions as described in the FMP and harvest specifications regulations. The potential for greater bottom contact in the groundfish bottom trawl fishery compared to the No Action Alternative is due to concentrated effort causing the vessel operator to fish within a larger range of bottom habitat. Under No Action or action Alternatives (1&2), groundfish bottom trawl gear could continue to be accidentally or exploratorily deployed in untrawlable habitat where groundfish bottom trawl fishing is allowed, by which contact could damage the net, and endanger the safety of the crew; two behaviors bottom trawl vessels are likely to avoid when possible. Most of the increased bottom contact compared to the No Action Alternative will be to soft sedimentary and mud bottom habitat (over 90 percent); no significant difference in impacts is projected among the alternatives with regard to impact to hard bottom habitats, when considering the amount of untrawlable hard bottom habitat in California Current Ecosystem within the entire West Coast EEZ which bottom trawl fishing vessels will likely continue to avoid to avoid harm to their gear and to reduce safety risks onboard the vessel. However, under the No-action Alternative, there is already a great disincentive to allow groundfish bottom trawl gear to come into contact with sensitive mixed/boulder and hard benthic habitats, such that the additional disincentive from increased accessibility to fishing grounds may not have a substantial impact on behavior from areas that are currently untrawled within open habitat (outside of existing trawl RCAs). Further, under catch share management, bottom contact rate in the groundfish bottom trawl fishery is expected to decline as catch is consolidated with the more efficient harvesters[3]. Numerous West Coast peer reviewed scientific literature studies based upon groundfish bottom trawl logbook track data, demonstrate that bottom trawl fishing has largely predictable trawl habitat, and that effort favors soft and some mixed habitat. Hard substrate is well documented to have the highest abundance of sensitive biogenic habitat, which is most abundant in areas that are untrawlable. Therefore, the NMFS-preferred action is expected to have minor magnitude of impact to the physical environment within the areas that will be liberalized through this proposed action.

Since 2002, NMFS has used large-scale, depth-based, closures to reduce catch of overfished rockfish in fisheries that take and retain groundfish, directing harvest of healthy stocks to areas that remained open. Impacts on the biological resources are primarily a function of the areas fished, gear types used, and level of effort; and of these, area fished is the only factor that might be affected. The levels of dermersal harvests will be variable. However declining trends in sablfish ex-vessel price per pound coupled with lower biomass trajectories from historical levels in the near future, at least for the short term (see 2013-2014 biennial specifications for the groundfish fishery ((NMFS 2012)), discussed in Section 5.1.4 of this EA). This reduced population size will result in reduced harvest opportunity for sablefish by all groundfish fishers and may shift effort to other fisheries to the degree that fishery or individual fisher quotas allow. Processors and communities

[3] Starting on January 1, 2014, all IFQ quota share permit holders may trade quota share pounds. Thus far, annual sales of quota pounds is allowed, but not of quota shares from individual permits.

will also have reduced product and fishery income, respectively, from the prominent sablefish resource and they too will have to depend on other fisheries or income sources to make up for the reduced landings. In the context of this downturn, alternatives that alleviate dependence on the sablefish resource, allowing increased underutilized harvest may be more beneficial to the long-term stability in the industry, than would be the case if harvest levels were expected to remain stable, as underutilized species markets will continue to improve under trawl rationalization.

In addition, the assumption is that small fish (i.e., non-target species) are able to escape codend meshes improves small fish escapement and survival. While it is possible that under the No Action Alternative there could be a decreased impact relative to the action alternatives, that impact is quite small. In addition, minimally increased impacts to eulachon due to increased shoreward (75fm to 100fm) trawling opportunity compared to No Action conditions may occur. There is no difference in impacts to listed species or to eulachon in particular because fishery impacts on eulachon have been very small or negligible. In addition, the eulachon Biological Opinion concludes that West Coast groundfish fisheries have minimal impact to the eulachon population growth rate. No changes in impacts to target species, marine mammals, and seabirds compared to No Action are expected among the action alternatives. Overall, the impacts on biological resources are neutral and magnitude is minor when compared to the No Action Alternative.

In addition, West coast trawl vessels engage in other fisheries and derive substantial revenues from those fisheries. Notable ones include shrimp and albacore. The income that trawlers receive from these other fisheries is far from stable and as a result can be expected to fluctuate in future years depending on the abundance or availability of these other resources to harvest. The availability of these other fishing opportunities somewhat diminishes the importance of any gain in economic efficiencies under the action alternatives, as compared to a situation in which vessels relied only on the groundfish bottom trawl fishery.

For impacts to human communities, greater revenues from increased opportunity to fishing grounds, with potentially a wider range of available opportunities to harvest target and underutilized species compared to the No Action Alternative, and therefore no magnitude is expected. The other action alternatives (1 and 2) have minimal impacts and minor magnitude compared to the No Action Alternative. Thus, expected impacts are beneficial in comparison to the baseline.

Therefore, when this proposed action is considered in conjunction with all the other pressures placed on fisheries by past, present, and reasonably foreseeable future actions, it is not expected to result in any significant impacts, positive or negative in direction or magnitude. Based on the information and analyses presented in these past FMP documents and this document, there are no significant cumulative effects associated with the action proposed in this document.

CHAPTER 6 STATUTORY REQUIREMENTS AND APPLICABLE LAW

6.1 FMP Goals and Objectives and National Standards

This proposed action should further the goals and objectives of, and be consistent with, the Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP), and also be consistent with the National Standards (NS) contained in the Magnuson-Stevens Act. The Groundfish FMP contains three broad goals and 17 objectives intended to achieve those goals. As briefly described below, the proposed action should:

- Minimize bycatch, and mortality to bycatch, by demonstrating the effectiveness of individual accountability under the Shorebased IFQ Program, even with increased access to fishing grounds (NS 9, NS 1; FMP goal 3; FMP objectives 6, 9, 11,).
- Improve safety at sea through reduced transiting requirements (NS 10; FMP objective 17).
- Reduce regulatory complexity for industry and management (FMP objectives 15, 16)
- Increase access to target stocks, while ensuring all other statutory requirements are met (NS 1, FMP Goals 1–3).

NATIONAL STANDARD 1
National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The groundfish harvest specifications and management measures are implemented every two years and incorporate the most recent scientific information, including new stock assessments. The most recent harvest specifications cover 2013-2014 (78 FR 580, January 3, 2013). The harvest specifications establish, in generally decreasing order, overfishing limits, acceptable biological catch limits, annual catch limits, and harvest guidelines. In addition, for some species, the harvest specifications also establish sector-specific allocations. Under the Groundfish FMP,

the annual catch limits are established in a manner to prevent overfishing while achieving optimum yield (OY).

For the shorebased trawl fishery, the IFQ program increases individual accountability for total catch, including bycatch, and gives fishermen greater discretion as to when and how to fish. This provides greater opportunity to extract the full optimum yield while avoiding overfished species. The 100 percent monitoring and increased accountability further reduces the risk of overfishing. The proposed action would increase access to fishing grounds and contribute to achieving OY.

Because this action would not change the overall amount of groundfish available to the trawl fishery, and considering the increased accountability under the shorebased IFQ program, this proposed action will continue to prevent overfishing while achieving OY. As the EA demonstrates, the risk of exceeding an ACL or trawl sector allocation is low.

NATIONAL STANDARD 2

National Standard 2 states that conservation and management measures shall be based upon the best scientific information available.

The EA and supporting analyses are based upon the best scientific information available. The EA used data from various sources or summaries of that data, including data from the Pacific Fisheries Information Network (PacFIN), Federal electronic fish tickets, the NMFS limited entry permit database, West Coast Groundfish Observer Program (WCGOP) data, state logbooks, and NMFS vessel monitoring systems and declarations data.

NATIONAL STANDARD 3

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.

The environmental impact statement for the 2013-2014 Groundfish Harvest Specifications and Management Measures described the management units for Pacific coast groundfish. This action would not modify those management units.

NATIONAL STANDARD 4

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 fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (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.

This proposed action does not discriminate between residents of different states. The trawl RCA boundaries could have incidental allocative effect, but the proposed action is not a direct assignment of fishing privileges.

NATIONAL STANDARD 5

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.

The shorebased IFQ program was designed, in part, to reduce fleet capacity and to economically rationalize the groundfish trawl fishery. The trawl fleet will likely consolidate and fewer vessels will be used to harvest the available allocations, especially once quota share trading is allowed. Reducing excess capacity is expected to improve the efficiency in the utilization of fishery resources as well as reduce the levels of incidental catch. In addition, once quota trading begins, quota is expected to move over the long-term to owners with more efficient fishing operations. This proposed action will not alter these components of the shorebased IFQ program. The proposed action should also increase the amount of fishing grounds available shoreward and seaward of the current RCA boundaries, reducing fuel costs and transiting time. This proposed action would also result in a simpler RCA configuration for enforcement and management purposes.

NATIONAL STANDARD 6

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.

The shorebased IFQ program provides greater flexibility to individual fishermen to determine when and how to fish. This flexibility enhances the ability of fishermen and managers to respond to unexpected circumstances. The program also provides for variations and contingencies in the fishery by allowing transfer of quota through leasing and sales. In addition, the Council retains the flexibility to act inseason to modify RCA boundaries in response to new information should it be necessary.

NATIONAL STANDARD 7

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

This proposed action should minimize costs by simplifying RCA boundaries, increasing access to fishing grounds, and reducing vessel transiting time. Generally, by coordinating management, monitoring, and enforcement activities between NMFS, the Council, and the States, duplication, and thus cost, is minimized. This proposed action will not introduce any new measures that duplicate those already in place.

NATIONAL STANDARD 8

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 proposed action alternatives will benefit fishing communities by increasing access to target stocks and are not expected to have adverse economic impacts.

NATIONAL STANDARD 9

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.

The shorebased IFQ program was designed to improve total catch accounting (with 100% observer coverage in all sectors and 100% dockside monitoring), reduce bycatch, increase target catches, and promote greater individual responsibility. This proposed action will open areas where some overfished species are more likely to be encountered. However, the action is not anticipated to increase the amount of bycatch. Fishermen have increased individual accountability under the IFQ program and are expected to avoid overfished species due to the limited amount of quota pounds available.

NATIONAL STANDARD 10

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The shorebased IFQ program provides fishermen with increased flexibility in determining when, where, and how to fish. This is expected to reduce incentives to fish in unsafe conditions. Some safety benefits were also expected to the degree that the fishery is more profitable and more money is put into vessel maintenance. Less efficient vessels are expected to leave the trawl fishery, which may eliminate older, less safe vessels. RCAs could affect safety if more vessels elect to fish seaward of the closed areas and are more exposed to bad weather conditions. The proposed action will increase the amount of fishing grounds both shoreward and seaward of the RCAs, potentially reducing transit time and increasing safety.

6.2 Other Applicable MSA Provisions

NMFS prepared an EIS evaluating programmatic measures designed to identify and describe west coast groundfish EFH (NMFS 2005), and minimize to the extent practicable, adverse effects of fishing 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 EA describes impacts of the proposed action on EFH, consistent with the EFH assessment requirements of 50 CFR 600.920 (e)(3). The proposed action, NMFS-preferred Alternative 1 as modified, is not anticipated to result in substantial adverse effects to groundfish EFH and is not anticipated to affect EFH designated for other species. No additional EFH conservation recommendations are provided. The Council is currently undertaking a review of its groundfish EFH designations and may take further steps to minimize adverse effects of fishing on groundfish EFH at that time, if practicable.

CHAPTER 7 **OTHER APPLICABLE LAW**

7.1 Other Federal Laws

7.1.1 Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act (CZMA) of 1972 requires all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. This proposed action will be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California. This determination was submitted on June 27, 2013, for review by the responsible state agencies under Section 307 of the CZMA. NMFS received responses from Washington (July 3, 2013) concurring with our determination. NMFS did not receive a response from Oregon and California, so consistency is inferred.

7.1.2 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 issued Biological Opinions under the Endangered Species Act (ESA) on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999 pertaining to the effects of the PCGFMP fisheries on Chinook salmon (Puget Sound, Snake River spring/summer, Snake River fall, upper Columbia River spring, lower Columbia River, upper Willamette River, Sacramento River winter, Central Valley spring, California coastal), coho salmon (Central California coastal, southern Oregon/northern California coastal), chum salmon (Hood Canal summer, Columbia River), sockeye salmon (Snake River, Ozette Lake), and steelhead (upper, middle and lower Columbia River, Snake River Basin, upper Willamette River, central California coast, California Central Valley, south/central California, northern California, southern California). These biological opinions have concluded that implementation of the PCGFMP is not expected to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS, or result in the destruction or adverse modification of critical habitat.

NMFS issued a Supplemental Biological Opinion on March 11, 2006 concluding that neither the higher observed bycatch of Chinook in the 2005 whiting fishery nor new data regarding salmon bycatch in the groundfish bottom trawl fishery required a reconsideration of its prior ''no jeopardy'' conclusion. NMFS also reaffirmed its prior determination that implementation of the PCGFMP is not likely to jeopardize the continued existence of any of the affected ESUs. Lower Columbia River coho (70 FR 37160, June 28, 2005) and Oregon Coastal coho (73 FR 7816, February 11, 2008) were recently relisted as threatened under the ESA. The 1999 biological opinion concluded that the bycatch of salmonids in the Pacific whiting fishery were almost entirely Chinook salmon, with little or no bycatch of coho, chum, sockeye, and steelhead.

On November 21, 2012, the U.S. Fish and Wildlife Service (FWS) issued a biological opinion concluding that the groundfish fishery will not jeopardize the continued existence of the short-tailed albatross. The (FWS) also concurred that the fishery is not likely to adversely affect the marbled murrelet, California least tern, southern sea otter, bull trout, nor bull trout critical habitat.

On December 7, 2012, NMFS completed a biological opinion concluding that the groundfish fishery is not likely to jeopardize non-salmonid marine species including listed eulachon, green sturgeon, humpback whales, Steller sea lions, and leatherback sea turtles. The opinion also concludes that the fishery is not likely to adversely modify

critical habitat for green sturgeon and leatherback sea turtles. An analysis included in the same document as the opinion concludes that the fishery is not likely to adversely affect green sea turtles, olive ridley sea turtles, loggerhead sea turtles, sei whales, North Pacific right whales, blue whales, fin whales, sperm whales, Southern Resident killer whales, Guadalupe fur seals, or the critical habitat for Steller sea lions.

7.1.3 Marine Mammal Protection Act

The MMPA of 1972 is the principle Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the U.S. Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee. Off the west coast, the Steller sea lion (Eumetopias jubatus) eastern stock, Guadalupe fur seal (Arctocephalus townsendi), and Southern sea otter (Enhydra lutris) California stock are listed as threatened under the ESA. The sperm whale (Physeter macrocephalus) Washington, Oregon, and California stock, humpback whale (Megaptera novaeangliae) Washington, Oregon, and California - Mexico Stock, blue whale (Balaenoptera musculus) eastern north Pacific stock, and Fin whale (Balaenoptera physalus) Washington, Oregon, and California stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The west coast groundfish trawl fisheries are category III fisheries indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals. The proposed action could affect the intensity, duration, and location of the groundfish bottom trawl fishery through changes to RCA boundaries. But these changes are not anticipated to change the effects of the groundfish fisheries on marine mammals.

7.1.4 Migratory Bird Treaty Act

The MBTA of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished the populations of many native bird species. The MBTA states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The MBTA prohibits the directed take of seabirds, but the incidental take of seabirds does occur. This proposed action is unlikely to affect the incidental take of seabirds protected by the MBTA.

7.1.5 Paperwork Reduction Act

This proposed action, as implemented by any of the alternatives considered, does not require collection-of-information subject to the Paperwork Reduction Act.

7.1.6 Regulatory Flexibility Act

The purpose of the Regulatory Flexibility Analysis (RFA) is to relieve small businesses, small organizations, and small governmental entities of burdensome regulations and record-keeping requirements. Major goals of the RFA are; (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require agencies to communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. An initial regulatory flexibility analysis (IRFA) is conducted unless it is determined that an action will not have a "significant economic impact on a substantial number of small entities." The RFA requires that an IRFA include elements that are similar to those required by EO 12866 and NEPA. NMFS prepared an IRFA for the proposed rule and will prepare a final regulatory flexibillty analysis for this proposed action.

7..1.7 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 following are core elements of an EA (40 CFR § 1508.9):

1. The need for the proposal,
2. Alternatives as required by NEPA § 102(2)(E),
3. The environmental impacts of this proposed action and the alternatives, and
4. The agencies and persons consulted.

Related NEPA Documents

The following NEPA documents provide information and analyses related to the effects of this proposed action:

- 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. Published by PFMC and NMFS in October 2012. (http://www.pcouncil.org/wp-content/uploads/September_2012_Main_Document_13-14_FEIS_SPEX.pdf)
- 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 PFMC and NMFS in February 2011. (http://www.pcouncil.org/groundfish/fishery-management-plan/fmp-amendment-16-5/#16-5)

- 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)
- PFMC (Pacific Fishery Management Council) and NMFS (National Marine Fisheries Service). Pacific Coast Groundfish Essential Fish Habitat, Final Environmental Impact Statement. Pacific Fishery Management Council, Portland, OR. December 2005. (http://www.nwr.noaa.gov/publications/nepa/groundfish/final_groundfish_efh_eis.html)

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 documents is incorporated, these procedures are followed within the body of this EIS.

7.2 Executive Orders

7.2.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

7.2.2 EO 12898 (Environmental Justice)

EO 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall

environmental impact analysis associated with an action. NOAA guidance, NAO 216-6, at Section 7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes."

7.2.3 EO 13132 (Federalism)

EO 13132, which revoked EO 12612, an earlier federalism EO, enumerates eight "fundamental federalism principles." The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the EO directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement." The Council process offers many opportunities for states (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management measures. This process encourages states to institute complementary measures to manage fisheries under their jurisdiction that may affect federally-managed stocks. This proposed action does not have federalism implications subject to EO 13132.

7.2.4 EO 13175 (Consultation and Coordination with Indian Tribal Government)

EO 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. 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.

7.2.5 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

EO 13186 supplements the MBTA (above) by requiring Federal agencies to work with the U.S. Fish and Wildlife Service (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 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. Past EISs evaluating the impact of groundfish harvest specifications (PFMC 2004b; PFMC 2006; PFMC 2008a) evaluated impacts to seabirds and concluded that this proposed action will not significantly impact seabirds. There is no new information to indicate that this proposed action would result in greater impacts to seabirds.

CHAPTER 8 LIST OF AGENCIES AND PERSONS CONSULTED AND PREPARERS

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CHAPTER 10 FINDING OF NO SIGNIFICANT IMPACT

10.1 Public Comment, including Response to Comments

NMFS received five letters of comments on the proposed rule and draft environmental assessment submitted by individuals or organizations. Three of the commenters supported the Council-preferred alternative (Alternative 1). Two commenters did not support the Council-preferred alternative.

The following public comments were received by NMFS for the proposed action as they pertain to the Draft EA:

Comment 1: Bottom trawl gear should be declared illegal. Trawl gear exacerbates the problem of whales and other large ocean fish becoming entangled in lines. Instead of opening the trawl RCAs, NMFS should consider expanding them.
Response: This EA does not affect the types bottom trawl gear allowed in the Pacific coast groundfish fishery, it only affects where vessels may fish with that gear (see 3.0 Alternatives). NMFS disagrees with the commenter that bottom trawl gear should be declared illegal. Bottom trawl gear is particularly efficient at targeting high volumes of species such as various flatfish (e.g., dover sole, English sole), roundfish such as Pacific cod, and other healthy bottom dwelling species such as thornyhead species; all of which are more inefficiently harvested with other groundfish gears. Therefore, groundfish bottom trawl gear can offer substantial benefits to the nation in terms of providing consistent healthy protein supply and economic benefits when carefully managed. In addition, entanglements with marine mammals or other large ocean fish are comparatively rare. For example, the groundfish bottom trawl fishery is considered a Category III fishery under the Marine Mammal Protection Act, indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals. *See* 78 FR 73477 (December 06, 2013).

With respect to expanding RCAs, NMFS notes that expansion of trawl RCAs continues to be an option available to the Council and NMFS through inseason modifications to the Code of Federal Regulations if needed. However, the purpose of this action includes increasing access to target stocks, not reducing access.

Comment 2: Alternative 1 provides increased access to target stocks and better achieves optimum yield, consistent with National Standard 1 of the Magnuson Stevens Fishery Conservation and Management Act (MSA). Alternative 1 will provide vessels opportunities seaward of the RCAs to catch target species, primarily Dover Sole.
Response: NMFS agrees that the Council's recommendation as contained in Alternative 1 would provide IFQ vessels fishing with bottom trawl gear increased access to target species catch, including Dover sole. However, even in the most uninhibited regulatory

scenarios, attainment of all groundfish ACLs is affected by natural inter-annual ecosystem changes, market priorities, and other business realities. This action will still allow some increased opportunities seaward of the RCA North of 45° 46' N. latitude (see 5.2 Socio-economic Impacts), will liberalize all of the shoreward RCA boundaries as recommended by the Council, and is consistent with National Standard 1. The trawl RCA boundaries being implemented are expected to still have a favorable economic impact on groundfish fishing vessels and for businesses and ports where groundfish are landed (see 5.2 Socio-economic Impacts). Moreover, additional refinements of RCA boundaries can still occur once habitat aspects associated with opening long-term year round RCA closures have been addressed.

Comment 3: Under the IFQ program, the Pacific groundfish trawl fishery operates with enhanced monitoring and individual accountability. Bycatch of overfished species and discard of target species has decreased dramatically from pre-IFQ years, as noted by NMFS own scientists. Therefore the boundaries of Alternative 1 will not create problems with increased catch of overfished species. The risk of exceeding bycatch of overfished species is minimal given the draft EA results and the IFQ program. The chances of an overfished species "lightning strike" are slim to none, as evidenced by NMFS trawl surveys, which are fishing in these areas and presumably not trying to avoid overfished species. If NMFS believes the IFQ system has not been responsible for reducing bycatch, then NMFS must immediately direct the Council to end the IFQ program.
Response: NMFS agrees with the commenter that the IFQ program has been very effective at reducing bycatch of some overfished species (see 5.1.4.2.1 Overfished Species). NMFS also agrees that increased bycatch of overfished species as a result of this EA, either as proposed or as implemented, is unlikely (see 5.1.4.2.1 Overfished Species). However, NMFS notes that at some point a large unanticipated tow of overfished species may occur, and management measures are in place for action should the Council and NMFS need to respond. Regarding NMFS trawl surveys, although those vessels are not actively trying to avoid certain rockfish species, and survey activities have not resulted in high overfished species catch events that would threaten continued commercial activities, the scientific surveys have dramatically different aims than that of commercial vessels (see 4.7.6 Current Habitat as Affected by NMFS Bottom Trawl Surveys). Trawl surveys typically use 15 minute tows, while commercial bottom trawl gear deployments of 3-6 hours are common, and may even exceed that, in which case undesired bycatch events of overfished species may be more likely to occur.

Comment 4: There is no reason to keep RCA areas closed until habitat areas of particular concern (HAPC) are modified. When the Council established its first groundfish HAPC designations, it included areas that had been subjected to extensive trawling. If the Council determines through the groundfish EFH review that all or a portion of the RCA that will be opened under Alternative 1 deserves additional protection, the Council can still do that later through the existing process. In addition, the RCA being considered in Altenrative 1 has been subject to trawling prior to the establishment of the RCA and restrictions on trawl gear use. The area has also been subject to fishing by other bottom contact gears and research surveys. This is not virgin wilderness that has been and should remain untouched. NMFS should implement

Alternative 1. Furthermore, EFH concerns are not the intent of RCAs, which were implemented to reduce catch of rebuilding rockfish stocks, and EFH should not be considered when deciding whether to liberalize RCAs.

Response: NMFS agrees that benthic habitat that would be exposed to groundfish bottom trawling by opening the seaward areas between 45°46' N. lat. and 40°10' N. lat. has likely been impacted to some degree in the past (see 4.7.1 Current Habitat as Affected by Groundfish Bottom Trawl Gear). NMFS further acknowledges that prior to the closure of these areas, substantially less restrictive trawl gear regulations were in place. Historical bottom trawl gear types were more destructive to sensitive habitat than current bottom trawl gear restrictions. Current restrictions have reduced incentives to deploy bottom trawl gear in hard and mixed substrate areas, particularly high-relief hard pinnacle areas where the greatest abundance of sensitive biogenic habitat (corals and sponges) are found (see 4.3 Essential Fish Habitat). NMFS also agrees that the seaward areas between 45°46' N. lat. and 40°10' N. lat. have been subject to fishing by other gear types and some limited trawling activity by NMFS scientific surveys (see 4.7.6 Current Habitat as Affected by NMFS Bottom Trawl Surveys).

Nevertheless, the seaward areas between 45°46' N. lat. and 40°10' N. lat., between the 150 fm (274-m) and modified 200 fm (366-m) line have largely been closed to groundfish bottom trawling since 2004 (see Table 4-6, see section 4.7.1 Current Habitat as Affected by Groundfish Bottom Trawl Gear), and the other gear types and survey activities have relatively lower impacts to benthic habitats (see Table 4-1, see 4.7 Current Habitat as Affected by Fishing Gear). This EA indicates that this area is more likely than others to have recovered from the impacts of groundfish bottom trawling (see Table 4-6). In fact, this area may currently have greater conservation value than portions of the actual "core" RCA (between the 100 fm and 150 fm lines, 183-m and 274-m). That core RCA has been closed to groundfish bottom trawling since at least 2003, but some of the areas are currently impacted by pink shrimp bottom trawl gear (see Table 4-10), whereas the seaward areas between 45°46' N. lat. and 40°10' N. lat., between the 150 fm (274-m) and modified 200 fm (366-m) are not. The recovery estimates provided in the 2005 EFH Environmental Impact Statement and subsequent 2012 and 2013 EFH review reports (excluding coral and sponge regeneration/recovery time) support NMFS conclusion that this area has had some opportunity to recover from trawling impacts (see Table 4-1, see Table 4-6).

NMFS agrees that the trawl RCAs were implemented primarily to reduce the catch of rebuilding rockfish stocks by closing off areas to bottom trawl activity where those species of concern were found in higher densities and/or where larger bycatch events had previously occurred. However, when long term closures such as the seaward area at issue have allowed for some level of habitat recovery, NMFS must take that into account (see Table 4-1).

While it is true that the Council and NMFS adopted EFH conservation areas through Amendment 19 encompassing habitat that had been previously been trawled, opening the seaward area between 45°46' N. lat. and 40°10' N. lat., between the 150 fm (274-m) and modified 200 fm (366-m) line now has the potential to adversely impact habitat that has partially recovered (see Table 4-1, see Table 4-6), prior to the Council considering whether additional protections are warranted. Doing so could negate some of the recovery that has occurred. At its November 2013 meeting, the Council decided to

move forward with phase III of its groundfish EFH review after determining that there was sufficient new information to warrant continuing evaluation of its existing groundfish EFH designations. Liberalizing the seaward RCA boundary between 40° 10' N. latitude and 45° 46' N. latitude, between the 150 fm (274-m) and modified 200 fm (366-m), may ultimately be consistent with the Council's EFH responsibilities. This action did not address the question of whether any of the seaward areas between 45°46' N. lat. and 40°10' N. lat. and the 150 fm (274-m) and modified 200 fm (366-m) lines, should ultimately receive additional protection through management measures designed to minimize, to the extent practicable, adverse effects on EFH from fishing. It did, however, highlight that additional analysis of this area is needed (see 5.1.3 Essential Fish Habitat). Prior to the completion of the phase III review of EFH proposals, or additional consideration of whether practicable measures exist that could minimize impacts of bottom trawling between 40° 10' N. latitude and 45° 46' N. latitude and the 150fm (274-m) and modified 200fm (366-m) RCA lines, NMFS believes there is an insufficient basis to open this year-round closed area to bottom trawling.

Comment 5: Alternative 1 provides increased harvest opportunities consistent with National Standards 5, 7, and 8 by considering efficiency in the utilization of fishery resources, minimizing costs, and taking into account the importance of fishery resources to fishing communities. The costs for participating in the west coast groundfish fishery continue to increase with the pending 3 percent cost recovery fee, the annual 5 percent buyback loan payments, state landing taxes, observer costs, and the possible implementation of the adaptive management program that could reduce 10 percent of the available quota pounds. Harvesters need the access to fishing grounds allowed by Alternative 1.

Response: NMFS is aware that fishermen have costs associated with the buyback repayment, state landing taxes, observer coverage, and cost recovery. However, participants in the IFQ program have already started realizing the benefits of the program even with these costs (see 5.2, Socio-economic Impacts). Preliminary data from the mandatory economic data collection program compares data from 2009 and 2010 (pre-trawl rationalization) versus 2011 (post-trawl rationalization) (see Agenda Item F.2 from the Council's June 2013 meeting), and shows that when looking at net revenue, the fleet is still profitable even with increased costs (e.g., high fuel prices, observer costs). However, with only one year of data post-trawl rationalization, it is too early to make conclusions on the economic benefits of the program.

While buyback loan repayment is a cost to industry, the harvesters that remained and are now in the Shorebased IFQ program have benefitted from the buyback program. Fishermen are also petitioning Congress to approve legislation that would refinance the buyback loan, extending the term of the loan and capping the fee rate at three percent of ex-vessel value, down from five percent.

NMFS is evaluating whether electronic monitoring could reduce the cost of observers. With respect to the adaptive management program, it is unclear at this time how it will be structured or affect the fleet. Ultimately, this proposed action will increase access to fishing grounds and is consistent with the National Standards.

Comment 6: The potential for gear conflicts resulting from liberalized RCAs was an issue raised at the Council's September 2013 meeting. However, fishing gears of various types are already in use throughout the area currently open to fishing with no indication that extensive gear conflicts are occurring. Allowing trawling in deeper water on the continental shelf out to 100 fathoms instead of the current 75 fathoms could actually reduce gear conflicts because there would be more area for vessels to operate.
Response: The Groundfish Advisory Subpanel and Groundfish Management Team considered the possibility of gear conflicts at the September 2013 Council meeting. By increasing the areas available to trawlers, including the deeper water on the continental shelf out to 100 fathoms, the NMFS-preferred Alternative 1 as modfied could potentially reduce concentration of gear between the trawl and fixed gear sectors in the areas where they currently overlap. Additionally, the shoreward boundary change could potentially reduce gear conflicts between crab and groundfish bottom trawl vessels. During public comment under this agenda item at the September Council meeting, trawl and fixed gear industry representatives commented and agreed with the above-mentioned assumptions. Any ancillary gear conflict consequences that might result from implementation of RCA boundary changes through this action could likely be avoided through increased communications among vessels.

Comment 7: Alternative 2 in the EA falls short of providing meaningful access to healthy target species while the risks associated with both alternatives are virtually the same. Alternative 1 provides increased access to currently closed trawl RCA areas in a manner that allows trawl IFQ fishermen to continue to demonstrate the benefits of 100 percent accountability of catch and discards. Trawl RCAs are a relic of pre-IFQ management.
Response: NMFS agrees that trawl RCAs are to some extent a relic of pre-IFQ trawl fishery management, which depended largely on trip limits and area closures to control catch in the groundfish trawl fishery. On the other hand, RCAs can still serve as an additional tool for controlling catch in areas with unacceptably high bycatch risks. NMFS also agrees that increased access to currently closed trawl RCA areas allows trawl IFQ fishermen to continue to demonstrate the benefits of the program, including individual accountability of catch and discards (see 5.1.4.1 Groundfish Target Species, see 5.1.4.2.1 Overfished Species, see 5.1.4.3 Bycatch of Other Non-target species).

However, NMFS disagrees that the trawl RCA boundaries implemented through this proposed action would fall short of providing meaningful access to healthy target species. This proposed action provides approximately 2,389 square miles of additional year-round access compared to taking no action (similar to Alternative 2 considered in the EA, which would provide increased year-round access to approximately 2,600 square miles, see Table ES-1). This is still a meaningful increase in year-round access to fishing grounds. Both Alternative 1 and the boundaries as implemented in the NMFS-preferred Alternative 1 as modified would provide more benefit than the no-action alternative. This increased access should provide greater access to healthy groundfish stocks, which could improve efforts to more fully attain harvest levels. The Council and NMFS can still consider additional modifications to trawl RCA boundaries in the future in manner that addresses the catch control aspects of RCAs along with the habitat aspects.

With respect to the risks associated with the different trawl RCA boundary

configurations, NMFS notes that while this EA determined that the boundaries in Alternative 1 presented relatively little risk of greatly increased overfished species catch (see 5.1.4.1 Groundfish Target Species, see 5.1.4.2 Non-target Species, Including Overfished Groundfish), the trawl RCA boundaries implemented through the NMFS-preferred Alternative 1 as modified would not increase access beyond the seaward line of the current RCA between 45°46' N. lat. and 40°10' N. lat.. Therefore, to the extent there are any increased impacts to overfished species by opening new fishing areas, they are expected to be lower in frequency and magnitude under this proposed action, particularly for slope species, than under Alternative 1 (see 5.1.4.3 Bycatch of Other Non-target species).

Comment 8: NMFS should not implement Alternative 1. The draft EA makes several erroneous assertions about past impacts to benthic habitat, arguing that the degraded baseline state of the benthic environment means that the impacts from opening the RCA to groundfish bottom trawling will be relatively lower. Illegal incursions into the RCA, fishing by other gears and fisheries, NMFS trawl surveys, and pre-RCA trawling do not mean that the Alternative 1 will have insignificant impacts. Most of these activities are relatively less harmful to benthic habitat, and trawl nets still bring up sponges and corals even in areas frequently trawled, as evidenced by NMFS West Coast Groundfish Observer Program (WCGOP) bycatch data.

Response: NMFS disagrees that prior impacts to benthic habitat in the RCAs are irrelevant to assessing the state of the affected environment and the types of impacts that could be anticipated from opening up areas to groundfish bottom trawling. The EA demonstrates that various activities have impacted benthic habitat in the past, including those activities mentioned by the commenter (see 4.6 Benthic Habitat Substrates and Recovery, see 4.7.1 Current Habitat as Affected by Groundfish Bottom Trawl Gear). NMFS agrees that fixed gear is generally ranked lower with respect to overall benthic habitat impacts when compared to bottom trawl gear (see 4.6 Benthic Habitat Substrates and Recovery, see Table 4-1). However, fixed gear is particularly adept at accessing some rocky areas such as hard/mixed rocky pinnacles with substantially less risk of damage to fishing gear, as compared to bottom trawl gear (see Table 4-9). Fixed gear impacts, in practice, can be greater in areas that bottom trawl vessels actively avoid or are considered untrawlable. NMFS also notes that although coral and sponge are present in trawlable habitat of all substrate types (soft, medium, hard), the magnitude of coral and sponges generally increases in hard areas that are untrawlable, and in which other fixed gear types are actively engaged in fishing activities (see 4.6 Benthic Habitat Substrates and Recovery, see Table 4-9).

Ultimately, recognizing the degree of previous and ongoing impacts to benthic habitat within the RCA boundaries under consideration contributed to NMFS conclusion that the upper slope area should remain closed through this proposed action, at least until additional groundfish EFH consideration has occurred. The area between 40° 10’ N. latitude and 45° 46’ N. latitude and the 150fm (274-m) and modified 200fm (366-m) RCA lines has not been trawled in almost a decade by groundfish trawl gear types, and in practice is not trawled by pink shrimp trawl gear. As such, this area has at least partially recovered from the relatively more substantial trawl impacts, despite still being subjected to fixed gear effort and occasional research trawls or inadvertent incursions.

In addition, while intensive trawling from the 1970s through early 2000s likely did destroy a significant amount of biogenic habitat, NMFS agrees that any assumption that none remains would be unwarranted and that NMFS bottom trawl survey and WCGOP data show coral and sponge bycatch, even in areas of high fishing effort. Trawling effort is heterogeneously distributed, with some areas trawled repeatedly and others less often or in some cases not at all. Ultimately, NMFS concluded that the RCA boundaries implemented through this proposed action will not significantly affect the quality of the human environment. All of the additional areas opened through this action are currently subjected to groundfish bottom trawling at some point during the year. This action would only change the boundaries to allow year-round access.

Comment 9: Alternative 1 could have significant impacts on corals, sponges, and other marine life. Removal by bottom trawling of slow growing corals could cause long-term changes in associated megafauna, which provide shelter and food sources for juvenile fish and shellfish. Corals, sponges, and Pennantulacea (sea whips and sea pens) also create three dimensional structures that form habitat for bottomfish, shellfish, invertebrates, and other marine life, and impacts by bottom trawling may have an impact on fish stocks. Some corals may live in excess of 2,000 years, some sponges may be over 220 years old, and some mounds formed by sponges appear have been estimated to be between 9,000 to 125,000 years old. NMFS needs to consider impacts to biogenic habitat in conjunction with impacts to substrate. The impacts to ocean floor substrate and impacts to biogenic habitat such as corals and sponges may be different.
Response: NMFS agrees that corals, sponges, and Pennantulacea (sea whips and sea pens) have the potential to create three−dimensional structures that form habitat for marine life (see 4.8.3.1 Coral, see 4.8.3.2 Sponges, see 4.8.3.3 Sea Whips), and impacts by bottom trawling may have an impact on fish stocks (see 5.1.3 Essential Fish Habitat). This was considered in the EFH synthesis review documents that informed this EA. As this EA points out, recolonization and recovery rates and recovery times may be greater than 100 years for deep-sea corals (see 4.6 Benthic Habitat Substrates and Recovery, see Table 4-1). NMFS agrees that some corals may live in excess of 2,000 years, some sponges may be over 220 years old, and that some mounds formed by sponges appear to have been estimated to be between 9,000 to 125,000 years old. However, many of these habitats and mounds are particularly inaccessible to bottom trawl gear given current gear restrictions (see 4.7.1 Current Habitat as Affected by Groundfish Bottom Trawl Gear, see Table 4-8). In addition, all of the areas opened through this action are currently subjected to groundfish bottom trawling at some point during the year (see 3.0 Alternatives, see 3.1 No-Action Alternative).

NMFS agrees that impacts to ocean floor substrate and impacts to biogenic habitat, such as corals and sponges, may be different and that the physical environment of the seafloor is formed by the combination of invertebrates with sediment structures. NMFS fully considered the physical environment of the seafloor formed by the combination of invertebrates with sediment structures in the EA for this action (see 5.1 Physical Environment). The recovery tables provided by the EFH habitat synthesis review products and utilized in this EA considered impacts to substrate types (see Table 4-1). Citing recovery times from those reviews, this EA specifically excludes structure-forming invertebrates, and qualifies the limitations regarding available analysis (see 4.6

Benthic Habitat Substrates and Recovery). Although the recovery tables in this EA are mostly relevant to seafloor areas lacking biogenic habitat, impacts to biogenic habitat such as corals, sponges, and sea whips/pens are explained elsewhere in detail in the EA (as well as in the 2005 EFH EIS and recent EFH synthesis analysis review documents; see 4.6 Benthic Habitat Substrates and Recovery, see 4.8.3.1 Coral, see 4.8.3.2 Sponges, see 4.8.3.3 Sea Whips, see 5.1.3 Essential Fish Habitat, see 5.1.4.3.1 Invertebrates). NMFS notes that the majority of scientific peer-reviewed literature on biogenic habitat abundance suggests that the abundance of slow growing epibenthic coral and sponge fauna tends to be greater in mixed/hard and hard substrates, as opposed to soft sand and mud habitat (see 4.6 Benthic Habitat Substrates and Recovery). Soft sandy/mud habitat is estimated to comprise over 90 percent of groundfish habitat substrate within all RCA areas, including those that will remain closed after this final action (see *4.6.1.4 Proportion of Substrate Types in the Action Area*). This action would only change the boundaries to allow year-round access (see 3.1 No-Action Alternative). NMFS disagrees that the NMFS-preferred Alternative 1 as modified will have significant impacts.

Comment 10: Trawl vessels do not avoid hard and mixed substrate sufficiently to mitigate impacts to areas with coral or sponge. Alternative 1 will allow trawling in areas with mixed and hard substrate and adversely impact corals and sponges.
Response: NMFS agrees that not all areas of hard and mixed substrate are untrawlable or actively avoided by vessels, and that trawling has the potential to impact corals and sponges when encountered (see 4.8.3.1 Coral, see 4.8.3.2 Sponges, see 4.8.3.3 Sea Whips, see 5.1.3 Essential Fish Habitat). However, as the commenter acknowledged, at least some areas may be avoided due to potential negative impacts on trawl gear, given current gear restrictions (see 4.6 Benthic Habitat Substrates and Recovery, see Table 4-8). Despite the fact that trawl vessels do tow over some trawlable smooth hard and mixed substrates, some high relief areas are considered untrawlable because of the potential for severe damage to trawl gear (see 4.6 Benthic Habitat Substrates and Recovery, see Table 4-8). These areas provide a financial and safety disincentive for vessels to engage in trawling, regardless of RCA configuration.

Comment 11: Alternative 1 raises doubts about the adequacy of the existing measures to protect groundfish EFH habitat from the adverse effects caused by fishing to the extent practicable, as required by the MSA.
Response: After reviewing public comment on the draft EA, information being developed through the Council's groundfish EFH review, the Council's recommendations, and the EA itself, NMFS has determined that additional consideration regarding the impacts of the seaward boundary modification on groundfish EFH between 45°46' N. lat. and 40°10' N. lat., between the 150 fm (274-m) and modified 200 fm (366-m) is warranted (see Table 4-1, see Table 4-6). Opening year-round closed areas to groundfish bottom trawling now, before completion of the groundfish EFH review or additional consideration is given through a separate process, is premature. Therefore, NMFS is not implementing that seaward boundary change at this time (see executive summary).

Comment 12: Evidence indicates that impacts to the physical environment from

Alternative 1 may be significant and an environmental impact statement is required. Alternative 1 received heated testimony, resulting in the Council revisiting the issue at its September meeting, indicating a high level of controversy and the need for an EIS.
***Response*:** NMFS disagrees that opening the areas would have a significant adverse impact on the physical environment. Numerous scientific literature studies demonstrate that untrawlable pinnacle hard substrate areas, which are most suitable to coral and sponges, will remain untrawlable given bottom-trawl gear restrictions implemented by the Council over the last decade (see 4.7.1 Current Habitat as Affected by Groundfish Bottom Trawl Gear, see Table 4-8).

Alternative 1 and the NMFS-preferred and modified Alternative 1 would leave the "core" trawl RCA from 40° 10'N. Lat. to 48° 10' N. lat., 100-150 fm (183-274-m) closed to bottom trawling, in addition to all currently existing state and Federal EFH closure areas and Marine Protected Areas (MPA). Additionally, the NMFS-preferred and modified Alternative 1 will not open the seaward boundary between 45°46' N. lat. and 40°10' N. lat., between the 150 fm (274-m) and the modified 200 fm (366-m) from the current status quo configuration (see 3.1 No-Action Alternative).

An action is "highly controversial," for purpose of determining whether an EIS is required, when there is substantial dispute about size, nature, or effect of the action (i.e., scientific controversy). The existence of opposition to an action, on its own, does not require preparation of an EIS. To the extent that public testimony or Council deliberations were "heated," an EIS is still not required for this action because the comments reflected opposition or support, and not a substantial dispute about its size, nature, or effect.

Comment 13: Trawling effort is heterogeneously distributed, with some areas trawled repeatedly and others less often or (in some cases) not at all.
Response: NMFS agrees that trawling effort is heterogeneously distributed, with some areas trawled repeatedly and others less often or (in some cases) not at all. Although NMFS bottom trawl survey and WCGOP data show coral and sponge bycatch, even in areas of high fishing effort, such impacts are minimal. ROV observations suggest that the preponderance of sensitive biogenic habitat is encountered in untrawlable hard pinnacle habitat. Numerous peer-reviewed scientific studies analyzing logbook analysis suggest that gear restrictions over the last decade have substantially altered bottom trawl fishing patterns such that hard substrate areas are actively avoided compared to behavior prior to gear restrictions being implemented. Additionally, historical logbook studies have demonstrated that certain hard pinnacle areas were consistently avoided, even prior to gear restrictions being implemented.

Comment 14: Changes to the RCA should be made through a comprehensive coastwide process in coordination with revisions to EFH.
Response: NMFS agrees that addressing changes to RCAs and revisions to EFH in a more coordinated and comprehensive manner could have some benefits (see 4.3 Essential Fish Habitat, see 4.6 Benthic Habitat Substrates and Recovery, see 4.8 Biological Resources). However, there are numerous procedural avenues available to the Council and NMFS that could accomplish these goals. As mentioned previously, at the Council's September 2013 meeting several industry groups and environmental nongovernmental

organizations submitted a joint letter indicating their intent to collaborate on long term RCA proposals (Agenda Item G.9.d, Supplemental Public Comment 2). That effort, coordinated with the ongoing EFH review, could provide one option for considering the catch control aspects of RCAs along with the habitat aspects.

10.2 Finding of No Significant Impact

The NMFS-preferred modified Alternative 1 will open year-round bottom trawl fishing shoreward from 40° 10' N. lat. to 48° 10' N. lat. (75 to 100 fm), and will open year-round fishing seaward from 45° 46' N. lat. to 48° 10' N. lat. (200 to 150 fm).

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the CEQ regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity". Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria.

These include:

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

The proposed action is not expected to jeopardize the sustainability of groundfish target species because the proposed action will not affect the manner by which annual catch limits are established through the biennial harvest specifications and management measures. Under the shorebased IFQ program, all catch of IFQ species, retained or discarded, must be covered by quota pounds. Fishermen are individually accountable for their catch, and are subject to a 100 percent monitoring requirement. Non-IFQ species are managed by groundfish trip limits. Therefore, the proposed action is not expected to jeopardize the sustainability of any target species in any manner that would prevent continued optimum yield (see chapter CHAPTER 4).

(2) Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?

This action cannot reasonably be expected to jeopardize the long-term sustainability of any non-target species because as mentioned above, the proposed action is anticipated to allow members of industry greater flexibility in attaining their target catch. Catch of non-groundfish species (i.e., CPS, HMS, etc.) are accounted for in set asides in their FMPs. Catch of non-Groundfish FMP species are also reviewed and accounted for in annual WCGOP Groundfish Mortality Reports. Under the proposed action, overall fishing effort

is not likely to increase or change significantly. Changes in effort location are not anticipated to increase impacts to non-target species to the extent that their sustainability would be jeopardized under the IFQ program. Individual component species within the IFQ program that are managed within a complex, such as shortraker rockfish and rougheye rockfish managed withing the minor slope north complex are not anticipated to be overfished, nor are they projected to become overfished within the time-frame of this proposed action (2014).

(3) Can the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Fishery Conservation and Management Act and identified in FMPs?

As discussed in 5.1.3 Essential Fish Habitat, the action proposed cannot reasonably be expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Fishery Conservation and Management Act and identified in the FMP because the coastal habitats are not affected since the action is in the open ocean. For non-groundfish FMPs, EFH is pelagic; therefore, the proposed action is not expected to affect non-groundfish EFH. Only groundfish EFH would likely be affected.

The Council identified Groundfish EFH, and minimized to the extent practicable adverse effects on such habitat caused by fishing, through the adoption of Amendment 19 to the Groundfish FMP in 2005. Amendment 19, which NMFS partially approved in 2006, recognized that the trawl RCA closures are established and modified on a continuing basis to reduce bycatch of overfished species, although some habitat benefits may accrue incidentally. All of the RCA that would be opened under the proposed action is already open to bottom trawling at specific periods during the year or has been opened in the recent past. The areas that have been closed year-round for almost a decade will remain closed to bottom trawling through this proposed action. Therefore, the action is unlikely to cause substantial damage when compared to the No Action.All existing closures established through Amendment 19 and gear requirements that minimize impacts to habitat remain in place under the proposed action. In addition, the core RCA area between the 100 fm and 150 fm boundary lines would remain in place.

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

This action is not expected to have substantial adverse impacts on public health or safety because the program as implemented in 2011 provides fishermen with increased flexibility in determining when, where, and how to fish. This is expected to reduce incentives to fish in unsafe conditions. Some safety benefits were also expected to the degree that the fishery is more profitable and more money is put into vessel maintenance. Less efficient vessels are expected to leave the trawl fishery, which may eliminate older, less safe vessels. The proposed action boundaries will reduce transit distance and therefore, potentially benefit safety of fishing crews by reducing time on the water.

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

The proposed action cannot reasonably be expected to adversely affect endangered or threatened species, marine mammals, or the critical habitat of these species because the activities to be conducted under the proposed action are within the scope of the FMP and do not change the basis for the determinations made in previous consultations. Impacts of this action on these resources were assessed in Sections 5.1.4 of this document. No significant impacts are expected on listed species or critical habitat outside of the scope of what has been analyzed in existing biological opinions. Any encounters will continue to be monitored with 100 percent monitoring requirement of the IFQ program. Gathered data will be utilized by the recently convened Council Endangered Species Groundfish Workgroup to advise the Council on how to improve avoidance of protected species. Under the proposed action, overall fishing effort is not likely to increase or change significantly. Instead, some dispersal of existing effort is likely. Changes in effort location are difficult to predict but are not anticipated to increase impacts to non-target species, including listed species and marine mammals.

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

The proposed action cannot be expected to have a substantial impact on biodiversity and ecosystem function within the affected area because, as described in CHAPTER 5, minimal, if any, impacts are expected from implementation of the proposed action. No significant change from status quo is expected because the area proposed to be open has been recently impacted by groundfish non-trawl gear, pink shrimp bottom trawl activity (excluding the upper slope area), groundfish fixed gear, and groundfish bottom trawl activities. Any impacts to ecosystem function and biodiversity are anticipated to be similar to No Action.

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

As discussed in 5.2 of this EA, there are no significant social or economic impacts interrelated with significant natural or physical environmental effects because the implementation of the proposed action will not result in significant natural or physical environmental effects. To the extent increased access to fishing grounds allows fishermen to more successfully harvest target stocks and minimize transit time, the proposed action could result in some beneficial economic effects.

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

There is some scientific literature suggesting that invertebrate communities are healthier in some non-trawled habitat compared with trawled habitat. The EA discusses the known

effects of bottom trawling on the quality of the human environment and there are not substantial disputes about size, nature, or effect of the action. The proposed action will only alter seasonal access to fishing grounds that are already being exposed to bottom trawling at some point during the year. The effects of the proposed action on the quality of human environment are not expected to be highly controversial because this action is spatial in nature, and is not expected to have any scientific controversy associated with it.

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

The Pacific coast groundfish fishery is not known to take place in any unique areas such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. The proposed action is not anticipated to affect unique characteristics of the geographic area. The liberalized RCA structure would allow trawling in areas with benthic substrate and habitat characteristics typical of areas currently subject to trawl effort. Therefore, the proposed action is not expected to have a substantial impact on any of these areas.

(10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The effects of the proposed action on the human environment, which are described in CHAPTER 5 of the EA, are not likely to be highly uncertain or involve unique or unknown risks because the action is not expected to significantly alter fishing methods or activities that would have a significant impact on the human environment. Trawl RCA boundaries have been routinely adjusted over various depths through various inseason actions since their inception in 2002, with catch documented (including habitat substrate data) by the West Coast Groundfish Observer Program, and the effects of such catch have been analyzed. Accordingly, highly uncertain, unique, or unknown risks are anticipated to be minimal based on previous experience. Additionally, routine inseason action authority will allow the Council and NMFS to revert to more restrictive RCA boundaries if warranted, based on new biological or physical information. Effects to biological and physical resources are not anticipated to involve unique or unknown risks because this action is likely to redistribute some existing trawl effort, with expected similar impacts to other areas that have been trawled in the past. To the extent liberalized RCA configurations result in more dispersed effort over a larger area, intensity of localized effects could be reduced.

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

The proposed action, together with past, present, and reasonably foreseeable future actions, is not expected to result in significant cumulative impacts on the biological and physical components of the environment or on human communities. This proposed

action is not related to any other actions that could, together, have cumulatively significant impacts (see Cumulative Effects Summary in 5.3).

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

The proposed action will not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause the loss or destruction of significant scientific, cultural, or historical resources because the Pacific coast groundfish fishery does not take place in the vicinity of any of these areas or resources.

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

The proposed action cannot reasonably be expected to result in the introduction or spread of a non-indigenous species because the activities under the proposed action will not involve the transport of non-indigenous species. The fishing vessels participating in the proposed action should not increase the risk of introduction through ballast water or hull fouling. Disposition of the catch does not include any translocation of living marine resources, nor use of any non-indigenous species as bait.

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

The proposed action is not anticipated to establish a precedent for future actions with significant effects. The Council is currently undertaking a five-year review of groundfish EFH. The ability for the Council to take additional practicable measures to minimize adverse effects to EFH, should it be determined necessary through the EFH review, will not be precluded by this proposed action. Areas that would be opened under the proposed action are already subject to trawl or other fishery effort at various times during the year. Some of the preliminary EFH review documentation considers the core RCA closure between the 100 fm and 150 fm boundary lines to be a Marine Protected Area of unknown duration. This action would maintain that core closed area.

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

This proposed action is not expected to alter fishing methods or activities such that they threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment because this action is not expected to alter fishing methods in any way except to change access to the level of catch or landings that are already permitted for the fishery as a whole.

(16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

As detailed in 5.1.4, the proposed action is not expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species because the proposed action is anticipated to allow members of industry greater flexibility in attaining their target catch by increasing the flexibility of groundfish bottom trawl fishing activities. Impacts on target and non-target species are primarily a function of the areas fished, gear types used, and level of effort; and, of these, area fished is the only factor that might be affected as a result of the proposed action. No change is being made to the allocation of quota; therefore, this action is not expected to jeopardize the sustainability of the target or non-target species.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment, it is hereby determined that the proposed action will not significantly impact the quality of the human environment as described above and in the Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environmental Impact Statement for this action is not necessary.

Deputy Regional Administrator, West Coast Region

March 4, 2014
Date