TRAWL RATIONALIZATION TRAILING ACTIONS: SEASON DATE CHANGE FOR MIDWATER TRAWL FISHERY (WHITING AND NONWHITING)

Final Environmental Assessment

PREPARED BY
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March 2015

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Trawl Rationalization Trailing Actions: Season Date Change for Midwater Trawl Fishery (Whiting and Nonwhiting), Final Environmental Assessment - March 2015

LOCATION: Exclusive economic zone off the west coast.

SUMMARY: The proposed action analyzed in the environmental assessment (EA) would modify the season opening date for the shorebased midwater trawl fishery (one month earlier from 42° N. lat. to the U.S./Canada border and a month and a half later from 40°30' N. lat. to 42° N. lat.). It would affect when midwater trawl gear fisheries occur for vessels targeting both whiting and nonwhiting groundfish and delivering to shorebased processors.

RESPONSIBLE OFFICIAL: William W. Stelle, Jr.
Regional Administrator
National Marine Fisheries Service, National Oceanic and Atmospheric Administration (NOAA)
7600 Sand Point Way NE
Seattle, WA 98115

The environmental review process led us to conclude that this action will not have a significant impact on the environment. Therefore, an environmental impact statement was not prepared. A copy of the finding of no significant impact (FONSI), including the environmental assessment, is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the Responsible Official named above.

Sincerely,

TRONVIG.KRISTEN.A.1365886012

Digitally signed by TRONVIG.KRISTEN.A.1365886012
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for Patricia A. Montanio
NOAA NEPA Coordinator

Enclosure

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Chapter 1 Introduction

This document provides background information analyses on modifications affecting regulations for the shorebased fishery using midwater gear to target Pacific whiting (whiting) as well as nonwhiting groundfish species that have been recommended by the Pacific Fishery Management Council (Council). The proposed action would require an amendment to the regulations implementing the Pacific Coast Groundfish Fishery Management Plan (FMP). The proposed action must conform to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore.

In addition to addressing MSA mandates, this environmental assessment (EA) assesses the impacts of the Council's final preferred action alternative (PFMC 2012a) relative to the No Action Alternative, pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended.

1.1 How this Document is Organized

This document describes the proposed action (Chapter 1) and alternatives (Chapter 2), describes the current physical, biological, and socioeconomic environments relevant to the proposed action (Chapter 3), and analyzes an alternative provision for the shorebased individual fishing quota (IFQ) program for Pacific whiting and nonwhiting species harvested with midwater trawl gear with regard to the season opening date (Chapter 4). The analyses in Chapter 4 compare the Action Alternative to the No Action Alternative and provide an assessment of potential impacts relative to specified physical, biological, and socioeconomic criteria.

1.2 Description of the Proposed Action

The proposed action is to amend the regulations governing the groundfish fishery by modifying the season opening date for the shorebased primary whiting season in the areas north of 40° 30´ N. latitude covering all use of midwater trawl gear (whiting and nonwhiting) for delivery to shorebased first receivers. No other regulations are proposed to be amended or implemented as part of this proposed action.

1.3 Purpose and Need for the Proposed Action

The purpose for the proposed action is to allow owners of quota shares (QS) in the IFQ fishery for Pacific whiting and nonwhiting groundfish species taken with midwater trawl gear to have greater flexibility in deciding when to use their QS, which will simplify the whiting fishery regulatory structure and equalize fishing opportunity by all whiting sectors. The needs for this action are to improve fishery benefits, provide consistency between the shorebased and at-sea sectors, and reduce regulatory complexity.

The trawl rationalization program generates benefits over the previous management program to the degree that previous management constraints can be relieved and flexibility provided in the new program. The opportunity for regulatory relief is generated by the individual and collective responsibility for staying within allowed catch levels that are imposed by the rationalization program. The self-responsibility of the trawl rationalization program is generated through a system of catch shares (in the form of IFQs or catch

limits assigned to co-operatives). Flexibility in the new program is provided by allowing the opportunity for individuals to trade catch shares among themselves and a reduction of constraints related to the timing of harvest and species mixes landed. This flexibility is expected to allow the industry to optimize the value it derives from the fishery, subject to those regulations which need to remain in place to achieve conservation objectives and address socioeconomic concerns which would not otherwise be expected to result from the influence of market forces. A substantial portion of the regulatory relief previously provided to the shorebased trawl fishery was the near elimination of the system of 2-month cumulative trip limits which was used to control harvest of nonwhiting species under the previous management regime those species generally harvested with bottom trawl gear. However, the trawl rationalization program did not adjust the season structure used to control harvest in the shorebased and at-sea whiting fisheries, including the structure which applied to nonwhiting targeted with midwater trawl gear. There may be an opportunity to further enhance benefits of the trawl rationalization program by relieving constraints imposed by the season regulations. The Amendment 20 trawl rationalization program specifically identified consideration of modification of the whiting season dates to be a matter for a trailing action. Additionally, the current regulatory structure is more complex than necessary given the current system in which each vessel is individually accountable for its catch. There is no longer a need to use separate mothership and shorebased opening dates for all vessels to preserve their opportunities in both fisheries (part of the original rationale for the current staggered openings, see page 3-5 of PFMC 1997).

1.4 Background

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 gears: bottom trawl and midwater trawl. The whiting fishery, both shorebased and at-sea-based, uses midwater trawl gear to harvest the resource. The gear has also been used to target other species, pelagic rockfish species in particular (explained in the text, below). Midwater trawls are generally towed above the ocean floor (pelagic), although they may be used near the bottom (off-bottom). They are also towed faster than bottom trawls to stay with the schooling fish they target and to prevent the net from touching bottom. Towing time varies from a few minutes to several hours (PFMC 2013a).

Management of whiting to achieve optimum yield (OY) from the resource on a continuing basis (sustained yield objective) is undertaken annually by the ocean fishery authorities of the United States and Canada. Amendment 20 to the groundfish FMP establishes the trawl rationalization program (also known as a catch share program), which consists of the shorebased IFQ program and the at-sea cooperative programs, including the at-sea mothership processing (MS) and catcher/processor (C/P) sectors. Amendment 21 to the Groundfish FMP describes the formal allocations of groundfish species and species' complexes for sectors of the groundfish fishery, including whiting. The trawl rationalization program was implemented in 2011. The IFQ and at-sea cooperative programs replaced the previous catch control tool for the whiting fishery, which was season/sector specific quota-based management; i.e., the fisheries were managed as "derby fisheries" in which vessels raced to catch as much fish as possible before the sector quota was exhausted. Targeting of nonwhiting species with midwater gear was previously controlled with 2-month cumulative trip limits.

This EA covers one of several trawl rationalization trailing actions that the Council has and continues to pursue for regulatory implementation. These trailing actions address issues related to optimizing the

benefits of the catch share program which were outstanding as of the completion of the Council's initial work on the program. These actions also address provisions needed to complete or clarify the final program and new concerns identified during and after program implementation. For a recent accounting of the trailing action process see PFMC 2013a.

A variety of factors have been considered over time in setting whiting targeted midwater trawl season start dates including impacts to non-target species (e.g., salmon), whiting availability by time and area, product quantity and quality, fishery timing to produce maximum sustainable yield, and timing and availability of alternative fisheries (e.g., Alaska pollock by at-sea vessels that fish off Alaska). These were important considerations when the fisheries were conducted as "derby" fisheries, wherein vessels competed with one another to catch as many fish as possible until the allocation for their particular fishery sector was met. The trawl rationalization program allows fishers much greater flexibility in when and where they conduct their fishing operations. Additionally, it incentivizes them to minimize bycatch of non-target IFQ species (groundfish species covered by IFQ) and to maximize their net fishery revenues.

Current season start date and southern allocation provisions by fishery sector follow in Table 1-1:

Table 1-1. Current regulations regarding whiting fishery season start date by fishery sector, and the southern allocation.

660.131(b)(2)(iii) Primary whiting season start dates and duration. After the start of a primary season for a sector of the whiting fishery, the season remains open for that sector until the sector allocation of whiting or nonwhiting groundfish (with allocations) is reached or projected to be reached and the fishery season for that sector is closed by NMFS. The starting dates for the primary seasons for the whiting fishery are as follows:
(A) Catcher/processor sector—May 15.
(B) Mothership sector—May 15.
(C) Shorebased IFQ Program, Pacific whiting IFQ fishery.
(1) North of 42°N. lat.—June 15;
(2) Between 42°–40°30′_N. lat.—April 1; and
(3) South of 40°30′_N. lat.—April 15.
660.55 (f) (2). No more than 5 percent of the Shore based IFQ Program allocation may be taken and retained south of 42° N. lat. before the start of the primary Pacific whiting season north of 42° N. lat.

Until 1990, over 90 percent of the whiting harvest was taken by large foreign trawler/processor vessels and small US trawl vessels that delivered fish at-sea to foreign mothership processors (joint venture operations). Foreign fishing was prohibited before June 1 each year. Joint ventures had no season restriction, but generally did not start until April when fishable concentrations of whiting were available. The fishery was prohibited from operating south of 39° N. latitude to protect rockfish and juvenile whiting. The potential impact to Sacramento winter-run Chinook was also a concern if the whiting fishery were to expand in the Monterey area during January-March, before the maturing salmon left the ocean to spawn. Foreign fishing ended in the late 1980s while joint venture fishing was closed in 1990 (PFMC 1991).

Season start date management effectively began in 1991 when the fishery converted from a foreign ship processing fishery to a domestic fishery, including at-sea and shorebased sectors. January 1 was the effective opening date for the domestic whiting fishery, but fish availability kept it dormant until April through June (PFMC 1991). In 1992 the opening date was set at April 15, which was the approximate start of the actual fishing season (PFMC 1995).

In 1996, the northern shorebased fishery (north of 42° N. latitude) and at-sea whiting fisheries (mothership and catcher/processor) all began on May 15, the central shorebased fishery (between 42° N. latitude and 40° 30' N. latitude) began on March 1 and the southern fishery (south of 40° 30' N. latitude) began on April 15 (FR 61 (42), pages 8021-8023). For 1997 the Council adopted, and NMFS approved, a preferred alternative which changed the opening date for the northern shorebased fishery to June 15, and moved the start date for the central fishery to April 1. The move to delay the northern fishery start date to June 15 allowed shorebased vessels to deliver whiting to at-sea motherships for a full month or until the at-sea allocation was met and then to switch their delivery strategy to shorebased facilities until the shorebased allocation was met for the year. There were other considerations in the decision to delay the shorebased fishery start date, which are discussed in Section 2.2. Additionally, an allocation decision was made to limit the central and southern fisheries (the California fisheries) to taking a total of 5 percent of the shorebased allocation prior to the start of the northern fishery (PFMC 1997). In addition to modifying the season dates and establishing a California early season allocation, the Council's action for the 1997 fishery also established a framework for modifying the season opening dates on an annual basis (ibid).

The regulations that restrict the use of midwater gear during the primary whiting season are shown in Table 1-2. Currently these regulations, while referring to the whiting season, pertain to the use of midwater gear to target whiting and nonwhiting species. Certain pelagic rockfish have historically been harvested using midwater trawl gear. Those species, which are treated as target species of the fishery, are discussed in Section 3.2.1 (Target Species).

Table 1-2. Midwater trawl gear regulations that provided for the directed harvest of whiting and nonwhiting species and possession on board of midwater trawl gear.

§ 660.130 (c) (3) Fishing with midwater trawl gear. North of 40°10′ N. lat., midwater trawl gear is permitted only for vessels participating in the primary Pacific whiting fishery (for details on the Pacific whiting fishery see §660.131, subpart D). South of 40°10′ N. lat., the use of midwater trawl gear is prohibited shoreward of the RCA and permitted seaward of the RCA. [during the primary whiting season, fishing within the RCA south of 40°10′ N. lat. is allowed as provided in § 660.130 (e) (4) (i)]). § 660.130 (c) (4) (i) The following restrictions apply to vessels operating north of 40°10′ N. lat.: (F) Midwater trawl gear is allowed [on board] only for vessels participating in the primary whiting season.

Regulations also limit the types of gear on board under specified conditions (§ 660.130 (c) (4)), prohibit directed whiting fishing in specified areas or under specified conditions (§ 660.130 (c) (3)) and limit the amount of whiting that may be taken and landed when fishing in specified areas of the coast (§ 660.130 (b) (3)). These latter regulations in addition to those shown in Table 1-2 are not proposed to be affected by the proposed action considered in this EA.

The whiting season openings allow the use of midwater gear to target whiting within and outside the RCAs, north of 40° 10' N. latitude (south of this area midwater gear may be used year-round seaward of the RCA and within the RCAs only during the primary whiting season). With the implementation of the trawl catch share program in 2011, vessels were provided the opportunity to catch nonwhiting species with midwater

gear within the RCAs whenever the whiting season was open and year-round seaward of the RCA south of 40° 10' N. latitude. Previously, midwater gear could be used within the RCAs only to target whiting.

1.5 Terminology

The hierarchy of terms used to discuss the trawl fisheries covered in this document is displayed in Figure 1-1. The groundfish trawl fishery is managed under a *trawl rationalization program* which is also termed a *catch share program*. There are two catch share management tools used in the fishery: *IFQs* and *cooperatives*. IFQs are used for management of the *shorebased fishery* (catch which is first received shoreside) and *cooperatives* are used for management of the *at-sea fishery* (catch which is delivered for processing at-sea).

There are two primary types of trawl gear used, midwater gear and bottom trawl gear (bottom trawl gear includes a number of subcategories which are not relevant to this discussion). All bottom trawl deliveries are of nonwhiting species (though there may be some very small amount of whiting taken as bycatch) and are delivered shoreside. Midwater gear is used primarily to target whiting (the *whiting fishery*) but may also be used to target nonwhiting species (the *nonwhiting midwater trawl fishery*). The primary species targeted in the *nonwhiting midwater trawl* fishery are pelagic rockfish. Whiting is delivered both for at-sea processing in the *at-sea fishery* (managed with co-operatives) and to shorebased processors (*the shorebased whiting fishery*).

The *IFQ fishery* includes all the shorebased fisheries: *the shorebased whiting fishery, the nonwhiting midwater trawl fishery,* and the *bottom trawl fishery*. The *nonwhiting fishery includes both the nonwhiting midwater trawl fishery* and the *bottom trawl fishery*. The *shorebased midwater trawl fishery* includes the shorebased whiting fishery and nonwhiting midwater trawl fishery. The primary topic of this EA is the *shorebased midwater trawl fishery* (both its whiting and nonwhiting segments)

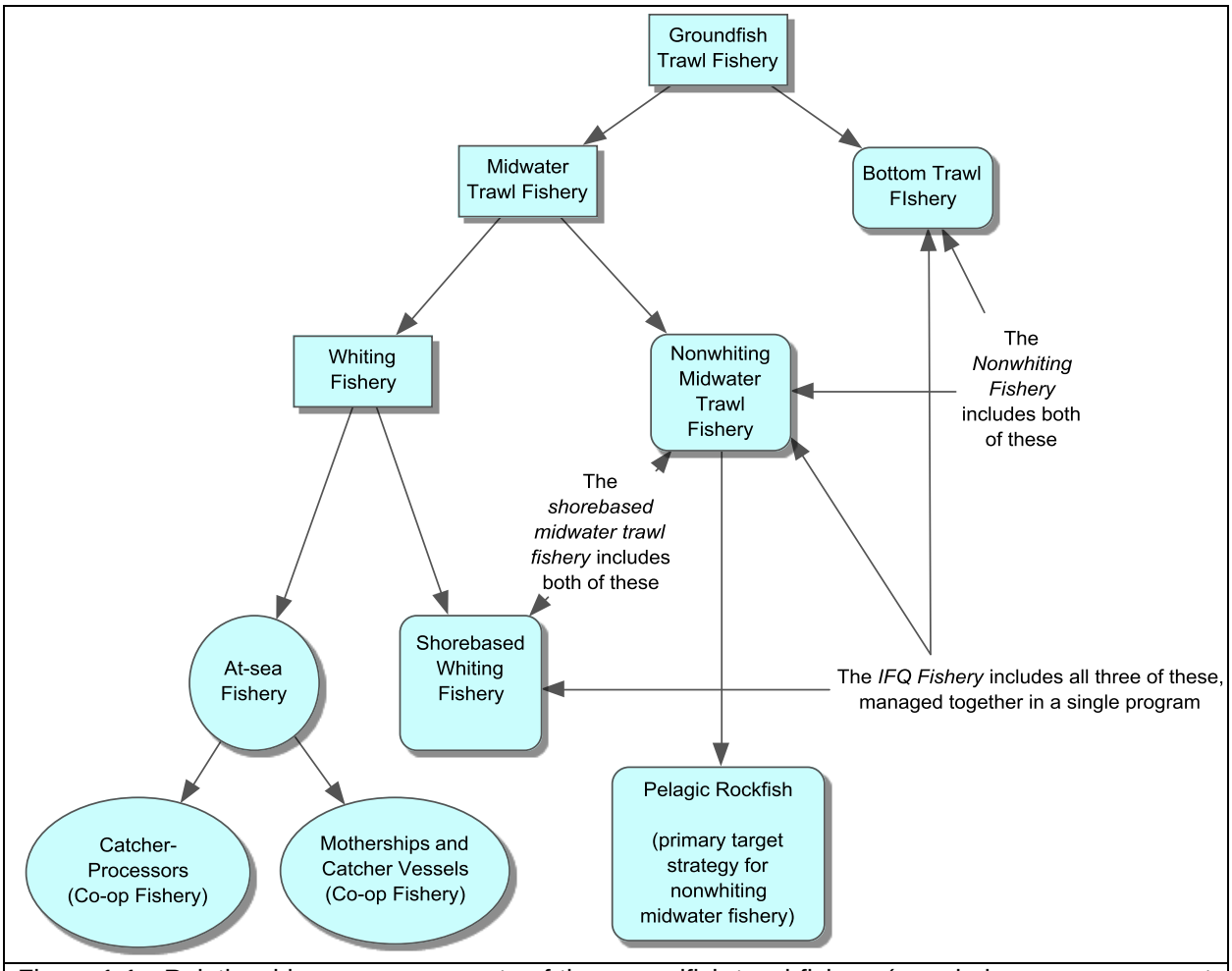

Figure 1-1. Relationship among segments of the groundfish trawl fishery (rounded squares represent segments of the fishery managed under a single unified IFQ program, circles represent segments of the fishery managed with a co-op system – the catcher/processor and mothership co-op system are separate systems).

1.6 Council and Agency Scoping

The Council process—which is based on stakeholder involvement and allows for public participation and public comment on fishery management proposals during Council, subcommittee, and advisory body meetings—is the principal mechanism to scope NEPA-based initiatives, including EAs. The advisory bodies involved in groundfish management include: the Groundfish Management Team (GMT), with representation from state, Federal, and tribal fishery scientists; and the Groundfish Advisory Subpanel (GAP), whose members are drawn from the commercial, tribal, and recreational fisheries, fish processors, and environmental advocacy organizations. Additionally, the Council receives management advice from its Enforcement Consultants, composed of representatives from each state, NMFS and the USCG. Scientific information is reviewed by the Council's Scientific and Statistical Committee. Meetings of the Council and its advisory bodies constitute the Council scoping process, which involves the development of alternatives and consideration of the impacts of the alternatives.

As discussed in Section 1.4 (and in more detail in Section 4.4.4) above, this is one of several trailing actions that the Council has undertaken relative to the implementation of the trawl rationalization program. To assist in developing those actions, the Council has formed an ad-hoc committee made up of Council, GAP, other constituent, enforcement, and governmental representatives to review and make recommendations regarding needed changes in trawl fishery regulations. Such potential changes include, but are not limited to, those needed to comport existing trawl fishery regulations with the various new fishery control mechanisms associated with Trawl Rationalization Program implementation. The Trawl Rationalization Regulatory Evaluation Committee (TRREC), met October 2011 and proposed, along with several other recommendations, the regulation changes contained in this EA (PFMC 2011a). A chronology of Council and agency scoping meetings on the proposed regulation changes follows in Table 1-3.

Table 1-3. Chronology of meetings and actions leading to whiting season.

Date	Meeting	Action
September 14-19, 2011	Council meeting, San Mateo, CA	Public comments were received describing need for various trawl gear regulation changes; Council action was taken to prioritize future trailing actions; Trawl Rationalization Regulation Evaluation Committee (TRREC) was tasked with providing comments on issues identified for implementation in 2013(http://www.pcouncil.org/wp-content/uploads/FINAL_June2011_Minutes.pdf, page 31).
October 27, 2011	Trawl Rationalization Regulatory Evaluation Committee (TRREC) meeting, Portland, OR	TRREC made recommendation on whiting season date change, among other initiatives (PFMC 2011a).
November 2-7, 2011	Council meeting, Costa Mesa, CA	The TRREC report was presented at meeting; Council voted to move forward with the recommendations (PFMC 2011a) (http://www.pcouncil.org/wp-content/uploads/1111decisions.pdf).
March 2-7, 2012	Council meeting, Sacramento, CA	The whiting fishery regulation proposal was presented as part of a broader trawl gear regulation review. The season start date action was deemed the Council's Preferred Alternative (http://www.pcouncil.org/wp-content/uploads/0312decisions.pdf).
April 1-6, 2012	Council meeting, Seattle, WA	The whiting season date action was reviewed again, but was put on hold due to other workload issues http://www.pcouncil.org/wp-content/uploads/0412decisions.pdf).

Date	Meeting	Action
September 14-18, 2012	Council meeting, Boise, ID	The season start date action was deemed by the Council its final preferred alternative (addressed in this EA) http://www.pcouncil.org/wp-content/uploads/1112decisions.pdf). The Council decision was made in part based on a discussion document presented by Council staff (ibid) and http://www.pcouncil.org/wp-content/uploads/I5a_ATT6_WHITING_SEASON_NOV2012BB.pdf, and the recommendation of the GAP http://www.pcouncil.org/wp-content/uploads/I5b_SUP_GAP_NOV2012BB.pdf.
November 12-19, 2014	Council meeting, Costa Mesa, CA	The NMFS explained their interpretation of the Council action regarding the midwater trawl fishery (whiting and nonwhiting) season date change proposal. http://www.pcouncil.org/wp-content/uploads/J4b_Sup_NMFS_Rpt1_NOV2014BB.pdf The Council concurred with that interpretation, which is reflected in this EA. http://www.pcouncil.org/wp-content/uploads/1114decisions.pdf

Chapter 2 Alternatives

There is one alternative to the No Action Alternative contained and analyzed in this EA. Other alternatives were considered but rejected as discussed in Section 2.1.4. The No Action Alternative maintains current regulations on shorebased whiting season start date. The action alternative (see Section 2.1.2) would alter the whiting season start date in the shorebased IFQ fishery north of 40°30′ N. latitude to match the start date in the at-sea cooperative fisheries.

2.1 Description of Alternatives

2.1.1 No Action. The Current Regulations for the IFQ Whiting Fishery Start Date and Southern Allocation Would Remain Unchanged.

The wording of the IFQ fishery current whiting season regulation (covering all use of midwater trawl gear (whiting and nonwhiting)) is shown in Table 1-1. The current regulations provide for four different season opening dates depending on fishery sector and area: one at-sea opening and three shorebased openings.

2.1.2 Action Alternative (Council Final Preferred Alternative): Use a Single May 15 Start Date for All Whiting Sectors North of 40° 30´ N. Latitude.

This alternative would conform the IFQ fishery season start date north of 40°30′ N. latitude to the at-sea fishery start date. It would leave unchanged the season start date in the California fishery south of 40°30′N. latitude.

The resulting change for the midwater trawl component of the shorebased IFQ program (whiting and nonwhiting targeting) would be the following:

North of 42° N. latitude — *June 15 → May 15*

Between 42°-40°30′ N. latitude — *April 1 →May 15*

South of 40°30′ N. latitude — *April 15 (no change)*

2.2 Rationale for Preferred Alternative

A number of considerations influenced the 1996 decision (implemented in 1997) to move the season opening date for the northern shorebased fishery from May 15 to June 15, including providing an opportunity for catcher vessels to participate sequentially in the mothership fishery (opening May 15) and the shorebased fishery (opening June 15), and allowing vessels to complete their May-June DTS (Dover sole, thornyhead, sablefish complex) cumulative limits before the start of the whiting fishery (it was not permissible to land more than 60 percent of the DTS limit in a particular month). On the down side was an expectation that shifting a portion of the season to later in the year might increase bycatch rates of rockfish because more of the whiting stock biomass would be in northern areas where rockfish such as yellowtail and widow are more available to midwater gear. With respect to the salmon bycatch in the shorebased whiting fishery, the 1997 EA (PFMC 1997) summarized:

> The salmon bycatch data do not show a consistent pattern other than to indicate that high salmon bycatch rates may occur in the at-sea fishery later in the year. The shorebased fishery has experienced low salmon bycatch rates during most summer periods. It would be difficult to predict the impact of changing the season timing on salmon bycatch, especially on a year-to-year basis as could occur under the proposed framework" (PFMC 1997, p. ES-4).

The change in the shorebased season opening dates was supported by all sectors of the industry, including the shorebased processors in northern California. The 5 percent limitation on early season whiting catch in the California fishery was seen as "prevent[ing] expansion and further capitalization in that area, contributing to further stability as well as minimizing cost to the nation from further capitalization" (PFMC 1997, p. ES-4).

For the shorebased industry in the north, returning to a May 15 opening would increase flexibility to determine the most optimal time to harvest the whiting by adding one month to the season length. The actual timing of harvest under the IFQ program would likely take into consideration numerous factors including: (1) bycatch rates of other species (bycatch of most groundfish is constrained by the quota pounds (QP) fishermen hold and bycatch of salmon above certain levels may trigger a reinitiation of consultation under the ESA, (2) opportunity costs related to other fishing opportunities (such as participation in the mothership whiting fishery or pink shrimp fishery), (3) optimal size and condition of whiting for processing, and (4) market prices. Under trawl rationalization those who have catch shares for both the shorebased IFQ and mothership co-op program no longer have to choose between the fisheries therefore there is less of a problem of conflict between the shorebased and at-sea openings. Moving the season start date for the California fishery north of 40°30′ N. latitude would simplify regulations, but would result in a shortened season for that area (shortened by a month and a half). However, with implementation of the IFQ program it appears that harvest has moved out of northern California. Industry members report that the small historic landings in this area were primarily from catcher vessels testing their gear and trying to get a jump on the start of the season. With the IFQ program, traveling south for the early season no longer provides an advantage in terms of increased harvest opportunity (PFMS 2012b).

2.3 Alternatives Considered But Rejected from Detailed Analysis

The scope of the current alternatives is limited to moving the whiting season opening for the shorebased fisheries to May 15 for the fisheries north of 40°30′ N. latitude. Moving the whiting season opening date even earlier or other modifications of the whiting season regulations might also be considered, but a stepwise approach was decided to evaluate environmental impacts (physical, biological and socioeconomic) before considering an even earlier season start date. The current priority is to determine whether some interim regulatory relief can be provided until more substantial adjustments to the whiting regulations can be considered. Moving the season date for the area south of 40°30′N. latitude was not considered because there has been no directed fishery in that area for many years (addressed in Section 3.3.5, below) and would have required an FMP amendment. At the time Council action was taken, it was believed that this would delay implementation of the change for the fisheries north of 40°30′ N. latitude where the directed fishery is conducted.

Consideration was also given to removal of the California fishery five percent early season allocation (cap), but was rejected as such a move would was not needed because under the proposed action alternative (uniform opening north of 40°30′ N. latitude) the cap would only apply to the area south of 40°30′ N. latitude where there has been no directed fishery for many years. Such an action would also require an

FMP amendment, which would have required a lengthier process and unnecessarily delayed the expected positive benefits of this action. Nothing in this action prevents future consideration of removal of the five percent cap. An FMP amendment would be required to remove the cap because the early season cap is specified in the FMP whereas the season start date for the areas north of 40°30′ N. latitude is not, as explained below.

2.4 Process for Taking Action

The Council's action for the 1997 fishery established a framework for modifying the season opening date on an annual basis. This action was intended to provide flexibility in harvesting and processing opportunities [FR 62 (97): 27519-27523]. The season start date provisions are found at 660.131 (b) (2) (i-ii) and read as follows:

> 660.131(b)(2) Different primary season start dates. North of 40°30' N. latitude, different starting dates may be established for the catcher/processor sector, the mothership sector, and in the Pacific whiting IFQ fishery for vessels delivering to IFQ first receivers north of 42°N. latitude and vessels delivering to IFQ first receivers between 42° through 40°30' N. latitude.
>
> Procedures. The primary seasons for the whiting fishery north of 40°30′ N. latitude generally will be established according to the procedures of the Groundfish FMP for developing and implementing harvest specifications and apportionments. The season opening dates remain in effect unless changed, generally with the harvest specifications and management measures.
>
> Criteria. The start of a primary season may be changed based on a recommendation from the Council and consideration of the following factors, if applicable: Size of the harvest guidelines for whiting and bycatch species; age/size structure of the whiting population; expected harvest of bycatch and prohibited species; availability and stock status of prohibited species; expected participation by catchers and processors; the period between when catcher vessels make annual processor obligations and the start of the fishery; environmental conditions; timing of alternate or competing fisheries; industry agreement; fishing or processing rates; and other relevant information.

Use of the framework was initially not considered because the alternatives were to include provisions that were outside the scope of what is allowed under the framework (the framework does not provide for the modification of the California early season allocation (south of 42° N. latitude)). However, that provision was not included in the Council final action therefore use of the framework process would be possible; nevertheless, it would not be expedient to use that process at this time since the biennial specification process has already been completed (the framework was developed at a time when that specification process was implemented on an annual basis). All of the criteria that are required to be considered under the framework have been considered in this document (see Section 4.5).

Chapter 3 Affected Environment

This chapter describes the affected environment in terms of the components that could be affected by the proposed action. The affected environment reflects conditions as they exist before the proposed actions are implemented and provides a baseline for considering effects. This chapter is organized into the following sections:

- Section 3.1: Physical Environment
- Section 3.2: Biological Environment
- Section 3.3: Socioeconomic Environment

This outline closely follows the outline used in the immediately preceding Trawl Rationalization Trailing Action: Chafing Gear (PFMC 2013a).

3.1 Physical Environment, including Essential Fish Habitat and Ecosystem

3.1.1 Physical Oceanography

A divergence in prevailing wind patterns causes the west wind drift (North Pacific Current), when it reaches the North American Continent, to split into two broad coastal currents: the California Current to the south and the Alaska Current to the north (Figure 3-1). 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. A more detailed description of the physical and biological oceanography of Pacific Coast marine ecosystems can be found in PFMC 2013b.

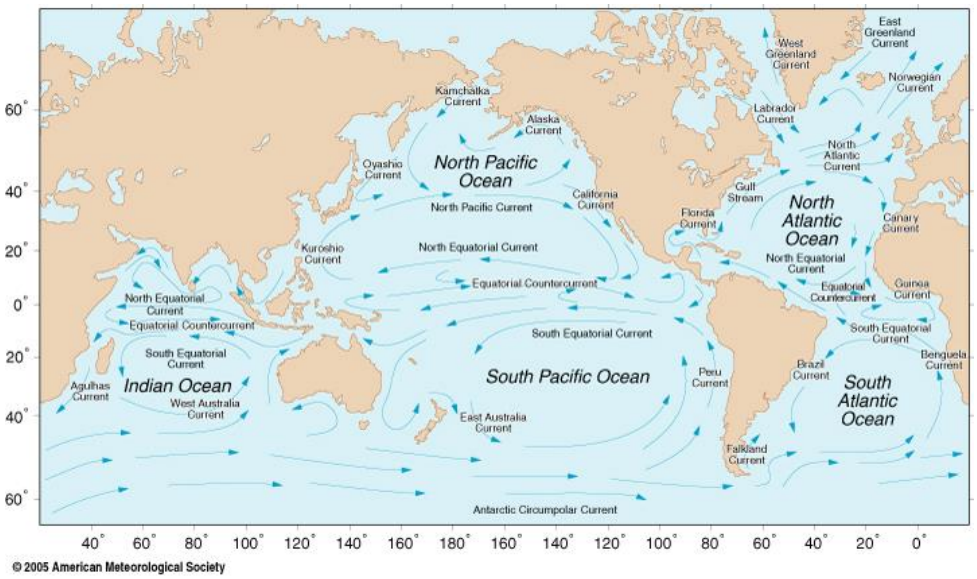

Figure 3-1. Location map of the major ocean currents of the world, including the California Current of the Council management area.

3.1.2 Pacific Coast Marine Ecosystem

Along the U.S. Pacific 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 action 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). Both Cape Mendocino and Point Conception are key management boundaries for the Council. The biogeography of the action area is discussed in detail in PFMC 2013c, and is hereby incorporated by reference.

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 (PFMC 2013b).

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 (HMS) such as salmon, albacore tuna, sooty shearwaters, fur seals, and baleen whales, whose dynamics may be partially or wholly driven by processes in entirely different ecosystems, even different hemispheres. For this description of the affected environment, the ecosystem is considered in terms of physical and biological oceanography, climate, biogeography, and essential fish habitat (EFH). A more detailed description of this ecosystem is found in PFMC 2013b. The species of fish described in following sections are integral components of the Pacific Coast Marine Ecosystem.

3.1.3 Essential Fish Habitat

EFH is defined by the Magnuson-Stevens Act as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1802(10)). Groundfish EFH has been deemed through the Council 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 (NMFS 2005).

The ocean area constituting 100 percent habitat suitability probability (HSP) for all species and life stages of FMP groundfish was used to define the extent of EFH designation. This was a precautionary approach because it was based on the currently known maximum depth distribution of all life stages of fishery management unit species. There is a lack of information on the value of seamounts to groundfish in depths greater than 3,500 m. Designating seamounts as EFH is precautionary because they may prove to be essential to certain life stages of fish in the groundfish fishery.

3.1.4 Habitat Areas of Particular Concern (HAPCs)

EFH guidelines published in Federal regulations (50 CFR 600.815(a) (8)) identify habitat areas of particular concern (HAPCs) as types or areas of habitat within EFH that are identified based on one or more of the following considerations: the importance of the ecological function provided by the habitat; the extent to which the habitat is sensitive to human-induced environmental degradation; whether, and to what extent, development activities are or will be stressing the habitat type; and the rarity of the habitat type. The HAPCs that are of greatest concern in this EA are those that occur in the offshore area where the midwater fishery takes place. These are briefly described below.

3.1.4.1 *Rocky Reefs*

Rocky habitats are generally categorized as either nearshore or offshore in reference to the proximity of the habitat to the coastline. Rocky habitat may be composed of bedrock, boulders or smaller rocks, such as cobble and gravel. Hard substrates are one of the least abundant benthic habitats, yet they are among the most important habitats for groundfish.

3.1.4.2 *Areas of Interest*

Areas of Interest are discrete areas that are of special interest due to their unique geological and ecological characteristics. The following areas of interest are designated HAPCs (see NMFS 2005 EFH Environmental Impact Statement for a more detailed description of these areas of interest):

Off of Washington: All waters and sea bottom in state waters shoreward from the three nautical mile boundary of the territorial sea shoreward to the Mean Higher High Water Mark.

Off of Oregon: Daisy Bank/Nelson Island, Thompson Seamount, President Jackson Seamount.

Off of California: all seamounts, including Gumdrop Seamount, Pioneer Seamount, Guide Seamount, Taney Seamount, Davidson Seamount, and San Juan Seamount; Mendocino Ridge; Cordell Bank; Monterey Canyon; specific areas in the Federal waters of the Channel Island National Marine Sanctuary; specific areas of the Cowcod Conservation Area.

Given where midwater fishing has occurred in recent years, the midwater trawl fishery interactions with HAPCs are most likely to occur in areas identified as offshore rocky reef. These can occur within or outside of areas identified as Areas of Interest, which have specific boundaries identified in regulation.

3.1.5 Essential Fish Habitat Conservation Areas (EFHCA)

An EFHCA, a type of closed area, is a geographic area defined by coordinates expressed in degrees of latitude and longitude at 50 CFR §§ 660.75 through 660.79, subpart C, where specified types of fishing are prohibited. EFHCAs apply to vessels using bottom trawl gear or to vessels using "bottom contact gear," to include bottom trawl gear, among other gear types. Midwater trawling is allowed in EFHCAs when midwater trawl fishing is allowed in adjacent waters by the groundfish regulations (50 CFR 660 Parts C-G available at http://www.trawl.org/Groundfish%20Regulations/pink-pages.pdf).

3.1.6 Rockfish Conservation Areas (RCAs)

RCAs are large-scale closed areas that extend along the entire length of the U.S. Pacific Coast (Figure Figure 3-2). RCA boundaries are lines that connect a series of latitude/longitude coordinates intended to approximate particular depth contours. RCA boundaries for particular gear types differ between the northern and southern areas of the coast. RCA boundaries change at different times of the year. The locations of the RCA boundaries are set in order to minimize opportunities for vessels to incidentally take overfished rockfish by eliminating fishing in areas where, and times when, those overfished species are most likely to co-occur with more healthy stocks of groundfish. RCAs protect various benthic habitat types, hard bottom or rocky habitats in particular, where overfished rockfish are most abundant.

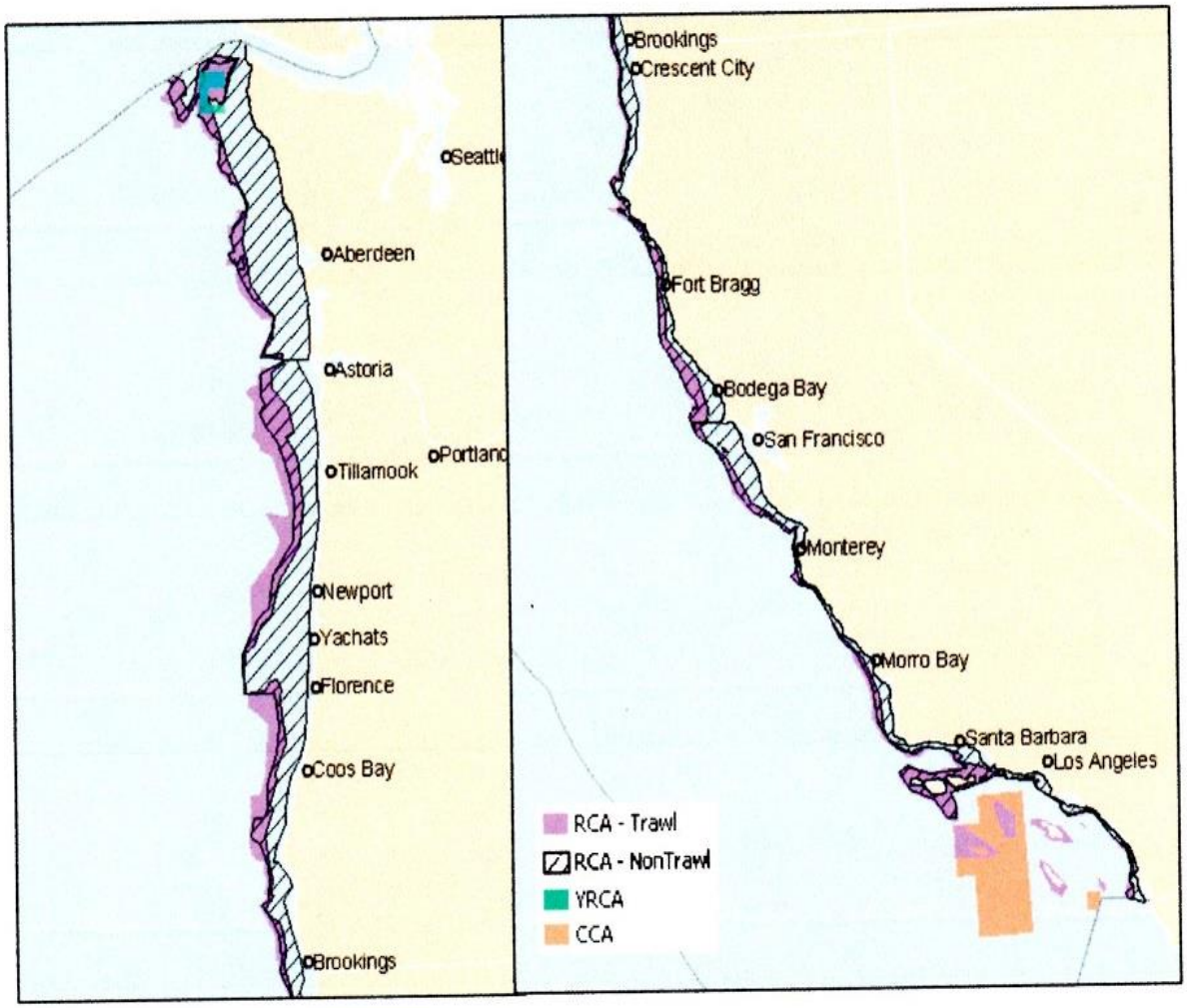

Figure 3-2. Example map showing trawl and nontrawl RCA boundaries.

The Council introduced RCAs in 2002. From 2002 to present, midwater trawl gear used to target Pacific whiting has been exempted from RCA restrictions during the primary whiting season. Beginning in 2011, the groundfish midwater trawl fishery has expanded under the trawl rationalization program, and includes targeting of pelagic rockfish complex species. Vessels have targeted pelagic rockfish within the RCAs during the primary whiting season. Since 2005, midwater trawling has been allowed in the area south of 40°30' N. latitude for (1) all groundfish species when fishing seaward of the trawl RCA and (2) within the

trawl RCA by vessels targeting Pacific whiting during the primary whiting season (see National Marine Fisheries Service (NMFS), West Coast Region web page at http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Groundfish- Closed-Areas/Index.cfm#CP_JUMP_30284).

The trawl RCAs and related gear restrictions were established in order to reduce bycatch of overfished species and have been modified over the years. Because of the long rebuilding periods for many of the overfished groundfish species, the RCAs were expected to be in place for many years, reducing the effects of trawl gear types on bottom habitat within the RCAs. Because the RCA restrictions on bottom trawling have been in place since 2002, a great deal of recovery to pre-fishing conditions has likely occurred in the baseline environment described in the NMFS 2005 EFH Final Environmental Impact Statement (EIS).

3.2 Biological Environment

Federal regulations at 50 CFR 600.310(d)(3) and (4) provide the following definitions for "target stocks" and "non-target species," both of which are considered fishery management unit species: "Target stocks" are stocks that fishers seek to catch for sale or personal use, including "economic discards" as defined under MSA 3(9). "Non-target species" and "non-target stocks" are fish caught incidentally during the pursuit of target stocks in a fishery, including "regulatory discards" as defined under MSA section 3(38). They may or may not be retained for sale or personal use. Non-target species may be included in a fishery and, if so, they should be identified at the stock level. Some non-target species may be identified in an FMP as ecosystem component (EC) species or stocks.

The 2014 Stock Assessment and Fishery Evaluation (SAFE) document (PFMC 2014a), available on the Council website at www.pcouncil.org, describes distribution and life history, stock status and management history, stock productivity, and fishing mortality attributes of each assessed Groundfish FMP stock in detail. The SAFE also describes the stock assessment methods employed and the harvest specification framework including methods used to determine these specifications. In following sections, the target and non-target stocks of the midwater trawl fishery are described. In Chapter 4, the impacts of the Action Alternative (described in Chapter 2) are assessed relative to the No Action Alternative.

3.2.1 Target Species

The primary target species of the midwater trawl fishery from 2001 to 2013 was Pacific whiting (whiting) and, to a very limited extent because of constraining regulations, chilipepper rockfish. Beginning in 2011, and more significantly in 2012, a directed fishery for widow rockfish and yellowtail rockfish has redeveloped. Historically (pre-2002) the pelagic rockfish complex species (widow rockfish, yellowtail rockfish and chilipepper rockfish) were commonly targeted with midwater and bottom trawl gear. Since 2011 and the implementation of trawl rationalization, interest by fishermen and fish processors in targeting widow and yellowtail rockfish has increased. Initially, in 2011-12, much of the midwater trawl fishery opportunity was limited to whiting because of limited QP of overfished rockfish species, widow rockfish in particular. That situation has changed, because widow rockfish has been declared rebuilt from overfishing, and in 2013 the annual catch limit (ACL) was increased. Additionally, the Council has recommended substantial increases in both the widow rockfish and yellowtail rockfish ACLs for the 2015-2016 management period. Widow rockfish and yellowtail rockfish are generally caught together in a pelagic rockfish targeting strategy. In recent years, because of its overfished status, widow rockfish has

constrained harvest using this strategy. Now that widow rockfish is rebuilt, as the widow rockfish ACL increases, more targeting on pelagic rockfish complex species is expected to occur. In addition, new midwater trawl target species may emerge. Existing regulations already allow for nonwhiting target fishing year-round seaward of the RCA south of 40° 30' N. latitude, but abundance of the four target species (whiting, widow, yellowtail, and chilipepper) in that area is relatively low. During the primary whiting season midwater gear may be used to target any groundfish species within and outside the RCAs (except that use of midwater trawl gear is prohibited shoreward of the RCAs south of 40° 30' N. latitude).

3.2.1.1 *Pacific Whiting (Pacific Hake)*

Biology (CDFG 2001a): Pacific whiting are distributed from the Gulf of Alaska to the Gulf of California. Four major stocks have been identified within this area. The most abundant and widely distributed stock (which is the major subject of this report) spawns between central California and northern Baja California and is referred to as the "coastal stock." The oceanic coastal stock of adult Pacific whiting is migratory and inhabits the continental slope and shelf within the California Current system from Baja California to British Columbia. It is often classified as a demersal species (living on or near the sea bed), but its distribution and behavior suggests a pelagic existence. It exhibits extreme night and day movement during spring and summer feeding migrations as it feeds on a variety of pelagic fishes or zooplankton. It is commonly found at depths of 160 to 1,500 feet but has been found from the surface to 2,600 feet.

Coastal Pacific whiting are pelagic spawners that appear to spawn from January to March. The location of spawning appears to center on the Southern California Bight, but spawning may take place within an area from San Francisco to Baja California at depths of 660 to 1,600 feet and as far as 300 miles offshore. Active spawners aggregate in loose, stationary bands that can be up to 150 feet thick.

In late winter, following spawning, adult whiting migrate north in deep water overlying the continental slope to the summer feeding grounds off northern California, Oregon, Washington, and Vancouver Island. The peak period of northward migration appears to be in March and April. The migration behavior of whiting is strongly age dependent, and influenced by oceanographic conditions. Pacific whiting tend to migrate farther north as they age. Figure 3-3 shows the mean location of Pacific whiting observed in the acoustic survey by age and year. Age-2 whiting are located in the southern portion of their distribution, while older age classes are found in more northerly locations within the same year. The mean locations of Pacific whiting age-6 and older tend to be more similar among years than those for the younger ages. With the aging of the strong 1999 year class causing a reduction in the number of older fish, a more southerly distribution was observed (Stewart, *et al.* 2011 p. 33). Hake caught from Oregon to Vancouver Island range from 16 to 18 inches, fork length, and are 4 to 10 years old.

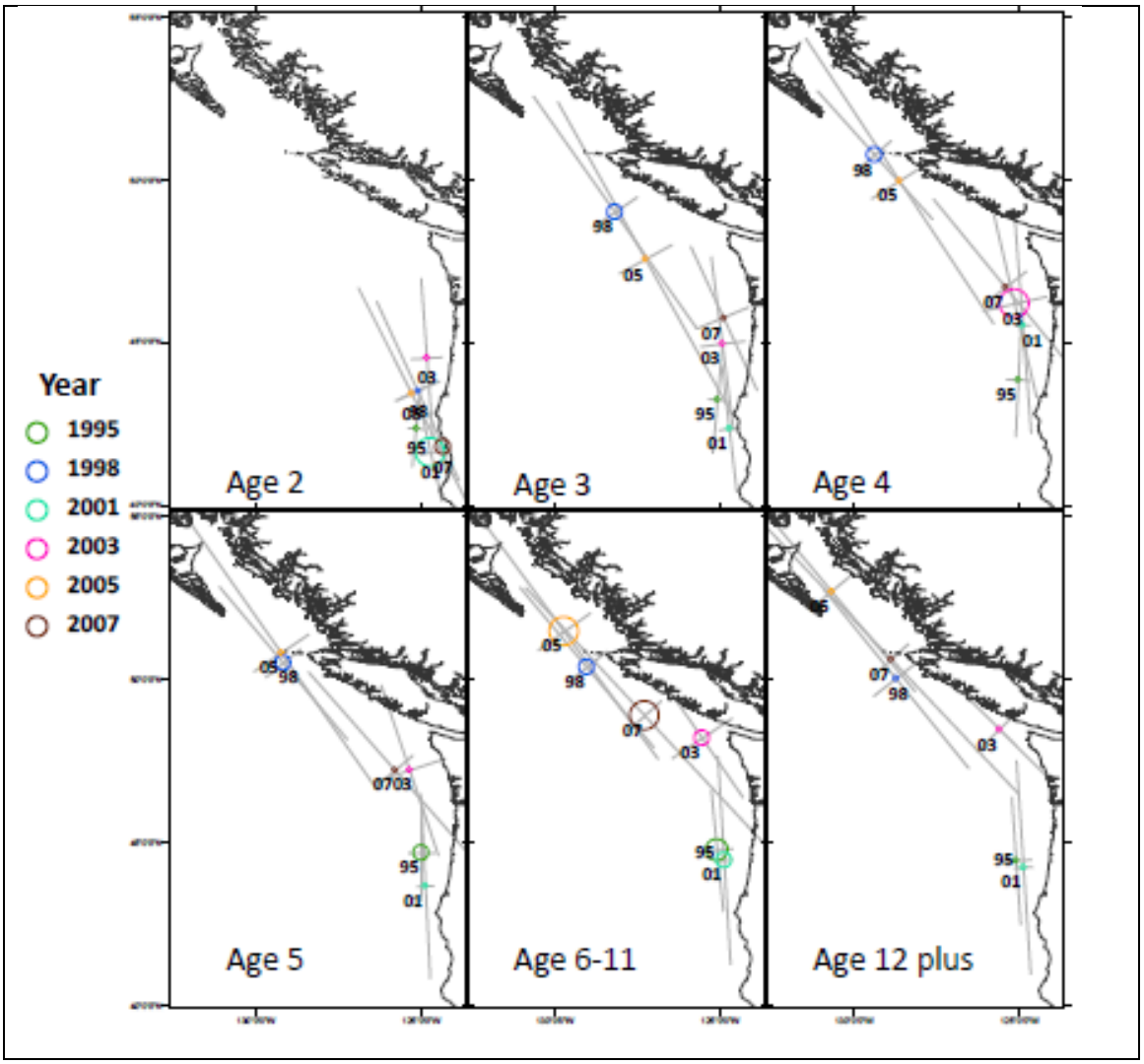

Figure 3-3. The mean spatial location of the whiting stock (circles are proportional to biomass) and variance (grey lines) by age group and year based on acoustic survey observations 1995-2007 (Figure courtesy of O'Conner and Haltuch's ongoing Fisheries And The Environment project investigating the links between ocean conditions and Pacific whiting distribution) (Stewart, et al. 2011).

When northward-migrating whiting inhabit waters overlying the continental shelf and slope, they form schools that may be characterized as long, narrow bands usually oriented parallel to the depth contours. During the summer, when feeding adults are distributed over the continental shelf, schools exhibit pronounced movement into midwater associated with nighttime feeding activities. At dawn, coastal whiting descend and begin to regroup into schools near the sea bed (7 to 70 feet above the ocean floor), usually in the same area where they were the day before. The degree to which whiting congregate during the day appears to be related to the type of food that was available during the feeding period. Schools are more dispersed when feeding on fish and other mobile nekton, but more compact when feeding on euphausiids. The southward spawning migrations of the adults appears to occur in November and December, just prior to the spawning period. Availability of Pacific whiting to bottom and midwater trawls off Oregon, Washington, and Vancouver Island drops sharply in November and is practically nil during winter.

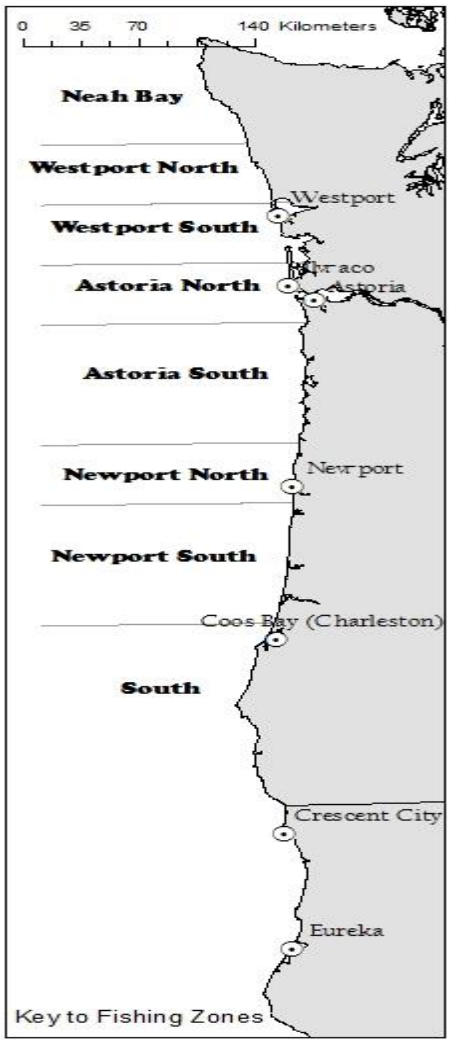

Figure 3-4. Key to fishing zones used for tow analysis.

The following analysis indicates the degree to which shorebased whiting vessels range along the coast on a given trip. For purpose of analysis and maintaining confidentiality, the coast was divided up into eight geographic regions (Figure 3-4)) and tows were assigned to each region based on the starting point of the tow. Figures Figure 3-5 through Figure 3-8 show the geographic distribution of whiting tows out of each port for trips on which the vessel departed from and returned to the same port. Each dot represents one tow within the respective regional polygon shown in the figures, but the dots are randomly distributed within each polygon. (The polygons bound all tow locations within the given year.) In general, polygons with no dots indicate areas where data was excluded for confidentiality (less than 3 vessels fishing in those areas). Table 4-3 provides counts of tows by region, categorized by port for the trip. In these figures and table it can be seen that in some years vessels fishing out of Astoria range as far north as vessels fishing out of Westport but that vessels fishing out of Newport on a particular trip often do not go that far north. Also notable is the variation in distribution among years and the increased fishing range of vessels in 2011, likely due to the reduction in time pressure under the rationalized fishery. The exception is ports from Coos Bay south, for which trips substantially diminished starting in 2011.

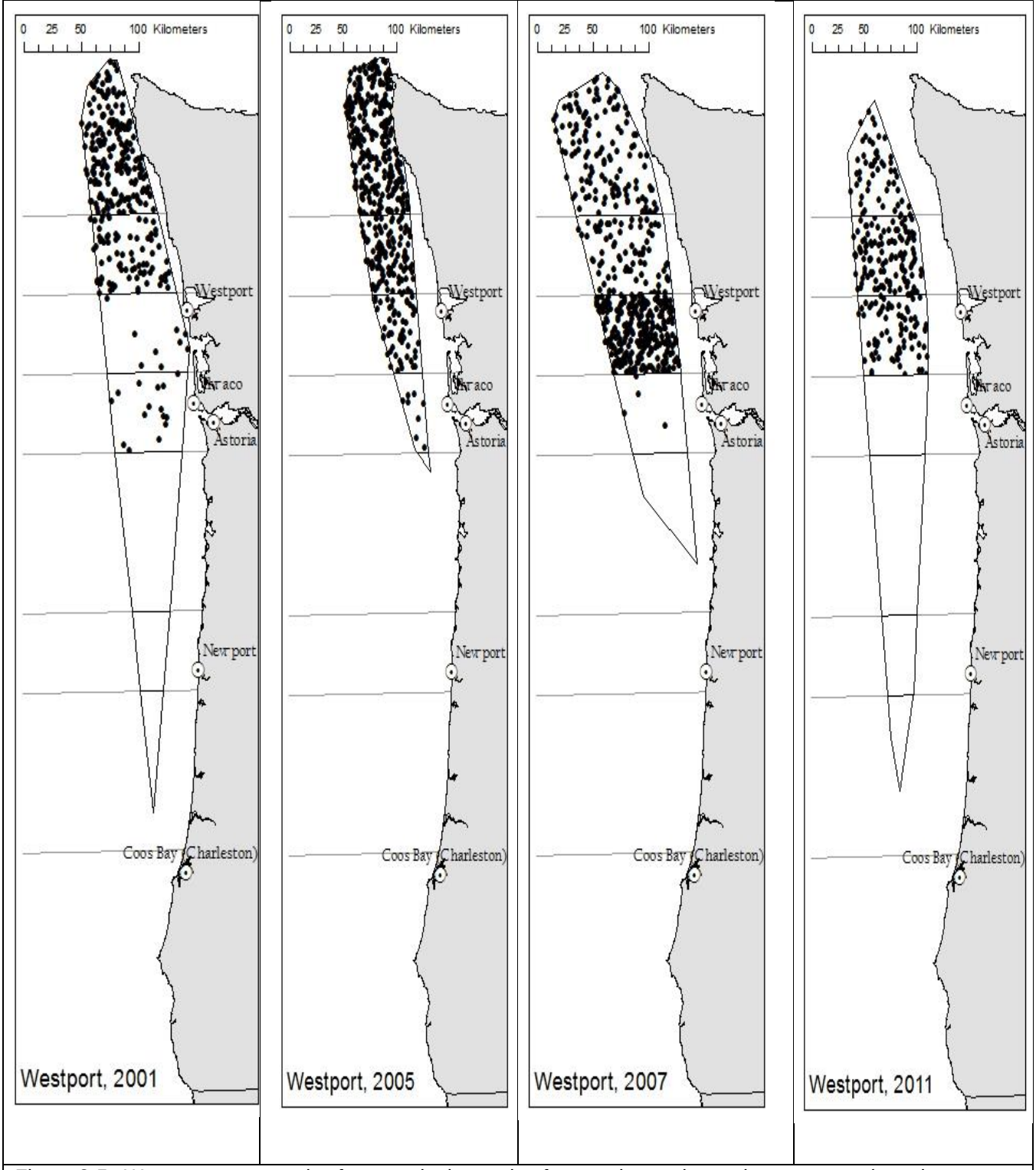

Figure 3-5. Westport: tows on trips for vessels departaing from and returning to the same port (one dot per tow, randomly distributed within the region in which the tow occured, blanks indicate confidential areas (arease where fewer than three vessels operated).

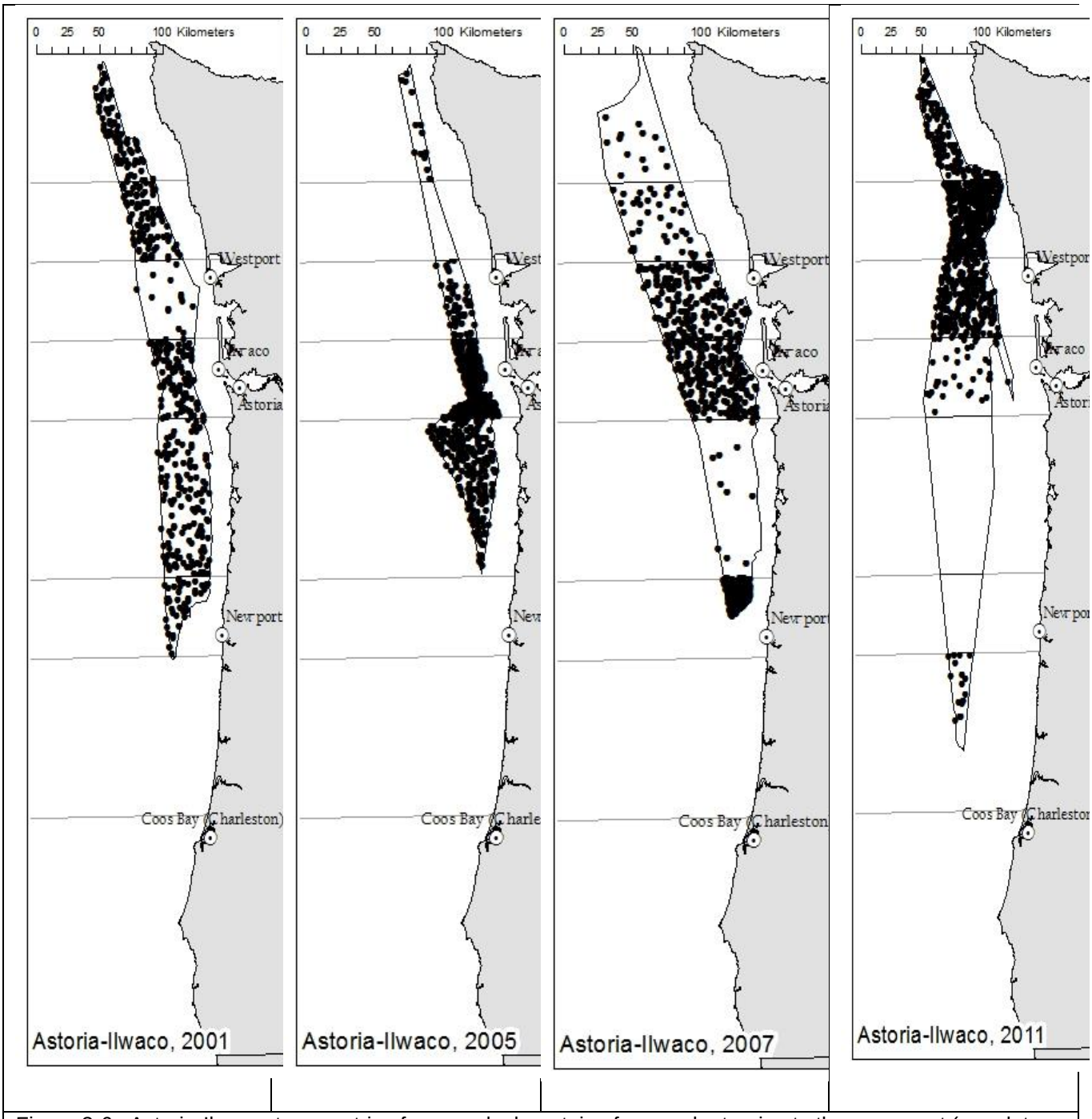

Figure 3-6. Astoria-Ilwaco: tows on trips for vessels departaing from and returning to the same port (one dot per tow, randomly distributed within the region in which the tow occured, blanks indicate confidential areas (areas where fewer than three vessels operated).

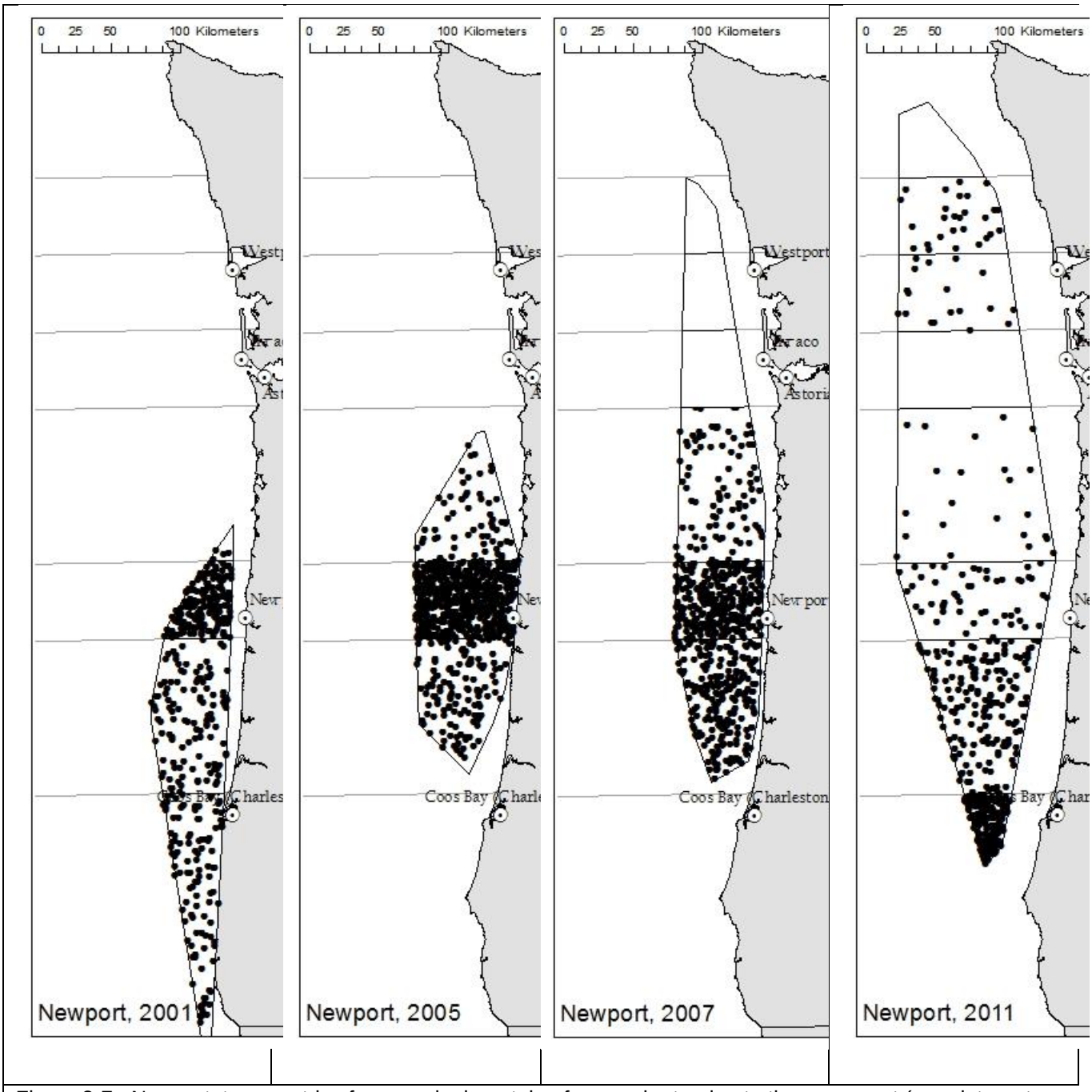

Figure 3-7. Newport: tows on trips for vessels departaing from and returning to the same port (one dot per tow, randomly distributed within the region in which the tow occured, blanks indicate confidential areas (areas where fewer than three vessels operated).

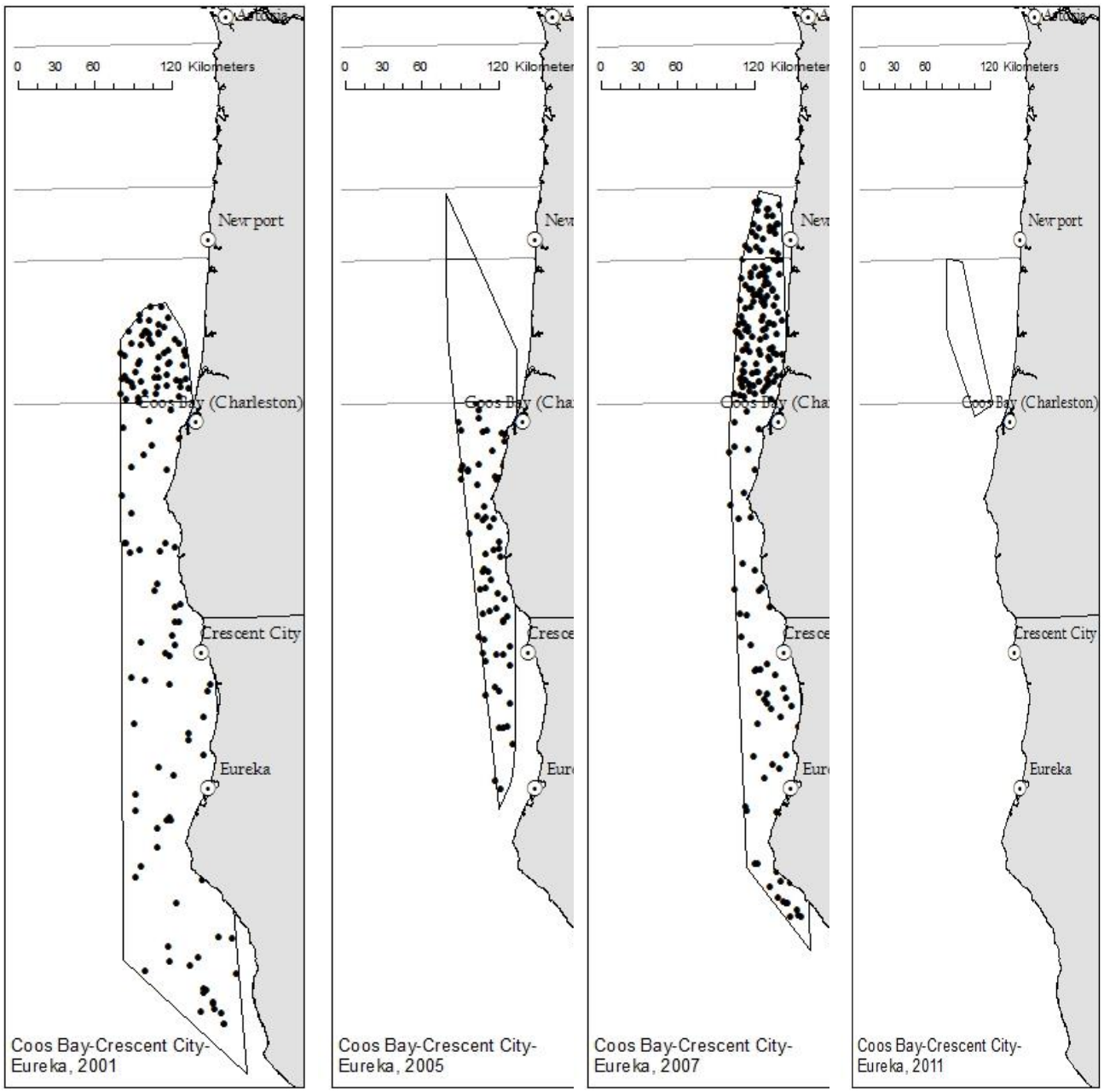

Figure 3-8. Coos Bay, Crescent City, Eureka: tows on trips for vessels departaing from and returning to the same port (one dot per tow, randomly distributed within the region in which the tow occured, blanks indicate confidential areas (areas where fewer than three vessels operated).

Fishery Management: Whiting fishery management aims to achieve OY from the resource on a continuing basis (sustained yield objective). The fishery is the largest on the West Coast of both the United States and Canada and operates in the Canadian EEZ off the British Columbia coast and in the U.S. EEZ off Washington, Oregon and California. Its management bodies are the NMFS and the Pacific Fishery Management Council in the United States, and the Department of Fisheries and Oceans in Canada. A Joint Technical Committee (JTC) has been formed to analyze available data on the coastal whiting stock, which are used in developing base-case-models to set annual harvest guidelines (HGs) for the respective countries. The annual stock assessments are highly dependent upon hydoacoustic survey data of biomass index to infer the scale of the current coastal whiting stock (http://www.pcouncil.org/wp-content/uploads/Hake_2013_Assessment.pdf).

Amendment 20 to the Pacific Coast Groundfish FMP establishes the trawl rationalization program, which consists of two parts: the shorebased IFQ program and the at-sea cooperative programs, including the mothership processor (MS) and catcher/processor (C/P) sectors. The IFQ and at-sea cooperative programs replace the previous catch control tool, which was season/quota-based management. At the start of the IFQ program in 2011 QS were allocated to fishery participants based on landing history during a specified qualification period. The initial allocation of QS whiting to the shorebased sectors was as follows: 80 percent to qualified vessel owners and 20 percent to qualified whiting processors. QS accumulation limits are in place to prevent single entities from acquiring excess groundfish shares, including whiting. Beginning in 2014 shareholders were free to buy and sell QS (except for widow rockfish QS for which a trading moratorium will continue to remain in place for a short period of time). QS represent a proportion, or percent, of the shorebased trawl allocation. Each year, these shares are converted from a percent to a quantity by issuing QP based on the ACLs established for the year. The amount of groundfish caught by a limited entry (LE) trawl vessel, even if it is subsequently discarded, must be matched by equivalent quantity of QP. The QP are expended in this way, with the matched amount deducted from the vessel's account. Both QS and QP are perfectly divisible and tradable.

Amendment 21 to the groundfish plan describes formal allocations of groundfish species and species' complexes for sectors of the groundfish fishery.

The midwater trawl fishery targeting Pacific whiting has earned Marine Stewardship Council (MSC) certification as a sustainable and well managed fishery. Certification of attainment of the MSC standard is an assurance to buyers and consumers that their seafood comes from a well-managed and sustainable source. MSC certification is valid for 5 years. During this period the performance of the fishery will be reviewed at least once a year to check that it continues to meet the MSC standard. After 5 years, the fishery must be reassessed in full if it wants to continue to be certified (see: http://www.msc.org/about-us/standards/standards/msc-environmental-standard#what-does-it-assess). As part of the assessment, the three principles of the MSC standard were evaluated in detail: the status of the fish stock, the impact of the fishery on the marine ecosystem, and the management system overseeing the fishery (MSC 2009).

Stock Status ((IJTCPH 2013): The most recent (at time of writing this EA) stock assessment for whiting was in 2013. The base-case stock assessment model indicated that the Pacific whiting female spawning biomass was below the average unfished equilibrium in the 1960s and 1970s. The current median posterior spawning biomass is estimated to be 72.3 percent of the average unfished equilibrium level. However, this estimate is quite uncertain, with 95 percent posterior credibility intervals ranging from 34.7 percent to 159.7

percent. The estimate of 2013 female spawning biomass is 1.5 million mt, which is more than double the projected spawning biomass from the 2012 assessment. The difference in projected biomass is largely driven by increases in the estimated size of the 2008 and 2010 year classes.

Management Performance (IJTCPH 2013): Total catches last exceeded the coastwide catch target in 2002, when landings were 112 percent of the catch target (40 percent of spawning biomass). Over the last ten years, the average utilization has been 87 percent of the preseason allowable catch (Table 3-1).

From 2009 to 2012 much of the U.S. tribal allocation remained uncaught and Canadian catches have also been below the limit even though in retrospect the target harvest rate was surpassed in some years (based on postseason analysis of actual biomass levels). The exploitation history in terms of both the biomass and *F*-target reference points shows that historically the fishing intensity has been low and the biomass has been high. Recently, the estimated depletion level has been below 40 percent and the fishing intensity high—until 2012 when fishing intensity was below target and depletion was above 40 percent.

Table 3-1: Recent trends in Pacific whiting landings and management decisions (US and Canada) (IJTCPH 2013).

Year	Total Landings (mt)	Coast-wide target (mt)	Landings as Percentage of target
2003	205,177	228,000	0.90
2004	338,654	501,073	0.68
2005	363,157	364,197	1.00
2006	361,761	364,842	0.99
2007	291,129	328,358	0.89
2008	322,145	364,842	0.88
2009	177,459	184,000	0.96
2010	226,202	262,500	0.86
2011	286,055	393,751	0.73
2012	204,040	251,809	0.81
		Avg=	0.87

3.2.1.2 *Widow rockfish*

Biology (CDFG 2001b): Widow rockfish *(Sebastes entomelas)* are found from Todos Santos Bay, Baja California, to Kodiak Island, Alaska. Peak abundance is off northern Oregon and southern Washington, with significant aggregations occurring south to central California. While many commercial catches occur at bottom depths between 450 and 750 feet, young fish occur near the surface in shallow waters, and adults have been caught over bottom depths to 1,200 feet. Widow rockfish often form midwater schools, usually at night, over bottom features such as ridges or large mounds near the shelf break. The schooling behavior of widow rockfish is quite dynamic and probably related to feeding and oceanographic conditions. There appears to be some seasonal movement of fish among adjacent grounds, and there is evidence that fish move from area to area as they age, with fish of the same size tending to stay together. The maximum recorded age for widow rockfish is 59 years, but fish older than 20 years are now uncommon. Most are

less than 21 inches long, corresponding to a weight of just under five pounds. The maximum size is 24 inches or about 7.3 pounds. At first, growth is fairly rapid and by age five widow rockfish average 13.5 inches. By age 15, growth slows greatly, when the average size is about 19 inches for females and 17.5 inches for males. Widow rockfish do not become reproductive until years after birth. For example, only 50 percent are mature by age five, but almost all are mature by age eight when they are 16.5 inches long. Off California, fecundity ranged from 55,600 eggs for a 12.8-inch female to 915,200 eggs for an 18.8-inch fish. The release of larvae by widow rockfish peaks in January-February and appears to occur in the same areas where they are caught during that season. The larvae are about 0.2 inch when released. The young fish lead a pelagic existence until they are about five months old. During the latter part of the pelagic stage, the two-inch fish feed mostly on copepods and small stages of euphausiids. Adult widow rockfish feed on midwater prey such as lantern fish, small Pacific whiting euphausiids, sergestid (deep-water) shrimp, and salps. Juvenile rockfish, including widow rockfish, are important prey items for sea birds and Chinook salmon in May and June. Little is known about predation of adult widow rockfish.

Fishery Management: Widow rockfish was an untargeted species prior to 1979. Before that it had been taken primarily with bottom trawl from widely spaced aggregations in 40-140 fathoms. These aggregations produced high catch rates during the fall and spring, which are the mating and spawning seasons for the species. In 1979 a highly directed midwater trawl fishery developed for widow rockfish. New technology, incorporating the use of electronic navigation, fish finding equipment, and midwater nets, extended fishing operations into previously unfished areas and enabled vessels to follow shifts in widow rockfish concentrations throughout the year (Quirollo 1987, Demory 1987). Schooling behavior of widow rockfish allows them to be targeted easily by fishermen, and catches (when the fishery was active) were often 100 percent widow rockfish. Midwater trawling for widow rockfish historically occurred at night when they formed dense off-bottom schools, which dispersed at dawn (Tagart 1987; Ralston and Pearson 1997). Species most commonly caught incidentally to widow rockfish include yellowtail rockfish and Pacific whiting. Other *Sebastes* landed with widow rockfish include Pacific Ocean perch, boccaccio rockfish, canary rockfish, and sharpchin rockfish (Tagart 1987). The targeted widow fishery stopped in 2002 after it was declared overfished. Since the Trawl Rationalization Program began in 2011 and widow stocks being rebuilt, some targeting has started again.

An Oregon-based widow rockfish fishery took place during 1991-2003 on Cobb Seamount, located outside of the US EEZ, approximately 280 nautical miles northwest of the northern Oregon coast (Douglas 2011). Several important differences between the Cobb Seamount and nearshore populations of widow rockfish were observed in the initial (1991) landings from the Cobb Seamount fishery: the Cobb Seamount fish had a significantly smaller average size overall, and females a smaller average size-at-maturity. Other important differences were noted in prior studies cited in the report. U.S. fishing activity on the Cobb Seamount ceased in early 2004 when NMFS stopped issuing high seas permits for net gear types.

The groundfish FMP (PFMC 2014b) contains the rules for managing the groundfish fishery. It outlines the areas, species, regulations, and methods that the Council and the Federal government must follow to make changes to the fishery. The FMP also creates guidelines for the biennial process of setting harvest levels.

Stock Status (He et al. 2011): The most recent widow rockfish assessment in 2011 applied to widow rockfish (*Sebastes entomelas*) located in the territorial waters of the U.S., including the Vancouver, Columbia, Eureka, Monterey, and Conception areas. The stock is assumed to be a single mixed stock and

subject to five major fisheries. Stock spawning biomass of widow rockfish showed a steady decline between 1980 and 2001, soon after major commercial fisheries for widow rockfish began. The stock was declared overfished in 2001. A stock that has declined to less than 25 percent of its unfished spawning biomass is considered "overfished" until it rebuilds to 40 percent of its unfished spawning biomass. The most recent stock assessment showed that the stock had rebuilt to a depletion level of 51 percent and a spawning stock size of 36,342 mt.

Management Performance (He et al. 2011 and GMT 2013): The exploitation rate for widow rockfish was above the target spawning potential ratio (SPR of 50 percent (i.e., $F<F_{MSY}$) until the late 1970s when trawl catches in the target midwater fishery increased to rates beyond the target. This continued until the stock was declared overfished and managed under a rebuilding plan. Harvest declined dramatically and the estimated SPR harvest rates increased rapidly above target F_{MSY}. The increase in biomass during the past decade was the result of reduced catches rather than strong year-classes (PFMC 2012c).

Lower OYs specified in 2005-2010 were not exceeded as the fishery was managed to avoid widow bycatch and the percent of OY attainment decreased with time during that period. The percent attainment of the 2011 IFQ allocation was 40 percent. The at-sea whiting sectors have been better able to avoid widow rockfish in recent years with the lowest bycatch rates (widow catch/whiting catch) observed in the past couple of years. Management uncertainty is low since widow rockfish is a trawl-dominant species and there is mandatory 100 percent observer coverage in trawl fisheries (PFMC 2014b).

The combined fishery catches of widow rockfish during 1999-2001, prior to the species being declared overfished, achieved between 92 percent and 98 percent and averaged 95 percent of the HG. From 2002-2012 the widow rockfish catch ranged from 5 percent to 74 percent and averaged 47 percent of the HG (Table 3-2).

Table 3-2. Management performance in obtaining the harvest guideline for widow rockfish, 1999-2012. Harvest guidelines and acceptable biological catch (ABC) are taken from He et al 2011. Catches for 1999-2010 are from He et al 2011, catches for 2011-2012 are from GMT 2013 (SpeciesTypeDisLnd) and catch for 2013 are from GMT 2014 (Table 16).

	Harvest Guideline, OY or ACL (mt)	Acceptable Biological Catch (mt)	Catch (mt)	Catch as Percentage of HG/OY or ACL
1999	5,090	5,750	4,770	0.94
2000	5,090	5,750	4,661	0.92
2001	2,300	3,727	2,258	0.98
2002	856	3,727	432	0.50
2003	832	3,871	43	0.05
2004	284	3,460	101	0.36
2005	285	3,218	199	0.70
2006	289	3,059	215	0.74
2007	368	5,334	259	0.70
2008	368	5,144	237	0.64
2009	522	7,728	195	0.37
2010	509	6,937	152	0.30
2011	600	4,872	212	0.35
2012	600	4,705	271	0.45
2013	1,500	4,598	499	0.33

3.2.1.3 *Yellowtail rockfish*

Biology (CDFG 2001c): Yellowtail rockfish are found from Kodiak Island, Alaska to San Diego, although they are rare south of Point Conception. They are wide-ranging and are reported to occur from the surface to 1,800 feet and are known to form large schools, either alone or in association with other rockfish, including widow rockfish, canary rockfish, redstripe rockfish, and silvergray rockfish. They are primarily distributed over deep reefs on the continental shelf, especially near the shelf break, where they feed on krill and other micronekton. Some allozyme and parasitological evidence supports the view that multiple stocks exist, whereas other genetic data indicate one single coastal stock. Like many other species of rockfish, yellowtail is long lived. The age distribution of fish sampled in commercial fisheries off Oregon and Washington can span six decades, with the oldest known specimen a 64-year-old male. They typically approach their maximum size at about 15 years of age and the largest recorded specimen was a 28-inch female. Females begin to mature at 10 to 15 inches, with half reaching maturity by a size of 15 to 18 inches; males do not grow quite as large as females.

Fishery Management: Until the late 1990s, yellowtail rockfish were harvested as part of a directed midwater trawl fishery. Yellowtail rockfish are common in both commercial and recreational fisheries throughout its range, and commonly occur with canary and widow rockfishes. Despite its popularity in commercial and recreational fisheries, its association with those highly regulated species has greatly decreased removals over the last decade. From the end of 2002 through 2010, implementation of the RCAs and small landings limits designed to only accommodate incidental bycatch eliminated directed mid-water

fishing opportunities for yellowtail rockfish in non-tribal trawl fisheries. A limited opportunity to target yellowtail rockfish in the trawl fishery has been available since 2011 under the trawl rationalization program, yet low quotas for widow rockfish, canary rockfish, and for other constraining stocks has continued to limit mid-water targeting of yellowtail rockfish (PFMC 2014b). The Council has recommended substantial increases in the yellowtail rockfish ACLs for the 2015-2016 management period.

Yellowtail rockfish are currently managed with stock-specific harvest specifications north of 40º10' N. latitude and within the southern shelf rockfish complex south of 40 º10' N. latitude. There has never been an assessment of the southern stock and the OFL contribution of yellowtail rockfish to the southern shelf rockfish complex is based on a deletion based stock reduction analysis estimate (ibid).

The groundfish FMP (PFMC 2014c) contains the rules for managing the groundfish fishery. It outlines the areas, species, regulations, and methods that the Council and the Federal government must follow to make changes to the fishery. The FMP also creates guidelines for the biennial process of setting harvest levels.

Stock Status: The most recent stock assessment for yellowtail rockfish (2004) showed the following: The estimated age 4+ biomass in 2004 for the stock north of 40° 10´ N. latitude was estimated to be 72,152 mt with a 26 percent coefficient of variation an increase from 58,025 mt in 2003. The spawning biomass has remained above 40 percent of unfished spawning biomass since 1995. Annual fishing mortalities have been less than FMSY since 1997, due to more restrictive regulations put in place to rebuild other overfished rockfishes (Wallace and Lai 2005).

Management Performance: From 2007-2013, annual yellowtail rockfish catches in commercial fisheries north of 40° 10´ N. latitude ranged from 364 to 1,523 mt and averaged 878 mt (Table 3-3). These annual catch levels ranged from 8 percent to 39 percent and averaged 23 percent of the ACL. These relatively low catch levels, as reported above, have been due to restrictive regulations aimed at rebuilding overfished rockfishes.

Table 3-3. Overfishing limits (OFL), acceptable biological catch (ABC), annual catch level (ACL), actual catch (mt), and catch expressed as a proportion (P) of the ACL for yellowtail and chilipepper rockfish by year, 2007-2013. For data sources see footnote 1/. Catch estimate qualifiers are explained in footnote 2/.

	Yellowtail (N of 40° 10´)					Chilipepper (Monterey and Conception areas)				
Year	OFL	ABC	ACL	Catch	P	OFL	ABC	ACL	Catch	P
2007	n/a	4,548	4,548	364	0.08	n/a	2,700	2,000	116	0.06
2008	n/a	4,548	4,548	453	0.10	n/a	2,700	2,000	138	0.07
2009	n/a	4,562	4,562	726	0.16	n/a	3,037	2,885	291	0.10
2010	n/a	4,562	4,562	918	0.20	n/a	3,037	2,885	341	0.12
2011	4,566	4,364	3,857	1,284	0.33	2,073	1,981	1,966	318	0.16
2012	4,566	4,364	3,857	1,523	0.39	2,073	1,981	1,966	289	0.15
2013	4,579	4,378	4,378	1,424	0.33	1,768	1,690	1,690	404	0.24

1/ Sources: Table 1a to Part 660, Subpart C. Specifications of OFL, ABC, and ACL (mts): 78 FR 592, 78 FR 579, 76 FR 27507, 75 FR 39178, 71 FR 78638; GMT 2013; and GMT 2014

2/ The only sectors missing from this product versus groundfish mortality reports are Research and Recreational estimates. Discard mortality rates are applied retroactively to species discard estimates, following methods used in the 2012 groundfish mortality report (i.e. if there is a discard mortality rate applied to estimates for that species-sector-gear in the 2012 GM report, then it will be applied to all years in this multi-year data product).

3.2.1.4 *Chilipepper rockfish*

Biology (CDFG 2001d): Chilipepper rockfish range from Queen Charlotte Sound, British Columbia to Magdalena Bay, Baja California. The area of greatest abundance is found between Point Conception and Cape Mendocino, California (Field 2007). Adults are found on deep rocky reefs, as well as on sand and mud bottoms, from 150 to 1,400 feet; juveniles school and are frequently found in shallow nearshore waters, particularly in kelp beds. Spawning occurs from September to April with a peak occurring in December and January. About 50 percent of female chilipepper are sexually mature at four years when they are between 11 and 12 inches in length, while males mature at two years and between eight and nine inches in length. Chilipepper attain a maximum age of 35 years and a size of up to 23 inches, with females growing substantially larger than males. Adults feed on krill and other small crustaceans, squid, and a variety of small fishes. Probable predators of chilipepper include marine birds and mammals, Chinook salmon, lingcod, Pacific whiting, sablefish, and other rockfish.

Fishery Management: Chilipepper have been one of the most important commercial target species in California waters since the 1880s and were historically an important recreational target in Southern California waters. With the exception of excluding foreign fishing effort from the U.S. EEZ in the late 1970s, management actions were modest (and usually general to all rockfish and other groundfish) prior to the implementation of the Groundfish FMP in 1982. When the FMP was implemented, management for the groundfish trawl fishery was based on individual vessel trip limits, which were set at 40,000 pounds per trip on the Sebastes (all rockfish species) complex. These limits were maintained until 1991, when they were reduced to 25,000; in 1993 the trip limit system was revised from daily to biweekly trip limits, which were set at 50,000 pounds (south of Cape Mendocino). The trip limit regime continued to evolve in its absolute amounts and temporal duration (monthly, bimonthly) throughout the 1990s, with a general trend towards lower limits as conservation concerns arose for other rockfish species (particularly bocaccio rockfish in the region south of Mendocino). The chilipepper catch in the bottom and midwater trawl

fisheries has been managed under an IFQ system since 2011 (PFMC 2014b).The groundfish FMP (PFMC 2014c) contains the rules for managing the groundfish fishery. It outlines the areas, species, regulations, and methods that the Council and the Federal government must follow to make changes to the fishery. The FMP also creates guidelines for the biennial process of setting harvest levels.

Stock Status: The last stock assessment of chilipepper in 2007 indicated the stock was in quite good condition. The base model in that assessment suggested a spawning biomass of 23,889 tons in 2006, corresponding to approximately 70 percent of the unfished spawning biomass of 33,390 tons and representing a near tripling of spawning biomass from the estimated low of 8,696 tons (26 percent of unfished) in 1999 (Field 2007).

Management Performance: Although chilipepper rockfish have been a commercially important species in California waters since well before the Second World War, the exploitation rate has rarely exceeded the current target exploitation rate (SPR 50 percent). The highest exploitation rates occurred from the late 1980s through the mid-1990s, when they were above target levels and the stock was approaching its lowest estimated historical levels. From the late 1990s through the present, exploitation rates have been declining significantly, as a result of management measures implemented to rebuild other depleted rockfish species (Field 2007).

From 2007-2013, annual chilipepper rockfish catches in commercial fisheries in the Conception and Monterey areas ranged from 116 to 404 mt and averaged 271 mt (Table 3-3). These annual catch levels represented from 6 percent to 24 percent and averaged 13percent of the ACL. These relatively low catch levels have been due to restrictive regulations aimed at rebuilding overfished rockfishes, as reported by Field 2007.

3.2.2 Non-Target Species

The biological resources covered in this subsection include those species that share the same marine environment both temporally and spatially with Pacific whiting (coastal stock), a principal species under consideration in this assessment, and the three rockfish species that comprise the pelagic rockfish species complex historically targeted with midwater trawl gear: widow, yellowtail, and chilipepper rockfish.

3.2.2.1 *Incidence of Non-Target Species in the Shorebased Whiting Fishery*

Non-target species data for the IFQ whiting fishery were obtained from the West Coast Groundfish Observer Program (WCGOP) database maintained by the NMFS. The WCGOP whiting data used for this EA were for the years 2007-2010 and 2011-2013 and were limited to the non-tribal shorebased fishery. Earlier years' data were not used because the fishery extended further south and bycatch species were not representative of the fishery in more recent years, when California species (e.g., overfished bocaccio rockfish, California halibut and Bluefin tuna) no longer appeared in catches. For the years 2007-2010 fishery sampling data were used to estimate fishery impacts by the WCGOP. The first year of the trawl rationalization program was 2011. Beginning that year fishers had to cover their groundfish catches of IFQ species with QP and an observer was required onboard the vessel to document total fishery impacts. Trip limits were in place for most non-IFQ species. For this EA, WCGOP data were combined on a coastwide basis. The estimates are expressed in metric tons, which is inclusive of landed catch and discarded catch by species and in some cases species groups.

2007-2010 Data. Directed whiting fishing vessels and their landings are those that conform to the regulations found at 50 CFR 660, subparts C-G. (in particular §160.131). The fishery is limited to permitted vessels that have declared their intent to participate in the taking of Pacific whiting using specified fishing gear (midwater trawl), during the specified primary whiting season (which may vary by geographic area) and in specified ocean fishing areas. The directed whiting fishery average annual catch during 2007-2010 totaled 57,380 mt of fish and invertebrates. The nonwhiting bycatch included over 100 species of animals, which comprised 1.24 percent of the total catch (Table 3-4). Of these, four species made up 80 percent (572 mt) of the catch. In order of fishery impact, these species included unidentified squid, yellowtail rockfish, widow rockfish, and dogfish shark. Prohibited[1] species included all five species of Pacific salmon, Dungeness crab and Pacific halibut. Endangered species included eulachon and some stocks of salmon. Overfished groundfish included overfished bocaccio rockfish, canary rockfish, darkblotched rockfish, Pacific Ocean perch and petrale sole.

2011-2013 Data. The directed whiting fishery catch during 2011-2013 averaged 85,032 mt of fish and invertebrates (Table 3-4). The nonwhiting bycatch comprised 0.99 percent of the total catch, 20 percent lower than in the pre-IFQ years. Three species made up 81 percent of the nonwhiting catch during the IFQ years. In order of impact, these species included yellowtail rockfish, spiny dogfish shark and widow rockfish. Prohibited and endangered species caught were the same as in the previous period. Overfished groundfish included canary rockfish, darkblotched rockfish, Pacific Ocean perch and petrale sole

Table 3-4. Estimated average annual and maximum single year catches (mt) of target and non-target fish and invertebrate species in the shorebased whiting fishery, by species or species group, 2007-2010 and 2011-2013 (Source: 2007-2012 from the 2012 multiyear data product (Bellman, et al. 2013); 2013 groundfish data from the 2013 groundfish mortality report provided by the WCGOP; 2013 data for nongroundfish species is from fish tickets[a/]).

	2007-2010		**2011-2013**	
Row Labels	**Average**	**Max**	**Average**	**Max**
Target Species				
Pacific Hake	56,671	73,281	84,466	97,327
Non-Target Species				
Groundfish IFQ Species				
Overfished Groundfish				
Bocaccio rockfish (South of 40°10' N. lat.)	0.00	0.01	0.00	0.00
Canary rockfish	2.51	4.05	2.11	3.36
Cowcod rockfish (South of 40°10' N. lat.)			0.00	0.00
Darkblotched rockfish	2.43	7.41	2.93	4.33
Pacific Ocean Perch (North of 40°10' N. lat.)	11.79	23.28	6.57	12.36
Petrale Sole	0.03	0.06	0.00	0.00
Yelloweye Rockfish	0.03	0.07	0.00	0.00
Non-Overfished Groundfish				
Arrowtooth flounder	4.44	9.32	14.32	24.82
Chilipepper rockfish (South of 40°10' N. lat.)	0.04	0.17	0.00	0.00
Dover sole	0.40	1.40	0.26	0.60

[1] Prohibited species means those species or species groups whose retention is prohibited unless authorized by provisions of this section or other applicable law. The following are prohibited species: Any species of salmonid, Pacific halibut, Dungeness crab caught seaward of Washington or Oregon, and groundfish species or species groups under the FMP for which quota have been achieved and/or the fishery closed. Prohibited species must be returned to the sea as soon as practicable with a minimum of injury when caught and brought on board (50 CFR 660, Subparts C-G).

	2007-2010		2011-2013	
Row Labels	**Average**	**Max**	**Average**	**Max**
English sole	0.08	0.25	0.02	0.03
Lingcod (North of 42° N. lat.)	2.76	4.92	5.57	8.43
Lingcod (South of 42° N. lat.)	0.04	0.09	0.00	0.00
Longspine Thornyhead (North of 34°27' N. lat.)	0.05	0.12	0.02	0.05
Minor shelf rockfish (North of 40°10' N. lat.)				
Bocaccio Rockfish	0.13	0.46	0.26	0.51
Chilipepper Rockfish	8.38	21.47	0.01	0.01
Greenblotched Rockfish	0.00	0.00	0.00	0.00
Greenspotted Rockfish	0.00	0.00	0.00	0.00
Greenstriped Rockfish	0.13	0.39	0.04	0.05
Redstripe Rockfish	0.15	0.48	0.05	0.11
Rosethorn Rockfish	0.00	0.00	0.06	0.18
Shelf Rockfish Unid	0.47	1.48	0.03	0.07
Silvergray Rockfish	0.15	0.45	0.44	0.59
Stripetail Rockfish	0.00	0.00	0.01	0.01
Minor slope rockfish (North of 40°10' N. lat.)				
Aurora Rockfish	3.36	13.10	0.27	0.46
Bank Rockfish	0.01	0.01	0.02	0.04
Blackgill Rockfish	0.03	0.08	0.10	0.23
Blackspotted Rockfish	0.00	0.00	0.04	0.12
Redbanded Rockfish	0.03	0.06	0.35	0.83
Rougheye Rockfish	2.32	5.11	18.02	47.08
Sharpchin Rockfish	0.01	0.04	0.30	0.66
Shortraker Rockfish	0.75	1.45	2.88	5.63
Slope Rockfish Unid	2.62	7.81	0.11	0.14
Splitnose Rockfish	8.80	19.79	8.70	16.44
Yellowmouth Rockfish	0.08	0.22	0.20	0.52
Other flatfish				
Flatfish Unid	0.01	0.03	0.00	0.01
Flathead Sole	0.00	0.01	0.00	0.00
Pacific Sanddab	0.40	0.86	0.03	0.07
Rex Sole	1.71	6.43	1.88	4.39
Rock Sole	0.00	0.00	0.00	0.00
Sand Sole	0.00	0.00	0.00	0.00
Sanddab Unid	0.01	0.03	0.00	0.00
Pacific Cod	0.08	0.19	2.22	6.59
Sablefish (North of 36° N. lat.)	19.83	49.16	26.09	47.21
Sablefish (South of 36° N. lat.)	0.00	0.03	0.00	0.00
Shortspine Thornyhead (North of 34°27' N. lat.)	2.90	11.10	4.60	8.32
Starry flounder	0.08	0.31	0.00	0.00
Widow Rockfish	88.30	108.66	155.47	236.03
Yellowtail rockfish (North of 40°10' N. lat.)	125.53	197.74	411.04	424.33
Landing Limit Species				
Black rockfish (North of 46°16' N. lat.)	0.23	0.90	0.00	0.00
Black rockfish (South of 46°16' N. lat.)	0.01	0.04	0.00	0.00
Nearshore Rockfish Unid	0.01	0.02	0.00	0.00
Quillback Rockfish	0.00	0.00	0.00	0.00
Spiny Dogfish Shark	70.77	151.46	140.56	181.04

	2007-2010		2011-2013	
Row Labels	**Average**	**Max**	**Average**	**Max**
Non-Landing Limit Groundfish				
Longnose skate	0.06	0.15	0.17	0.24
Mixed thornyheads	0.00	0.00	0.00	0.00
Other groundfish				
Big Skate	0.00	0.00	0.08	0.24
Grenadier Unid	0.00	0.00	0.00	0.01
Groundfish Unid	0.46	1.60	0.60	1.36
Skate Unid	0.51	0.82	0.28	0.58
Shortbelly Rockfish	0.09	0.23	0.74	2.14
Soupfin Shark	0.23	0.59	0.39	0.64
Spotted Ratfish	0.03	0.09	0.00	0.00
Nongroundfish				
Endangered Species				
Eulachon	0.00	0.00	0.03	0.08
Prohibited Species				
Dog (Chum) Salmon b/	0.13	0.49	0.07	0.18
Dungeness Crab	0.19	0.47	0.01	0.03
King (Chinook) Salmon b/	5.81	10.23	6.58	12.47
Pink (Humpback) Salmon b/	0.03	0.07	3.85	11.56
Red (Sockeye) Salmon b/	0.00	0.00	0.00	0.00
Salmon Unid b/			0.02	0.05
Silver (Coho) Salmon b/	0.15	0.38	0.19	0.41
Pacific Halibut b/	0.37	0.46	0.41	0.63
CPS				
Market Squid	1.90	7.54	0.01	0.01
Northern Anchovy	0.01	0.05	0.00	0.00
Pacific Mackerel	0.84	2.59	1.76	3.42
Pacific Sardine	0.75	1.71	0.08	0.17
Jack Mackerel	14.52	46.89	60.20	117.12
HMS				
Albacore Tuna	0.00	0.01	0.00	0.00
Bonito (Shortfin Mako) Shark	0.00	0.00	0.11	0.23
Blue Shark	0.09	0.33	0.17	0.36
Common Thresher Shark	0.37	0.68	1.84	4.61
Other Nongroundfish				
American Shad	9.59	14.42	58.69	146.55
Bivalves Unid	0.74	2.21	0.00	0.00
Black Skate	0.00	0.00	0.00	0.01
Brown Cat Shark	2.82	11.27	6.26	14.31
California Mussel	0.00	0.00	0.00	0.00
Echinoderm Unid	0.00	0.01	0.00	0.00
Fish Unid	0.00	0.00	0.02	0.07
Hagfish Unid	0.00	0.00	0.00	0.00
Jellyfish Unid	0.00	0.00	0.00	0.00
Mackerel Unid	1.12	2.67	1.14	2.83
Mixed Species	1.30	3.01	0.67	0.97
Mola Mola (Sunfish)	0.00	0.00	0.06	0.17
Octopus Unid	0.03	0.08	0.01	0.02
Other Nongroundfish	0.13	0.28	0.18	0.32

	2007-2010		2011-2013	
Row Labels	**Average**	**Max**	**Average**	**Max**
Pacific Herring	12.12	48.20	0.24	0.65
Pacific Pomfret	0.00	0.00	0.00	0.00
Pink Shrimp	0.00	0.00	0.00	0.00
Prowfish	0.00	0.00	0.00	0.00
Sea Cucumber Unid	0.00	0.00	0.00	0.00
Shark Unid	5.38	18.07	5.21	8.96
Shrimp Unid	0.00	0.00	0.00	0.00
Smelt Unid	0.00	0.00	0.03	0.09
Squid Unid	287.25	880.95	18.71	22.53
Walleye Pollock	0.33	1.34	0.00	0.00
White Sturgeon	0.01	0.02	0.00	0.00
Wolf-eel	0.00	0.00	0.00	0.00
Grand Total	57,380.04	73,878.10	85,441	97,050.56
Non-Target Species Totals	709.26		974	
Non-Target Species Proportion	1.24%		1.14%	

a/ The whiting fishery is a full retention fishery, therefore 2013 fish ticket data on nongroundfish species landed may be reasonably comparable to observer data for these species from earlier years. The main difference between 2013 observer and 2013 fish ticket data would be that the observer data would include expansions for nonselective discards (e.g. net bleeds) and data on the species landed may not be broken out in as much detail as observer data. Less than one half of one percent of the hake was discarded at sea. With the exception of the salmon data (for which 2013 data is not included and 2014 data is provided in Chapter 4) these data source differences will not affect the substantial conclusions of this analysis.
b/ Data for 2013 are not included for this species because of incomplete reporting on fish tickets.

3.2.2.2 *Incidence of Non-Target Species in the Pelagic Rockfish/ Nonwhiting Midwater Trawl Fishery*

Non-target species data for the pelagic rockfish fishery and other nonwhiting mid-water trawl fisheries were obtained from two sources: (1) The WCGOP database maintained by the NMFS and (2) the State logbook database (PacFIN) maintained by the Pacific States Marine Fisheries Commission. For purposes of this analysis, nonwhiting midwater trawl trips are those in which midwater trawl gear was used and less than 50 percent of the catch was Pacific whiting. In Council area fisheries these are trips in which pelagic rockfish species comprised most of the nonwhiting catch but, as will be shown, this is not always the case. The WCGOP data obtained for this EA were for the periods 2002-2011 and 2012-2013. The 2002-2011 data could not be separated by year because of confidentiality policy that does not allow for public distribution of catch information for fewer than three vessels for an area and year. In years prior to 2011 there was random sampling of the nonwhiting midwater trawl fishery, which resulted in very few samples in any year and area because of regulatory constraints to protect overfished groundfish. There were also policy concerns with the 2011 data, the first year of the IFQ program, because of few boats involved in the fishery. Beginning in 2012 the Council's GMT began displaying nonwhiting midwater trawl fishery catch data separate from nonwhiting bottomtrawl fishery data not including nongroundfish species because observer program expansions for discarded or non-landed catch are not complete at this time. The number of boats involved in the nonwhiting midwater trawl fishery expanded in these years, which allayed the confidentiality policy issue: six in 2012 and four in 2013. All of the fishing in these years where in the area north of 40˚10' N. latitude, which is why no data are displayed for the area south of that landmark (Table 1

in each of the following GMT reports: GM12_ReportTables_GMT draft_093013 and Groundfish_Mortality_2013_Tables, respectively).

Most or perhaps all the data received for the earlier period were collected in 2011 because, as reported above, fishing regulations during 2002-2010 did not provide for directed pelagic rockfish fishing north of 40˚ 10' N. latitude. Beginning in 2011 fishers had to cover their groundfish catches for IFQ species with QP and an observer was required onboard the vessel to document fishery impacts. Trip limits were in place for most non-IFQ groundfish species. Data were collected during 2002-2011 from 12 vessels on 20 trips during which 49 tows were observed and estimated for discarded catch, retained catch and total catch by species or species group and weight, reported here in metric tons. WCGOP data for this earlier period are displayed separately for fishing north and south of 40º 10 N. latitude, referred to as management areas north and south. Catch data are not displayed for separate years because of vessel confidentiality constraints, as explained above.

Combined observer data for the years 2002-2011 and for each year during 2012-2013 were available for analysis in this EA with the exception for nongroundfish species as explained above. The confidentiality issues that limited display of data for the early years used in this analysis are also discussed above. All fishing during the latter years available for this analysis took place north of 40º 10 N. latitude and 100 percent observer cover was required on all nonwhiting midwater trawl trips during these years. In 2012 observer coverage extended to six vessels, 11 fishing trips for a total of 37 observed tows. In 2013 the coverage extended to four vessels, 13 trips and 36 tows. Catch data will be described separately for the two reporting periods.

2002-2011 Data. A total of 62 categories of fish and invertebrates were observed in the coastwide nonwhiting midwater trawl fishery catch during 2002-2011 (Table 3-5). Catches in the north and south management areas were noticeably different with regard to species categories present and relative amounts in the catch. The south area data showed a large catch of bank rockfish (56 mt retained), a southern area minor slope rockfish species, while the north area catch was dominated by yellowtail rockfish (103 mt retained) and widow rockfish (75 mt retained), two major shelf rockfish species in the north area. It would appear these were the likely target species of the fisheries, because the bank rockfish catch represented 90 percent of the south area retained catch, while the combined yellowtail rockfish and widow rockfish catches represented 99 percent of the north area retained catch. Another difference between the two management area catches was that a much higher proportion of the catch was discarded in the south area (56.7 percent) compared to the north area (20.4 percent). Notable discard species in the south area included unidentified rockfish, shortbelly rockfish and Pacific whiting. The major discard species in the north area was Pacific whiting. Groundfish species dominated the catch in both areas: 99 percent in the south area and 97 percent in the north area. Overfished groundfish were caught in both areas: bocaccio rockfish, cowcod rockfish and darkblotched rockfish in the south and canary and Pacific Ocean perch in the north. Prohibited species were caught in both areas: Dungeness crab in the south and Chinook salmon and coho salmon in the north. CPS species encountered included market squid in the south and jack mackerel in the north. No HMS species or Pacific halibut were encountered in either area.

Table 3-5. West Coast Groundfish Observer Program catch data in metric tons for nonwhiting midwater trawl trips collected during 2002-2011 by management area and species category. The north and south management areas are divided at 40° 10 N. latitude (data provided January 7, 2013).

		North			South			Coastwide		
TYPE	SPECIES	Discard	Retain	Catch	Discard	Retain	Catch	Discard	Retain	Catch
rebuild	Bocaccio Rockfish	--	--	0.000	3.243	0.000	3.243	3.243	0.000	3.243
rebuild	Canary Rockfish	0.307	0.498	0.805	--	--	0.000	0.307	0.498	0.805
rebuild	Cowcod Rockfish	--	--	0.000	0.070	0.000	0.070	0.070	0.000	0.070
rebuild	Darkblotched Rockfish	0.000	0.000	0.000	0.000	0.016	0.016	0.000	0.016	0.016
rebuild	Pacific Ocean Perch	0.056	0.000	0.056	--	--	0.000	0.056	0.000	0.056
rebuild	Petrale Sole	--	--	0.000	0.000	0.254	0.254	0.000	0.254	0.254
other	Arrowtooth Flounder	0.019	0.004	0.023	--	--	0.000	0.019	0.004	0.023
other	Bank Rockfish	--	--	0.000	0.011	56.162	56.172	0.011	56.162	56.172
other	Big Skate	--	--	0.000	0.259	0.000	0.259	0.259	0.000	0.259
other	Blackgill Rockfish	--	--	0.000	0.000	0.007	0.007	0.000	0.007	0.007
other	Bocaccio Rockfish	0.015	0.003	0.018	--	--	0.000	0.015	0.003	0.018
other	California Skate	--	--	0.000	0.069	0.000	0.069	0.069	0.000	0.069
other	Chilipepper Rockfish	0.524	0.000	0.524	1.291	4.435	5.727	1.816	4.435	6.251
other	Curlfin Turbot	--	--	0.000	0.020	0.000	0.020	0.020	0.000	0.020
other	Dover Sole	--	--	0.000	0.513	0.000	0.513	0.513	0.000	0.513
other	English Sole	--	--	0.000	0.438	0.381	0.819	0.438	0.381	0.819
other	Greenspotted Rockfish	--	--	0.000	0.038	0.000	0.038	0.038	0.000	0.038
other	Greenstriped Rockfish	--	--	0.000	0.092	0.000	0.092	0.092	0.000	0.092
other	Harlequin Rockfish	0.006	0.000	0.006	--	--	0.000	0.006	0.000	0.006
other	Lingcod	0.010	0.030	0.040	0.077	0.000	0.077	0.087	0.030	0.117
other	Longnose Skate	0.032	0.045	0.077	4.297	0.000	4.297	4.329	0.045	4.374
other	Pacific Cod	0.000	0.008	0.008	--	--	0.000	0.000	0.008	0.008
other	Pacific Hake	24.166	0.070	24.236	10.189	0.000	10.189	34.355	0.070	34.425
other	Pacific Sanddab	--	--	0.000	0.071	0.000	0.071	0.071	0.000	0.071
other	Redstripe Rockfish	0.589	0.251	0.840	--	--	0.000	0.589	0.251	0.840
other	Rex Sole	0.000	0.001	0.001	0.429	0.000	0.429	0.429	0.001	0.430
other	Rockfish Unid	0.002	0.000	0.002	33.387	0.320	33.707	33.389	0.320	33.710
other	Rosethorn Rockfish	0.000	0.001	0.001	--	--	0.000	0.000	0.001	0.001
other	Sablefish	0.425	0.000	0.425	6.604	0.000	6.604	7.030	0.000	7.030
other	Sharpchin Rockfish	0.055	0.000	0.055	0.023	0.000	0.023	0.078	0.000	0.078
other	Shelf Rockfish Unid	0.000	0.341	0.341	--	--	0.000	0.000	0.341	0.341
other	Shortbelly Rockfish	--	--	0.000	16.842	0.023	16.864	16.842	0.023	16.864
other	Silvergray Rockfish	0.000	0.002	0.002	--	--	0.000	0.000	0.002	0.002
other	Skate Unid	0.000	0.018	0.018	0.000	0.281	0.281	0.000	0.299	0.299
other	Spiny Dogfish Shark	0.077	0.000	0.077	1.509	0.000	1.509	1.586	0.000	1.586
other	Splitnose Rockfish	0.000	0.000	0.000	0.416	0.006	0.422	0.416	0.006	0.422
other	Spotted Ratfish	--	--	0.000	0.038	0.000	0.038	0.038	0.000	0.038
other	Stripetail Rockfish	--	--	0.000	1.088	0.000	1.088	1.088	0.000	1.088
other	Widow Rockfish	11.268	74.926	86.194	--	--	0.000	11.268	74.926	86.194
other	Yellowtail Rockfish	1.752	101.320	103.072	--	--	0.000	1.752	101.320	103.072
nongrndfsh	American Shad	0.004	0.000	0.004	--	--	0.000	0.004	0.000	0.004
nongrndfsh	Armored Box Crab	--	--	0.000	0.071	0.000	0.071	0.071	0.000	0.071

		North			South			Coastwide		
TYPE	SPECIES	Discard	Retain	Catch	Discard	Retain	Catch	Discard	Retain	Catch
nongrndfsh	Brown Cat Shark	--	--	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Prohibited	Dungeness Crab	--	--	0.000	0.033	0.000	0.033	0.033	0.000	0.033
CPS	Jackmackerel	0.023	0.000	0.023	--	--	0.000	0.023	0.000	0.023
nongrndfsh	Jellyfish Unid	0.002	0.000	0.002	--	--	0.000	0.002	0.000	0.002
Prohibited	King (Chinook) Salmon	0.100	0.000	0.100	--	--	0.000	0.100	0.000	0.100
nongrndfsh	King of the Salmon	--	--	0.000	0.010	0.000	0.010	0.010	0.000	0.010
nongrndfsh	Mackeral Unid	0.168	0.000	0.168	--	--	0.000	0.168	0.000	0.168
CPS	Market Squid	--	--	0.000	0.000	0.127	0.127	0.000	0.127	0.127
nongrndfsh	Mixed species	5.508	0.000	5.508	--	--	0.000	5.508	0.000	5.508
nongrndfsh	Mola Mola (Sunfish)	--	--	0.000	0.013	0.000	0.013	0.013	0.000	0.013
nongrndfsh	Pacific Electric Ray	--	--	0.000	0.009	0.000	0.009	0.009	0.000	0.009
prohibited	Pacific Halibut	--	--	--	--	--	--	--	--	--
nongrndfsh	Pacific Herring	0.178	0.000	0.178	--	--	0.000	0.178	0.000	0.178
nongrndfsh	Red Rock Crab	--	--	0.000	0.051	0.000	0.051	0.051	0.000	0.051
nongrndfsh	Ribbonfish Unid	--	--	0.000	0.005	0.000	0.005	0.005	0.000	0.005
nongrndfsh	Sandpaper Skate	--	--	0.000	0.336	0.000	0.336	0.336	0.000	0.336
nongrndfsh	Shark Unid	0.011	0.000	0.011	--	--	0.000	0.011	0.000	0.011
Prohibited	Silver (Coho) Salmon	0.002	0.000	0.002	--	--	0.000	0.002	0.000	0.002
nongrndfsh	Slender Sole	--	--	0.000	0.132	0.000	0.132	0.132	0.000	0.132
nongrndfsh	Spot Shrimp	--	--	0.000	0.006	0.000	0.006	0.006	0.000	0.006
nongrndfsh	Squid Unid	0.222	0.000	0.222	0.006	0.276	0.282	0.228	0.276	0.504
	Grand Total	45.525	177.517	223.042	81.685	62.288	143.973	127.210	239.806	367.015
	Discard Proportion	20.4%			56.7%			34.7%		

2012-2013 Data. The observed trips in 2012 and 2013 (enumerated below) produced a total catch of 425.97 mt of fish, 196.5 mt in 2012 and 208.4 mt in 2013 (Table 3-6). About 95 percent of the total catch in the two years combined was composed of pelagic rockfish species including yellowtail rockfish (270.30 mt) and widow rockfish (270.3 mt). A variety of species comprised the remainder of the catch including overfished groundfish (canary rockfish, darkblotched rockfish, Pacific Ocean perch and petrale sole), IFQ and nonIFQ groundfish species (45 categories) and nongroundfish species (3 species). Dungeness crab was the only prohibited species encountered. There were no CPS or HMS in the observed catch, however the total catch in this strategy has been very low (roughly just over 200 mt per year of all species). Bycatch data for 2012-2013 is not provided for eulachon, green sturgeon, salmon or Pacific halibut. Preliminary data showing nonwhiting midwater trawl salmon bycatch rates in 2014 is presented in Section 4.2.2.

Table 3-6. West Coast Groundfish Observer Program catch data in metric tons by species category for nonwhiting midwater trawl trips observed during 2012 and 2013 (data from Table 3a of the workbook version of the 2012 and 2013 groundfish mortality reports). All fishing was conducted north of 40° 10 N. latitude.

	2012			**2013**			**2012-2013 Totals**		
	Dis[2]	Land	Catch	Dis	Land	Catch	Dis	Land	Catch
Rebuilding species	--	--	--	--	--	--	-	-	-
Bocaccio rockfish (South)	--	--	--	--	--	--	-	-	-

[2] Dis means discard; Land means landed.

	2012			2013			2012-2013 Totals		
	Dis[2]	Land	Catch	Dis	Land	Catch	Dis	Land	Catch
Canary Rockfish	--	0.49	0.49	--	0.54	0.54	-	1.03	1.03
Cowcod rockfish (South)	--	--	--	--	--	--	-	-	-
Darkblotched Rockfish	--	0.07	0.07	--	0.00	0.00	-	0.07	0.07
Pacific Ocean Perch (North)	--	0.03	0.03	--	0.00	0.00	-	0.03	0.03
Petrale Sole	--	1.69	1.69	0.00	0.00	0.00	0.00	1.70	1.70
Yelloweye Rockfish	--	--	--	--	--	--	-	-	-
Other groundfish species	--	--	--	--	--	--	-	-	-
Arrowtooth Flounder	--	1.90	1.90	0.00	0.00	0.00	0.00	1.90	1.90
Dover Sole	--	4.17	4.17	--	--	--	-	4.17	4.17
English Sole	0.00	0.12	0.12	0.00	0.00	0.00	0.00	0.12	0.12
Lingcod (North)	0.23	2.38	2.61	--	0.13	0.13	0.23	2.50	2.74
Longnose Skate	--	1.56	1.56	--	0.14	0.14	-	1.69	1.69
Longspine Thornyhead (North)	--	0.12	0.12	--	0.00	0.00	-	0.12	0.12
Pacific Cod	--	0.21	0.21	--	0.06	0.06	-	0.27	0.27
Pacific Hake	--	0.68	0.68	--	0.01	0.01	-	0.69	0.69
Sablefish (North)	--	1.62	1.62	--	--	--	-	1.62	1.62
Shortspine Thornyhead (North)	--	1.12	1.12	--	0.00	0.00	-	1.12	1.12
Spiny Dogfish	0.00	0.21	0.21	0.01	0.00	0.01	0.01	0.22	0.23
Starry Flounder	--	--	--	--	0.00	0.00	-	0.00	0.00
Widow Rockfish	--	10.88	10.88	0.00	123.67	123.67	0.00	134.55	134.55
Yellowtail Rockfish (North)	0.00	185.62	185.62	--	84.68	84.68	0.00	270.30	270.30
Minor nearshore rockfish (North)									
Nearshore Rockfish Unid	--	--	--	--	--	--	-	-	-
Quillback Rockfish	--	--	--	--	0.00	0.00	-	0.00	0.00
Minor shelf rockfish (North)	--	--	--	--	--	--	-	-	-
Bocaccio Rockfish	--	0.01	0.01	--	0.01	0.01	-	0.01	0.01
Chilipepper Rockfish	--	0.00	0.00	--	0.00	0.00	-	0.00	0.00
Greenspotted Rockfish	--	0.00	0.00	--	0.00	0.00	-	0.00	0.00
Greenstriped Rockfish	--	0.57	0.57	0.00	0.04	0.05	0.00	0.61	0.61
Redstripe Rockfish	--	0.00	0.00	--	0.01	0.01	-	0.01	0.01
Rosethorn Rockfish	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silvergray Rockfish	--	0.09	0.09	--	0.00	0.00	-	0.09	0.09
Stripetail Rockfish	--	--	--	--	0.00	0.00	-	0.00	0.00
Minor slope rockfish (North)	--	--	--	--	--	--	-	-	-
Aurora Rockfish	--	0.01	0.01	--	0.00	0.00	-	0.01	0.01
Blackgill Rockfish	--	0.00	0.00	--	--	--	-	0.00	0.00
Redbanded Rockfish	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rougheye Rockfish	--	0.07	0.07	--	0.00	0.00	-	0.07	0.07
Sharpchin Rockfish	--	--	--	--	0.00	0.00	-	0.00	0.00
Shortraker Rockfish	--	0.04	0.04	--	0.00	0.00	-	0.04	0.04
Slope Rockfish Unid	0.01	1.15	1.16	--	--	--	0.01	1.15	1.16
Splitnose Rockfish	--	0.00	0.00	--	0.00	0.00	-	0.00	0.00
Other flatfish	--	--	--	--	--	--	-	-	-
Butter Sole	--	--	--	--	0.00	0.00	-	0.00	0.00
Curlfin Turbot	--	--	--	--	0.01	0.01	-	0.01	0.01
Flatfish Unid	--	--	--	--	--	--	-	-	-
Flathead Sole	--	0.01	0.01	--	0.00	0.00	-	0.01	0.01
Pacific Sanddab	0.00	0.01	0.01	--	0.00	0.00	0.00	0.01	0.01
Rex Sole	--	1.15	1.15	0.00	0.00	0.00	0.00	1.15	1.15

	2012			2013			2012-2013 Totals		
	Dis[2]	Land	Catch	Dis	Land	Catch	Dis	Land	Catch
Rock Sole	--	0.00	0.00	--	0.00	0.00	-	.00	0.00
Other groundfish	--	--	--	--	--	--	-	-	-
Big Skate	0.00	--	0.00	--	--	--	0.00	-	0.00
Skate Unid	--	0.12	0.12	--	--	--	-	0.12	0.12
Spotted Ratfish	0.16	0.04	0.21	--	--	--	0.16	0.0	0.21
Skate Unid	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Nongroundfish species	--	--	--	--	--	--	-	-	-
Protected/Prohibited Species	--	--	--				-	-	-
Dungeness Crab	0.07	--	0.07	0.00	0.00	0.00	0.07	0.00	0.07
Salmon	NA 1/	NA	NA	NA	NA	NA	NA	NA	NA
Pacific halibut	NA	NA	NA	NA	NA	NA	NA	NA	NA
CPS	NA	NA	NA	NA	NA	NA	NA	NA	NA
HMS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-FMP flatfish	--	--	--	--	--	--	-	-	-
Slender Sole	--	--	--	0.00	--	0.00	0.00	-	0.00
Non-FMP skate	--	--	--	--	--	--	-	-	-
Pacific Electric Ray	0.01	--	0.01	--	--	--	0.01	-	0.01
Grand Totals	0.49	216.15	216.64	0.02	209.31	209.33	0.51	425.46	425.97
Target Species	0.00	196.50	196.50	0.00	208.35	208.36	0.00	404.85	404.85
Non-Target Species	0.49	19.65	20.14	0.02	0.96	0.97	0.51	20.61	21.12
Proportion Target Species	0.06%	90.91%	90.70%	10.30%	99.54%	99.54%	0.44%	95.16%	95.04%

1/ NA means not available at this time

The state logbook data examined for this report were collected during 2000-2002. These were years in which directed fishing was allowed coastwide for the pelagic rockfish complex and the fishery was managed with relatively high trip limits (e.g., 30,000 pounds/2 months each for widow and yellowtail rockfish; PFMC 1999) compared to years between 2003 and 2010 when widow rockfish was declared overfished and the midwater fishery for widow and yellowtail rockfish was essentially closed. State logbooks which are required in the trawl fishery and completed by the vessel operators cannot be verified as to their accuracy of the species encountered or the precision of the estimated weights of fish captured and landed. The data do not show the species or amounts of fish that were discarded. Logbook data for the three states combined show a wide variety of non-target species in the pelagic rockfish fishery catch during 2000-2002 with the proportion of non-target species in the catch ranging from 2.6 percent to 6.0 percent annually and averaging 2.7 percent for all years combined (Table 3-7). The logbook data do not closely agree with the WCGOP data presented above with regard to the overall level of non-target species in the fishery: 53 percent target species and 47 percent non-target species. This is because logbook data only reflect landed catch with much of the non-target species being discarded and may or may not be recorded.For this reason state logbook data are not used in this EA because discarded catch is an important consideration with regard to potential impact of the Action Alternative compared to the No Action Alternative.

Table 3-7. Washington, Oregon, and California state logbook data on catch retained (mt) in midwater trawl trips targeting on pelagic rockfish, 2000-2002 seasons.

	2000		2001		2002		Total	
Category	**mt**	**Prop.**	**mt**	**Prop.**	**mt**	**Prop.**	**mt**	**Prop.**
OVERFISHED ROCKFISH								

	2000		2001		2002		Total	
Category	**mt**	**Prop.**	**mt**	**Prop.**	**mt**	**Prop.**	**mt**	**Prop.**
Bocaccio rockfish	0.948	0	1.345	0.001	2.033	0.003	4.327	0.001
Canary rockfish	2.823	0.001	1.693	0.001	1.092	0.002	5.609	0.001
Darkblotched rockfish	0	0	0.357	0	0.088	0	0.446	0
POP	0.139	0	0.006	0	0.006	0	0.151	0
Petrale sole	2.318	0.001	3.015	0.001	4.371	0.007	9.705	0.001
Yelloweye rockfish	0	0	0	0	0.005	0	0.005	0
OTHER GROUNDFISH								
Arrowtooth flounder	0.123	0	0.68	0	1.545	0.003	2.348	0
Bank rockfish	0.279	0	1.199	0	0.093	0	1.571	0
Black rockfish	0.006	0	0	0	0.008	0	0.014	0
Blackgill rockfish	0	0	0.455	0	0	0	0.455	0
Brown rockfish	0.075	0	0	0	0	0	0.075	0
Butter sole	0	0	0	0	0.02	0	0.02	0
Chilipepper rockfish	55.936	0.013	70.633	0.028	49.263	0.081	175.832	0.023
Copper rockfish	0.004	0	0	0	0	0	0.004	0
Cowcod rockfish	0.004	0	0	0	0	0	0.004	0
Curlfin sole	0.001	0	0.01	0	0.006	0	0.017	0
Dover sole	0.926	0	2.083	0.001	3.563	0.006	6.573	0.001
English sole	4.262	0.001	6.579	0.003	2.496	0.004	13.336	0.002
Flatfish, unid.	0	0	0.003	0	0	0	0.003	0
Flathead sole	0	0	0.023	0	0.054	0	0.078	0
Greenspotted rockfish	0.02	0	0	0	0.043	0	0.064	0
Greenstriped rockfish	0.073	0	0	0	0	0	0.073	0
Kelp greenling, unid.	0	0	0	0	0.001	0	0.001	0
Lingcod	1.155	0	1.162	0	1.792	0.003	4.109	0.001
Longspine thornyhead	0	0	0.216	0	0.088	0	0.303	0
Nearshore rockfish	0	0	0	0	0.049	0	0.049	0
Nor. Shelf rockfish, unid.	2.059	0	0.501	0	0.058	0	2.618	0
Nor. Slope rockfish, unid.	5.811	0.001	3.205	0.001	0.45	0.001	9.466	0.001
Pac. Cod	0.243	0	0.145	0	0.323	0.001	0.711	0
Pac. Sandab	0.008	0	0.014	0	0.014	0	0.035	0
Pac. Whiting	65.486	0.015	2.018	0.001	0	0	67.504	0.009
Red rockfish, unid.	0.024	0	0.029	0	0.01	0	0.064	0
Rex sole	0.024	0	0.59	0	0.168	0	0.782	0
Rock sole	0.019	0	0.076	0	0.024	0	0.118	0
Rockfish, unid.	0.236	0	0.27	0	0.009	0	0.515	0
Rosefish rockfish, unid.	0.8	0	0	0	0.161	0	0.96	0
Rosethorn rockfish	0	0	0	0	0	0	0	0
Sablefish	2.969	0.001	4.04	0.002	6.413	0.011	13.422	0.002
Sand sole	0.015	0	0.002	0	0.143	0	0.16	0
Sanddabs, unid.	3.167	0.001	0	0	0	0	3.167	0
Sanddabs, unid.	0	0	0.603	0	0.208	0	0.811	0
Shelf rockfish, unid.	0.491	0	0.574	0	0.997	0.002	2.062	0
Shortbelly rockfish	6.654	0.001	4.378	0.002	0	0	11.032	0.001
Shortspine thornyhead	0.004	0	0.014	0	0.031	0	0.049	0
Shortspine thornyhead	0.045	0	0.012	0	0.055	0	0.112	0
Skate, unid.	3.262	0.001	4.587	0.002	1.629	0.003	9.479	0.001
Slope rockfish, unid.	0.095	0	2.195	0.001	0.207	0	2.498	0
Small red rockfish, unid.	0.103	0	0.011	0	0	0	0.114	0

	2000		2001		2002		Total	
Category	**mt**	**Prop.**	**mt**	**Prop.**	**mt**	**Prop.**	**mt**	**Prop.**
Spiny dogfish	0.477	0	0.314	0	0.002	0	0.793	0
Splitnose rockfish	0	0	0.22	0	1.128	0.002	1.348	0
Starry flounder	0.002	0	0.085	0	0.028	0	0.115	0
Thornyhead, unid.	0	0	0.001	0	0	0	0.001	0
Vermillion rockfish	0	0	0.008	0	0	0	0.008	0
Yellowtail rockfish	1,696.70	0.382	1,181.37	0.47	345.821	0.568	3,223.89	0.426
Widow rockfish	2,570.06	0.579	1,212.51	0.482	176.878	0.291	3,959.45	0.524
Soupfin shark	0.007	0	0.029	0	0.012	0	0.048	0
NONGROUNDFISH								
Prohibited Species								
Dungeness crab	0	0	0.004	0	0	0	0.004	0
Salmon								
Pacific halibut								
Protected Species								
Green sturgeon	0	0	0.002	0	0	0	0.002	0
Other Nongroundfish								
Calif. Halibut	0	0	0.097	0	0	0	0.097	0
Chub mackerel	0.889	0	0	0	0	0	0.889	0
Common thresher shark	0.107	0	0	0	0	0	0.107	0
Jack mackerel	0.187	0	0	0	0	0	0.187	0
Mackerel, unid.	0	0	0	0	0	0	0	0
Market squid	0	0	0	0	0.002	0	0.002	0
Misc. fish	0	0	0	0	0.003	0	0.004	0
No code	7.929	0.002	7.463	0.003	6.584	0.011	21.976	0.003
Octopus, unid.	0	0	0.056	0	0.394	0.001	0.45	0
Shad, unid.	0.006	0	0	0	0	0	0.006	0
Shark, unid.	0	0	0.01	0	0.07	0	0.08	0
White croaker	0.005	0	0	0	0	0	0.005	0
Wolf eel	0	0	0	0	0.002	0	0.002	0
TARGET SPECIES	4,322.70	0.974	2,464.51	0.98	571.962	0.94	7,359.18	0.973
NON-TARGET SPECIES	114.284	0.026	50.379	0.02	36.479	0.06	201.143	0.027
TARGET SPECIES PROP.	0.03		0.02		0.06		0.03	

3.2.2.2.1. Non-target Groundfish

The Groundfish Harvest Specifications for 2013-2014 (PFMC 2012c) describe the species and stocks managed under the Groundfish FMP. This information is incorporated by reference and summarized below. More than 90 fish species are managed under the Groundfish FMP. The remaining discussion on Biological Resources is largely taken from PFMC 2012c. Presented below are only those species specifically associated with the Pacific whiting and pelagic rockfish complex fisheries.

Starting in 2011 groundfish have been managed with species specific IFQ, species complex IFQs, trip limits (for nonIFQ groundfish species and nongroundfish species), sector allocations and set-asides for specific fishery sectors. Each of these harvest management objectives has different levels of accountability (individual vs. trawl fleet vs. entire groundfish fishery). The risks of overfishing groundfish under the alternatives being considered in this EA are analyzed in Chapter 4.

3.2.2.2.1.1 *Overfished Groundfish Species*

All species of overfished groundfish are actively managed in all ocean management areas and fisheries where they occur, as explained below. They occur as bycatch in the Pacific whiting shorebased fishery as shown in Table 3-4 and in the pelagic rockfish fishery as shown in WCGOP data (Table 3-5).

Habitat preference and latitudinal and depth distributions vary between the species (NMFS 2005, Appendix I). Most overfished species are widely subject to whiting fishery interception due to the broad geographic distribution of the whiting fishery (in the area north of 40° 30´ N. latitude). The two overfished species exceptions to primary whiting fishery interception include bocaccio and cowcod rockfish, species that primary occur south of the primary whiting fishery fishing area. All six overfished groundfish species are subject to interception in the pelagic rockfish fishery, which historically has taken place as far north as Cape Flattery in Northern Washington to as far south as about Port San Luis in Central California (data provided by Ed Waters, Fishery Consultant).

The presence of overfished groundfish in whiting and pelagic rockfish fishery catches, though very small in comparison to associated target species catches, can be explained as off-bottom feeding, spawning, or redistribution movements of the fish subjecting them to midwater trawl net capture. Catches are likely exacerbated when trawling is conducted in close proximity to preferred rockfish habitats. Deep water fishing for whiting occurs because adult whiting school at depth during the day, then move to the surface and disband at night for feeding. Fishing near rocky habitat is the usual fishing strategy when targeting pelagic rockfish species, thus occurrences of overfished rockfish species in the catch can be expected because rockfishes, in general, orient to rocky habitats.

There are currently six overfished rockfish stocks (bocaccio south of 40º10’ N. latitude, canary rockfish, cowcod south of 40º10’ N. latitude, darkblotched rockfish, Pacific ocean perch, and yelloweye rockfish) and one overfished flatfish stock (petrale sole) managed under rebuilding plans. New assessments and rebuilding analyses for these overfished stocks do not indicate any need to modify existing rebuilding plans since all these analyses indicate progress towards rebuilding is on track and, in most cases, ahead of schedule (PFMC 2014a).

3.2.2.2.1.2 *Other Non-target Groundfish Species*

Other groundfish species (other than overfished groundfish) are frequently caught in the shorebased whiting fishery. Notable ones because of their relatively large tonnages include yellowtail rockfish, widow rockfish,

dogfish shark and, and to a lesser degree, sablefish (Table 3-4). WCGOP data from 2002-2011 collected in the nonwhiting midwater trawl fishery showed that three species or species groups made up 73 percent of the catch excluding widow rockfish, yellowtail rockfish and chilipepper rockfish: bank rockfish, Pacific whiting and unidentified rockfish (Table 3-5). Widow, yellowtail and chilipepper rockfish were excluded because these are the usual target species of the nonwhiting midwater trawl fishery as described in Section 3.2.1. Most of the whiting and unidentified rockfish were discarded but nearly all of the bank rockfish were retained (and may have been the target of the fishing).

Biological information is provided in sections 3.2.1.2 and 3.2.1.3 for widow rockfish and yellowtail rockfish, respectively. Biological information for spiny dogfish is provided below in Section 4.2.2.1.2. Information on bank rockfish follows:

Bank rockfish occur from central Baja California to Washington State. They are most abundant in waters from southern California to Oregon. Bank rockfish live at depths from 30 to 450 m. Adults prefer depths over 100 m. They have been described as mid-water rockfish that are found over hard bottoms, structured areas or along banks and ledges. They feed on planktonic organisms, small fish and krill. They are believed to live to be over 80 years of age (based on otolith sectioning). Spawning occurs from December through April, peaking in January and February. Bank rockfish length at 50 percent maturity have been estimated to be 31 cm (12.2 inches) and 34-36 cm (13.4-14.2 inches) for males and females, respectively (Piner, et al 2000).

Biological information for many of the other bycatch species identified in this report can be found on the Council web page at: www.pcouncil.org.

3.2.2.2.2. Pacific Halibut

Pacific halibut (*Hippoglossus stenolepis*) belong to a family of flounders called Pleuronectidae. Pacific halibut are managed by the bilateral (U.S./Canada) International IPHC with implementing regulations set by Canada and the U.S. in their own waters. The Pacific Halibut Catch Sharing Plan for waters off Washington, Oregon, and California (Area 2A) specifies IPHC management measures for Pacific halibut on the west coast. Pacific halibut mortality in the groundfish trawl fishery is managed with individual bycatch quotas (IBQ). Pacific halibut are occasionally caught in the at-sea whiting fisheries as shown in at-sea fishery samples (Table 3-4). None was estimated caught in WCGOP sampling in the pelagic rockfish fishery conducted during 2002-2011 (Table 3-5).

3.2.2.2.3. Coastal Pelagic Species (CPS)

CPS (Pacific sardine, Pacific mackerel, jack mackerel, northern anchovy, and market squid) are taken incidentally in the groundfish fishery and are believed to be most vulnerable to midwater trawl gear compared to other groundfish gear types because of their off bottom schooling behavior. An average of 18 mt and 62 mt of CPS was estimated caught in the shorebased whiting fishery annually during 2007-2010 and 2011-2013, respectively (Table 3-4). Nearly all (80 or 97 percent depending on time period) of the CPS catch was of jack mackerel. Small amounts (<0.16 mt) of CPS were observed caught in the nonwhiting midwater trawl fishery during 2002-2011 (Table 3-5). None was reported caught in 2012-2013 samples, but those data are incomplete at this time (Table 3-6).

3.2.2.2.4. Highly Migratory Species and Salmon

Several species of HMS were recorded in 2007-2013 shorebased whiting catches (Table 3-4). During 2007-2013 they collectively averaged about 2.1 mt per year compared to an average annual whiting catch during the same period of 84,466 mt. Several species of salmonids were encountered in the aforementioned shorebased whiting catches. They weighed a total of about 57 mt for the seven years combined; Chinook salmon was by far the most abundant species in the catch (Table 3-4). About 220 pounds of Chinook salmon and one or two coho salmon (5 pounds) were observed caught and discarded in the WCGOP data (Table 3-5). The major concern with salmon intercepts has to do with listed species impacts, which are discussed below. Salmon (Chinook and coho) but no HMS were observed in nonwhiting onboard observation samples during 2002-2011 (Table 3-5). Neither HMS nor salmon have been reported in 2012-2013 nonwhiting fishery midwater trawl fishery trips, but those data are incomplete at this time (Table 3-6), however, there was an uptick in salmon bycatch in the 2014 nonwhiting fishery midwater trawl fishery as will be shown in Section 4.2.2.4.

3.2.2.2.5. Misc. nongroundfish

A wide variety of nongroundfish species have been recorded in shorebased whiting fishery and pelagic rockfish fishery catches (see Table 3-4, Table 3-5).

3.2.2.2.6. Forage Fish Species

These are lower trophic level species that are preyed upon by higher level species such as most groundfish species, including Pacific whiting. Potential forage fish species are discussed in Section 4.2.2.5.1. The only potential forage fish species in 2007-2013 shorebased whiting fishery catches was eulachon (an endangered species) which totaled about 0.085 mt (187 lbs) for all years combined (Table 3-4). The shorebased whiting fishery catch during these same years totaled about 480,000 mt.

3.2.3 Marine Mammals and Seabirds, including ESA, MMPA, and MBTA Protected Species

3.2.3.1 *Marine Mammals (PFMC 2012c)*

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. One of eight ESA-listed marine mammal species that occur in the Council area have a higher probability of encounter in groundfish fisheries: humpback whales (endangered) and stellar sea lions (threatened). Until recently, Stellar sea lions were an ESA listed species. On November 4, 2013, NOAA Fisheries published the final rule removing the eastern DPS of Steller sea lions from the List of Endangered and Threatened Wildlife under the ESA (78 FR 66140). The delisting became effective as of December 4, 2013. Eastern Steller sea lions remain protected under the MMPA.

Among the catches of marine mammal in groundfish trawl fisheries, bycatch estimates have been highest for California sea lions, which were caught primarily in trawl nets in the limited entry trawl (bottom and whiting). The next highest were Steller sea lions which were also caught in the limited entry trawl (bottom trawl and whiting) and California halibut trawl fisheries. Stellar sea lions taken on the west coast are

believed to be primarily from the eastern stock (east of 140° W. longitude). The majority of elephant seals that were caught were taken in the at-sea whiting fisheries.

NMFS prepared a Biological Opinion in 1990 that concluded the groundfish fisheries are not likely to jeopardize the continued existence of listed marine mammals. The 1990 consultation was reinitiated and a new Biological Opinion was prepared in 2012 for the 2012 fishery. The 2012 Biological Opinion concluded that the continued existence of humpback whales and Steller sea lions would not be jeopardized by the 2012 groundfish fishery. NMFS (2012c) further concludes that the Pacific Coast groundfish fishery is not likely to adversely affect sei whales, North Pacific right whales, blue whales, fin whales, sperm whales, southern resident killer whales (SRKW), or Guadalupe fur seals.

3.2.3.2 *Seabirds (PFMC 2012c)*

The California current system supports a diverse array of seabird species. Species found on the Pacific Coast include resident species and transitory species (migrating or foraging). All the California Current system seabirds are highly mobile and require an abundant food source to support their high metabolic rates. A total of 10 species or species groups of seabird interactions with the groundfish fishery were documented during 2002-2009. The at-sea whiting fishery interactions were with blackfooted albatross (0-3 per year), common murre (0-3 per year), northern fulmar (0 to about 50 per year), sooty shearwater (0-8 per year), unspecified tubenose species (0-6 per year) and unspecified alcid species (0-3 per year).

Two of the seabird species with documented interactions with the Pacific Coast groundfish fishery (short-tailed albatross and marbled murlette) are listed under the ESA. The California least tern (Sterna antillarum browni), which is found on the Pacific Coast, is also listed under the ESA. California least terns forage primarily in nearshore ocean waters and in shallow estuaries and lagoons, although some adults also feed close to shore in ocean waters. Fisheries are unlikely to impact California least tern populations directly through bycatch of individuals, and there have been no reported lethal takes of California least tern in west coast groundfish fisheries.

Short-tailed albatrosses (*Phoebastria albatrus*) are large, pelagic seabirds with long narrow wings adapted for soaring just above the water surface. Short-tailed albatross forage extensively along continental shelf margins, spending the majority of time within national EEZs, particularly the U.S. off Alaska, Russia, and Japan, rather than over international waters (Suryan, et al. 2007a; Suryan, et al. 2007b). Juveniles and sub-adults are prevalent off the west coasts of Canada and the U.S. (Environment Canada 2008). Short-tailed albatross may also interact with trawl fisheries. Seabirds, including other albatrosses, fly behind vessels or float in offal plumes that trail beyond vessels, where they can strike the trawl cables (warps) or the sonar cable (third wire) attached to the net (NMFS 2006), or become entangled on the outside of nets towed at or near the surface; those striking cables are very unlikely to show up on the vessels deck to be sampled (USFWS 2008).

The marbled murrelet is a small seabird. In the Pacific Northwest and California, murrelets tend to forage within 2 km of the coast during the breeding season, with somewhat greater dispersal during the non-breeding season. The WCGOP reported single interactions with marbled murrelets in 2001 and 2002 in northern California. Both of these occurred in the limited entry trawl sector, and were reported as “boarded vessel only” (Jannot, et al. 2011).

3.2.3.3 *Protected Species*

A variety of species are protected by Federal law (other than the MSA) with the objective of sustaining or rebuilding their populations from depleted levels. The applicability of these laws to this action is described in Chapter 5 Section 3.3 of the 2011-2012 Groundfish Harvest Specifications Final EIS (PFMC 2011e) and Section 3.18 and 3.19 of the Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery Final EIS (PFMC 2010). Those documents describe the protected species that are occasionally taken in groundfish fisheries in the action area. This information is incorporated by reference and summarized here.

3.2.3.3.1. ESA-listed Salmon and Steelhead

Salmon caught in West Coast groundfish fisheries originate in fresh water streams and rivers from Central California to Alaska. NMFS has identified eight evolutionarily significant units (ESUs)[3] that are most likely to be caught in the groundfish fisheries. Those ESUs range geographically from the Sacramento River to Puget Sound and are subject to the 2006 consultation (Table 3-8).

[3] An ESU, or evolutionarily significant unit, is a Pacific salmon population or group of populations that is substantially reproductively isolated from other conspecific populations and that represents an important component of the evolutionary legacy of the species. The ESU policy (56 FR 58612) for Pacific salmon defines the criteria for identifying a Pacific salmon population as a DPS, which can be listed under the ESA." Source: http://www.nmfs.noaa.gov/pr/glossary.htm#esu

Table 3-8. Endangered Species Act Status of West Coast salmon and steelhead (highlighted ESUs are those subject to the 2006 consultation).

Species	**ESU**	**Status**
Sockeye	Snake rive	Endangered
	Ozette Lake	Threatened
Chinook	**Sacramento River Winter-run**	Endangered
	Upper Columbia River Spring-run	Endangered
	Snake River Spring/Summer -run	Threatened
	Snake River Fall-run	Threatened
	Puget Sound	Threatened
	Lower Columbia River	Threatened
	Upper Willamette River	Threatened
	Central Valley Spring-run	Threatened
	California Coastal	Threatened
	Central Valley Fall and Late Fall-run	Species of Concern
Coho	Central California Coast	Endangered
	Southern Oregon/Northern California	Threatened
	Lower Columbia River	Threatened
	Oregon Coast	Threatened
	Puget Sound/Strait of Georgia	Species of Concern
Chum	Hood Canal Summer-run	Threatened
	Columbia River	Threatened
Steelhead	Southern California	Endangered
	Upper Columbia River	Threatened
	Central California Coast	Threatened
	South Central California Coast	Threatened
	Snake River Basin	Threatened
	Lower Columbia River	Threatened
	California Central Valley	Threatened
	Upper Willamette River	Threatened
	Middle Columbia River	Threatened
	Northern California	Threatened
	Puget Sound	Threatened
	Oregon Coast	Species of Concern

Chinook salmon have been the primary salmonid species impacted in West Coast trawl fisheries, including the directed whiting midwater trawl fishery, by over 90 percent for trawl fisheries in combination (Table 3-9).

Table 3-9. Estimated bycatch of salmon (no. of fish) in all U.S. west coast fisheries observed by the West Coast Groundfish Observer Program (WCGOP) and the At-Sea Hake Observer Program (A-SHOP) from 2002-2010, as well as salmon bycatch in shoreside Pacific whiting sectors.

	Non-whiting	Whiting sectors	Total	Percent
Chinook	37,466	51,620	89,086	91%
Chum	51	735	786	1%
Coho	338	1,688	2,026	2%
Pink	2	4,982	4,984	5%
Sockeye	0	4	4	0%
Unspecified	178	351	529	1%
Total	38,037	59,380	97,417	100%
Percent	39%	61%	100%	

Chinook salmon are also called king, spring, or tyee salmon, and are the largest of the Pacific salmon. Chinook salmon are highly prized by commercial, sport, and subsistence fishers. Like all Pacific salmon, Chinook are anadromous, which means they hatch in freshwater streams and rivers, migrate to the ocean for feeding and growth, and return to their natal waters to spawn. Within this life history, Chinook can be very diverse. Their spawning environments range from just above tidewater to over 3,200 kilometers from the ocean. The natural range of Chinook in North America ranges from the Ventura River in California to Kotzebue Sound in Alaska. They also appear in Asia, from northern Japan to the Anadyr River in Russia (about 64 degrees N. latitude). In the ocean, Chinook from Washington, Oregon and California range widely throughout the Pacific Ocean and the Bering Sea, and as far south as the U.S. border with Mexico. Wild Chinook populations have disappeared from large areas where they used to flourish, and several ESUs have been listed or proposed for listing as at risk for extinction under the Endangered Species Act (ESA, http://www.pcouncil.org/salmon/background/).

Al-Humaidhi, et al (2012) has analyzed Chinook salmon catches in the West Coast bottom trawl fishery by area, season and depth. They found that highest catch rate, based on number of fish per metric ton of groundfish, was in the ocean area north of Cape Falcon, during winter months over summer months, and in depth between 0 and 125 fathoms (Table 3-10).

Table 3-10. Average bycatch rate (no. fish / mt of observed groundfish) of Chinook salmon in the groundfish bottom trawl fishery by area, season, and depth (fathoms), 2006-2010. (Source: Al-Humaidhi, et al. 2012, Table 1)

Area		Season		Depth	
North of Cape Falcon	0.037	winter	0.028	0-125	0.0361
Cape Falcon - Cape Blanco	0.007	summer	0.005	125-250	0.0130
Cape Blanco - Cape Mendocino	0.007			> 250	0
South of Cape Mendocino	0.015				

NMFS first consulted under the ESA on the effects of the fishery on listed salmonids in 1990 and reinitiated consultation several times thereafter. The 2006 biological opinion covers certain Chinook salmon ESUs

most likely to be affected by the fishery, as listed in Table 3-8 (highlighted)[4]. Although other salmon and steelhead species are taken in the fishery, consultations before 2006 determined that the amounts were limited such that further consultation was unnecessary.

The incidental take statement in a 1999 biological opinion identified an expected level of take of 11,000 Chinook salmon per year for the Pacific whiting fishery and 9,000 Chinook salmon for the bottom trawl fishery. Bycatch of other salmonid species is modest so no specified threshold was established for any other salmonid. Consultation under Section 7 of the ESA was reinitiated in 2006, because take exceeded these estimates in 2005 for the whiting fishery and two out of three years between 2002 and 2004 for the bottom trawl groundfish fishery. This resulted in the 2006 supplemental biological opinion evaluating whether additional mitigation measures were needed to prevent the activity from jeopardizing the continued existence of the species (NMFS 2006).

Shorebased Whiting Fishery. Chinook salmon was the predominant salmonid caught in the shorebased whiting fishery during 2007-2013 (Table 3-4). The Chinook salmon catch in the shorebased whiting fishery during these years totaled about 43 mt for all years combined. Salmon bycatch rates tend to be higher closer to shore and earlier in the season. (This may explain the higher bycatch rate for the tribal mothership sector since these vessels fish within the tribal usual and accustomed areas, and have less flexibility to make spatial adjustments in response to salmon bycatch (PFMC 2014b).) The shorebased sector, for cost and operational reasons, tends to fish closer to shore. However, no such factors adequately account for inter-annual variation in bycatch. Previous work found no "obvious or consistent correlation" between annual Chinook abundance and bycatch. Ocean conditions may play a role, but specific causative factors, at least any that can be used predicatively, have not been identified (ibid).

The salmonid take in the pelagic rockfish fishery in years since 2003 has been very low or nil because the directed fishery has been all but closed due to fishery constraints aimed at protecting widow rockfish. The WCGOP data collected during 2003-2011 showed a total Chinook salmon catch of 0.1 mt (220 lbs) compared to a total pelagic rockfish species complex catch of 195.5 mt (Table 3-5).

Nonwhiting Midwater Trawl Fishery. Targeting of pelagic rockfish and other off bottom schooling groundfish using midwater gear has the potential to increase impacts to salmonid species over annual catches seen in recent years, which are prohibited from retention, and ESA-listed salmonids, which are protected. This would occur stemming from increased ACLs for target species or non-target species, such as overfished groundfish, that might be constraining the catch. Now that widow rockfish has been rebuilt, increase catches of that species can be expected in future years. There would likely be an increase in salmon encounters associated with increase widow rockfish catch. The amount of increase, if any, will depend on a variety of factors. These include, but are not limited to: the amount of pelagic rockfish that are allowed to be harvested, any offset in salmonids harvested in other fisheries due to effort shift to the pelagic rockfish fishery, availability of salmonids to pelagic fishery intercept, and the year(s) used for comparison. In the future the total catch of Chinook salmon is likely to be closer to what it was in years prior to 2003 when the directed fishery was fully engaged, particularly in the area north of 40° 10' N. latitude. No data exists on the level of salmon catch that occurred in nonwhiting midwater trawl fishery in years prior to 2003 because

any salmon that was encountered had to be released back into the sea (a prohibited species) and the observer program did not start until late in 2002.

3.2.3.3.2. Green Sturgeon

Sturgeons are among the largest and most ancient of ray finned fishes. Sturgeons are highly adapted for preying on bottom animals, which they detect with barbels on the underside of their snouts. Sturgeons are confined to temperate waters of the Northern Hemisphere. Two of 25 extant species of sturgeon live on the Pacific Coast: the green sturgeon and the white sturgeon. There are several (subtle) physical differences between the two species. Green sturgeon can reach 8.85 feet (270 cm) in length and weigh up to 385pounds (175 kg) (Moyle 2002).

Sturgeons live a long time, delay maturation to large sizes, and spawn multiple times over their lifespan. Green sturgeon are known to occur from Mexico to the Bering Sea, with marine waters from Monterey Bay to Vancouver Island recognized as the main migratory corridor for the species (NMFS 2009).The widespread ocean distribution of green sturgeon ensures that most of the population at any given time is dispersed among areas where they are not vulnerable to catastrophic losses. At least two populations of green sturgeon have been identified, based on genetic analyses and spawning site fidelity (Adams et al. 2002, Israel et al. 2004): a northern distinct population segment (Northern DPS) consisting of populations originating from coastal watersheds north of and including the Eel River; and a southern distinct population segment (Southern DPS) consisting of populations originating from coastal watersheds south of the Eel River. The Southern DPS of North American green sturgeon was listed as threatened under the ESA in 2006 (71 FR 17757), and critical habitat was designated in 2009 (74 FR 52300). Southern DPS green sturgeon migrate up the Sacramento River between late February and late July. The spawning period is March–July, with a peak from May to June (Poytress et al. 2009). Spawning takes place in deep, fast water (Emmett et al. 1991, Moyle et al. 1995, Poytress et al. 2009). Green sturgeon reach maturity at about 14-16 years of age for males and 16-20 years of age for females (based on studies on Klamath River fish) (Van Eenennaam et al. 2006) and are believed to spawn every 2-5 years (Erickson and Webb 2007).

The maximum ages for the species is probably in range of 60–70 years or more. Outside of their natal waters, adult and subadult green sturgeon inhabit coastal marine waters from the Bering Sea to southern California, primarily occupying waters within 110 m depth (Erickson and Hightower 2007). Both Northern DPS and Southern DPS fish form mixed aggregations in coastal estuaries in California (Humboldt Bay), Oregon (Coos Bay, Winchester Bay), the Columbia River estuary, and Washington (Willapa Bay, Grays Harbor) in the spring to late summer months (Israel et al. 2004; Moser and Lindley 2007; Lindley et al. 2008, 2011).. Adults and subadults feed in estuaries during the summer ona wide variety of small bottom dwelling invertebrates and fish (Ganssle 1966, Moser and Lindley 2007, Dumbauld et al. 2008). Whether green sturgeon feed while in marine waters is unknown; if they do, they most likely feed on prey similar to those fed upon in estuaries.

White sturgeon were observed in shorebased whiting catches during 2007-2013 but no green sturgeon (Table 3-4). A small amount of green sturgeon (0.002 mt about 4 lbs) was reported caught in one year in the logbook data discussed above (Table 3-7). This entry is suspect for it accuracy because it is not easy to differentiate between green sturgeon and white sturgeon, particularly young/small sized individuals. Based

on directed whiting fishery data, and assuming/accepting the fish was a sturgeon, the logbook entry was more likely a white sturgeon than a green sturgeon. The NMFS biological opinion (2012) has determined that the continued operation of the Pacific Coast Groundfish Fishery is likely to adversely affect green sturgeon or their critical habitat. However, it is not likely to jeopardize the species nor destroy or adversely modify crucial habitat.

3.2.3.3.3. Eulachon

Eulachon is listed as threatened under the ESA. Eulachon are found in the eastern North Pacific Ocean from northern California to southwest Alaska and into the southeastern Bering Sea. The southern DPS of eulachon was listed as threatened under the ESA in 2010 (75 FR 13012). The eulachon southern DPS is defined from the Mad River in northern California north to the Skeena River in British Columbia.

Eulachon is an anadromous smelt. Adults migrate from the ocean to freshwater creeks and rivers where they spawn from late winter through early summer. The offspring hatch and migrate back to the ocean to forage until maturity. Once juvenile eulachon enter the ocean, they move from shallow nearshore areas to deeper areas over the continental shelf. There is little information available about eulachon movements in nearshore marine areas and the open ocean. Eulachon are incidentally caught in the groundfish trawl fisheries (Table 3-11). The depth distribution of observed tows encountering eulachon bycatch from 2002-2010 indicates that 86 percent of such tows, as well as 86 percent of the eulachon encountered, were in the depth range of 60-90 fm. The shallowest observed tow that encountered eulachon was at 19.5 fm and the deepest observed tow was at 118.5 fm (Al-Humaidhi, et al. 2011).

Table 3-11. Eulachon catch estimates by fishery 2002-2011.

Year	Bycatch estimate by fishery (number of fish) [a/b/]		
	LE trawl[/]	At-sea whiting (mothership and catcher/processor)	Tribal Whiting
2002	821	0	0
2003	52	0	0
2004	5	0	0
2005	0	0	1
2006	0	145	0
2007	72	10	0
2008	0	43	0
2009	67	36	32
2010	21	0	0
2011	not yet available	1,322	160

a/ Point estimates of bycatch fluctuate due to a number of non-biological factors, including annual variation in observer coverage rates, fishing behavior, and various physical characteristics. Estimates of observer data uncertainty are presented the form of confidence intervals around bycatch estimates.
b/ Does not include data representing catch in the shorebased whiting fishery c/ Includes all LE trawl not just those vessels targeting whiting

The most recent risk assessment for the eulachon southern DPS can be found at: https://pcts.nmfs.noaa.gov/pcts-web/dispatcher/trackable/NWR-2012-9437?overrideUserGroup=PUBLIC&referer=%2fpcts-web%2fpublicAdvancedQuery.pcts%3fsearchAction%3dSESSION_SEARCH.

The NMFS biological opinion (2012) has determined that the continued operation of the Pacific Coast Groundfish Fishery is likely to adversely affect eulachon or their critical habitat. However, it is not likely to jeopardize the species nor destroy or adversely modify crucial habitat.

3.3 Socioeconomic Environment

Section 3.2 in the 2013-14 Groundfish Harvest Specifications Final EIS (PFMC 2012c) describes commercial fisheries targeting groundfish and characterizes west coast fishing communities with respect to groundfish fisheries. That information is a useful resource upon which the draft 2015-16 Groundfish Harvest Specifications EIS (Draft 2015-16 Specs) (PFMC 2014b) is based. The 2014 Groundfish SAFE document (PFMC 2014a) contains a series of tables summarizing landings and ex-vessel revenue in groundfish fisheries, landings and revenue by port, and indicators of fishery participation. These data are summarized in the Draft 2015-16 Specs to highlight current fishery trends. Long-term historical landings, revenue, and price data (the full PacFIN database time series) and a recent a 10-year baseline period of 2003-2012 are used in the Draft 2015-16 Specs to characterize fisheries and communities**.**

3.3.1 Harvest Sector

The reader is referred to the Draft 2015-16 Specs document for information on revenue trends for commercial groundfish fisheries overall. That document is hereby incorporated, by reference, into this EA. The emphasis here is on the shorebased sector of the West Coast whiting fishery, which is briefly analyzed for revenue trends in the Draft 2015-16 Specs EIS. Additional data on the shorebased whiting fishery for the tribal and non-tribal components combined follow.

3.3.1.1 *Directed Whiting Fishery*

Harvest and revenue in the shorebased whiting fishery increased steeply in 1991 the year following cessation of the domestic joint venture fishery, which delivered to offshore processing vessels. The fishery further expanded in 1992 (Table 3-12). From 1991-2012 the fishery averaged 75,015 mt of fish worth an average of $10.6 million dollars (adjusted for inflation) in ex-vessel revenues. Both of these statistics have been highly variable over the years, as shown in Figure 3-9. These wide ranges in value have been due to the highly variable recruitment nature of the resource in combination with highly variable price paid for the fish as shown in Figure 3-10. That figure shows a range in price from $2.70 per metric ton to $13.68 per metric ton, averaging $7.89 per metric ton during the period 1981-2012.

Table 3-12. Shorebased whiting landings (non-tribal and tribal combined) by weight (mt), revenues ($1,000's adjusted to 2012 dollars) and ex-vessel price per mt of whiting, 1981-2012.

Year	Weight	Revenues	$000s/mt
1981	839	$311	$2.70
1982	1,027	$377	$2.72
1983	1,051	$376	$2.80
1984	2,721	$781	$3.48
1985	3,894	$1,067	$3.65
1986	3,465	$830	$4.17
1987	4,795	$1,184	$4.05

Year	Weight	Revenues	$000s/mt
1988	6,868	$1,933	$3.55
1989	7,414	$1,753	$4.23
1990	9,633	$2,335	$4.13
1991	23,970	$5,986	$4.00
1992	56,128	$8,931	$6.28
1993	42,108	$4,295	$9.80
1994	73,617	$7,278	$10.12
1995	74,963	$11,119	$6.74
1996	85,129	$7,156	$11.90
1997	87,417	$11,131	$7.85
1998	87,857	$6,423	$13.68
1999	83,471	$9,088	$9.18
2000	85,855	$9,907	$8.67
2001	73,412	$6,632	$11.07
2002	45,708	$5,465	$8.36
2003	55,336	$6,487	$8.53
2004	96,504	$8,800	$10.97
2005	109,053	$13,814	$7.89
2006	127,166	$17,776	$7.15
2007	91,442	$15,216	$6.01
2008	67,761	$16,114	$4.21
2009	49,223	$6,652	$7.40
2010	64,654	$10,328	$6.26
2011	103,190	$24,137	$4.28
2012	66,369	$20,499	$3.24
2013	96,504	$26,174	$3.69

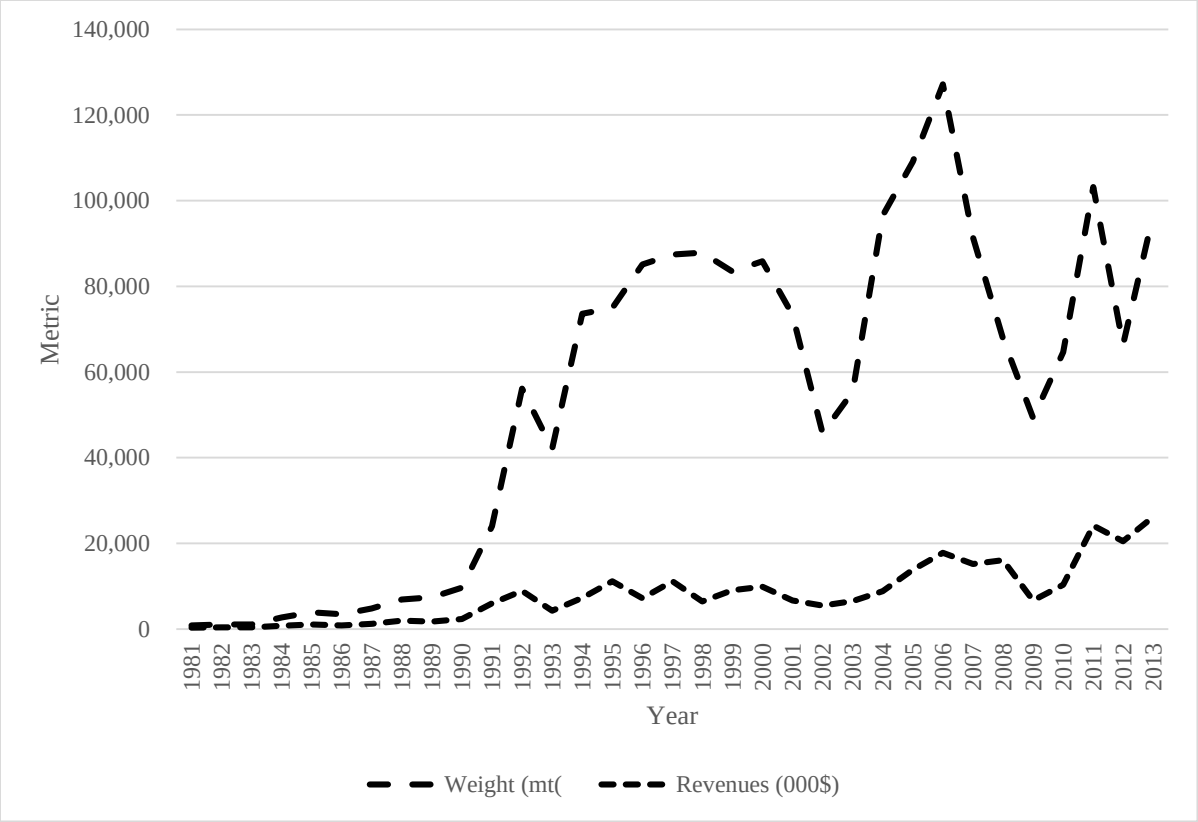

Figure 3-9. Annual shorebased whiting landings on metric tons and ex-vessel revenues (000$s) in 2012 dollars (tribal and non-tribal combined), 1981-2013.

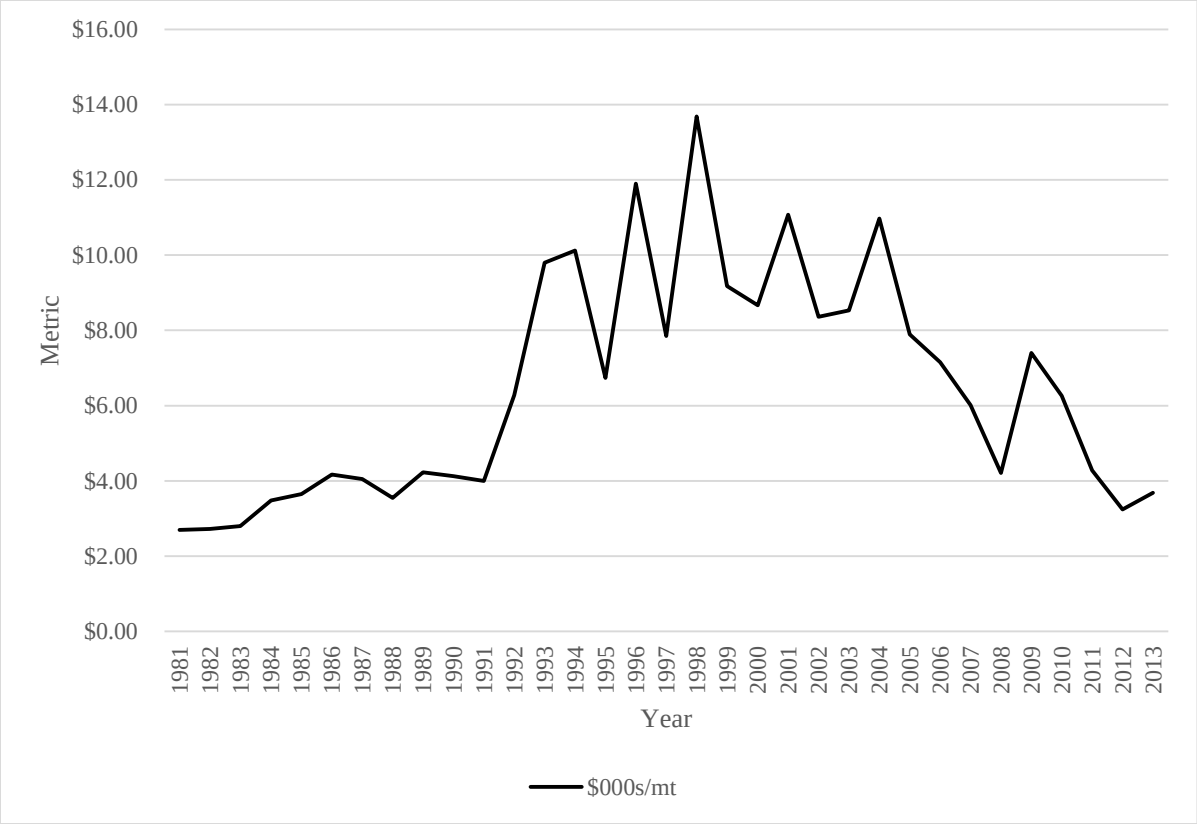

Figure 3-10. Ex-vessel price in 2012 dollars (000s) per mt of whiting delivered shoreside by year, 1981-2013.

Before 2011, the shorebased trawl fishery was composed of two separately managed sectors: a seasonal fishery targeting Pacific whiting with midwater trawl gear, and a year-round bottom and midwater trawl sector targeting other groundfish species. With the implementation of trawl rationalization (Amendment 20) these two fisheries were merged beginning in 2011 in terms of management through a single combined IFQ program. IFQs (percent of the trawl sector allocation) are converted annually to QP that may be traded among licensed groundfish trawl vessels. In the first three years of the IFQ program (2011, 2012, 2013) QS could not be transferred (although QP could be traded). QS trading for all species except for widow rockfish began at the start of 2014. Widow QS trading will commence with the completion and implementation (if a widow QS reallocation action alternative is selected) of a widow QS reallocation decision that the Council is currently considering.

Although the whiting and nonwhiting fisheries are considered a single sector from a management perspective, the two fisheries continue to be operationally distinct. With implementation of the IFQ program the whiting season opening dates were maintained, but midwater targeting of nonwhiting species (primarily pelagic rockfish) is also allowed during these openings. The bottom trawl fishery uses a different gear and has a variety of targets and strategies. The two fisheries also have different seasonal harvest strategies with spring openings for the whiting fishery (and associated opening for nonwhiting midwater trawl fishing) and year-round fishing opportunities for the bottom trawl fishery.

By regulation, the whiting fishery during the early years of the domestic fishery began on April 1 and continued to the end of the calendar year or when the HG was met; the fishery was started on April 1 (as opposed to January 1) to reduce the incidental take of ESA-listed salmon species, although the season opening corresponds somewhat with the availability of Pacific whiting off the west coast. The bottom trawl fishery, on the other hand, operated year-round under a trip limit management system, although there were particular seasonal strategies depending on the species being targeted.

Prior to IFQ program implementation in 2011, the shorebased directed whiting fishery was managed with a fishery quota and closure upon quota attainment or December 31. In these prior years and continuing under the IFQ program an incidental catch and retention allowance was in place for all West Coast vessels (permitted and nonpermitted vessels) incidentally catching whiting while targeting other species of fish. Prior to the start of the season there were trip limit allowances to allow very low levels of harvest, partially to accommodate whiting bycatch in nonwhiting fisheries. Since 1997, the fishery has started in northern California on April 1 (week 14) and off Oregon and Washington on June 15 (week 24). The major landings were in the northern area between weeks 24 and 34 as shown in weekly landings during 2006-2010 (Figure 3-11).

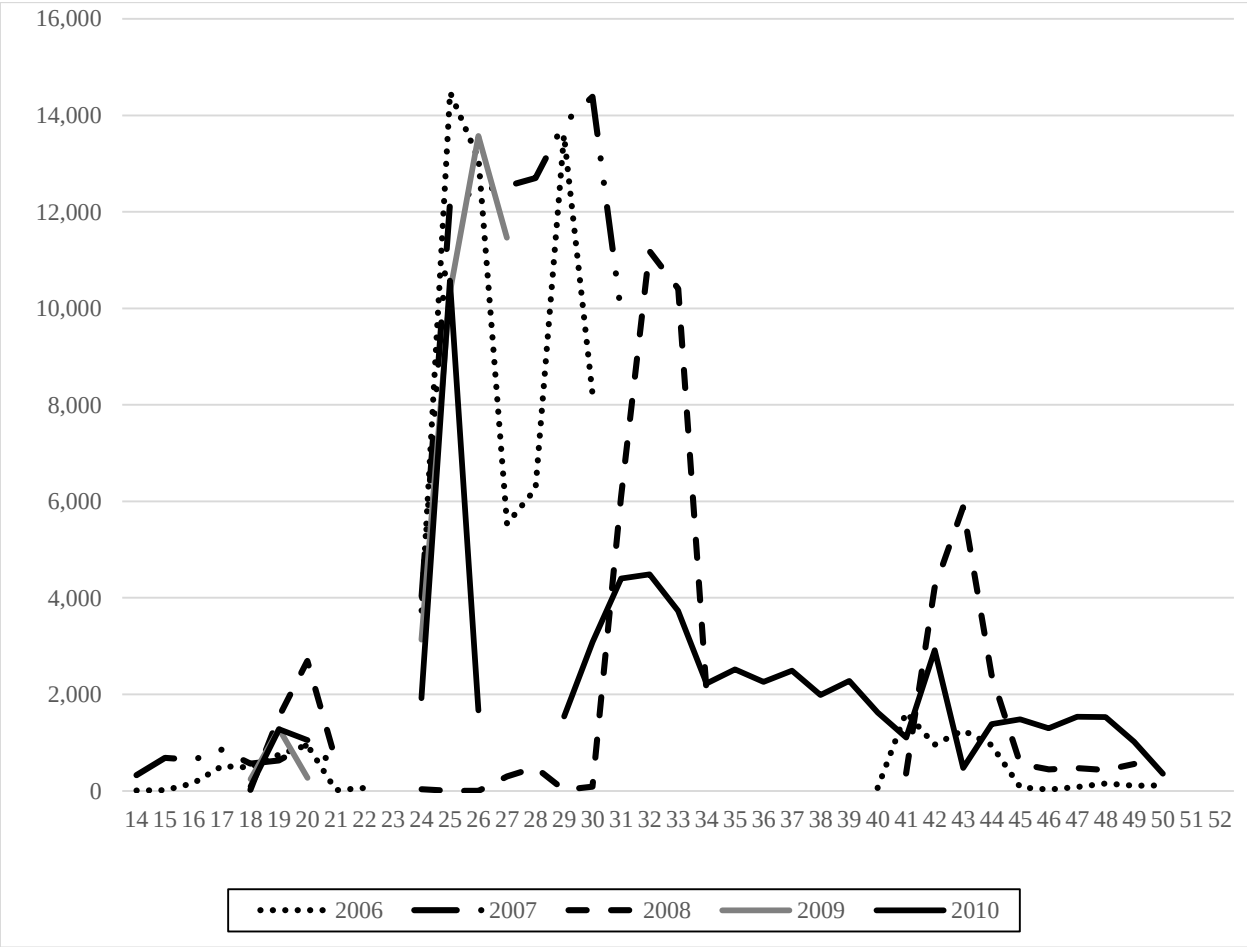

Figure 3-11. Total weight (mt) of Pacific whiting landed by week in the shorebased directed whiting fishery, 2006-2010 (prior to IFQ implementation).

The IFQ program has changed the fishery landings pattern by extending them over a longer period of time, generally, from week 24 through week 46. Also, there have been no early season landings in northern California (Table 3-12).

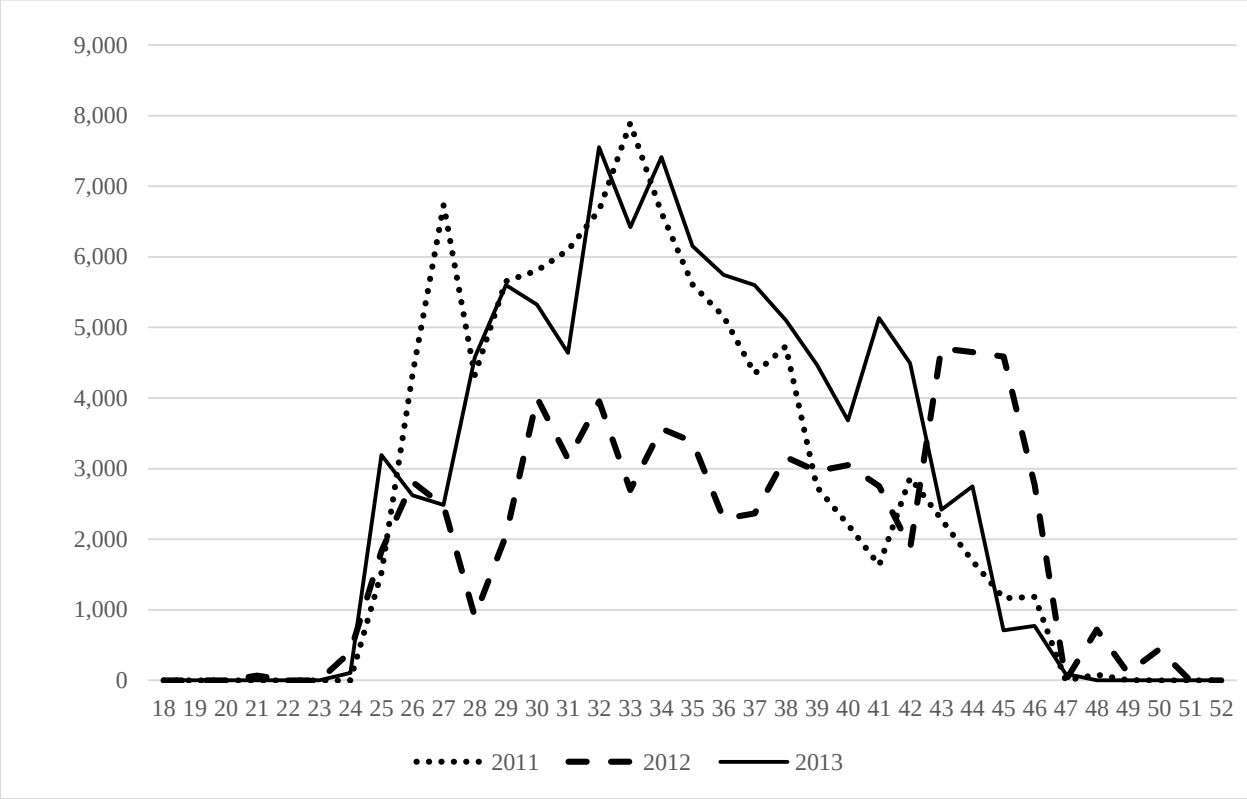

Figure 3-12. Total weight (mt) of Pacific whiting landed by week in the shorebased directed whiting fishery, 2011-2013 (post IFQ implementation).

The numbers of vessels that made at least one shorebased whiting landing during 2005-2011 are shown in Figure 3-13. The data show a range in vessels of from 26 to 39 and an average of 34. The relatively low number of vessels that participated in the fishery in 2011, which was the first year of the Trawl Rationalization Program, was likely due to consolidation of QP among vessels with the aim of decreasing overall operating costs to make the harvest.

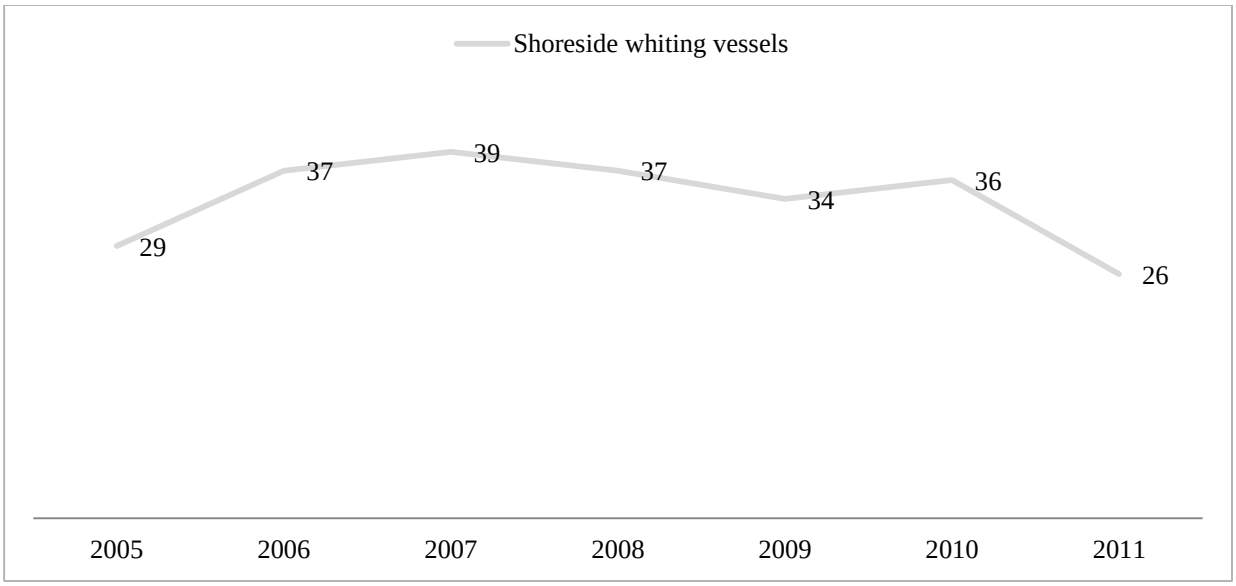

Figure 3-13. Number of vessels making at least one shorebased whiting landing in the Council area during 2005-2011

The numbers of catcher vessels that participated in at-sea and shorebased directed whiting fisheries during 2005-2011 are shown in Table 3-13. The table shows that between 7 and 15 vessels delivered whiting to at-sea motherships and also participated in the shorebased whiting fishery. Generally about 20 to 25 vessels participated only in the shorebased fishery but this number dropped to just 13 with implementation of the trawl rationalization program. This table does not enumerate the number of motherships that received whiting from catcher vessels during the base years. In 2011, the first year of the trawl rationalization program, there were 5 motherships active in the fishery (PFMC 2012c).

Table 3-13. Counts of vessels participating in groundfish fishery sectors: 2005-2011 (PFMC 2012c).

Whiting Fishery Sector	2005	2006	2007	2008	2009	2010	2011
Catcher/Processors	6	9	9	8	6	7	9
Mothership whiting CVs	17	20	20	19	19	22	18
Shorebased whiting CVs	29	37	39	37	34	36	26
Vessels participating in both shorebased and at-sea whiting fisheries	7	12	15	13	13	15	13

Figure 3-14 presents estimates of the breakdown in costs for the 2011 shorebased whiting fishery provided by the Economic Data Collection (EDC) program of the Northwest Fisheries Science Center, which was created to monitor the economic effects of the 2011 transition of the West Coast groundfish trawl fishery to a catch share (IFQs, co-ops) program (trawl rationalization program) (http://www.nwfsc.noaa.gov/research/divisions/fram/economic/overview.cfm).

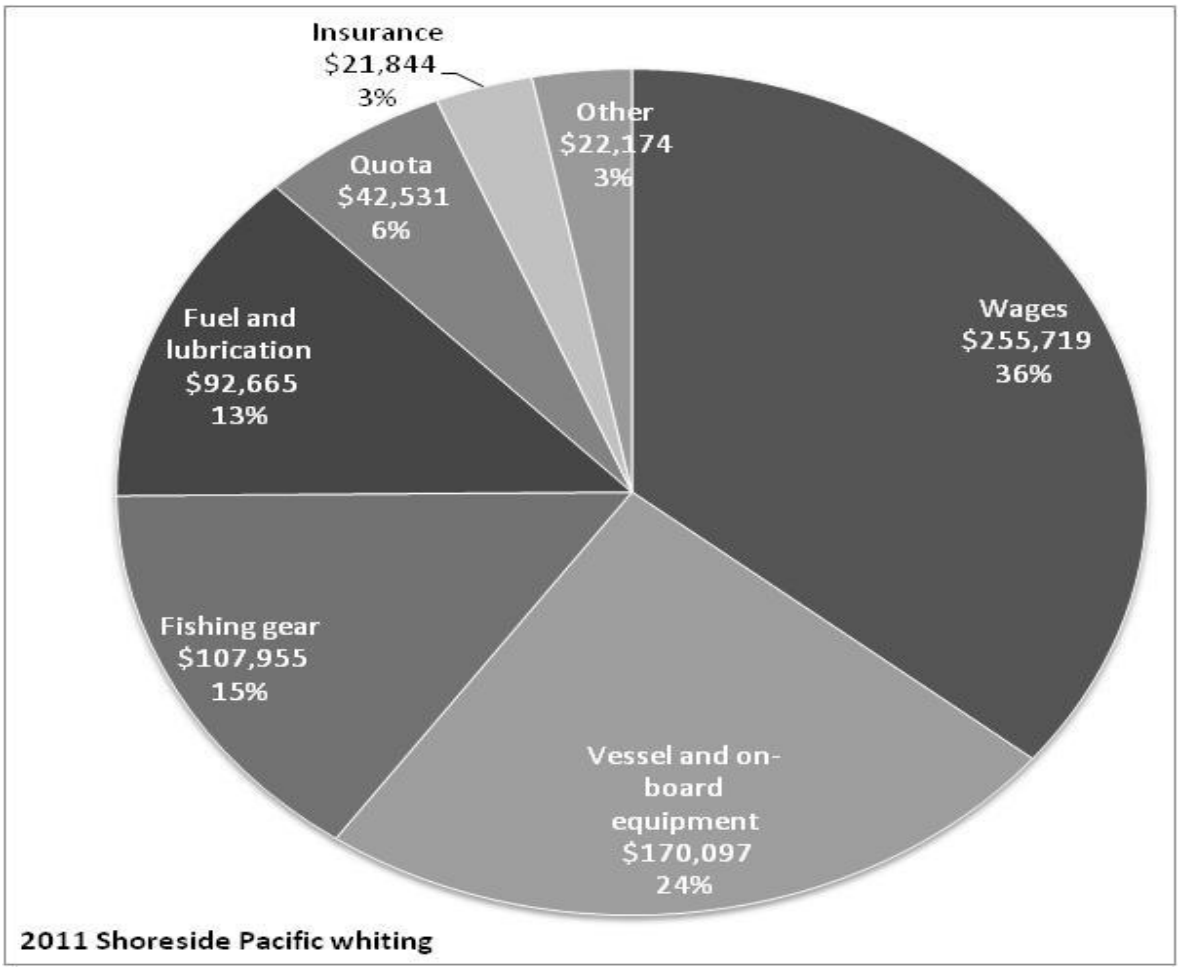

Figure 3-14. Estimates costs in 2011 shorebased whiting fishery.

3.3.1.2 *Nonwhiting Midwater Trawl Fishery*

The reader of this EA is directed to the Whiting Fishery Chafing Gear EA (PFMC 2013a) and the 2015-2016 Specifications Document (PFMC 2014b) for more detailed information on the historic and recent nonwhiting midwater trawl fishery harvest sector, which historically targeted pelagic rockfish species including widow and yellowtail rockfish (in the Eureka, Columbia River and Vancouver INPFC areas) and to a lesser extent chilipepper rockfish (in the Monterey INPFC area). Those document are hereby incorporated by reference into this EA. A condensation and update of those documents follows.

Historic and Recent Pelagic Rockfish Harvests and Revenues

The main species harvested with midwater trawl nets historically have included Pacific whiting and the following rockfish species: widow rockfish, yellowtail rockfish and chilipepper rockfish (pelagic rockfish species complex). In the 1990s pelagic rockfish catches using midwater gear were relatively robust, as will be shown below, but starting in 2002 catches fell off steeply as management measures were implemented to protect widow rockfish, which had been declared an overfished species. The PacFIN data base used in the following was queried by year for all fish tickets that showed that midwater gear was used to make the catch. No attempt was made to estimate species harvest strategy (i.e., Pacific whiting or pelagic rockfish

complex) and to partition catches accordingly. The challenges in doing such an analysis are discussed below.

The midwater trawl fishery for pelagic rockfish in the Council area has primarily taken place north of 40˚ 10' N. latitude (Northern management area). During 1994-2001 the northern fishery landed an annual average of 2,603 mt of pelagic rockfish, which represented over 97 percent of the northern and southern management area (i.e., south of 40˚ 10' N. latitude) catches combined (Table 3-14). Only chilipepper rockfish showed a higher average catch in the southern area during this same time period (24 mt) compared to the northern area (4 mt) (Table 3-14). The large drop in pelagic rockfish complex landings beginning in 2003 is illustrated in Figure 3-15. In 2011, the first year of the IFQ program there was an increase in yellowtail rockfish landings but did not last through the next two years.

Table 3-14 Midwater (shoreside) trawl landings (mt) of Pacific whiting and specified pelagic rockfish species by management area and year, 1994-2013. Page 1. Note: These data do not reflect target species strategy or projection of discarded catches.

	Species	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
North 1/	PWHT	68,640	70,751	73,371	79,590	77,133	74,296	85,824	73,372	45,679	51,220	89,634
	WDOW	1,768	1,597	1,599	1,756	849	1,845	3,464	1,663	242	13	28
	YTRK	272	292	470	231	411	436	2,583	1,560	439	45	118
	CLPR	0	0	2	0	0	0	28	1	1	10	21
	Subtotal	70,681	72,640	75,441	81,577	78,393	76,577	91,900	76,595	46,361	51,287	89,801
South	PWHT	0	0	0	0	0	0	0	0	0	0	0
	WDOW	0	8	0	19	0	18	274	55	0	0	0
	YTRK	0	0	0	0	0	0	21	0	0	0	0
	CLPR	0	0	0	0	0	0	82	106	32	0	0
	Subtotal	0	8	0	19	0	18	376	162	32	0	0
Both	PWHT	68,640	70,751	73,371	79,590	77,133	74,296	85,825	73,372	45,679	51,220	89,634
	WDOW	1,768	1,604	1,599	1,774	849	1,863	3,738	1,718	242	13	28
	YTRK	272	292	470	231	411	436	2,603	1,560	439	45	118
	CLPR	0	0	2	0	0	0	110	107	32	10	21
	Total	70,681	72,648	75,441	81,595	78,393	76,595	92,276	76,757	46,392	51,287	89,801

1/ North and South mean north and south of 40˚ 10' N. lat., respectively

Table continued (Page 2).

	Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	94-01 AVE	02-13 AVE
North 1/	PWHT	97,587	97,266	73,280	50,787	40,293	62,320	52,439	66,792	96,504	75,372	68,650
	WDOW	77	50	82	101	109	62	111	102	148	1,818	94
	YTRK	173	156	186	43	75	198	151	215	112	782	159
	CLPR	26	13	6	4	2	21	0	0	0	4	9
	Subtotal	97,863	97,484	73,554	50,936	40,479	62,601	91,966	67,109	96,764	77,976	72,184
South	PWHT	40	2	0	0	0	0	0	0	0	0	4
	WDOW	0	0	0	0	0	0	0	0	0	47	0
	YTRK	0	0	0	0	0	0	0	0	0	3	0
	CLPR	0	2	0	0	0	0	0	0	0	24	3
	Subtotal	40	4	0	0	0	0	0	0	0	73	6
Both	PWHT	97,627	97,268	73,280	50,787	40,293	62,320	91,406	66,792	96,504	75,372	71,901

	Species	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	WDOW	77	50	82	101	109	62	113	102	148	1,864	94
	YTRK	173	156	186	43	75	198	446	215	112	784	184
	CLPR	26	15	6	4	2	21	0	0	0	27	11
	Total	97,903	97,488	73,554	50,936	40,479	62,601	91,966	67,109	96,764	78,048	72,190

1/ North and South mean north and south of 40° 10' N. lat., respectively

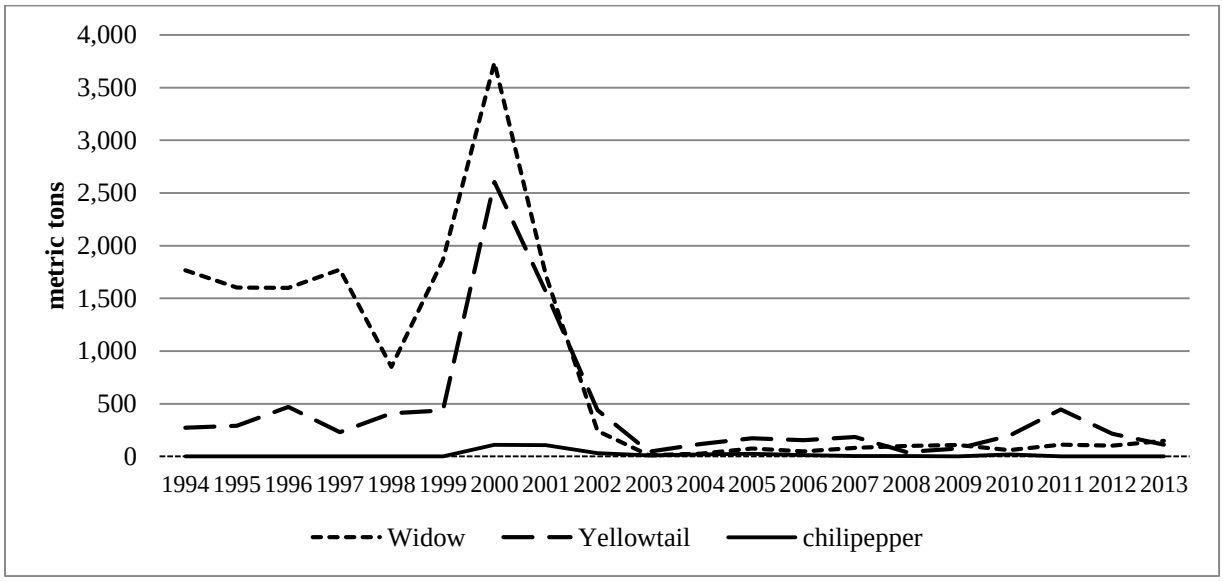

Figure 3-15. Shoreside midwater trawl landings in metric tons of pelagic rockfish by species and year, 1994-2013.

During 2002-2013, pelagic rockfish landings coastwide averaged only about 11 percent (289 mt) of the previous period average (Table 3-14). The fishery in the southern management area dropped to only 4 percent (4 mt) of the previous period average.

The drop in pelagic rockfish complex revenues during 1994-2013 shown in Figure 3-16 parallels that of pelagic rockfish landings shown in Figure 3-15 as would be expected.

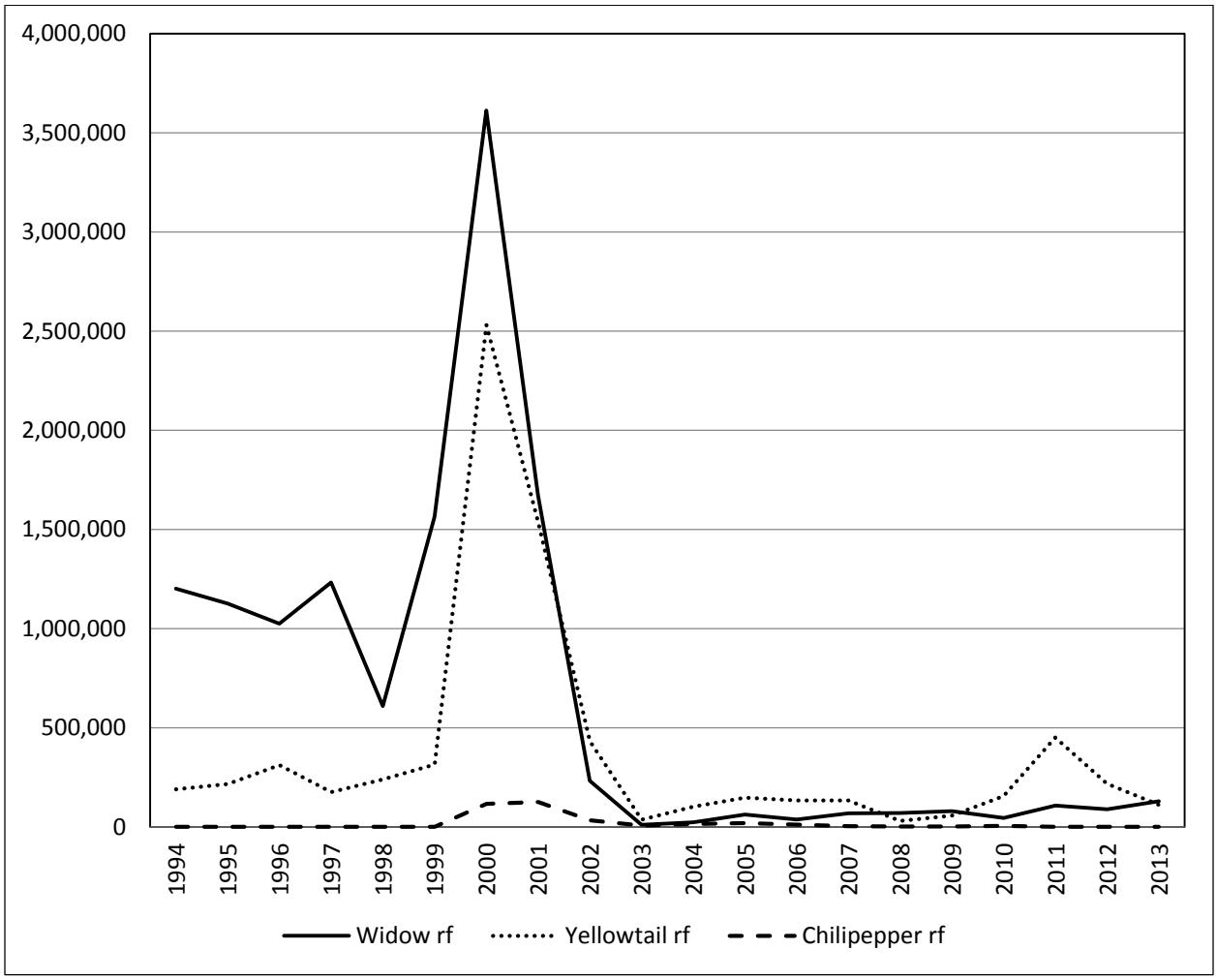

Figure 3-16. Annual ex-vessel revenues for widow, yellowtail and chilipepper rockfish caught with midwater trawl, 1994-2013.

Historical Participation in Pelagic Rockfish Fishery

The number boats that participated in the directed whiting fishery have very high individual landings dominated by Pacific whiting, which facilitates counting. The number of boats that have used midwater gear and only landed pelagic rockfish are also easy to count. The number of boats that mix harvest strategy on the same trip are not possible to count based on fish ticket information. The number of boats that mix harvest strategy during the year presents a challenge in analyzing fish ticket data. One approach to the latter situation is to use a proportion of whiting in the catch to differentiate rockfish trips from whiting trips and vice versa. The figure of 50 percent or greater of whiting to define whiting trips is used in the 2015-2016 Specifications Document to estimate pelagic rockfish trips and to estimate their landings and revenues (PFMC 2014b). Here the presentation is limited to counts of whiting vessels (which land significant quantities of pelagic rockfish) and pelagic rockfish only midwater trawl vessels. The years used this analysis are 1994-2011.

As shown in Figure 3-17 the number of rockfish only midwater trawl vessels in the fishery declined sharply in 2003 corresponding to widow rockfish being declared overfished and regulations implemented to curtail the harvest. During the peak years of the fishery, 2000-2002, the number of rockfish vessels in the midwater rockfish fishery ranged from 84 (two years) to 49. Since 2003 (through 2011) the number of rockfish only midwater vessels has dropped to 0 or 1 boats per year. (It is noteworthy that the WCGOP reported that 6 and 4 vessels in 2012 and 2013, respectively, conducted rockfish targeted trips with midwater trawl gear. It is unlikely that those vessels are rockfish only midwater trawl vessels because there was not sufficient revenue to support that degree of dependence on the pelagic rockfish fishery.

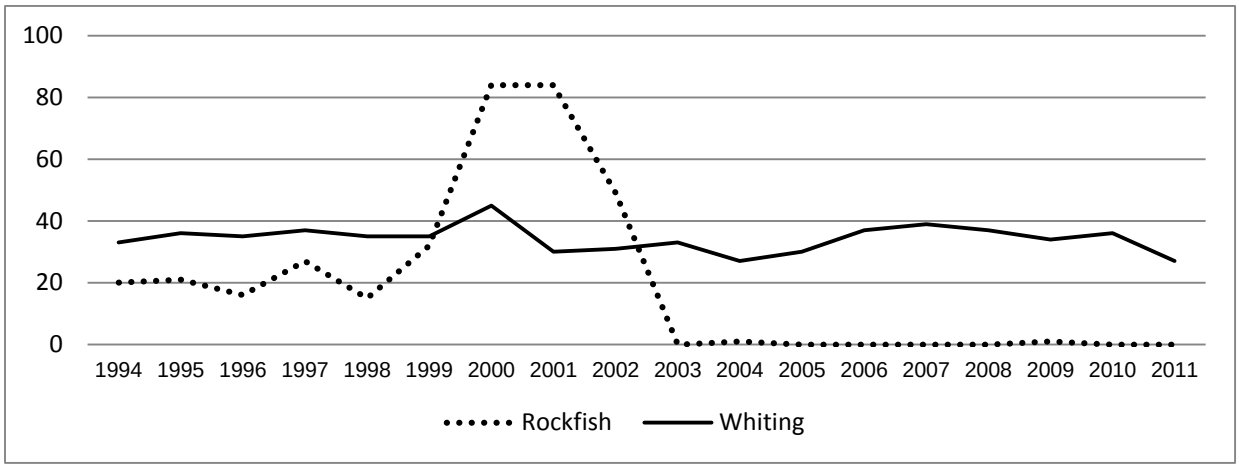

Figure 3-17. Counts of pelagic rockfish only and Pacific whiting fishery vessels by year, 1994-2011.

The number of shorebased whiting vessels participating in the directed whiting fishery has been relatively stable over the base years presented here, ranging from 27 to 45 vessels per year. In 2001, the first year of the IFQ program the number of whiting vessels matched the lowest level in the base period at 27 vessels.

3.3.2 Tribal Sector

The reader is referred to the Draft 2015-2016 Specs EIS (PFMC 2014b) for a description of the tribal groundfish fisheries, which is here incorporated by reference. It is noteworthy for this document that only the Makah tribe participates in the whiting fishery, which takes place in their usual and accustomed fishing grounds. The Makah fishery has both a shorebased and a mothership component. The Federal government has accommodated these fisheries through a regulatory process described at 50 CFR 660.50. Tribal fishery management is coordinated through the Council process so catches can be accounted for when developing management measures. Whether formally allocated or not, tribal catches are accounted through set-asides, which are amounts taken "off the top" of the overall catch limit.

3.3.3 Recreational Fishery

The reader is referred to the Draft 2015-2016 Specs EIS (PFMC 2014b) for a description of Council area recreational fisheries. It is important to note that whiting harvest in the recreational fishery is very minor in comparison to the commercial whiting fisheries. During 2004-2009, for example, Council area recreational fisheries harvested an average of 0.283 mt of Pacific whiting per year with a yearly range of

0.177-1.170 mt (RecFIN data query dated June 16, 2014). During these same years the shorebased commercial catch averaged 90,192 mt with a yearly range of 49,223-127,166 mt (Table 3-12).

Recreational fishery importance is much higher for pelagic rockfish species and many non-target species taken with commercial midwater trawl gear compared to the commercial fisheries for those same species.

3.3.4 First Receivers

Table 3-15 (from the Draft 2015-2016 Specs EIR, PFMC 2014b) shows the sector distribution of first receivers based on the processor ID field in the PacFIN database. (Note that a single firm may own several entities with different IDs so these numbers may overstate the number of independent firms engaged in processing groundfish. A comparison to counts based on processor names stored in the database showed a negligible difference.) A first receiver may be an entity that both buys and processes fish or a buyer or transportation company serving as a middleman between purchasing locations and processing facilities. The count of first receivers (based on ID) has declined by about 20 percent both for those accepting groundfish and those accepting any species. The data show that between 10 and 20 entities received shorebased whiting landings during 2003-2010 and only 9 entities received shorebased whiting in each of the first two years of the IFQ program, 2011 and 2012. From a sector perspective the largest declines overall have been the counts of first receivers accepting nonwhiting trawl caught groundfish from the shorebased sectors. This may represent consolidation within the buyer/processor sector.

Table 3-15. Count of first receivers (based on processor ID) that accepted groundfish, by major groundfish fishery sector, 2003-2012. (Source: PacFIN vdrfd vessel summary files 8/29/13.)

Groundfish Fishery Sector	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Shorebased IFQ Trawl (Whiting)	12	10	10	14	14	15	17	20	9	9
Shorebased IFQ Trawl (Nonwhiting)	65	57	52	49	49	47	45	36	26	25
Shorebased IFQ Nontrawl									20	19
Nonnearshore Fixed Gear	202	211	183	198	205	187	201	178	179	203
Nearshore Fixed Gear	133	153	142	140	131	132	145	124	120	121

3.3.5 Fishing Communities

Fishing communities are described below in terms of shorebased whiting landings by IOPAC port group. (See Table 9 in NOAA Technical Memorandum NMFS-NWFSC-111 for ports included in these port groups. The IOPAC Input-Output Model for Pacific Coast Fisheries is used to evaluate personal income impacts of proposed management measures.) The 18 port groups in the IOPAC are:

Washington State:

1. Puget Sound
2. North Washington Coast

3. South and Central Washington Coast

Oregon:

4. Astoria (and other Columbia River ports in Oregon)
5. Tillamook
6. Newport
7. Coos Bay
8. Brookings

California: [5]

9. Crescent City (North Coast)
10. Eureka (North Coast)
11. Fort Bragg (North Coast)
12. Bodega Bay (North-Central Coast)
13. San Francisco (North-Central Coast)
14. Monterey (South-Central Coast)
15. Morro Bay (South-Central Coast)
16. Santa Barbara (South Coast)
17. Los Angeles (South Coast)
18. San Diego (South Coast)

3.3.5.1 *Dependence and Engagement in Shorebased Whiting Fisheries*

Engagement is defined as shorebased whiting ex-vessel revenues in the port as a percent of coastwide shorebased whiting ex-vessel revenue for the 2003-2012 baseline period. Dependence is defined as groundfish ex-vessel revenue in the port as percent of total ex-vessel revenue for all commercial species in the port during the baseline period (PFMC 2014b).

A total of six port groups accounted for nearly 100 percent of total shorebased whiting landings during 2003-2012. Their ranks in terms of fishery engagement were: South and Central Washington Coast (39 percent), Newport (29 percent), Astoria (26 percent), Coos Bay (3 percent), Eureka (2 percent) and Crescent City (1 percent). In terms of fishery dependence, they ranked as follows: Newport (12 percent), Astoria (11 percent) and South and Central Washington Coast (8 percent). The remaining port groups (Coos Bay, Crescent City and Eureka) had very low dependence on the shorebased whiting fishery at about one percent per group.

Harvest of nonwhiting midwater trawling for species such as pelagic rockfish was significant in the 1990s but has been a very minor contribution to revenue in the fishery since 2002, due primarily to the imposition of RCAs and extremely low trip limits to protect overfished species, and widow rockfish in particular. Since the imposition of the trawl IFQ program in 2011 and the achievement of rebuilt status for widow rockfish in 2012, a few vessels have begun targeting with midwater gear on pelagic rockfish (see Section 3.3.1.2). Even under the trawl IFQ program, the available quota has not been harvested (likely because of a lag time in adjustment to new opportunities and continuing concern about overfished species that may be caught in conjunction with pelagic rockfish). The ACLs for widow rockfish and yellowtail rockfish are expanding substantially starting in 2015 (see Section 4.4.4.1.1) and increasing dependence and engagement in the fishery is expected on that basis.

[5] The regions noted in parenthesis show the approximate correlation between port groups and California state reporting regions for recreational fisheries.

Table 3-16. Total fishery revenues (thousands of dollars adjusted for inflation) during 2003-2012 by port group, species or species group and in total.

IOPAC	Whiting	Other groundfish	Nongroundfish	Totals
01Puget Sound	1	33,126	42,882	76,010
02North WA coast	0	45,476	56,346	101,823
03South and central WA coast	53,943	42,589	582,684	679,216
04Astoria	36,948	87,486	210,332	334,767
05Tillamook	0	1,923	34,260	36,184
06Newport	40,932	62,842	241,413	345,188
07Coos Bay	3,599	54,521	208,337	266,458
08Brookings	0	36,602	77,544	114,146
09Crescent City	1,967	14,842	150,799	167,608
10Eureka	2,399	39,316	117,446	159,160
11Fort Bragg	7	35,210	61,543	96,761
12Bodega Bay	0	2,833	74,008	76,841
13San Francisco	2	17,412	171,521	188,934
14Monterey	6	18,353	96,693	115,052
15Morro Bay	2	31,333	17,083	48,419
16Santa Barbara	2	9,550	348,031	357,582
17Los Angeles	14	10,294	309,675	319,983
18San Diego	0	7,005	62,459	69,465
Other	0	16	3,939	3,955
Total	139,823	550,731	2,866,996	3,557,550

3.3.5.2 *Community Vulnerability*

The Social Vulnerability Index (SoVI®) 2006-10) measures the social vulnerability of U.S. counties to environmental hazards. The index is a comparative metric that facilitates the examination of the differences in social vulnerability among counties. It illustrates the geographic variation in social vulnerability. It shows where there is uneven capacity for preparedness and response and where resources might be used most effectively to reduce the pre-existing vulnerability. SoVI® also is an indicator in determining the differential recovery from disasters (http://webra.cas.sc.edu/hvri/products/sovi.aspx).

The index synthesizes 30 socioeconomic variables, which the research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. SoVI ® data sources include primarily those from the United States Census Bureau. A "high" score indicates a "high" vulnerability to social and economic disruption stemming from an environmental or economic perturbation such as might occur due to whiting fishery collapse or implementation of adverse regulatory constraints. The scores for the six port groups that have had a relatively high engagement and or dependence on the shorebased whiting fishery are shown in Table 3-17. Except for Humboldt County (Eureka) all of the other counties were ranked in the upper 30 percent of vulnerable U.S. counties. Two counties, Pacific in Washington and Del Norte in California where ranged in the "high" category with a score of 20 percent or less.

Table 3-17. SoVI scores for selected counties with historically high engagement and or dependence on the shorebased whiting fishery.

Port Group	County	State	SoVI Score	Nat' Percentile
South and Central WA Coast	Pacific	Washington	2.357	83.8%
	Grays Harbor	Washington	1.254	72.7%
Astoria	Clatsop	Oregon	1.114	70.9%
Coos Bay	Coos	Oregon	1.599	76.8%
Newport	Lincoln	Oregon	1.865	79.7%
Crescent City	Del Norte	California	3.660	92.3%
Eureka	Humboldt	California	-0.073	50.7%

3.3.5.3 *Geographic Participation in Early Season*

While the shorebased midwater trawl fishery opens coastwide starting on June 15, there have been early season (pre-June 15) fishing opportunities south of 42° N. Latitude. Participation in that fishery has been minimal as demonstrated in . Since the start of the shorebased trawl IFQ program there have been no early season midwater trawl landings in that area (whiting or nonwhiting).

Table 3-18. History of early season shorebased midwater whiting participation (1994-1996 and 2004-2013).

Shoreside Early Season Landings		1994	1995	1996	2004	2005	2006	2007	2008	2009	2010	2011-2013
						Metric Tons						
N of 42	May 15-June 14	12,648	25,598	11,250	-	-	-	-	-	-	-	-
42°–40°30′N. lat	April 1-May 14	1,730		1,283				2,087	2,298	1,792	1,736	0
S. of 40°30′N. lat.	April 15-May 14	0	0	0	0		0	0	0	0	0	0
						ExVessel Value ($)						
N of 42	May 15-June 14	796,295	2,682,576	657,727	-	-	-	-	-	-	-	-
42°–40°30′N. lat	April 1-May 14	171,850		119,509				259,645	493,746	197,080	297,657	0
S. of 40°30′N. lat.	April 15-May 14	0	0	0	0		0	0	0	0	0	0
						Number of Vessels						
N of 42	May 15-June 14	16	25	26	-	-	-	-	-	-	-	-
42°–40°30′N. lat	April 1-May 14	4	1	4	4	4	5	6	7	6	9	0
S. of 40°30′N. lat.	April 15-May 14	0	0	0	0	1	0	0	0	0	0	0
						Number of Buyers						
N of 42	May 15-June 14	6	11	7	-	-	-	-	-	-	-	-
42°–40°30′N. lat	April 1-May 14	3	1	3	2	2	2	3	5	5	7	0
S. of 40°30′N. lat.	April 15-May 14	0	0	0	0	1	0	0	0	0	0	0

Cells are blacked out to ensure confidentiality.

3.3.6 Observer Providers

The Northwest Fisheries Science Center WCGOP is a collaborative program between the Pacific States Marine Fisheries Commission (PSMFC) and NMFS. The WCGOP was established in 2001 as a Cooperative Agreement between PSMFC and NMFS in response to the West Coast Groundfish Fishery (WCGF) being declared a failure on January 19, 2000. The main goal of the WCGOP is the collection of coast-wide, year-round discard rates for the groundfish fisheries of the Pacific coast of the United States (PSMFC 2014).

A variety of observer coverage goals are in place in an attempt to meet the needs of the Pacific Fishery Management Council to adequately assess the impacts of the fisheries on the resource. In January 2011 the limited entry trawl fleet, the largest groundfish fishery on the West Coast, transitioned to a Catch Shares management system. The Catch Share Program requires participating vessels to carry an observer onboard 100 percent of the time the vessel is active in the Catch Share Fishery. All other groundfish fisheries that the WCGOP monitors are lumped into "non-catch share fisheries." The non-catch share groundfish fisheries will continue to be observed by the WCGOP much in the same way the program has operated since 2001 with coverage rates determined by fishery. Observer coverage rates vary widely for these fisheries with coverage priorities focused on the limited entry sablefish fishery. Coverage rates for Non-Catch Share Fisheries are dynamic and modified in response to the needs of the Council. During 2011 up to 100 observers were active in the Catch Share and Non-Catch Share Fisheries (ibid).

The WCGOP trains, certifies, and equips prospective catch share observers; ensures data quality; and stores, maintains, and analyzes data collected by observers (ibid). The WCGOP web page has a link to four West Coast observer providers (http://www.nwfsc.noaa.gov/research/divisions/fram/observation/catchshares_how.cfm

3.3.7 Government Entities

The enforcement agencies affected by the proposed action include the United States Coast Guard, Federal Agents of the NMFS and the enforcement units of the three coastal states (Washington, Oregon, and California). The management entities that undertake fishery monitoring in the action area include the marine fisheries divisions of the state wildlife agencies for Washington, Oregon, and California, the Pacific States Marine Fisheries Commission, the At-Sea Hake Monitoring Program, and the WCGOP.

Chapter 4 Impacts on the Affected Environment

The direct and indirect impacts of the actions being considered are addressed for the physical environment in Section 4.1, for the biological environment in Section 4.2, and for the socioeconomic environment in Section 4.3. Cumulative impacts are analyzed in Section 4.4.

The Action Alternative (Preferred) analyzed in this EA differs from the No Action Alternative in two ways: (1) it advances the opening date for the shorebased whiting fishery north of California from June 15 to May 15 (to coincide with the opening date for the at-sea whiting fishery sectors), and (2) conforms the shorebased whiting fishery opening date off California north of 40° 30′ N. latitude to that of the Oregon and Washington shorebased fisheries (May 15). The Action Alternative does not affect midwater trawl regulations off California south of 40° 30′ N. latitude.

In this chapter, impacts of the Action Alternative (Preferred) to the physical, biological, and socioeconomic environment are analyzed relative to the No Action Alternative; i.e., what changes, if any, can be expected in those environments resulting from implementation of the Action Alternative that would not have occurred under the No Action Alternative. The specific geographically-based regulatory changes proposed in this EA relate to the timing of the shorebased whiting fishery in two distinct geographic areas of the coast. Under the present regulatory regime, the openings for the shorebased whiting fishery allow the use of midwater trawl gear in the RCAs north of 40º 30’ N. latitude for the targeting of all groundfish species, not just whiting (see cumulative impacts for discussion of concurrent “whiting cleanup rule” which establishes a separate definition for use of midwater trawl gear to target nonwhiting). Thus, the analysis in the following sections focuses on impacts relative to the areas of the coast potentially impacted under the Action Alternative (Preferred): (1) the shorebased midwater trawl fishery off Oregon and Washington, and (2) the shorebased midwater trawl fishery off California north of 40° 30′ N. latitude.

Impacts under the No Action Alternative Relative to Baseline

Under the No Action Alternative, the fishery and related impacts are expected to continue as in the past, as documented in Chapter 3,[6] except as noted in the discussion of cumulative effects in Section 4.4. The primary cumulative impact change under the No Action Alternative (of a kind that will alter the differential between the impacts under No Action and the impacts under the Action Alternative) is the increase in the ACLs for widow rockfish and yellowtail rockfish that is expected for the 2015-2016 time period. Whiting ACLs are likely to increase as well, however, because of the short-lived nature of the species, the biomass is highly variable and it is difficult to predict from one year to the next whether there will be increases or decreases, until each year’s stock assessment is produced. These ACL changes will change the intensity of fishing activity, and therefore the size of the difference in impacts between the No Action and Action Alternative. However, for most impacts on the physical and biological environment, the size of the difference caused by the increases in the ACLs will be small, because expected impacts from opening the

[6] For each resource considered in this chapter there is section in Chapter 3 with a corresponding number which describes current conditions in the fishery.

season a month earlier are minimal, as described in the following sections. The upcoming changes in the ACL are expected to be implemented as part of the 2015-2016 biennial groundfish fishery specifications. Expected changes in the fishery relative to the information provided in Chapter 3 are described in detail in the Final EIS for the 2015-2016 groundfish specifications document.

Table 4-1. Comparison of shorebased whiting fishery regulatory changes proposed in this EA by geographic area relative to the No Action Alternative.

Area Reference	Geographic location	Alternative	
		No Action	**Action Alternative (FPA)**
Northern Fishery	North of 42° N. lat. (Oregon and Washington)	Season opens June 15; closes Dec. 31	Season opens May 15; closes Dec. 31
Central Fishery	North of 40° 30´ to 42´ N. Lat. (Northern California)	Season opens April 1; California early season allocation set at 5% of the coastwide shorebased fishery allocation	Season opens May 15; closes Dec. 31. California early season 5% allocation would not apply (because season start date is the same as the Northern Fishery)
Southern Fishery	South of 40° 30 (Southern California)	Season opens April 15; closes Dec. 31. California early season allocation set at 5% of the coastwide shorebased fishery allocation	No change is proposed for this area

4.1 Physical Environment, including Ecosystems and Essential Fish Habitat and Ecosystem

The physical environmental elements of the action area discussed in the text (Section 3.1) related to the action area include physical oceanography, West Coast marine ecosystems, issues associated with protection of groundfish EFH, potential gear impacts to different habitat types, and potential gear impacts to Rockfish Conservation Areas (RCAs) habitats. Potential adverse impacts of the action alternatives compared to the No Action Alternative are discussed and analyzed below.

4.1.1 Physical Oceanography

An ocean current, such as the California Current of the Council management area (Figure 3-1), is a continuous, directed movement of ocean water. Ocean currents are rivers of relatively warm or cold water within the ocean. Currents are generated from the forces acting upon the water like the planet rotation, the wind, the temperature and salinity differences, and the gravitation of the moon. The depth contours, the shoreline, and other currents influence the current's direction and strength (http://en.wikipedia.org/wiki/Ocean_current).

Phytoplankton (microscopic, single-celled, photosynthetic organisms) provides the ultimate source of food for marine life. If upwelling of cold, nutrient-rich ocean water ceases (e.g., during El Niño), blooms of brown and green phytoplankton diminish, and so do the fish, and with them the sea birds. This has a severe impact on the fishing industry (http://oceanmotion.org/html/background/patterns-of-circulation.htm).

The proposed action pertains to the opening date for the shorebased whiting fishery north of 40° 30´ N. latitude. Ocean currents and associated phytoplankton production are influenced by factors much larger in scale and influence than the setting of fishing season start dates. These factors include but are not limited to global rotation, wind currents, lunar gravitation, terrestrial runoff, pollution events, etc. No impact to the Physical Oceanography is projected to occur under the Action Alternative proposed in this EA compared to the No Action Alternative (Table 4-2).

Table 4-2. Potential impacts of Action Alternative compared to No Action Alternative: Physical Environment. An nc designation means no change in impact compared to the No Action Alternative.

	Northern Fishery (North of 42° N. Lat.)	**Central Fishery (40° 30´→ 42° N. Lat.)**	**Southern Fishery (South of 40° 30´ N. Lat.)**
Environment	**Action Alternative**	**Action Alternative**	**No Action**
Physical Oceanography	nc	nc	nc
West Coast Marine Ecosystems	nc	nc	nc
EFH 1/	nc	nc	nc
HAPCs 1/	nc	nc	nc
RCAs 1/	nc	nc	nc

1/ For the Northern and Central fishery areas there may be a minor temporal and spatial shift in fishing effort, but areas open and net impact are not expected to change, thus nc is indicated

4.1.2 Pacific Coast Marine Ecosystem

The trophic interactions in the California Current Ecosystem are extremely complex, with large fluctuations over years and decades. Food webs are heavily structured around CPS, which are highly dependent on phytoplankton production of the California Current System. CPS 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. The top trophic levels of such ecosystems are often dominated by HMS 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. These wide-scale fluctuations in web species abundance and availability need to be anticipated and planned for in coming years. This is because the Pacific Coast marine ecosystem is controlled by biological systems and environmental perturbations much larger in influence than the changing of fishing season start dates as proposed in this EA (Table 4-2). Therefore, no difference in impacts to the Pacific Coast Marine Ecosystem are projected between the Action Alternative and the No Action Alternative.

4.1.3 Essential Fish Habitat

As reported in Section 3.1.3, groundfish EFH has been deemed 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 (NMFS 2005).

The Action Alternative may result in changes in the distribution of impacts to some elements of the physical environment including areas designated as EFH in the Northern Fishing Area (off Oregon and Washington) if, somehow, an earlier opening date in the area would result in a redistribution of fishing effort among fishing grounds (the action will not open up new fishing grounds or result in fishing in areas where it has not occurred in the past). Total effort and total catch is not expected to change because total allocations will not be changing, nor is the manner in which the gear is deployed expected to be altered. Therefore, there might be some redistribution of harvest; however, an increase in one area will likely be offset by a decrease in another area such that there is no net change in the overall impacts to EFH.

The main driver for any change in the distribution of midwater trawl effort would be the migratory patterns of whiting. Other groundfish species targeted with midwater trawl gear, such as pelagic rockfish, do not exhibit strong migratory patterns. The geographic distribution of whiting harvest by port shows that vessels fish the geographically accessible range of harvest out of each port off Washington and Oregon, and that there is interannual variation in that distribution, most likely driven by the stock distribution (Figure 3-5 and Figure 3-8). The harvest for all Washington and Oregon ports combined has ranged from the U.S.-Canada border down to northern California. Figure 3-3 shows the annual variation in stock distribution, as detected in acoustical surveys. Under the trawl rationalization program, the peak of harvest does not generally occur until July, indicating that the industry is not using the earlier period (later part of June) to strongly target on whiting. The shift of the opening to May 15 is not expected to shift the peak fishing effort time, but may redistribute some of the lower levels of effort into the earlier period when fish are slightly farther to the south.

While there may be some redistribution of effort, the impact of midwater gear on the bottom is generally at a low level. Midwater trawl gear as used in the whiting and pelagic rockfish fisheries only occasionally touches bottom. In order to minimize the possible incentives for use of midwater gear to fish hard on the bottom, the regulations have been designed to require that the gear be very light and thus more subject to damage through bottom contact (including requirements for small footropes bare of any protective devices, and 20 feet of 16 inch or greater mesh directly behind the footrope and headrope, substantially increasing the strain on each line, see CFR 660.130(b)). Given the cost of the gear (see Chafing gear EA, PFMC 2013a, for gear cost information) and this requirement for light construction, it is believed that there is a substantial incentive to avoid any sustained bottom contact or hard-on-bottom fishing with the gear. Additionally, when in contact with the bottom, the net may become fouled and not work properly, resulting in increased operating costs. In a recent midwater trawl chafing gear analysis, a bottom contact rate of 8 percent or less was used to characterize the bottom contact rate in the West Coast whiting fishery (PFMC 2013a). More recent preliminary studies provided to the Council have indicated the possibility of higher incidents of contact for the use of midwater gear in the shorebased whiting fishery (NMFS, 2014b). A high

incidence in the indicator of at least one bottom contact during a trip may or may not reflect the extent of the contact. These studies are still being evaluated.

The proposed delayed opening date in the Central Area Fishery (Northern California) would reduce the timing of fishing effort in that area by a month and a half with associated reduced risk to EFH, except there has been no midwater trawl activity in the area in recent years. However, a reduction in one area will be offset by an increase in another area, such that there is no net change in the overall impacts to EFH. In addition, the later season will reduce the opportunity to re-establish such a fishery, should the incentives arise.

The Council EFH Review Committee reported that effects from the midwater trawl used to target Pacific whiting on EFH are generally limited to: (1) removal of prey species, (2) direct removal of adult and juvenile groundfish, (3) occasional, usually unintentional contact with the bottom, and (4) effects resulting from loss of trawl gear, potentially resulting in impacts to bottom habitats and ghost fishing (PFMC 2012d). Overall, no change in impact to EFH is expected to occur under the Action Alternative compared to the No Action Alternative (Table 4-2).

4.1.4 Habitat Areas of Particular Concern (HAPCs)

HAPCs are located and fairly evenly distributed off of all three states. Their names and locations by State are presented in Section 3.1.4.

The following section includes an analysis of the potential effects of the Action Alternative compared to the No Action Alternative on specific West Coast offshore habitat types. An adverse effect is considered to be any impact which reduces the quality and/or quantity of that habitat type. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate, and loss of, or injury to benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of that particular habitat type. Adverse effects result from actions occurring within or outside of particular habitat types, and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

The HAPCs that are of greatest concern in this EA are those that occur in the offshore area where the midwater fishery takes place. These areas include Rocky Reefs (Section 3.1.4.1) and Areas of Interest (Section 3.1.4.2). These are primarily areas of rocky habitat wherein midwater trawling is the only commercial fishing gear allowed. This is because midwater trawl gear only occasionally touches bottom, particularly over hard substrate where the risk of gear damage would be quite high (see Section 4.1.3 for a discussion on bottom contact). Whiting fishing primarily takes place over soft (sedimentary) bottom habitat (ibid). Fishing in HAPCs would be primarily for pelagic rockfish species, which are known to form dense schools over such areas, and then, in the case of widow rockfish, primarily at night. Any such fishing can currently only take place during the primary whiting season.

Midwater trawling for pelagic rockfish species, whether in HAPCs or in the coastwide RCA, is likely to take place to the extent that allocations will allow for pelagic rockfish species (widow, yellowtail, and chilipepper rockfish) *and* comingled overfished rockfish species. Increases in the allocation for these three rockfish are expected for the 2015-2016 time period (see Section 4.4.4.1.1 for further detail). To the degree that there is a probability for bycatch of overfished species, there will be a disincentive to conduct major

targeting of pelagic rockfish because of very limited amounts of QP available for overfished rockfish species (all catch must be covered with QP). The species which may be particularly constraining are canary rockfish, coastwide, and cowcod south of 40° 30' N. latitude. If ACLs are reached for overfished groundfish species, there is a threat that the entire fishery could be shut down.

This action only changes fishing activity by approximately 1 month (earlier in the Northern area and later in the Central area). The total ACLs for pelagic rockfish and the probability of attaining them will not likely be changed by this action, and the availability of pelagic rockfish in the HAPCs is not expected to be different with a one-month earlier opening. While the earlier opening in the northern area could increase the amount of time available to harvest the available quota, there is generally believed to be adequate harvesting, processing, and market[7] capacity such that the additional month in the north will not add to harvest (personal communications with NWFSC Economic Data Collection Program regarding harvesting capacity and with West Coast Seafood Processors Association regarding processing and market capacity). Data is not available to quantitatively substantiate the qualitative information. There have been no early season landings of these species in the southern areas, therefore contracting the season in this area is not expected to reduce attainment for these species. While there may be some local area redistributions, there will be no new areas subject to fishing impacts and no net change to the impacts on HAPCs under the Action Alternative compared to the No Action Alternative (Table 4-2).

4.1.5 Essential Fish Habitat Conservation Areas (EFHCA)

Groundfish EFH is inclusive of all areas currently fished using midwater trawl gear for Pacific whiting and pelagic rockfish species. The driver for any change in impacts associated with the Action Alternative would be the change in the time of year of fishing (total harvest will remain unchanged) and any associated shifts in the spatial distribution of fishing effort (Table 4-1). Section 4.1.3 provides a discussion of the likelihood of a geographic redistribution of harvest. With respect to the earlier opening off of Washington and Oregon (northern area), it concludes that while there might be a minor shift in whiting effort to the south because of whiting seasonal migratory patterns, there would be no new areas open to fishing. There is no reason to expect a shift in the geographic distribution of harvest of targeted pelagic rockfish because they do not have the strong seasonal migration pattern that whiting do. However, in either case, any increase in effort in the south would be offset by a decrease in effort to the north. For the openings off California, since there has been no midwater trawl fishing occurring in the earlier openings, there is expected to be no redistribution of effort as a result of moving the opening later in the year (to May 15). With respect to whiting trips, any local area increase in bottom contact for whiting trips would take place in soft bottom habitats because this is where the whiting fishery primarily takes place. Soft bottom habitats recover much more rapidly than hard bottom habitats (NMFS 2005).

Any local area increase in habitat impacts for the pelagic rockfish fishery would be for rocky habitat, which is much slower to recover compared to soft bottom habitat where the whiting fishery takes place. Low ACLs for overfished rockfish species (canary and cowcod in particular) will, to a degree, constrain catches of pelagic rockfish species, thus, as a result, reduce potential impacts to hard bottom habitats. While there may be some local area redistributions, there will be no new areas subject to fishing impacts, and the net

[7] Adequate market capacity is considered to exist when the market is able to receive additional volumes of fish without substantially affecting prices. This question was asked with respect to the market's ability to absorb the amounts of additional QP for pelagic rockfish that will be allocated under the 2015-2016 specifications (see Section 4.4.4.1.1).

impacts to EFH conservation areas for the larger area as a whole are expected to remain unchanged under the Action Alternative compared to the No Action Alternative (Table 4-2).

4.1.6 Rockfish Conservation Areas (RCAs)

The trawl RCAs, which were designed in 2002 during the trip limit management regime, were intended to minimize opportunities for trawl vessels to incidentally take overfished rockfish, which prefer rocky bottom habitats. From 2002 to present, the RCAs have been closed to bottom trawling but open to midwater trawling coastwide during the primary whiting season for vessels that participate in the whiting fishery and, more recently, for midwater targeting on pelagic rockfish species. The boundaries of the RCAs have varied between years. Given the absence of bottom trawling within the RCAs from 2002 to 2013, the seafloor habitats in the RCAs have likely recovered considerably.

Targeting opportunities for widow and yellowtail rockfish with midwater gear were eliminated in 2002 and retention was restricted to the whiting fishery (trip> 10,000 lbs. of whiting). Trip limits for widow and yellowtail rockfish (which are often caught jointly with widow) were reduced to accommodate incidental catch and prevent targeting on widow during whiting fishing opportunities. Targeting opportunities for chilipepper rockfish with midwater gear were eliminated in 2003, but larger limits (large enough to allow targeting) were reinstated in 2005. Under the shorebased IFQ program, which makes fishermen individually responsible for their groundfish catch (including discards), the midwater trawl fishery started re-emerging in 2011.

As the widow rockfish allocations increase in future years, more midwater trawl effort targeting nonwhiting species, including pelagic rockfish, is anticipated to occur, particularly in the shelf areas including within the trawl RCAs. However, the character of the emerging midwater trawl fishery may be different from the historical fishery. Because some marine organisms currently targeted with demersal gear have diurnal and/or seasonal vertical migrations, off-bottom target fishing techniques for these species may develop, given the incentives created by the IFQ management structure combined with trawl RCA restrictions that only allow the use of midwater trawl gear. The use of midwater trawl gear to target species that have traditionally been harvested with on-bottom trawl gear may develop by fishing close to the bottom (while avoiding bottom contact which causes net damage).

The discussions above regarding potential impacts of the Action Alternative to EFH (Section 4.1.3) apply equally to potential impacts to RCA habitats contained within the Northern, Central, and Southern Area fishing areas. That is:

- Current habitat impacts may shift southward in the Northern Area due to the earlier opening date combined with the northward early season migration pattern of whiting, but any such impacts will be very small because midwater gear only occasionally makes bottom contact;
- Net impacts for the region will remain unchanged (with increases in one area offsetting decreases in others);
- The earlier season opening will not expose any new areas to fishing impacts;
- The season change for the Central Area Fishery will have no impacts because there is no early season fishing occurring in that area; and
- No impact in the Southern Area fishery because the season opening date remains the same in that area.

In brief, no change in habitat impacts in RCAs are projected under the Action Alternative compared to the No Action Alternative (Table 4-2).

4.2 Biological Environment

4.2.1 Groundfish Target Species

The primary target species of the midwater trawl fishery in the Council area include Pacific whiting, widow rockfish, yellowtail rockfish, and chilipepper rockfish. The rockfish species are collectively referred to as pelagic rockfish because of their off-bottom schooling behavior (see NMFS 2005 Appendix H for groundfish behavioral information). However, there are unknowns with the emerging midwater trawl fishery for the shorebased IFQ fisheries. As the fishery develops, other target species may emerge. Our current understanding of target species is based on historical landings under a trip limit structure and three complete years of experience under trawl rationalization (2011 through 2013). As the fishery develops, it could change considerably from our historic understanding with target species becoming less clearly defined. Pacific whiting, widow rockfish, yellowtail rockfish north, and chilipepper rockfish south are all managed under the IFQ structure or with allocations and set-asides in the at-sea fisheries. It is unclear how the shorebased IFQ midwater trawl fishery will change and develop, and whether new target species will emerge or if a mixed target strategy will become more common. Table 4-4 below identifies other groundfish species that school near or above the bottom and may be harvested with midwater trawling gear.

4.2.1.1 *Pacific Whiting*

The fishery management program for Pacific whiting is described in Section 3.2.1.1. It is a joint venture program involving the principal fishery management entities of the U.S. and Canada. That process results in the assessment of stock status and productivity that results in the projection of allowable removals from the resource and the allocation of fish in terms of metric tons between the two countries for the coming fishing season. Management performance is reviewed in that same EA section, which shows that together the two countries have averaged 87 percent attainment of allowable annual catches during the years 2003-2012. The range in total catch attainment ranged from 73 to 100 percent during that same period.

The shorebased whiting fishery is allocated 42 percent of the U.S. portion of the coastwide allowable catch measured in metric tons. Changing the shorebased whiting fishery season start date has no impact to the amount of whiting available and allocated to the shorebased whiting fishery. The onboard observer program has been implemented to ensure that total impacts by shorebased whiting vessels are accounted for in landed catches.

The 1997 EA (PFMC 1997) indicated a 10 percent change in the yield would result from a five-month delay in the entire whiting OY: a harvest taken entirely in September or later (by all sectors) as compared to a harvest taken entirely in April. The action taken at that time was to move the start of the seasonally-managed shorebased fishery from May 15 to June 15 (a one-month move for an Olympic fishery lasting a few months). This change was only 8 percent of the change (a one-month shift (20 percent of 5 months) of the shoreside harvest (42 percent of the OY) (50% x 42% = 8.4%)) required to achieve a 10 percent yield. Thus less than a 1 percent change in yield (8.4% x 10% = 0.84%) would have been expected from the move of the season opening from May 15 to June 15, assuming that the model assumptions hold.

The action alternative is expected to have even less of an impact on total yield. The fishery is no longer managed using seasonal closures. Under the IFQ program there is a lower rate of fishing spreading the season out over a substantially longer period (see Figure 3-11 and Figure 3-12). As a result, the earlier opening date extends the season duration by one month, but will shift harvest by a smaller portion of the harvest than was shifted under the previous management regime when the season opening was moved from May 15 to June 15. Consequently, the effect of the season change on yield would likely be negligible.

The projected biological impact to the whiting resource stemming from implementation of the Action Alternative is for no or negligible change compared to the No Action Alternative (Table 4-3). This is because the same tonnage of whiting is available to the shorebased whiting fishery, regardless of season start date, and the likely loss in stock productivity from an earlier opening would likely be undetectable under any likely shift in actual harvest to the earlier fishing period.

4.2.1.2 *Pelagic Rockfish Complex (Widow, Yellowtail and Chilipepper Rockfish)*

Changing the whiting season date affects midwater gear targeting not only on whiting but on other groundfish species as well. Under the trawl rationalization program, once the primary whiting season is open in an area, midwater gear can be used to target any species of groundfish for which an individual has adequate QP. Widow rockfish and yellowtail rockfish are the most likely targets. The main effect of moving the season date is a change in the timing of harvest. Total harvest is not likely to be affected.

The fishery management programs for the forenamed pelagic rockfish species are described in sections 3.2.1.2, 3.2.1.3, and 3.2.1.4. They are all IFQ species which have ACLs developed based on Council- and NMFS-sponsored stock assessments and implemented in regulation as part of the biennial specifications process. These ACLs are then allocated in the form of QP to eligible entities on an annual basis for use in prosecuting the respective resources for sale or personal use. Management performance data are displayed for the respective species in these same EA sections.

The amount of QP available for harvest (or personal use) for the respective species is fixed on an annual basis. Because of this, no change in whiting season start date (and associated start date for nonwhiting species) will affect the amounts of IFQ species pounds available for harvest. Under current management, QP issued for pelagic rockfish are not fully harvested, despite the apparent absence of harvest capacity, processing capacity, or market capacity constraints (see discussion in Section 4.1.4). While an increase in harvest as result of the season change appears unlikely, if an increase in attainment of ACLs were to occur, harvest would still be within that which is authorized under the biennial specifications. Onboard fishery monitoring is used to document discards, if any, and ensure they are taken into account so that QP limits are not exceeded. It is projected that implementation of the Action Alternative will likely have no biological impact to pelagic rockfish complex species compared to the No Action Alternative (Table 4-3).

Table 4-3. Potential impacts of Action Alternative compared to No Action Alternative: Biological Environment. An nc designation means no change in impact compared to the No Action Alternative.

	Northern Fishery (North of 42 ° N. Lat.)	Central Fishery (40° 30´→ 42° N. Lat.)	Southern Fishery (South of 40° 30´ N. Lat.)
Sector	**Action Alternative**	**Action Alternative**	**No Action**
Whiting	nc	nc	nc
Pelagic RF	nc	nc	nc
Overfished GF	nc	nc	nc
Other Non-Target GF	nc	nc	nc
Pacific Halibut	nc	nc	nc
CPS	nc	nc	nc
HMS/Salmon	nc	nc	nc
Misc. Non-GF	nc	nc	nc
ESA-Salmon	nc	nc	nc
ESA-Green Sturgeon	nc	nc	nc
ESA-Eulachon	nc	nc	nc
Marine Mammals and Seabirds	nc	nc	nc

4.2.1.3 *Other Potential Groundfish Target Species*

Table 4-4 below identifies other groundfish species that school near or above the bottom and may be harvested with midwater trawling gear in the future. Most of these fish are IFQ species which have ACLs developed based on Council- and NMFS-sponsored stock assessments and implemented in regulation as part of the biennial specifications process. These ACLs are then allocated in the form of QP to eligible entities on an annual basis for use in prosecuting the respective resources for sale or personal use. Management performance data are displayed for the respective species in these same EA sections.

The amount of QP available for harvest for IFQ species is fixed on an annual basis. Because of this, no change in whiting season start date (and associated start date for nonwhiting species) will affect the amounts of IFQ species pounds available for harvest. To ensure QP limits are not exceeded, and non-IFQ species that are discarded are accounted for, onboard fishery monitoring to document that discards, if any, are taken into account. These are potential future target species of the midwater trawl fishery. For this EA, they are treated as groundfish non-target species. Projected impact of Action Alternative impacts on these species is addressed in following sections.

Table 4-4. Groundfish Species with above bottom schooling behavior (Appendix B2 to NMFS 2005).

Species	Management	Schooling behavior	Co-occurring species when schooling	Depth and Latitude
Black rockfish	Trip limit - minor nearshore rockfish	In the central portion of their range from Oregon to southeast Alaska, they will often form schools of thousands of individuals. Black rockfish form mixed-sex, midwater schools, especially in shallow water.	Yellowtail, dusky, silvergray and blue rockfishes. Black rockfish occur with blue and olive rockfishes in the water column.	0-366 m 34° – 55° N. lat.
Blue rockfish	Trip limit - minor nearshore rockfish	They form both loose and compact aggregations.	North of Point Conception, they will school with olive and black rockfish; south of Point Conception they are found schooling with kelp bass, olive rockfish, blacksmith, and halfmoon.	0-550 m 31.5°-55° N lat.
Bocaccio	Overfished species - allocation to accommodate incidental catch	Some adults are semi-pelagic and some are non-schooling (benthic).	Bocaccio directly compete with chilipepper, widow, yellowtail, and shortbelly rockfishes for both food and habitat resources.	50-475 m 29.8°-56° N. lat.
Canary	Overfished species - allocation to accommodate incidental catch	Some adults are semi-pelagic and some are non-schooling (benthic).	Near, but usually not on the bottom, often associating with yellowtail, widow, and silvergray rockfish.	18-425 m 31°-56° N. lat.
Chilipepper	75% of the Fishery HG allocated to trawl fishery	Adults form schools. Chilipepper also school by sex just prior to spawning.	Off southern California, chilipepper are found with widow rockfish, greenspotted rockfish, and swordspine rockfish.	0-425 m 24.5°-51° N. lat.
Dark and Dusky Rockfish	Minor shelf rockfish trawl allocation	Dark and dusky rockfish adults have been observed in common schools.	Co-occur with blue rockfish and kelp bass in areas of reef and giant kelp.	25-910 m 33.3°-60° N. lat.
Olive	Trip limit - minor nearshore rockfish	Adult olive rockfish are a midwater fish. They often form single or multispecies aggregations of thousands of individuals.	Often form schools in association with blue and yellowtail rockfish.	0-174 m 28.3°-41.3°
POP	Overfished species - allocation to accommodate incidental catch	Adults form large schools 30 m wide, to 80 m deep, and as much as 1,300 m long. They also form spawning schools.	Darkblotched, redbanded, and splitnose rockfish, and shortspine thornyhead.	25-825 m 32.8°-55° N. lat.
Rougheye	Minor slope rockfish trawl allocation	Sometimes found in small schools.	Pacific ocean perch and shortraker rockfish.	25-875 m 32.5°-55° N. lat.
Sharpshin	Minor slope rockfish trawl allocation	Sometimes found in small schools. Identified as schooling species, although they also occurred singly.	They occurred in dense patches on and within 2 m of the bottom, often mixed with pygmy rockfish.	25-475 m 33°-60° N. lat.
Shortbelly	Unlimited trip limits	Adults commonly form very large schools.	Shortbelly rockfish play a key role in the food chain, as they are preyed upon by Chinook and coho salmon, lingcod, black rockfish, whiting, bocaccio, chilipepper, pigeon guillemots, western gull, marine mammals, and others.	50-350 m 28.3°-48.5° N. lat.
Shortraker	Minor slope rockfish trawl allocation	Small schools may perform seasonal vertical migration; with the depth range expanding during the months of June through November and decreasing from spring to autumn.		25-875 m 39.5°-55° N. lat.
Splitnose	Minor slope rockfish trawl allocation	Adults form schools.	Darkblotched and redbanded rockfish, shortspine thornyhead, and Pacific ocean perch.	80-800 m 28°-60.5° N. lat.
Silvergray	Minor slope rockfish trawl allocation	Form loose aggregations.	Pacific ocean perch, yellowtail rockfish, and canary rockfish.	0-436 m 33.5°-55° N. lat.
Squarespot	Minor slope rockfish trawl allocation	Tend to form schools, often consisting of hundreds to thousands individuals 10m above bottom.		18-224 m 28°-42° N. lat.

Species	Management	Schooling behavior	Co-occurring species when schooling	Depth and Latitude
Vermillion	Minor slope rockfish trawl allocation	Small aggregations.		15-436 m 28°-60° N. lat.
Widow	Species specific trawl allocation	Adults are frequently found in large schools, but can also be solitary. Adults form dense, irregular, midwater and semi-demersal schools deeper than 100 m at night and disperse in midwater during the day.	Co-occur with yellowtail rockfish, chilipepper, shortbelly rockfish, and bocaccio.	24-549 m 31.8°-56.5° N. lat.
Yellowtail	Species specific trawl allocation north, Minor slope rockfish trawl allocation south	Form large (sometimes greater than 1,000 fish) schools and can be found alone or in association with other rockfishes. Form schools, commonly within 2 m of the bottom sometimes the schools are several meters off of the bottom.		0-549 m 32.7°-55° N. lat.
Pacific whiting	Species specific trawl allocation	Extensive midwater aggregations.		0-920 m 24.5°-54.5° N. lat.
Sablefish	Species specific trawl allocation	Adults and large juveniles form schools.		0-1900 m 28°-55° N. lat.
Leopard shark	Managed under other fish unlimited trip limit	May form large nomadic schools.	May be mixed with gray or brown smoothhounds, sevengill shark, bat rays, or spiny dogfish.	0-91 m 23°-43° N. lat.
Spiny dogfish shark	Managed with trip limits	Often migrate in large schools.	Pelagic prey consisted of 80% of their diet and they consumed twice as much food in the summer as in the winter.	0-1236 m 30°-55° N. lat.

4.2.2 Non-Target Species

The biological resources covered in this subsection include those species that share the same marine environment both temporally and spatially with Pacific whiting (coastal stock), a principal species under consideration in this assessment, and share with the three rockfish species that comprise the pelagic rockfish species complex historically targeted with midwater trawl gear: widow, yellowtail, and chilipepper rockfish. Indices of population abundance of non-target FMP species are presented to provide biological context for what observed bycatch levels mean in terms of likely population level impacts. These indices included ACLs/HGs, directed fishery catch levels, and spawning population size. The data in this analysis are restricted to the years 2011-13, the first three years of IFQ groundfish program implementation. Data for the whiting targeted fishery are provided in Table 4-7. Bycatch sample data for the pelagic rockfish midwater trawl fishery are shown in Table 3-5.

An issue which might be of concern is whether some bycatch rates of non-target species might be higher during the earlier opening proposed in this EA for the Oregon and Washington whiting and nonwhiting midwater trawl fisheries. The last time the shorebased whiting fishery was open from May 15 through June 14 was prior to 1997. While the fishery at that time was a full retention fishery, the data recorded on fish tickets for some bycatch species is reported to be unreliable (e.g. data on eulachon and forage fish bycatch). Nevertheless, available 1993-96 landings data for whiting targeted trips has been analyzed for seasonal differences in incidental rates. Observer data for fishing pre-1997 fishing prior to June 15 is not available because the WCGOP was not in place until 2002.

Historic Early Season Shorebased Whiting Fishery Analysis. Target and non-target species fish ticket data for the shorebased whiting fishery during 1993-96 have been analyzed to determine if non-target species bycatch rates were any different during the periods May 15-June 14 and June 15-July 14 in that

fishery. During these years, the fishery was essentially a total retention fishery except for prohibited species, which had to be discarded or disposed of in some other manner and do not appear in fish ticket data. There were 86 categories of bycatch species or groups in the data (Table 4-5). The bycatch species of greatest abundance in these catches included, in order of abundance: yellowtail rockfish, widow rockfish, jack mackerel, and chub (Pacific) mackerel.

These data were converted for analytical purposes to bycatch pounds by category per pound of Pacific whiting. The mean bycatch rates were analyzed for statistical differences using a (two-tailed) t-test. Average bycatch pounds per pound of whiting for each bycatch category are shown in Figure 4-1. There were no statistical differences in any of the comparisons at the 95 percent confidence level. There were four differences at the 90 percent confidence level as follows: arrowtooth flounder (lower in May), miscellaneous fish/animals (higher in May), other groundfish (higher in May), and silvergrey rockfish (lower in May).

The miscellaneous fish/animals category has no biological context, nor does the category of other groundfish. For arrowtooth and silvergray rockfish, the rates were lower in May 15-June 14 than in June 15-July 14. The other groundfish category includes dogfish, for which there is evidence from the mothership sector of higher bycatch earlier in the year. However, while dogfish bycatch rates may be somewhat higher in May, they are substantially higher later in the year when the preponderance of incidental catch occurs. Further, the average bycatch per month for May 15 through June 14 was only 75 pounds. The conclusion reached here is that available shorebased whiting fishery data do not indicate bycatch rates for those species reported in the data should be affected by the Action Alternative in a manner that has a noticeable conservation affect as compared to the No Action Alternative. It should be clarified this conclusion does not extend to prohibited species (salmon, Dungeness crab, and Pacific halibut), which do not appear in the data, nor to forage fish species, for reasons cited above. Fishery impacts to these latter species or species groups are discussed in following sections.

Table 4-5. Shorebased directed whiting fishery landings by species (lbs.) during May 15-June 14 and June 15-July, 1994-1996.

	May 15-Jun 14				Jun 15-Jul 14			
CATEGORY	1994	1995	1996	Average	1994	1995	1996	Average
AURORA ROCKFISH	0	1	0	0	0	1	13	5
ARROWTOOTH FLOUNDER	78	163	28	90	74	209	270	184
BANK ROCKFISH	0	0	0	0	0	2	0	1
BOCACCIO	0	5	171	59	2	3,030	1,121	1,384
BLACK ROCKFISH	1	131	0	44	6	42	0	16
BLACKGILL ROCKFISH	0	4	28	11	0	107	154	87
NOM. BLACK ROCKFISH	0	0	0	0	0	0	72	24
BLUE SHARK	0	0	0	0	0	163	29	64
CHINOOK SALMON	5	0	0	2	0	121	0	40
CHILIPEPPER	0	146	0	49	0	168	1	56
CHUB MACKEREL	73,797	96,251	1,564	57,204	23,277	256,964	1,744	93,995
NOM. CANARY ROCKFISH	0	28	14	14	0	864	242	369
CANARY ROCKFISH	13	137	54	68	162	491	35	229
COWCOD ROCKFISH	0	2	0	1	0	33	0	11
DARKBLOTCHED ROCKFISH	25	364	6,830	2,406	105	876	3,439	1,473
DUNGENESS CRAB	0	0	0	0	0	26	0	9
DOVER SOLE	0	1	0	0	4	10,419	0	3,474
SPINY DOGFISH	969	148	7,339	2,819	939	33	119	364
NOM. DOVER SOLE	0	0	0	0	4,785	0	349	1,711
NOM. ENGLISH SOLE	0	0	0	0	0	0	960	320
ENGLISH SOLE	0	9	0	3	0	813	0	271
FLATHEAD SOLE	0	0	1	0	0	0	0	0
GREENBLOTCHED ROCKFISH	0	0	0	0	0	1	0	0
UNSP. GRENADIERS	0	0	0	0	10,485	0	0	3,495
GREENSPOTTED ROCKFISH	0	8	0	3	0	1	0	0
GREENSTRIPED ROCKFISH	3	497	947	482	23	1,462	474	653
JACK MACKEREL	6,895	8,061	119,730	44,895	18,465	135,595	89,028	81,029
NOM. LINGCOD	0	0	0	0	0	0	13	4
LINGCOD	7	40	66	38	19	2,446	71	845
LONGSPINE THORNYHEAD	0	0	0	0	6,554	0	0	2,185

	May 15-Jun 14				Jun 15-Jul 14			
CATEGORY	1994	1995	1996	Average	1994	1995	1996	Average
MISC. FISH/ANIMALS	647	3,894	2,653	2,398	135	1,712	1,374	1,074
MISC. FISH	0	0	0	0	38	3	0	14
MARKET SQUID	445	345	421	404	296	321	157	258
UNSP. OCTOPUS	0	0	0	0	0	0	101	34
OTHER GROUNDFISH	0	164	60	75	0	0	0	0
OTHER SHARK	27	0	0	9	0	0	0	0
PACIFIC COD	1,179	8	6	398	48	359	37	148
PACIFIC SANDDAB	0	0	0	0	0	0	55	18
PYGMY ROCKFISH	0	63	0	21	0	0	0	0
PACIFIC HERRING	2,237	14,505	1,109	5,950	2,857	11,057	1,273	5,062
PACIFIC OCEAN PERCH	29	94	1,766	630	34	4,301	5,656	3,330
GEN. SHELF/SLOPE RF	7,277	28,080	2,286	12,548	10,000	12,138	19,052	13,730
NOM. POP	901	159	5,456	2,172	4,306	22	6,457	3,595
PACIFIC SARDINE	2	0	10	4	0	0	0	0
NOM. PETRALE SOLE	0	0	0	0	0	0	1,302	434
PETRALE SOLE	0	12	0	4	0	905	0	302
PACIFIC WHITING	29,715,343	58,624,079	25,218,645	37,852,689	24,159,215	62,445,520	48,898,815	45,167,850
QUILLBACK ROCKFISH	0	0	0	0	0	0	4	1
SPOTTED RATFISH	0	0	0	0	0	2	0	1
ROCK CRAB	0	0	0	0	2	0	0	1
REDBANDED ROCKFISH	2	19	128	50	9	197	314	173
REDSTRIPE ROCKFISH	6	1,400	996	800	26	7,936	4,655	4,206
REX SOLE	0	0	1	0	0	0	0	0
NOM. REX SOLE	0	0	0	0	0	0	163	54
ROUGHEYE ROCKFISH	2	13	106	40	10	6,586	927	2,508
ROCK SOLE	0	0	0	0	0	11,639	0	3,880
ROSETHORN ROCKFISH	0	30	66	32	1	3	22	9
SABLEFISH	10,458	16,721	23,396	16,858	21,778	27,927	12,107	20,604
SHORTBELLY ROCKFISH	0	3	11	4	0	0	3	1
UNSP. SHAD	15,365	5,115	35,117	18,532	19,361	7,682	9,391	12,145
SHARPCHIN ROCKFISH	2	427	1,510	646	12	1,591	838	813
SILVERGREY ROCKFISH	1	3	207	70	11	2,857	2,333	1,734
SPLITNOSE ROCKFISH	2	97	177	92	7	222	90	106
UNSP. SQUID	46	0	0	15	0	0	0	0
NOM. SQUARESPOT	0	0	0	0	1	0	0	0

	May 15-Jun 14				Jun 15-Jul 14			
CATEGORY	1994	1995	1996	Average	1994	1995	1996	Average
SHORTRAKER ROCKFISH	7	27	275	103	27	499	385	304
NOM. SHORTSPINE THORNYHEAD	0	10	0	3	0	4	1	2
SHORTSPINE THORNYHEAD	79	0	0	26	1,916	0	0	639
STRIPETAIL ROCKFISH	0	0	0	0	0	176	0	59
THORNYHEADS (MIXED)	20	0	0	7	20	0	0	7
TIGER ROCKFISH	0	0	0	0	1	0	0	0
COMMON THRESHER SHARK	0	242	0	81	0	0	54	18
UNSP. SANDDABS	0	0	0	0	0	0	2,789	930
UNSP. MACKEREL	488	0	89,358	29,949	5,910	0	5,771	3,894
UNSP. ROCKFISH	2,526	1,241	2,767	2,178	1,631	2,749	5,149	3,176
UNSP. SKATE	0	2	82	28	151	249	7,432	2,611
UNSP. SHARK	21	0	0	7	0	0	0	0
UNSP. TURBOTS	0	0	0	0	0	0	80	27
WIDOW ROCKFISH	57,007	107,296	125,142	96,482	71,831	166,469	210,706	149,669
NOM. WIDOW ROCKFISH	0	21,194	50	7,081	179	17,792	342	6,104
WOLF EEL	0	0	0	0	0	0	27	9
NOM. YELLOWEYE ROCKFISH	0	0	0	0	0	7	0	2
YELLOWEYE ROCKFISH	1	25	15	14	5	145	241	131
YELLOWMOUTH ROCKFISH	0	4	0	1	8	234	497	246
NOM. YELLOWTAIL ROCKFISH	87,270	49,223	14,322	50,272	11,171	124,650	39,825	58,549
YELLOWTAIL ROCKFISH	21,837	90,276	72,890	61,668	42,409	152,678	155,171	116,753
GRAND TOTALS	30,005,019	59,070,768	25,735,799	38,270,529	24,418,306	63,422,499	49,491,728	45,777,511

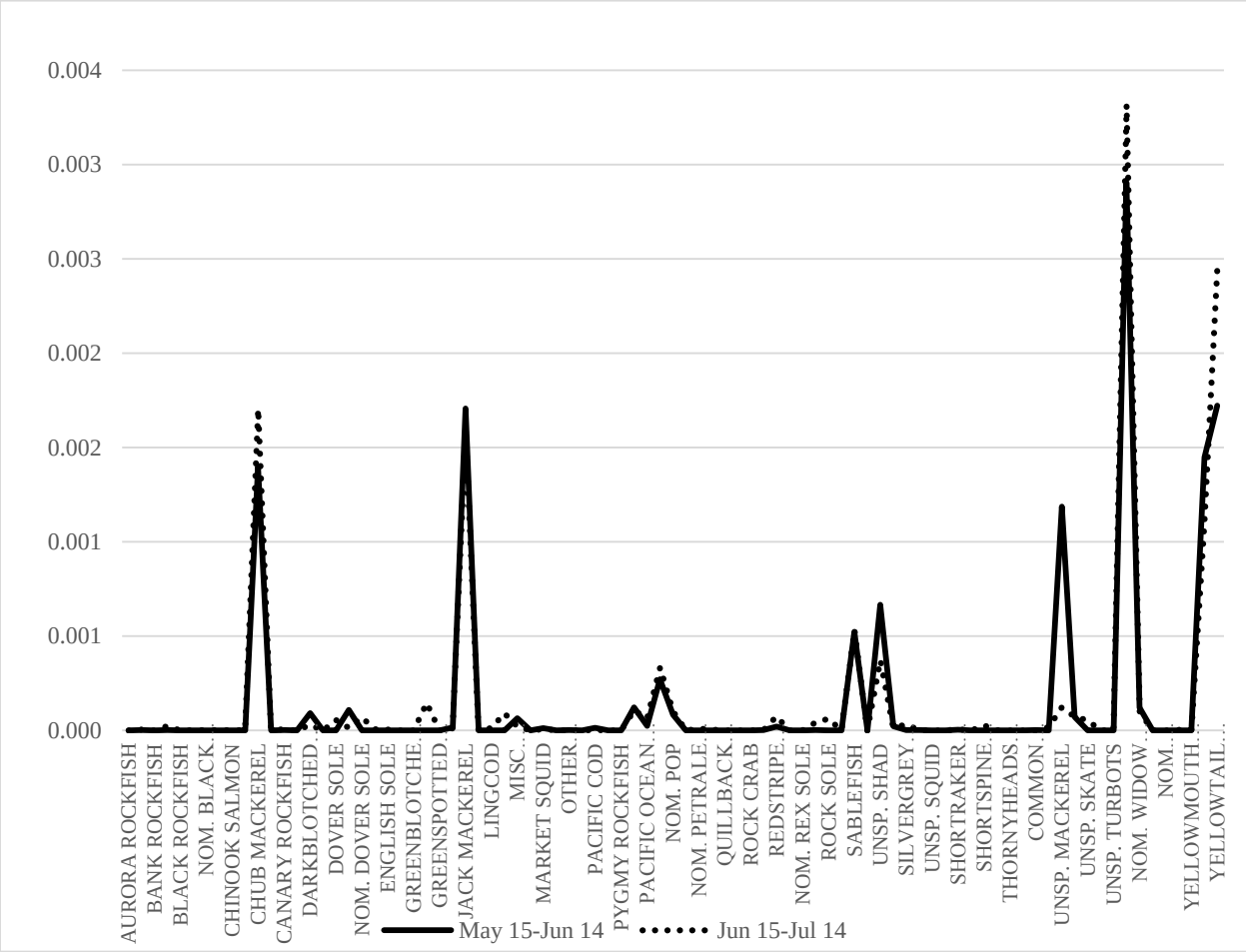

Figure 4-1. Average pounds of bycatch species per pound of Pacific whiting caught during May 15-Jun 14 and Jun 15-Jul 14, 1993-1996.

Historic Early Season Nonwhiting Midwater Fishery Analysis. An analysis of historic early season (May 15-June 14) nonwhiting midwater fishery data similar to that done for the shorebased whiting fishery was not attempted because the bycatch discard rate was known to be substantially higher (such that fish ticket data on landings would not be informative), but there was no observer program data available until 2002, after the fishery was all but closed to protect overfished widow rockfish.

Recent Years Early Season Mothership Analysis. The at-sea whiting sectors include catcher/processors and motherships, the latter of which depend on catcher vessels to deliver whiting to them for processing. The catcher vessels for motherships are largely the same vessels that deliver to shorebased processors as shown in Table 3-13. The at-sea sectors have long had a primary whiting season opening of May 15, whereas the shorebased season has opened off Oregon and Washington on June 15. The primary season off California has traditionally opened in April, but at-sea processing has been prohibited off California for many years. This staggered opening off Oregon and Washington has allowed shorebased catcher vessels to deliver fish to motherships for a full month prior to the shorebased fishery opening off Oregon and

Washington. The earlier opening in the at-sea sectors has allowed those vessels to conveniently move between fishing in the Council area during May and early June to fishing off Alaska during summer months.

An analysis was done of the bycatch rates observed in the mothership sector to determine if the May 15 opening in the Council area has produced higher (or lower) bycatch rates compared to bycatch rates observed after June 15 when the shorebased fishery has been open. The hypothesis being tested was that there is no difference in bycatch rates in the mothership fishery during May 15-June 14 compared to bycatch rates in the mothership fishery during June 15-July 14. While this analysis may show the potential for differences in bycatch rate in the whiting fishery, it is not clear that such an analysis of the seasonality of catcher vessels delivering to motherships is applicable to an earlier opening for the shorebased fishery. The gear used by the catcher vessels is likely the same, but the areas fished may not be comparable because of different operational constraints between at-sea and shorebased delivery strategies in terms of delivering fish for processing in a timely matter. It is important that whiting are processed, even though chilled, within 24 hours of harvesting (Morrissey, et. al. 1998). At-sea operations likely allow for a broader and wider fishing area because of their greater mobility, compared to the fixed delivery locations for the shorebased sector and the need for catcher vessels to stay within close proximity of those facilities as possible. These differences may affect the species and amounts of bycatch the offshore and shorebased operations may encounter. As one example of the differences between these fisheries, recent reports indicate that there is a much higher bottom contact rate in the shorebased fishery as compared to the mothership fishery (NMFS 2014b). However, the other information available indicating possible seasonal differences in bycatch rates is nearly 20 years old (see analysis of the 1994-1996 shorebased fishery data). Results here should only be considered indicators of possibility, and not definitive with respect to the existence or non-existence of seasonal differences for the months in question. If the Action Alternative is selected, because there is 100 percent at-sea monitoring, set harvest levels, and a responsive management system, the fishery will provide the definitive answer to this question. In addition, stock insensitivities to small increases in harvest for a few years are such that an adaptive management response will allow conservation objectives to be met.

The years of data included in the analysis of the mothership sector were 2007-2008, 2011, and 2013. These were the most recent years since 2007 in which "paired data" (for the two periods of analysis) were available for analysis. This was because June 15-July 14 data were missing for 2009, 2010, and 2012, presumably because there was no mothership activity for that period during those years.

The data reflect a total of 78 categories of fish and invertebrates in the catch during the years and periods used in this analysis (Table 4-6). The catch of nonwhiting species or species groups ranged from 0.4 percent to 2.4 percent and averaged 0.6 percent of the total catch during May 15-June 14 of the study years. The catch of nonwhiting species or species groups ranged from 0.2 percent to 0.5 percent and averaged 0.4 percent of the total catch during June 15-July 14 of the study years. Yellowtail rockfish and widow rockfish combined made up most of the bycatch in all periods and years, with one exception: a relatively large catch of unidentified sharks occurred during June 15-July 14 of 2013.

For analytical purposes, weight of bycatch species by period and years were converted to bycatch rates measured as weight of bycatch species caught to weight of whiting caught in the same stratum (8 strata total). The species means of these data for the two study periods are shown in Table 4-6. A two-tailed test was used to analyze differences in species catch rates between the two study periods, May 15-June 14, and

June 15-July 14. Two levels of significance in differences were applied to the results: 90 percent confidence and 95 percent confidence. The analysis assumes that the variances are the same between the comparisons.

There were no significant differences in any of the comparisons (78 total), with the following exceptions (May refers to May 15-June 14 and June refers to Jun 15-July 14):

- Rougheye rockfish had a significantly higher (95 percent level) catch rate in May than in June.
- Silvergray rockfish had a significantly higher (90 percent level) catch rate in May than in June.
- Unspecified squid had a significantly higher (95 percent level) catch rate in May than in June.
- Unknown species had a significantly higher (90 percent level) catch rate in May than in June.

It may be important to note that while not statistically different, the catch rate for Chinook salmon was lower in May than in June (61 percent), but the catch rate for Pacific halibut was higher in May than in June (71 percent). The catch rate difference for Eulachon, an endangered species, was slightly lower in May than in June (24 percent).

The two rockfish species of concern here (rougheye and silvergray) are managed as part of the minor slope rockfish and minor shelf rockfish complexes, respectively, under the IFQ program for which QP is required to cover such impacts. The squid impact, likely of Humboldt squid, involves a migratory species which has extended its usual range northward in recent years and is not a species of major concern except as a major fish predator. The "unknown species" impact has no biological context and may be due to smashing of fish in the codend to the extent that the observer was not able to determine species but could determine total weight of flesh. Lack of significance for other species could be because there is no difference or because of a small sample size. Statistical significance for identified species/species groups is not the same as biological significance for the purpose of assessing impacts. As will be discussed below (Section 4.2.2.1.1) in relation to Table 4-6, the impact rates on these species is so low that even a statistically significant bycatch rate is not likely to have a noticeable effect on the populations of the bycatch species.

Taken collectively, the mothership data analyzed for this EA do not indicate that earlier fishing in that sector has resulted in increased bycatch impacts over those that have occurred in the fishery after June 15 when the shorebased fishery has opened. Whether these results can be applied to the earlier season opening proposal for the shorebased fishery is problematic, because of fishery area differences between the two fisheries. However, the results do not suggest there should be any difference in impact by opening the season earlier in the shorebased fishery compared to the No Action Alternative. Again, full at-sea monitoring and opportunity for an adaptive management response will ensure that there are no problematic adverse impacts to overfished groundfish.

Table 4-6. Weight (mt) of Pacific whiting and non-target species by common name delivered to motherships by period, May 15-Jun 14 and Jun 15-Jul 14, 2007, 2008, 2011 and 2013 (NORPAC Report from PacFIN).

			May 15-Jun 14					Jun 15-Jul 14		
Common Name	2007	2008	2011	2013	Mean	2007	2008	2011	2013	Mean
AURORA ROCKFISH	0.0007	0.0000	0.0000	0.0010	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000
ARROWTOOTH FLOUNDER	0.6129	1.1443	0.7902	1.3132	0.9652	0.0554	0.0635	0.1050	0.0567	0.0701
BANK ROCKFISH	0.2035	0.0101	0.0000	0.0000	0.0534	0.0000	0.0000	0.0000	0.0000	0.0000
BOCACCIO	0.0429	0.0731	0.0667	0.1570	0.0849	0.0007	0.0010	0.0184	0.0000	0.0050
BLACK ROCKFISH	0.0017	0.0000	0.0000	0.0000	0.0004	0.0000	0.0019	0.0000	0.0000	0.0005
BLACKGILL ROCKFISH	0.0000	0.0000	0.0000	0.0035	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000
BIG SKATE	0.2830	0.2493	0.0000	0.0245	0.1392	0.0299	0.0352	0.0374	0.0362	0.0347
BLUE SHARK	0.0281	0.0000	0.0000	0.0000	0.0070	0.0000	0.0000	0.0000	0.0539	0.0135
CALIFORNIA HALIBUT	0.0000	0.0303	0.0000	0.0000	0.0076	0.0000	0.0000	0.0000	0.0000	0.0000
CHINOOK SALMON	0.9532	0.4744	0.7218	0.3117	0.6153	0.7911	0.3631	0.1663	0.1694	0.3725
CHUM SALMON	0.2703	0.0065	0.0300	0.0000	0.0767	0.0744	0.0619	0.0159	0.0000	0.0380
CHILIPEPPER	0.3174	0.4586	0.0023	0.0000	0.1946	0.0000	0.0016	0.0000	0.0000	0.0004
CHUB MACKEREL	0.0011	0.0000	0.0000	0.0000	0.0003	0.1364	0.0000	0.0000	0.0013	0.0344
CANARY ROCKFISH	1.5469	0.6751	0.0542	0.3428	0.6547	0.0713	0.0500	0.0193	0.0839	0.0561
COHO SALMON	0.0800	0.0058	0.0073	0.0046	0.0244	0.2682	0.0327	0.0000	0.0000	0.0752
DARKBLOTCHED ROCKFISH	6.7146	3.8627	0.5782	1.0097	3.0413	0.0000	0.0012	0.0000	1.6432	0.4111
DUNGENESS CRAB	0.0158	0.0018	0.0000	0.0000	0.0044	0.0000	0.0021	0.0012	0.0377	0.0102
DOVER SOLE	0.0159	0.0010	0.0000	0.0000	0.0042	0.0030	0.0000	0.0000	0.0000	0.0008
SPINY DOGFISH	19.8415	15.3544	1.4501	0.7395	9.3464	3.3434	0.6261	0.8780	0.0843	1.2329
ENGLISH SOLE	0.0024	0.0004	0.0000	0.0000	0.0007	0.0000	0.0003	0.0000	0.0000	0.0001
EULACHON	0.0002	0.0002	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0012	0.0003
FLATHEAD SOLE	0.0009	0.0005	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000
GREENSTRIPED ROCKFISH	0.0041	0.0000	0.0000	0.0000	0.0010	0.0013	0.0000	0.0000	0.0000	0.0003
GREENLAND TURBOT	0.0000	0.0011	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000
HARLEQUIN ROCKFISH	0.0000	0.0014	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000
JACK MACKEREL	0.0309	0.0134	0.0000	0.0000	0.0111	0.0095	0.0584	0.0000	0.0631	0.0328
LINGCOD	3.8777	2.4029	0.0602	0.1536	1.6236	0.3533	0.2233	0.0481	0.3527	0.2444

			May 15-Jun 14					Jun 15-Jul 14		
Common Name	2007	2008	2011	2013	Mean	2007	2008	2011	2013	Mean
LONGNOSE SKATE	0.3145	0.0956	0.0000	0.0000	0.1025	0.1416	0.0000	0.0000	0.0219	0.0409
MISC. FISH/ANIMALS	0.1697	0.1052	0.0015	0.0158	0.0730	0.0233	0.0099	0.0000	0.2087	0.0605
MOLA/OCEAN SUNFISH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2225	0.0000	0.0000	0.0556
MISC. FISH	0.9014	2.3140	1.5865	0.0193	1.2053	0.0005	0.6197	0.0000	0.0127	0.1582
NORTHERN ANCHOVY	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNSP. OCTOPUS	0.0141	0.0179	0.0013	0.0157	0.0123	0.0000	0.0291	0.0000	0.0000	0.0073
OTHER SHARK	2.0181	0.4762	0.1784	0.3840	0.7642	0.1500	0.1313	0.0000	3.6607	0.9855
PACIFIC COD	0.0000	0.0442	0.0000	0.0000	0.0110	0.0049	0.0186	0.0000	0.0000	0.0059
PACIFIC SANDDAB	0.0000	0.0005	0.0000	0.0000	0.0001	0.0000	0.0013	0.0000	0.0047	0.0015
PACIFIC HALIBUT	0.5899	0.6105	0.0539	0.1018	0.3390	0.0276	0.0146	0.0000	0.1092	0.0379
PACIFIC HERRING	0.0140	0.0118	0.0000	0.0020	0.0069	0.0130	0.0005	0.0002	0.0000	0.0034
PINK SALMON	0.0073	0.0000	0.0027	0.0026	0.0031	0.0121	0.0000	0.0000	0.0000	0.0030
WALLEYE POLLOCK	0.0000	0.0000	0.0000	0.0020	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000
PACIFIC POMFRET	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0031	0.0000	0.0000	0.0008
PACIFIC OCEAN PERCH	0.7281	2.9131	0.1693	0.9053	1.1789	0.0000	0.0015	0.0000	0.0608	0.0156
PROWFISH	0.0194	0.0000	0.0000	0.0000	0.0049	0.0000	0.0000	0.0000	0.0000	0.0000
PACIFIC SARDINE	0.0970	0.2062	0.0000	0.0000	0.0758	0.2013	0.0060	0.0000	0.0002	0.0519
PETRALE SOLE	0.0054	0.0000	0.0000	0.0000	0.0013	0.0005	0.0000	0.0000	0.0000	0.0001
PACIFIC WHITING	42,796.1	31,483.9	14,751.9	8,058.2	24,272.5	5,013.8	4,040.8	3,674.0	6,011.5	4,685.0
QUILLBACK ROCKFISH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0004
SPOTTED RATFISH	0.0019	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000
REDBANDED ROCKFISH	0.0000	0.0075	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000	0.0000
REDSTRIPE ROCKFISH	1.1392	0.0115	0.0090	0.0000	0.2899	0.0000	0.0038	0.0000	0.0000	0.0009
REX SOLE	0.0990	0.0279	0.0000	0.0000	0.0317	0.0038	0.0007	0.0000	0.0037	0.0021
ROUGHEYE ROCKFISH	1.7141	2.8046	1.5058	0.6622	1.6717	0.0000	0.0000	0.0000	0.2996	0.0749
SABLEFISH	0.0684	0.1096	0.0096	0.0020	0.0474	0.0261	0.0042	0.0060	0.0098	0.0115
SHORTBELLY ROCKFISH	0.0057	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000	0.0000	0.0117	0.0029
UNSP. SHAD	2.4987	0.1496	16.2428	0.0304	4.7304	1.0731	0.0091	0.1987	0.0496	0.3326
SHARPCHIN ROCKFISH	0.9129	0.0000	0.0000	0.0000	0.2282	0.0000	0.0000	0.0000	0.0041	0.0010

			May 15-Jun 14					Jun 15-Jul 14		
Common Name	2007	2008	2011	2013	Mean	2007	2008	2011	2013	Mean
SILVERGREY ROCKFISH	0.0538	0.0350	0.0225	0.0238	0.0338	0.0000	0.0028	0.0000	0.0062	0.0023
SLENDER SOLE	0.0001	0.0003	0.0000	0.0000	0.0001	0.0007	0.0000	0.0000	0.0000	0.0002
UNSP. SMELT	0.0000	0.0314	0.0000	0.0000	0.0079	0.0000	0.0050	0.0000	0.0000	0.0013
SPLITNOSE ROCKFISH	1.7465	0.1942	0.0006	0.0016	0.4857	0.0000	0.0000	0.0000	1.0770	0.2692
SANDPAPER SKATE	0.0019	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000
UNSP. SQUID	7.6248	6.4653	3.0937	1.1159	4.5749	0.0000	0.4892	0.0783	0.6608	0.3071
SHORTRAKER ROCKFISH	0.0248	0.0064	0.0000	0.0000	0.0078	0.0000	0.0000	0.0000	0.0000	0.0000
SHORTSPINE THORNYHEAD	0.0700	0.0730	0.0000	0.0034	0.0366	0.0000	0.0000	0.0000	0.0080	0.0020
SOUPFIN SHARK	0.3166	0.0811	0.0000	0.0000	0.0994	0.0000	0.0193	0.0000	0.2309	0.0626
STRIPETAIL ROCKFISH	0.0205	0.0000	0.0000	0.0000	0.0051	0.0000	0.0000	0.0000	0.0000	0.0000
THORNYHEADS (MIXED)	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNSP. FLATFISH	0.0010	0.0242	0.0000	0.0000	0.0063	0.0000	0.0154	0.0000	0.0000	0.0038
UNSP. ROCKFISH	0.0012	0.0124	0.0320	0.0000	0.0114	0.0000	0.0000	0.0000	0.0000	0.0000
UNSP. ROUNDFISH	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNSP. SKATE	0.0346	0.0000	0.0000	0.0000	0.0086	0.0000	0.0000	0.0000	0.0000	0.0000
UNSP. SHARK	0.0331	0.0000	0.0000	0.0000	0.0083	0.0000	0.0000	0.0000	0.0000	0.0000
UNSP. OCEAN SHRIMP	0.0002	0.0002	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0009	0.0002
WIDOW ROCKFISH	69.9008	52.6767	7.9570	2.8050	33.3348	2.9179	2.4457	0.1114	1.2139	1.6723
WOLF EEL	0.0000	0.0017	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000
UNKNOWN SPECIES	0.0685	0.0685	0.0056	0.0371	0.0449	0.0000	0.0002	0.0000	0.0007	0.0002
YELLOWMOUTH ROCKFISH	0.0176	0.0014	0.0102	0.0000	0.0073	0.0000	0.0000	0.0000	0.0000	0.0000
YELLOWTAIL ROCKFISH	25.768	54.545	31.421	187.846	74.895	13.644	6.437	16.992	1.548	9.655
GRAND TOTAL	42,948	31,633	14,818	8,256	24,414	5,037	4,053	3,693	6,023	4,701
PROPORTION NON-TARGET SPECIES	0.354%	0.471%	0.446%	2.399%	0.578%	0.464%	0.296%	0.506%	0.196%	0.350%

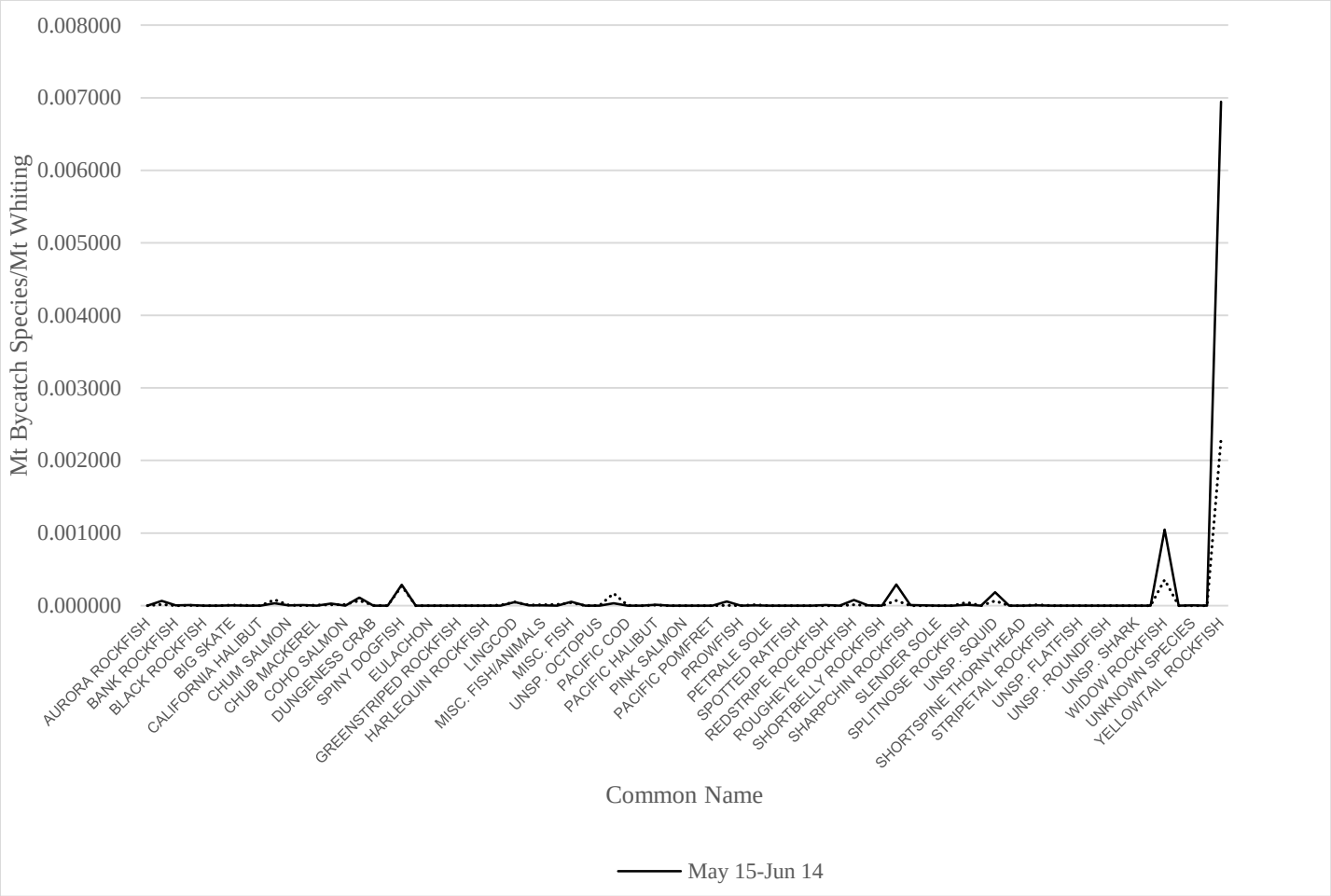

Figure 4-2. Mean catch rates of bycatch species during May 15-June 14 and June 15-July 14 in the mothership fishery during the study years.

4.2.2.1 *Non-Target Groundfish*

For the analysis in the following, the emphasis is on relative impacts of the midwater trawl fisheries under current primary whiting season structure on indices of bycatch species ocean population sizes.

4.2.2.1.1. Overfished Groundfish

Shorebased Whiting Fishery. There currently are six overfished rockfish stocks (bocaccio south of 40º 10' N. latitude, canary rockfish, cowcod south of 40º 10' N. latitude, darkblotched rockfish, Pacific ocean perch, and yelloweye rockfish) and one overfished flatfish stock (petrale sole) managed under rebuilding plans. With the exception of cowcod and overfished bocaccio rockfish (south of 40º 10' N. latitude), these occur as bycatch, in varying amounts, in the Pacific whiting shorebased fishery as shown in Table 3-4, and for the pelagic rockfish fishery in Table 3-5. Cowcod and overfished bocaccio have not been taken in the whiting midwater fishery in recent years. In Table 4-7, maximum annual catches of overfished groundfish species during 2011-2013 are compared to the shoreside whiting fishery allocations for those species. The data show that for five species (overfished bocaccio, darkblotched rockfish, cowcod, yelloweye rockfish, and Petrale sole) the fishery took less than 2 percent of the respective allocations. The impacts were higher for two species: Pacific Ocean perch at 11.34 percent and canary rockfish at 8.4 percent.

Table 4-7. Estimated catches in mt of target and non-target species in shorebased directed whiting fishery landings during 2011-2013, including species abundance reference points and reference point impact proportions (Source: 2007-2012 from the 2012 multiyear data product (Bellman, et al. 2013); 2013 groundfish data from the 2013 groundfish mortality report provided by the WCGOP; 2013 data for nongroundfish data is from fish tickets[a/]).

	2011-2013					
Row Labels	**Average**	**Max**	**Reference Point**	**Type of Reference Point**	**Proportion of Reference Point**	**Reference**
Target Species						
Pacific Hake	84,466.146	97,327.455	85,679	SB Trawl Allocation: 2013		NMFS 2014a
Non-Target Species						
Groundfish IFQ Species						
Overfished Groundfish						
Bocaccio rockfish (South of 40°10' N. lat.)	0.000	0.000	75	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Canary rockfish	2.115	3.357	40	SB Trawl Allocation: 2013	8.39%	NMFS 2014a
Cowcod rockfish (South of 40°10' N. lat.)	0.000	0.000	1	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Darkblotched rockfish	2.933	4.326	267	SB Trawl Allocation: 2013	1.62%	NMFS 2014a
Pacific Ocean Perch (North of 40°10' N. lat.)	6.575	12.357	109	SB Trawl Allocation: 2013	11.34%	NMFS 2014a
Petrale Sole	0.001	0.001	2,318	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Yelloweye Rockfish	0.000	0.000	1	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Non-Overfished Groundfish						
Arrowtooth flounder	14.322	24.819	3,846	SB Trawl Allocation: 2013	0.65%	NMFS 2014a
Chilipepper rockfish (South of 40°10' N. lat.)	0.000	0.000	1,100	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Dover sole	0.265	0.598	22,234	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
English sole	0.017	0.027	6,365	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Lingcod (North of 42° N. lat.)	5.567	8.426	1,223	SB Trawl Allocation: 2013	0.69%	NMFS 2014a
Lingcod (South of 42° N. lat.)	0.000	0.000	494	SB Trawl Allocation: 2013	0.00%	NMFS 2014a

	2011-2013					
Row Labels	**Average**	**Max**	**Reference Point**	**Type of Reference Point**	**Proportion of Reference Point**	**Reference**
Longspine Thornyhead (North of 34°27' N. lat.)	0.018	0.053	1,860	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Minor shelf rockfish (North of 40°10' N. lat.)		1.524	508	SB Trawl Allocation: 2013	0.30%	NMFS 2014a
Bocaccio Rockfish	0.264	0.507				
Chilipepper Rockfish	0.006	0.010				
Greenblotched Rockfish	0.000	0.000				
Greenspotted Rockfish	0.000	0.000				
Greenstriped Rockfish	0.035	0.050				
Redstripe Rockfish	0.051	0.112				
Rosethorn Rockfish	0.063	0.175				
Shelf Rockfish Unid	0.027	0.069				
Silvergray Rockfish	0.439	0.595				
Stripetail Rockfish	0.006	0.006				
Minor slope rockfish (North of 40°10' N. lat.)		72.152	777	SB Trawl Allocation: 2013	9.29%	NMFS 2014a
Aurora Rockfish	0.273	0.458				
Bank Rockfish	0.024	0.036				
Blackgill Rockfish	0.097	0.234				
Blackspotted Rockfish	0.041	0.122				
Redbanded Rockfish	0.347	0.830				
Rougheye Rockfish	18.015	47.080				
Sharpchin Rockfish	0.300	0.657				
Shortraker Rockfish	2.884	5.632				
Slope Rockfish Unid	0.107	0.143				
Splitnose Rockfish	8.698	16.441				
Yellowmouth Rockfish	0.199	0.520				
Other flatfish		4.466	4,190	SB Trawl Allocation: 2013	0.11%	NMFS 2014a
Flatfish Unid	0.004	0.009				
Flathead Sole	0.001	0.002				
Pacific Sanddab	0.034	0.066				
Rex Sole	1.877	4.388				
Rock Sole	0.000	0.001				
Sand Sole	0.000	0.000				
Sanddab Unid	0.000	0.000				

	2011-2013					
Row Labels	**Average**	**Max**	**Reference Point**	**Type of Reference Point**	**Proportion of Reference Point**	**Reference**
Pacific Cod	2.225	6.594	1,125	SB Trawl Allocation: 2013	0.59%	NMFS 2014a
Sablefish (North of 36° N. lat.)	26.087	47.211	1,828	SB Trawl Allocation: 2013	2.58%	NMFS 2014a
Shortspine Thornyhead (North of 34°27' N. lat.)	4.599	8.319	1,385	SB Trawl Allocation: 2013	0.60%	NMFS 2014a
Starry flounder	0.000	0.000	752	SB Trawl Allocation: 2013	0.00%	NMFS 2014a
Widow Rockfish	155.468	236.029	994	SB Trawl Allocation: 2013	23.75%	NMFS 2014a
Yellowtail rockfish (North of 40°10' N. lat.)	411.042	424.328	2,635	SB Trawl Allocation: 2013	16.10%	NMFS 2014a
Landing Limit Species						
Black rockfish (North of 46°16' N. lat.)	0.001	0.001				
Black rockfish (South of 46°16' N. lat.)	0.000	0.000				
Nearshore Rockfish Unid	0.000	0.000				
Quillback Rockfish	0.000	0.000				
Spiny Dogfish Shark	140.564	181.037	2,101	SB Trawl Allocation: 2015	8.62%	Council staff
Non-Landing Limit Groundfish						
Longnose skate	0.171	0.236				
Mixed thornyheads	0.000	0.000				
Other groundfish						
Big Skate	0.079	0.236				
Grenadier Unid	0.002	0.006				
Groundfish Unid	0.597	1.359				
Skate Unid	0.279	0.580				
Shortbelly Rockfish	0.738	2.138				
Soupfin Shark	0.392	0.643				
Spotted Ratfish	0.003	0.004				
Nongroundfish						
Endangered Species						
Eulachon	0.028	0.083	(19472739)	Ocean Abundance	See Text	BioOp
Prohibited Species						
Dog (Chum) Salmon b/	0.065	0.183	(1500000)	Population Index	See Text	WDFW 2014
Dungeness Crab	0.012	0.034	5,491	Population Index	0.00%	ODFW 2014

	2011-2013					
Row Labels	**Average**	**Max**	**Reference Point**	**Type of Reference Point**	**Proportion of Reference Point**	**Reference**
King (Chinook) Salmon b/	6.582	12.474	586	Population Index	2.13%	PFMC 2014d
Pink (Humpback) Salmon b/	3.855	11.564	(6500000)	Population Index	See Text	SU 2013
Red (Sockeye) Salmon b/	0.002	0.003	(614179)	Population Index	See Text	FPC 2014
Salmon Unid b/	0.015	0.046				
Silver (Coho) Salmon b/	0.189	0.413	(109400)	Population Index	See Text	PFMC 2014d
Pacific Halibut b/	0.406	0.634	107	SB Trawl Allocation: 2013	0.59%	NMFS 2014
CPS						
Market Squid	0.008	0.012	107,048	Harvest Guideline: 2011	0.00%	PFMC 2011b
Northern Anchovy	0.000	0.000	9,750	Harvest Guideline: 2011	0.00%	PFMC 2011b
Pacific Mackerel	1.763	3.416	40,514	Harvest Guideline: 2011	0.01%	PFMC 2011b
Pacific Sardine	0.076	0.166	50,526	Harvest Guideline: 2011	0.00%	PFMC 2011b
Jack Mackerel	60.197	117.121	31,000	Harvest Guideline: 2011	0.38%	PFMC 2011b
HMS						
Albacore Tuna	0.000	0.000	13,904	West Coast Commercial Catch: 2012	0.00%	PFMC 2014b
Bonito (Shortfin Mako) Shark	0.109	0.230	27	West Coast Commercial Catch: 2012	0.85%	PFMC 2014b
Blue Shark	0.172	0.357	0.2	West Coast Commercial Catch: 2012	c/	PFMC 2014b
Common Thresher Shark	1.837	4.605	70	West Coast Commercial Catch: 2012	6.58%	PFMC 2014b
Other Nongroundfish						
American Shad	58.691	146.546				
Bivalves Unid	0.000	0.000				
Black Skate	0.003	0.010				
Brown Cat Shark	6.262	14.311				

	2011-2013					
Row Labels	**Average**	**Max**	**Reference Point**	**Type of Reference Point**	**Proportion of Reference Point**	**Reference**
California Mussel	0.000	0.000				
Echinoderm Unid	0.000	0.000				
Fish Unid	0.022	0.067				
Hagfish Unid	0.000	0.000				
Jellyfish Unid	0.000	0.001				
Mackerel Unid	1.137	2.835				
Mixed Species	0.671	0.975				
Mola Mola (Sunfish)	0.057	0.171				
Octopus Unid	0.010	0.022				
Other Nongroundfish	0.183	0.324				
Pacific Herring	0.236	0.651				
Pacific Pomfret	0.001	0.002				
Pink Shrimp	0.000	0.000				
Prowfish	0.000	0.000				
Sea Cucumber Unid	0.000	0.000				
Shark Unid	5.206	8.958				
Shrimp Unid	0.000	0.000				
Smelt Unid	0.029	0.087				
Squid Unid	18.710	22.532				
Walleye Pollock	0.000	0.000				
White Sturgeon	0.000	0.000				
Wolf-eel	0.000	0.000				
Grand Total	**85,440.534**	**n/a**				
Non-Target Species Totals	**974.388**	**n/a**				
Non-Target Species Proportion	**0.011**	**n/a**				

a/ The whiting fishery is a full retention fishery, therefore 2013 fish ticket data on nongroundfish species landed may be reasonably comparable to observer data for these species from earlier years. The main difference between 2013 observer and 2013 fish ticket data would be that the observer data would include expansions for nonselective discards (e.g. net bleeds) and data on the species landed may not be broken out in as much detail as observer data. Less than one half of one percent of the hake was discarded at sea. With the exception of the salmon data (for which 2013 data is not included and 2014 data is provided in Chapter 4) these data source differences will not affect the substantial conclusions of this analysis.
b/ Data for 2013 not included because of incomplete reporting on fish tickets.
c/ Blue shark is a non-target species. Landings, which are very small, do not indicate the magnitude of the actual catch, thus no analysis is presented as it is for the other species in this category. See the text for more information on blue shark.

Nonwhiting Midwater Trawl Fishery. An analysis of nonwhiting midwater trawl trips observed during 2012 and 2013 was done to compare those catch levels with 2013 shorebased trawl fishery allocations (Table 4-8). Nonwhiting trips are distinguished from whiting trips based on catch composition (there is no binding regulatory distinction for what constitutes a whiting or nonwhiting midwater trawl trip). Those observations covered the entire fishery because 100 percent observer coverage was required of all IFQ fishers who were required to cover their IFQ species impacts with QP. The bycatch of overfished groundfish caught in the nonwhiting midwater trawl fishery during the second and third years of the IFQ program are compared to 2013 overfished groundfish shorebased trawl fishery allocations in Table 4-8 for the purpose of illustrating the level of impacts in the nonwhiting midwater trawl fishery. The data show that over the last two years, the fishery had no bycatch of overfished bocaccio rockfish, overfished cowcod rockfish, or yelloweye rockfish, and that the maximum single-year catch of the ones that were encountered were less than 2 percent each for canary rockfish, darkblotched rockfish, Pacific Ocean perch, and Petrale sole of the 2013 shorebased trawl fishery allocations for those species.

Table 4-8. Average annual and maximum single year catch (mt) in observed nonwhiting midwater trawl fishery trips during 2012-2013 compared with 2013 shorebased trawl fishery allocations, including the proportion of each allocation taken in the fishery based on the highest single year catch. Catch is inclusive of retained and discarded catch. (Source: 2007-2012 from the 2012 multiyear data product ((Bellman, et al. 2013); 2013 groundfish data from the 2013 groundfish mortality report provided by the WCGOP).

Species Category	2012-2013 Average	Maximum	2013 Shorebased Trawl Allocation	Proportion of Allocation
Overfished Groundfish				
Canary Rockfish	0.52	0.54	39.90	1.34%
Darkblotched Rockfish	0.04	0.07	266.70	0.03%
Pacific Ocean Perch	0.02	0.03	109.43	0.03%
Petrale Sole	0.85	1.69	2,318.00	0.07%
Yelloweye Rockfish	0.00	0.00	1.00	0.00%
Non-overfished Groundfish				
Arrowtooth Flounder	0.95	1.90	3,846.13	0.05%
Dover Sole	2.08	4.17	22,234.50	0.02%
English Sole	0.06	0.12	6,365.03	0.00%
Lingcod	1.37	2.61	1,222.57	0.21%
Longnose Skate	0.85	1.56	none	
Longspine Thornyhead	0.06	0.12	1,859.85	0.01%
Minor nearshore rockfish			none	
Quillback Rockfish	0.00	0.00		
Minor shelf rockfish	0.37	0.68	508.00	0.13%
Bocaccio Rockfish	0.01	0.01		
Chilipepper Rockfish	0.00	0.00		
Greenspotted Rockfish	0.00	0.00		
Greenstriped Rockfish	0.31	0.57		
Redstripe Rockfish	0.00	0.01		
Rosethorn Rockfish	0.00	0.00		
Silvergray Rockfish	0.05	0.09		
Stripetail Rockfish	0.00	0.00		
Minor slope rockfish	0.64	1.28	776.93	0.16%
Aurora Rockfish	0.01	0.01		
Blackgill Rockfish	0.00	0.00		
Redbanded Rockfish	0.00	0.00		

Species Category	2012-2013 Average	Maximum	2013 Shorebased Trawl Allocation	Proportion of Allocation
Rougheye Rockfish	0.03	0.07		
Sharpchin Rockfish	0.00	0.00		
Shortraker Rockfish	0.02	0.04		
Slope Rockfish Unid	0.58	1.16		
Splitnose Rockfish	0.00	0.00		
Other flatfish	0.59	1.18	4,189.61	0.03%
Butter Sole	0.00	0.00		
Curlfin Turbot	0.00	0.01		
Flathead Sole	0.00	0.01		
Pacific Sanddab	0.01	0.01		
Rex Sole	0.57	1.15		
Rock Sole	0.00	0.00		
Other groundfish			none	
Big Skate	0.00	0.00		
Skate Unid	0.06	0.12		
Spotted Ratfish	0.10	0.21		
Skate Unid	0.00	0.00		
Pacific Cod	0.14	0.21	1,125.29	0.02%
Pacific Hake	0.34	0.68		
Sablefish	0.81	1.62	1,828.00	0.09%
Shortspine Thornyhead	0.56	1.12	1,385.35	0.08%
Spiny Dogfish	0.11	0.21		
Starry Flounder	0.00	0.00	751.50	0.00%
Widow Rockfish	67.28	123.67	993.83	12.44%
Yellowtail Rockfish	135.15	185.62	2,635.33	7.04%
Prohibited Species				
Dungeness Crab	0.03	0.07		
Nongroundfish				
Slender Sole	0.00	0.00		
Pacific Electric Ray	0.00	0.01		
Grand Totals	212.98	216.64		

All overfished groundfish are IFQ species, which have ACLs developed based on Council- and NMFS-sponsored stock assessments and approved rebuilding plans. Rebuilding plans and associated ACLs are implemented in regulation as part of the biennial specifications process. Species-specific ACLs are then allocated in the form of QS to eligible entities on an annual basis for use in prosecuting target groundfish species using overfished groundfish QS to compensate for unintended overfished groundfish encounters. Fishery participants have joined together to form risk pools to allow fishers to share QP for overfished species to better ensure that sufficient pounds are available to cover excess overfished groundfish encounters.

The projection here is that implementation of the Action Alternative will have no biological impact to overfished groundfish species compared to the No Action Alternative (Table 4-3). This is because the amounts of QP of overfished groundfish species are the same regardless of primary whiting season opening date. Moreover, the amount of bycatch of overfished groundfish in previous years of the whiting fishery

and the nonwhiting midwater trawl fishery has been relatively small compared to overfished groundfish allocations applied to 2013 shorebased fisheries.

4.2.2.1.2. Other Non-Target Groundfish

Shorebased Whiting Fishery. As shown in Table 4-7, other non-target groundfish species taken on whiting targeted trips included 54 categories of fish. IFQ species or species that are within IFQ management groups comprise the majority of these entries (41; 76 percent). The remaining species categories are managed under monthly catch limits or have no limit on the amounts that can be landed. Four species made up 68 percent of the non-target other groundfish catch. In order of importance these included yellowtail rockfish (37 percent), spiny dogfish shark (17 percent) and widow rockfish (15 percent). These are all IFQ species except for dogfish shark, which in 2013-2014 seasons was managed based on a vessel monthly trip limit (60,000 lbs.).

The nonwhiting midwater trawl observer data for 2012-2013 show 40 species of non-overfished groundfish were taken on trips targeting pelagic rockfish, in this case yellowtail and widow rockfish (Table 4-8). The non-target species included 18 IFQ species or IFQ species groups, 2 species managed with landing limits, one protected species (Dungeness crab), and two nongroundfish species. The combined weight of IFQ species (including overfished groundfish) in the catch of 420.4 mt represented 99.4 percent of the total catch for all species combined of 422.8 mt. It should be noted that nonwhiting midwater trawl fishery data for nongroundfish species are incomplete at this time as explained above.

IFQ Species. All IFQ species and IFQ species groups have trawl fishery ACLs developed through the Council process and based on Council- and NMFS-sponsored stock assessments or analyses provided by Council advisory panels and implemented in regulation as part of the biennial specifications process. These ACLs are then allocated in the form of QP to eligible entities on an annual basis for use in prosecuting the respective resources for sale or personal use.

The amount of QP available for harvest (or personal use) for the respective species or species groups is fixed on an annual basis. Because of this, no change in whiting season start date (and associated start date for nonwhiting species) will affect the amounts of IFQ species or species group pounds available for harvest. To ensure QP limits are not exceeded, onboard fishery monitoring is required to document that discards, if any, are taken into account.

Irrespective of the effects of a move of the season on the amount of groundfish taken as bycatch, total trawl-related mortality is limited by sector allocations and the amount of fish allocated to each quota holder. Thus, no biological or distributional impacts would be expected. The allocations to each QP holder provide individual vessel incentive to avoid bycatch for IFQ species that may constrain total harvest. Analyses are provided in Section 4.2.2 on (1) historic catch of bycatch species in the shorebased whiting fishery when it opened prior to June 15 in the Northern Fishing Area, and (2) recent year's landings of bycatch species in the at-sea mothership fishery which opens under current regulations on May 15. These analyses are not definitive with regard to the potential impact of the proposed change in shorebased whiting season opening date, but they may be instructive for those fisheries; the bycatch impacts for May 15-June 14 compared to bycatch impacts during June 15-July 14 may indicate the degree of potential differences in bycatch impacts between those periods.

Non-IFQ Groundfish Species. Thirteen categories of nonIFQ groundfish were identified in 2011-2013 directed whiting fishery catches (Table 4-7). Some of these species are managed with catch limits (spiny dogfish, black rockfish, and minor nearshore rockfish), while others have no limitations on catch and retention (big skate, grenadiers, longnose skate, shortbelly rockfish, soupfin shark, and spotted ratfish). None of the species in this category had trawl fishery allocations associated with them at the start of the 2013 fishing season, which is the base year used for the population index analysis in this EA. However, an ACL has been established for spiny dogfish shark beginning in 2015 (2101 mt). The highest catch of spiny dogfish in any year during 2011-13 represented 8.62 percent of the 2015 trawl ACL (Table 4-7). More on spiny dogfish shark follows.

Spiny Dogfish Shark.

Spiny dogfish are worldwide in distribution occurring primarily in coastal waters. The spiny dogfish has two dorsal spines, no anal fin, white spots along its back, and a heterocercal (asymmetrical) tail. If captured, the shark can arch its back to pierce its captor with its dorsal spines. Glands at the base of the spines secrete a mild poison. Males mature at around 11 years of age, growing to 80–100 cm (2.6–3.3 ft) in length; females mature in 18–21 years and are slightly larger than males, reaching 98.5–159 cm (3.23–5.22 ft). Fertilization is internal. Mating takes place in the winter months with gestation lasting 22–24 months. Litters range between 2 and 11, but average 6 or 7. Spiny dogfish are bottom-dwellers. They are commonly found at depths of around 50-149m, but have been found deeper than 700m. Lifespan is estimated to be more than 100 years, and their gestation period is 18 to 24 months, which may be the longest of any known animal (http://en.wikipedia.org/wiki/Spiny_dogfish).

Gertseva and Taylor (2012) estimated the maximum sustainable output of the spiny dogfish resource spawning and growing within the Council management Area. Their estimate of maximum sustainable yield was 848 mt (1,869,518 lbs). The recommended SPR for spiny dogfish in 2015 and 2016 is 50 percent, which is an increase from 45 percent used in previous years; i.e., more spawners in the population will be protected than under the previous regime. This was recommended because of the relatively low productivity and late maturity of the species (2014c). The shorebased midwater fishery took an average of 4 percent (70.8 mt) of the average total harvest in all fisheries (1,781 mt) during 2001-10 (ibid). Most of the impact (51 percent) during these years was in the bottom trawl fishery. A large majority (90 percent) of the total dogfish impact was off Washington State (ibid). Managing the stock with its own OFL and acceptable biological catch (ABC) starting in 2015 will provide more direct catch accounting and control. There does not appear to be a high risk of the stock being subject to overfishing in the next management cycle (ibid). Landing limits and area closures are the catch control tools used to manage spiny dogfish (ibid).

Will advancing the opening date (from June 15 to May 15) in the Northern Area (Oregon and Washington) potentially increase dogfish impact? The answer is maybe, but the increase would likely be very small. This is based on examination of at-sea nontribal directed whiting data provided by Corey Niles, GMT (January 2014 email). These data cannot be displayed due to confidentiality restrictions. There were only slight elevations in the dogfish bycatch rates in the May time period relative to June. Highest bycatch rates in these data were observed later in the year: October-December, particularly north of 46° N. latitude (about Columbia River mouth).

Nonwhiting Midwater Trawl Fishery. The findings for the nonwhiting midwater trawl fishery analysis for other groundfish species presented in Table 4-8 were very similar to the findings from the shorebased directed whiting fishery: fishery impacts were very low, less than 2 percent on all allocations, except for widow rockfish (12.44 percent) and yellowtail rockfish (7.04 percent), which were much higher because the fishers were specifically targeting those species.

The amount of QP available for harvest (or personal use) of the respective IFQ species are fixed on an annual basis. Because of this, the change in whiting season start date proposed in the Action Alternative (and associated start date for nonwhiting species) will not affect the amounts of IFQ species pounds available for harvest. To ensure QP limits are not exceeded, 100 percent onboard fishery monitoring is conducted to document that discards, if any, are taken into account.

The projection here is that implementation of the Action Alternative will have no differential biological impact to groundfish non-target species taken as bycatch in the shorebased whiting fishery and the nonwhiting midwater trawl fishery compared to the No Action Alternative (Table 4-3). This is because IFQ species (over 90 percent in pelagic rockfish fishery samples and 65 percent in whiting fishery catches) have catch limitations associated with them which remain the same, regardless of whiting season opening date. For nonIFQ species in the whiting and pelagic rockfish fishery, there is only limited information available of uncertain applicability on the basis of which to evaluate whether bycatch rates in the May 15-June 14 time frame would be different than rates from June 15 onward. However, these fisheries are monitored for total mortality (including 100 percent at-sea monitoring of discards). If there is a problematic unexpected increase in bycatch as a result of the earlier opening, an adaptive approach can be used to make adjustments in future management cycles. In general, any shifts due to the earlier opening are expected to be small and not problematic because observed catches in the whiting fishery have been relatively low compared to shorebased trawl fishery allocations.

4.2.2.2 *Pacific Halibut*

Pacific halibut are managed with IBQ when they are caught by vessels with a limited entry trawl permit, declared into the shorebased IFQ program, and operating north of 40° 10' N. latitude. The IFQ entity shares were calculated based on historic catch ratios for their permitted vessel of halibut to specified target species that closely associate with halibut, except that each share owner is awarded a minimum amount of IBQ. Under the trawl rationalization program, vessel owners must be awarded or obtain halibut IBQ to cover their Pacific halibut bycatch mortality. Pacific halibut bycatch south of 40° 10' N. latitude is managed using set-asides, whereby an amount is held in reserve to accommodate mortality in the shorebased IFQ program and in the at-sea Pacific whiting fisheries.

Pacific halibut caught by vessels using midwater trawl gears, both shorebased and at-sea, may retain Pacific halibut when on maximized retention trips. All other vessels participating in the shorebased IFQ program may not retain Pacific halibut because it is a prohibited species which must be returned to sea as soon as practicable with a minimum of injury when caught and brought on board.

The proposed action to modify the shorebased IFQ midwater trawl season start date would be in effect north of 40° 30' N. latitude where halibut is managed exclusively with IBQ. Bycatch of Pacific halibut in the 2011-13 shorebased IFQ fishery north of 40° 10 N. latitude using midwater gears showed an average catch per year of 0.4 mt with a maximum catch in any year of 0.6 mt (Table 4-6, Bellman, et al. 2013). The

highest catch in any year represented 0.59 percent of the 2013 allocation to the shorebased trawl fishery (http://www.westcoasttrawlers.net/sites/westcoasttrawlers.net/files/NMFS-SEA-13-07%20halibut%20IBQ%20top%20up.pdf). A more recent August 2014 report released by WCGOP on halibut mortality reports somewhat higher halibut mortality rates for the whiting fishery, 0.35, 0.62, and 1.32 mt for 2011, 2012, and 2013, respectively (Jannot, et. al., 2014). Trace amounts (less than 0.00 mt) of Pacific halibut were observed in the nonwhiting midwater trawl fishery during 2012-2013 (Table 4-8), but may occur in larger amounts as the fishery expands in future years to harvest widow and yellowtail rockfish.

There could be some seasonal differences in the bycatch rates with an earlier opening, however, halibut bycatch was not identified as a problem previously when the fishery opened earlier and based on

- the very low halibut catches during the base period of less than one percent of recent years', and
- in the north, IBQ constraints will prevent catch from exceeding that which has been authorized as sustainable and in the south (where there is a 10 mt bycatch limit) this action will not change the season dates.

No negative impact to the Pacific halibut resource is projected under the Action Alternative compared to the No Action Alternative (Table 4-3).

4.2.2.3 *Coastal Pelagic Species*

Species managed under the CPS FMP are categorized as actively managed (Pacific sardine and Pacific mackerel) and monitored (market squid, jack mackerel, northern anchovy) (http://www.pcouncil.org/wp-content/uploads/2011_CPS_SAFE_Text_FINAL.pdf). The Council's 2011 SAFE document used for CPS management beginning in 2011 provides useful information on the CPS fisheries and the allowable harvest levels recommended for the different species in the FMP. The impact levels of the shorebased whiting fishery on the respective species relative to their recommended ACLs for 2011 are shown in Table 4-7. These impact levels, computed as the whiting bycatch level in metric tons divided by the species' ACLs in metric tons, are based on the maximum landing by species in any year during the base period of 2011-13. The highest relative impact level for any CPS species was 0.38 percent for jack mackerel, which was reported in the document to be a relatively unfished species on the west coast. For the other species in the samples, relative impact levels were 0.01 percent or lower. No CPS were observed in pelagic rockfish catches during 2012-2013 (Table 4-7), but they have been observed in historic fishery catches (Table 3-5). There could be some seasonal differences in the bycatch rates with an earlier opening; however, because sampling shows very low catches of CPS in shorebased whiting fishery and pelagic rockfish fishery, collectively and individually, no negative change in impacts to CPS is projected stemming from adoption of the Action Alternative compared to the No Action Alternative (Table 4-3).

4.2.2.4 *Highly Migratory Species and Salmon*

Since HMS move throughout large areas of the Pacific and are fished by many nations and gear types, management by the United States alone is not enough to ensure that harvests are sustainable in the long term. The Council FMP for HMS has been only partially approved. The FMP allows the Council to provide advice to NMFS and the State Department so that West Coast interests are represented in international negotiations. For more information on HMS management in the Council area, the reader is referred to the Council website at: http://www.pcouncil.org/highly-migratory-species/background/.

Four HMS species were encountered in shorebased whiting fishery catches during 2011-13. These catches are compared (except for blue shark, explained below) to actual West Coast landings for 2012 in Table 4-7. The analysis is based on the highest impact in the shorebased whiting fishery in any one year during the base period. The catch rate for common thresher shark was relatively high at 6.58 percent. The relatively high impact to common thresher shark occurred in one year, 2012, when 4.6 mt were caught. The next highest year was 2011 when 0.7 mt were estimated caught. They occurred in catches in all three years of the base period. Common thresher shark occur in the western Pacific Ocean from Chile to British Columbia (http://en.wikipedia.org/wiki/Common_thresher). Off California, common threshers feed mostly on the northern anchovy, with Pacific whiting, Pacific sardine, Pacific mackerel, market squid, and pelagic red crab (*Pleuroncodes planipes*) also being important food items (ibid). There, occurrences in whiting catches may be because of their association with whiting as a prey species.

It is important to note that the directed West Coast fishery data do not include discards. Like other pelagic sharks, blue sharks are caught in many of the same fisheries as tunas and billfish, including longline, gillnet, troll, purse seine, and hook-and-line. However, they are targeted much less commonly than tunas and billfish, and thus comprise an important component of bycatch from many commercial pelagic fishing operations (ISCTTNP 2014). The low catch of blue shark in HMS fishery landings used in this analysis (0.2 mt, Table 4-7) is not indicative of the actual catch (because of high discard rates in the HMS fishery). Therefore, the trawl fishery bycatch is not compared to the HMS fishery total catch in the same manner that it is for other species in the HMS category.

Moving the season opening date is not expected to change bycatch rates for HMS, however, the fishery is closely monitored, and if such changes do occur, they can be responded to adaptively through standard regulatory processes provided by the FMP and through regulation.

No HMS were observed in historic pelagic rockfish fishery samples (Table 3-5), but that might change in future years as the fishery expands to harvest widow rockfish.

All five species of Pacific salmon were caught in directed whiting fishery catches during the base years used in this EA (Table 4-7).[8] Salmon, like Dungeness crab and Pacific halibut, are prohibited from retention when caught in West Coast trawl fisheries. Chinook salmon were the most abundant salmon species encountered in the shorebased whiting fishery catches during base period years averaging 6.6 mt per year, while sockeye salmon catches averaged only 0.002 mt per year. While Chinook catch was very large compared to the catches of the other salmon species, the maximum Chinook catch in any year was 12.5 mt, which was 2.1 percent the size of the directed ocean commercial troll fishery Chinook catch in the Council area in 2013 of 586 mt (PFMC 2014d).

[8] Salmon caught in groundfish fisheries is a prohibited species which must be released, with some exception in groundfish fisheries, in the best condition possible (e.g., total retention provision for whiting trips). This designation is intended to discourage target fishing and retention of salmon for personal use and to minimize illegal sale opportunity. Some salmon stocks are listed species under the ESA. These fish cannot be identified individually in ocean fishery catches because they are physically identical to nonlisted salmon, which comprise the majority of fish in ocean catches. DNA analysis is used to assign probabilities of individual salmon stock contributions to mixed-stock fishery catches, but even these analyses may not be able to assign contribution probabilities for individual ESA species. ESA salmon are managed based on biological opinions and regulations intended to minimize the take of salmon in general, such as total catch or catch rate triggers used to implement more restrictive fishing regulations and, in some situations, additional ESA consultation.

The largest pink salmon catch observed in the whiting fishery during the based years of 2011-2012 of 11.56 mt (about 8,500 adult equivalent fish at 3 pounds per fish) was about 0.39 percent the size of the projected 2013 pink salmon run into Puget Sound of 6.5 million fish (SU 2014). The largest chum salmon catch observed in any year in the base years for the directed whiting fishery totaled 0.18 mt (about 48 adult equivalents at 8.2 pounds per fish). For context, the projected chum salmon run size into Puget Sound streams in 2013 was about 1.5 million fish (WDFW 2014). The largest sockeye catch in any year in the whiting fishery data totaled 0.003 mt (2-3 fish), which was, for comparison, less than 0.001 percent the size of the sockeye run over Bonneville Dam on the lower Columbia River for the year to date in 2014 (FPC2014). The largest coho salmon catch in any year in the whiting fishery data of 0.41 mt (about 100-150 adult equivalents) was about 0.09 percent the size of the spawning escapement of coho salmon to coastal Oregon streams and hatcheries in 2013 of 109,400 adult fish (PFMC 2014d).

With respect to salmon bycatch rates in the early season, the 1997 whiting season EA observed that prediction of bycatch rates by season is difficult, and the greatest risk of elevated salmon bycatch for the shorebased whiting fishery appeared to be in late April and early May. Prior to the 1997 season, before the shorebased whiting season start date off Oregon and Washington was delayed until June 15, peak salmon encounter rates in the fishery occurred in four of five years during April and mid-May (Table 4-9). During 1997-2004, peak encounter rates ranged from mid-April (off California where the season was open) to late July. During the latter period, peak encounter rates occurred in four of eight years during the last two weeks of July. It may be important to note that in only 3 of the 13 years studied (spanning the 1992-2004 seasons) did the peak salmon bycatch rate occur during the four-week timeframe (weeks 20-23) proposed to be affected by this regulatory change proposal. During the joint venture period of the 1980s (during which domestic catcher vessels delivered to foreign motherships) salmon bycatch generally increased after June, peaked in July, and increased again in October (PFMC, 1997).

Table 4-9. Weekly bycatch rate of salmon (number of salmon/mt of whiting) in the shorebased Pacific whiting fishery, 1992-2003. Rates for 1994 are based on observer data at sea and shoreside. Rates for 1995-2004 are based on all salmon species donated to state agencies by processors (ODFW 2004).

MO	WK	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
APR	13		0.088	0.042	0.069	0		0				0	0	0.122
	14		0.076	**0.074**	0.398	0.003	0	0.054			0.105	0.001	0.037	**0.182**
	15		0.019	0.052	**0.422**	0	0	0			0.031	0	0.167	0.054
	16		**0.135**	0.031	0.018	0	0	0		0.026	0	0.102	0.05	0.021
	17		0.038	0.015	0.041	0	0	0		**0.298**	0.012	0	0	0.138
MAY	18	0.019	0.034	0.002	0.04	0	0.001	0.049	0.013	0.132	0.008	0.028	0	0.012
	19	**0.097**	0.054	0.004	0.019	0.029	0.01	0.101	0	0.022	0.058	0	0.059	0.012
	20	0.056	0.014	0.003	0.011	**0.136**	0.003	**0.205**	0	0.137	0.126	0	**0.469**	0.015
	21	0.028	0.019	0	0.004	0.024	0	0.053	0	0.28	0.014	0	0	0
JUN	22	0.015	0.021	0.017	0.008	0.007	0	0.041	0	0.186	0	0.011	0.015	0
	23	0.004	0	0.007	0.032	0.007	0	0.028	0	0.034	0	0.023	0	0
	24	0.001	0.001	0.007	0.013	0	0.011	0.006	0.002	0.005	0.03	0.012	0.008	0.008
	25	0	0.001	0.001	0.035	0.001	0.005	0.005	0.005	0.072	0.082	0.013	0.007	0.035
JUL	26	0	0.011	0.001	0.024	0	0.01	0.001	0.013	0.049	0.045	0.009	0.003	0.023
	27	0.002	0.01	0.003	0.011	0.004	0.016	0.002	0.007	0.011	0.022	0.006	0.002	0.05
	28	0.003	0.004	0.001		0.003	0.025	0.011	0.053	0.04	**0.227**	**0.115**	0.001	0.016
	29	0.008	0.002	0.001		0.002	**0.034**	0.05	**0.064**	0.018	0.027			0.037
AUG	30	0.002	0.003	0.003		0.001	0.012	0.013	0.017	0.093	0.012			0.096
	31	0.004	0.008	0.002		0.001	0.025	0.033	0.029	0.027	0.01			0.05
	32	0.005	0.003	0.001		0	0.014	0.014	0.021	0.018	0.006			0.08
	33	0.014	0.003	0		0	0.022	0.014	0.02	0.029	0.027			
SEP	34	0.015		0.002		0		0.01	0.009	0.053	0.003			
	35	0.002		0.004		0		0.028	0.004	0.027	NA			
	36	0.009		0.008		0		0.069	0.003	0.027	NA			
	37	0.017		0.001				0.094	0.011	0.008	0.001			
OCT	38	0.005		0.003				0.025			0.001			
	39	0.016		0.01				0.003						
	40	0.012		0				0.005						
	41	0.001		0.002				0.008						
NOV	42	0.003		0.039										
	43	0.014												

* Oregon only

Note: Bold text indicates highest weekly rate for season.

Collectively, these data and observations corroborate the 1997 EA conclusion that "It would be difficult to predict the impact of changing season timing on salmon bycatch, especially on a year-to-year basis, as could occur under the proposed framework." Given the absence of a shorebased whiting fishery during this period in nearly the last two decades, this continues to be true. However, there is 100 percent at-sea monitoring in this fishery, including monitoring of any discards. On this basis, the fishery may be adaptively managed through standard process provided in the FMP for modifying regulations. Consistent with the Magnuson-Stevens Fishery Conservation and Management Act and the FMP, NMFS and the Pacific Fishery Management Council (Council) employ a variety of monitoring and inseason management mechanisms, or "accountability measures," to prevent Pacific coast groundfish harvest limits from being exceeded and also, to the extent practicable, to minimize bycatch and mortality of unavoidable bycatch. The FMP also lays out procedures and strategies for reducing bycatch and incidental take of nongroundfish species, including ESA-listed species, through biennial harvest specifications and management measures, a full rulemaking process, or after a single Council meeting for actions considered "routine." Based on the frameworks described in the FMP and built into the Council process, as well as NMFS' ability to take emergency actions, NMFS has the ability to evaluate and make necessary adaptations to fishery regulations that might

be required out of a completed consultation, or should expectations about ongoing fishery performance change.

From 1994-97, vessels targeting pelagic rockfish (nonwhiting species) with midwater gear harvested roughly between 7,000 and 9,000 mt a year. In 1999, a biological opinion on the groundfish fishery determined that, based on harvest levels and bycatch rates at the time, this fishery did not pose a threat to ESA-listed species. The targeted fishery was cut back when widow rockfish was overfished, with at most only one vessel participating in any given year, until the widow rockfish was rebuilt. In 2012, the fishery began to re-establish its and 161 mt were harvested of widow rockfish and yellowtail rockfish combined. In 2014, that amount had grown to 431 mt. Very few salmon were observed in nonwhiting trips through 2011; those catches included 220 pounds of Chinook salmon (20-40 fish) and 5 pounds of coho salmon (2 or 3 fish) (Table 3-5). However, as the target fishery has started to reestablish, bycatch rates of salmon in this fishery appear to be substantially higher than in the whiting fishery (1.70 chinook per metric ton as compared to 0.07 chinook per mt in the whiting fishery). While the rates are substantially higher, there is no expectation that an earlier season opening will result in higher salmon bycatch rates in this fishery. However, the fishery will continue to be monitored and may be managed adaptively if rates are problematic for ESA-listed salmon species, as described above with respect to whiting targeted trips.

Table 4-10. Shorebased chinook bycatch rates for whiting and nonwhiting targeted trips in 2014 (Source: PacFIN Answers, January 13, 2015).

	Midwater Trawl	
	Whiting (>50% whiting)	Nonwhiting (<50% whiting)
Chinook (count)	6,756.00	798.00
Whiting mt	97,964.24	19.16
Widow mt	285.93	204.69
Yellowtail mt	308.67	469.38
Widow + Yellowtail mt	594.6	674.07
Count of Chinook/Whiting mt	0.069	
Count of Chinook /(Widow + Yellowtail mt)		1.184
Count of Chinook /Yellowtail mt		1.700

Another of the main nonwhiting species targeted with midwater trawl gear is chilipepper rockfish. This species has generally not been caught and retained north of 40º 10’ N. latitude and therefore targeting activity and any salmon bycatch would not be affected by this season date change, which applies only north of 40º 30’ N. latitude.

Based on the relatively small catches of HMS and salmon compared to the directed fishery and biological parameters presented and discussed above for context any change in bycatch rates as a result of the Action Alternative is expected to have no measurable impact on the conservation status of these stocks, as compared to the No Action Alternative (Table 4-3). If any unexpected impacts do develop, the close monitoring of this fishery will allow for an adaptive management response. A discussion of potential impacts on ESA-listed salmon is provided in Section 4.2.3.

4.2.2.5 *Misc. Nongroundfish*

4.2.2.5.1. Forage Fish Species

Throughout its discussions on this issue, the Council has been focused on the question of how to provide new management measures, as needed, for lower trophic-level species that are not now managed under its FMPs or under state or tribal management programs. In its November 2011 report, the EPDT noted "that the greatest proportion of energy flow in the CCE [California Current Ecosystem] appears to be through krill, market squid, northern anchovy, Pacific sardine and Pacific herring. There are few other species (excluding juveniles of non-lower trophic level species) that occur with high frequency and with a comparable significance to that core group of species. Thus, despite real or potential historical or future conservation problems for some of these species, there is not a high level of unmanaged standing biomass for forage species that could become subject to fisheries targeting over the short term and which are critical to large scale CCE functioning, energy flow, or integrity"(http://www.pcouncil.org/wp-content/uploads/I2b_SUP_EWG_SEPT2013BB.pdf). The species groups (families) recommended for Council consideration have included (ibid):

Osmeridae family (eulachon, capelin, and other smelts)
Myctophidae family (lanternfishes)
Bathylagidae family (deep-sea smelts)
Ammodytidae family (Pacific sand lance)
Trichodontidae family (Pacific sand fish)
Pholidae family (gunnels)
Stichaeidae family (pricklebacks, warbonnets, eelblennys, cockscombs, and shannys)
Gonostomatidae family (bristlemouths, lightfishes, and anglemouths)
Order *Euphausiacea* (krill)

Whiting fishery catches and pelagic rockfish fishery data show very low or negligible catches of any of the above species groups (Table 3-5, Table 4-7). This is likely because of their very small physical sizes and the relatively large mesh sizes used in West Coast midwater trawls of 3-inch minimum (CFR 660.130(b)(2)).

Because of very small catches of potential forage fish species observed in whiting fishery catches and pelagic rockfish fishery samples compared to the fishery and biological parameters presented and discussed above for context, any change in bycatch rates as a result of the Action Alternative is expected to have no measurable impact on the conservation status of these stocks, as compared to the No Action Alternative (Table 4-3). If any unexpected impacts do develop, the close monitoring of this fishery will allow for an adaptive response.

4.2.2.5.2. Other Incidentally Caught Nongroundfish

With respect to catch for which the species was determined, the other incidentally caught non-groundfish species included 7 finfish species and no invertebrate species (Table 4-7). One finfish species, shad (likely American shad), made up most of the catch of fish in this category (58.69 mt average; 64 percent). The fairly large catch of unidentified squid (18.71 mt average) was most likely Humboldt squid (*Dosidicus gigas*), a species which has been spreading north of its usual oceanic range in recent years. All of the animals under this heading come under state management authority when caught in the Council area. For more information on Humboldt squid see: http://en.wikipedia.org/wiki/Humboldt_squid.

Dungeness crab is a prohibited species when caught in Oregon and Washington trawl fisheries, which means they must be returned to sea as soon as practicable with a minimum of injury when caught and brought on board. They are occasionally caught in the directed whiting fishery (indicating whiting nets are occasionally fished on or close to the ocean bottom). The highest catch in any one year in the base years of the shorebased whiting fishery totaled 0.03 mt (Table 4-7). By contrast, landings in the Oregon-directed Dungeness crab fishery (using traps) during the 2013-2014 season totaled 5,491 mt (ODFW 2014). Thus, the largest single-year whiting fishery catch was 0.0006 percent the size of the Oregon-directed fishery catch used for comparison.

A wide variety of nongroundfish species have been observed in historic nonwhiting midwater trawl fishery catches (Table 3-5), but only three species were recorded in 2012-2013 data, which is incomplete at this time (Table 4-8). These catches can be expected to increase as the pelagic rockfish fishery expands to harvest increased ACLs for widow rockfish.

Whiting fishery catches of the fishes and invertebrates addressed in this report section are projected to be very small in comparison to their actual abundance levels in the action area. This is shown to be the case for the FMP species addressed above, and it seems reasonable to infer that the same is true for nonFMP species. Because of very small catches in whiting fishery catches and pelagic rockfish fishery samples compared to the fishery and biological parameters presented and discussed above for context, any change in bycatch rates as a result of the Action Alternative is expected to have no measurable impact on the conservation status of these stocks, as compared to the No Action Alternative (Table 4-3). If any unexpected impacts do develop, the close monitoring of this fishery will allow for an adaptive response.

4.2.3 Protected Species Marine Mammals and Seabirds, including ESA, MMPA, and MBTA Protected Species

4.2.3.1 *Marine Mammals and Seabirds*

Marine mammal and seabird impacts in West Coast groundfish fisheries are discussed in Section 3.2.3. The direct impacts of fishing on marine mammals and seabirds has little or nothing to do with timing of the primary whiting season opening date. Once these animals enter a midwater trawl net (which is very rare), the chance of escape is probably close to nil. There could potentially be an indirect impact if bycatch of prey species is affected by a change in the season opening date. The primary prey species of concern would be salmon, which is prey to SRKW populations. In general, NMFS has determined that the groundfish fishery as a whole has minimal impact on salmon that would likely be prey to SRKW (NMFS, 2012). As part of its 2012 biological opinion, with respect to the groundfish fishery as a whole, NMFS made a "not likely to adversely affect" determination based on the range of the whales and the minor reduction in adult equivalent Chinook available to SRKWs (less than 1 percent). Changing the shorebased midwater season date may cause a minor temporal and spatial shift in fishing patterns, but would not change the total harvest of target species or the areas open to fishing. Any impact to salmon bycatch rates is expected to be minimal, as described in Section 4.2.2.1.2. No change in impacts to these animals are projected for the Action Alternative compared to the baseline No Action Alternative (Table 4-3).

4.2.3.2 *Protected Species*

4.2.3.2.1. ESA-Listed Salmon and Steelhead

ESA status of West Coast salmon and steelhead ESUs are shown in Table 3-8. The stocks subject to the 2006 consultation are shown in bolded text.

Shorebased Whiting Fishery. Chinook salmon was the predominant salmonid caught in the shorebased whiting fishery during 2007-2013 (Table 3-4). The Chinook salmon catch during these years totaled about 43 mt for all years combined. The salmonid take in the pelagic rockfish fishery in years since 2003 has been very low or nil because the directed fishery has been all but closed due to fishery constraints aimed at protecting widow rockfish. The WCGOP data collected during 2003-11 showed a total Chinook salmon catch of 0.1 mt (220 lbs) compared to a total pelagic rockfish species complex catch of 195.5 mt (Table 3-5). Data for 2014 show an uptick in chinook bycatch, corresponding to the increased harvest of widow and yellowtail rockfish on nonwhiting midwater trawl trips (Table 4-10).

ESA-listed Chinook salmon (or salmonids in general) are not readily identifiable until they reach their freshwater spawning grounds. As shown in Table 3-8, the ESA salmon species of special concern under the 2006 consultation include: Sacramento River Winter-run, Snake River Spring/Summer-run, Snake River Fall-run, Puget Sound, Lower Columbia River, Upper Willamette River, Central Valley Spring-run, and California Coastal. Additionally, upper Columbia River spring run is listed as an endangered ESU. In the ocean, listed stocks mix with non-listed stocks, which are the majority of fish present.

The effects of ongoing implementation of the groundfish FMP on listed salmonid species were considered in a biological opinion 1999 biological opinion which focused on bycatch of Chinook salmon, which comprises the largest portion of salmonid bycatch in the whiting fishery. Bycatch consists primarily of unlisted salmonid species; however, some ESA-listed evolutionarily significant units (ESUs) are caught in small numbers. The 1999 biological opinion also includes estimates of listed ESUs affected by the fisheries managed under the groundfish FMP. The 1999 biological opinion noted that there are two general patterns of ocean distribution for the listed chinook ESUs. The chinook ESUs originating in California (Sacramento River winter, Central Valley spring, California coastal) are generally distributed off the California and southern Oregon coast. The other chinook ESUs from Puget Sound and the Columbia River basin are either north on far-north migrating stocks that will be found only rarely to the south. The 1999 biological opinion found that there was insufficient information to characterize the listed stocks composition of the chinook bycatch in the groundfish fisheries, but estimates were made using coded wire tag data and information from salmon fisheries. The estimates show that ESU Chinook likely make up a small portion of the Chinook bycatch in groundfish fisheries.

The 1999 opinion determined that the fishery was not likely to jeopardized any of the listed ESUs and provided an incidental take statement estimating that total Chinook bycatch (listed and unlisted fish) for the whiting fishery (mothership, catcher/processor (C/P), shorebased, and tribal combined), would likely be 11,000 Chinook per year or 0.05 fish per metric ton (mt) of whiting catch. The 1999 biological opinion indicated consultation must be reinitiated if Chinook bycatch rates exceed 0.05 Chinook salmon/mt whiting or catch exceeds 11,000 Chinook per year. For the bottom trawl fishery, the 1999 biological opinion estimated that 6,000 to 9,000 Chinook salmon would be taken annually. The biological opinion concluded that if the bottom trawl fishery changes substantially in magnitude or character or if bycatch exceeds 9,000 salmon, consultation must be reinitiated.

In 2005, the whiting fishery exceeded the 11,000 Chinook per year limit. In response, the National Marine Fisheries Service (NMFS) issued a supplement to the 1999 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.

In 2013, NMFS reinitiated section 7 consultation on the FMP to address the effects on salmonids caused by the re-emerging use of midwater trawl gear to target non-whiting groundfish species such as yellowtail and widow rockfish. The request was made due to the evolution of the trawl fishery under the trawl rationalization framework and improving conditions for species such as widow rockfish that were expected to change the characteristics of the fishery. In addition, West Coast Groundfish Observer Program data reports showed new estimates of Chinook and coho salmon bycatch in the nearshore fixed gear fisheries (open access and limited entry fisheries), limited entry sablefish fishery, and open access California Halibut fishery. The update was expected to be completed prior to implementation of the 2015-2016 harvest specifications and management measures. In October 2014, prior to completion of the update, the whiting fishery exceeded the 11,000 Chinook and 0.05 Chinook salmon/mt whiting reinitiation triggers. Given the changes in the fishery identified in the January 22, 2013 reinitiation request, NMFS determined that the reinitiation should address the effects on listed salmonids of all fishing under the Pacific Coast Groundfish FMP, including the Pacific whiting and non-whiting fisheries and all gears.

Table 4-11. Catch of Chinook salmon and by vessels fishing in the Pacific whiting fisheries for all sectors combined including annual catch and bycatch rate data (Source: PacFIN Data Query).

	2011	**2012**	**2013**	**2014** [a/]
Number of Chinook (all sectors combined) [b/]	8571	6571	6039	14395
Whiting TAC	220995	186037	269745	316206
Whiting Catch	218832	159772	232633	263902
Annual bycatch rate [c/]	0.039	0.041	0.026	0.055

a/ 2014 values are based on a 1/13/2015 PacFIN data query, except for tribal whiting Chinook catch which is based on preliminary data from a 12/12/2014 letter from the tribes.

b/ Chinook bycatch (in numbers of fish) caught in all midwater fisheries (whiting and non-whiting) divided by mt of whiting catch.

c/ Also includes landings with midwater trawl gear targeting groundfish other than whiting (i.e., non-whiting midwater trawl fishery.

In the interim, until the reinitiated consultation is completed, NMFS must ensure that any action taken will not jeopardize any listed species, will not adversely modify any designated critical habitat, and will not result in any irreversible or irretrievable commitment of resources that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures, consistent with sections 7(a)(2) and 7(d) of the ESA. NMFS must also consider whether any incidental take of listed salmonids remains exempt from the prohibitions specified in the ESA. The proposed season start date change contained in this EA must take into consideration potential impacts to listed salmonids and their habitat; i.e., changing the season start date for the shorebased midwater trawl groundfish fishery to May 15 north of 40° 30′ N. latitude to the U.S./Canada border.

The catch of salmonids in trawl fisheries is expected to change, either up or down, depending on salmon availability to trawl gear and ACLs for Pacific whiting and nonwhiting species targeted with midwater gear, widow and yellowtail rockfish in particular. For 2015, the ACL for Pacific whiting is expected to increase, as they are for widow and yellowtail rockfish. Further increase in Chinook salmon bycatch levels can be expected over those associated with lower ACLs for those same species.

The action evaluated in this EA would not change the amounts of target groundfish species available, but would change when those species could be caught. This would move the season a month earlier off Washington and Oregon, and a month and half later off northern California (north of 40° 30′ N. latitude).

This action would not change the areas open to fishing or the total amount of fish available for harvest, but it would shift when those fish can be caught. A season start date of May 15 north of 40° 30′ N. latitude to the U.S./Canada border is expected to allow further opportunity for shorebased midwater trawl vessels, both whiting and nonwhiting, to harvest their allocations of whiting, widow, and yellowtail rockfish.

Historical salmon bycatch rate data for the shorebased whiting fishery by fishery week are discussed in Section 4.2.2.4 and displayed in Table 4-9. Those data (for the years 1992-2004) support the 1997 opinion that, for the shorebased whiting fishery, that prediction of bycatch rates by season is difficult, but the greatest risk of elevated salmon bycatch for the shorebased whiting fishery appears to be in late April and early May.

Preliminary data from the Northwest Fisheries Science Center on Chinook catch in 2014 show Chinook in the shorebased midwater nonwhiting trawl fishery were predominately caught off of Washington. Those same data show the highest catches of Chinook in the shorebased midwater whiting fishery were off of Oregon. Based on this information, the shorebased midwater whiting and nonwhiting fisheries likely affect different salmon populations. NMFS is gathering genetic information from these fisheries and will have further information on the affected salmon ESUs available in the future (NMFS pers. comm.).

In addition to providing more access to harvest target species, the season date change may allow some shifts in where species are targeted. Whiting are migratory, and areas fished shift over time as vessels follow the whiting or, in some cases, move to avoid bycatch of salmon or overfished groundfish species. While widow and yellowtail rockfish are less migratory, as the harvest levels for these target species increase, additional midwater vessels may pursue the opportunity and such that fishing areas or intensities expand over those observed in the recent past.

It is important to note that NMFS can take automatic action to close waters inside 100 fm [the Ocean Salmon Conservation Zone (OCZ), §660.131(c)(3)) to Pacific whiting midwater trawling when NMFS projects that the Pacific whiting fishery may take in excess of 11,000 Chinook within a calendar year (50 CFR 660.60(d)]. The OCZ would apply to all midwater vessels targeting whiting, including shorebased, but not to shorebased midwater nonwhiting vessels such as those targeting widow and yellowtail rockfish. In addition, the salmon FMP, section 6.6.2, states that the Council must consider groundfish regulations that would minimize salmon bycatch in the monitored fisheries.

This action, to advance the season start date off Oregon and Washington and delay it off northern California, is not expected to jeopardize the continued existence of any species listed as threatened or endangered, nor result in the destruction or adverse modification of designated critical habitat. The NMFS final assessment of this regulation change proposal was not available at the time of preparing this EA.

The assessment here, based on the best available data, is there would be no change, on average, in impact to ESA-listed salmonids under the Action Alternative compared to the No Action Alternative (Table 4-3). This is because the available data do not indicate a high availability of salmon to whiting midwater trawling during the proposed earlier fishing timeframe, coupled with the observation that total salmon catch is likely (loosely) linked to ACLs for target groundfish species, which will be the same regardless of season start date. Salmon bycatch in midwater trawl fisheries is highly variable between years. Moreover, conservation tools are in place to mitigate high salmon harvest level or harvest rate in the event the fisheries exceed specified salmon conservation triggers.

4.2.3.2.2. Green Sturgeon

No good data on current population sizes exist for either the Southern DPS or Northern DPS of green sturgeon, and data on population trends is lacking. Factor contributing to the threatened status of the Southern DPS of green sturgeon include (NMFS 2009):

- reduction of the spawning area to a limited section of the Sacramento River,
- insufficient freshwater flow rates in spawning areas,
- contaminants (e.g., pesticides),
- *bycatch of green sturgeon in fisheries (emphasis added),*
- potential poaching (e.g., for caviar),
- entrainment by water projects,
- influence of exotic species,
- small population size, and
- impassable barriers.

See NMFS website (http://www.nmfs.noaa.gov/pr/species/fish/greensturgeon.htm) for additional information on green sturgeon.

A small amount (0.024 mt maximum in any year) of white sturgeon were estimated caught in the directed shorebased whiting fishery during 2007-2010 (Table 3-4), but none was caught during the 2011-13 base years (Table 4-7). The sturgeon that were caught during earlier years were caught in the same year.

We do not have records of green sturgeon being caught in the directed shorebased whiting fishery during 2007-2013. The lack of encounters in the fishery may be due to the behavior and distribution of green sturgeon in marine waters. Adult green sturgeon captured in the Sacramento-San Joaquin delta are benthic feeders on invertebrates including shrimp, mollusks, amphipods, and even small fish (Adams et al 2002). One 100 cm green sturgeon from the Sacramento-San Joaquin estuary was examined in Fall 2001, and opisthobranch mollusks (Philline sp.) were the most common prey, but there was also one bay shrimp (Crangon sp.) and overbite clams (Potamocorbula amurensis). Juveniles in the Sacramento River delta feed on opossum shrimp, Neomysis mercedis, and Corophium amphipods(Ganssle 1966, Radtke 1966) and subadults and adults in Washington estuaries were also found to feed on benthic invertebrates (Dumbauld et al. 2008). It seems likely that green sturgeon would also orient closely to the sea floor during their ocean residency. Although evidence of feeding while in marine waters is lacking, green sturgeon would most likely they feed on organisms comparable ecologically to those that they eat during their freshwater and estuarine residency.

In addition, green sturgeon are believed to spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. Their sea floor orientation in combination with their nearshore distribution reduces their vulnerability to mid-water trawling as conducted in the whiting and pelagic rockfish complex fisheries, which generally takes place well off bottom in offshore fishing grounds. Because of the absence of catch for 2011 through 2013 and very low levels in other years, the projection here is that adoption of the Action Alternative will have no change in impact to green sturgeon compared to the No Action Alternative (Table 4-3).

4.2.3.2.3. Eulachon

Eulachon is listed as threatened under the ESA (see Section 3.2.3.3.3 for further information). The Biological Review Team that analyzed the status of the eulachon southern DPS ranked climate change and associated ocean warming as the principal cause of species decline. As recent as 2003, over 1 million pounds (11.7 million-13.3 million fish) were taken commercially in the Columbia River. The last commercial landing shown for the fishery was in 2008 when about 17,000 pounds (163,000 to 208,000 fish, about 10 fish/lb) were landed (BRT 2008). The impact of the WCGF to eulachon population growth based on data collected through 2010 has been assessed by NMFS 2012 as follows: Due to a lack of data on population abundance and reproductive rates of eulachon, combined with the rarity of observing eulachon in the WCGF fisheries, it is not possible to quantify an estimated impact of WCGF on population growth rate of eulachon. However, the level of mortality in the WCGF (less than 1,000 individuals annually) is very low compared to the probable total numerical abundance of the species, likely in the millions (estimated for 2011 at about 19 million in the lower Columbia River and 775,000 for the lower Fraser River,[9] NMFS 2012). It is therefore likely that the WCGF has at most a negligible effect on the southern DPS of eulachon (Nass River, British Columbia to Mad River, northern California). The impact of the WCGF is also very low compared to other fishery impacts, particularly the ocean shrimp trawl fisheries. As shown in, the largest eulachon catch in the base period data amounted to 0.08 mt (176 lbs, about 1,800 adult equivalents, 0.01 percent of the population) (Chafing Gear EA, PFMC 2013a). The projection here is that adoption of the Action Alternative will have no change in impact to eulachon compared to the No Action Alternative (Table 4-3). The fishery is closely monitored with 100 percent at-sea monitoring of discards, therefore there is an opportunity for adaptive response if bycatch rates increase unexpectedly.

4.3 Socioeconomic Environment

4.3.1 Harvest Sector (Non-Tribal)

The main impact to the harvest sector from the Action Alternative, (as compared to the No Action Alternative) in the Northern Area fishery will be to increase the flexibility that individual vessel operators have in using their IFQ with midwater gear by adding one month to the duration of their season. In the Central Area Fishery, it will reduce their flexibility by moving the season a month and a half later, but also reduce complexity by aligning their season with that to the north. This additional time in the Northern Area fishery should allow them more opportunity to maximize net profits from a fixed amount of fish available for harvest, while also balancing other social needs and concerns (e.g. safety). Under the trawl rationalization program, businesses will time the harvest of product to maximize net revenues from all fishing opportunities in aggregate. Processors might be able to influence the timing of the harvest by working with vessels and offering price incentives.

At present, there are a number of vessels which participate both in the at-sea and shorebased whiting fishery (see subsection 3.3.1). In 2011, the first year of the Trawl Rationalization Program, 13 vessels participated in both sectors, shorebased and mothership, and 13 vessels participated only in the shorebased fishery. Participation is not expected to change with the change in the season opening dates. One of the reasons for the staggered opening (May 15 for at-sea and June 15 for shorebased) was to reduce the conflict between these two fisheries. Both fisheries were managed through season closures, which were developing into a race for fish (as “derby” fisheries). The trawl catch share program reserves for each quota holder an amount

[9] The 2012 estimate for the lower Fraser River was 3 million individuals.

of fish, thereby reducing the potential conflicting opportunities. With the catch share program in place, a common opening date for these fisheries will not force quota holders to choose between them (i.e. participation in one fishery would not preclude participation in the other). However, if the at-sea and shorebased processors to which combination mothership/shorebased catcher vessels deliver both demand deliveries at the same time, some of the vessels may have to choose between making deliveries in one of the two sectors and leasing their quota to another vessel to deliver (or forgoing the acquisition of quota that they would need to participate in both fisheries).

While the regulatory framework for changing whiting season dates is not being used for this action, it contains a number of criteria that are still worthy of consideration. Three of these "expected participation," "timing of alternate or competing fisheries," and "fishing ... rates" are discussed in the previous paragraph. Another criteria related to harvesters is "the period between when catcher vessels make annual processor obligations and the start of the fishery." Mothership sector catcher vessels are required to declare their annual processor obligations as part of the annual MS/CV-endorsed limited entry permit renewal process, the deadline for which is November 30 of the previous year. If the earlier season opening date were to somehow affect a choice a vessel would make, under the Action Alternative there would still be substantial planning time (five and a half months) as compared to the No Action Alternative (six and a half months). A fifth criteria related to harvesters in "industry agreement." While there has been no formal industry agreement, the shorebased sector (harvesters and processors) has been united in its support of the Action Alternative.

Extending the shorebased season by a month will increase the choices available for the northern fishery (off Oregon and Washington), providing an opportunity to improve private economic and social benefits if those benefits are higher in the May 15 through June 14 period than later in the year. If the benefits cannot be increased by harvesting during that period, then it is less likely that the change in harvest date will have a substantial effect on the seasonal distribution of harvest in the Northern Area Fishery. For the Central Fishing Area, there would be a contraction in flexibility to harvest from April 1 to May 15. However, data for 2011 through 2013 shows no midwater trawl gear harvest is occurring in this area under the IFQ program. Even though those data show no harvest is currently occurring, introducing a constraint will reduce the opportunity to take advantage of any newly developing opportunities which may occur with shifts in stock distribution or shifts in other local economic factors. A single coast-wide opening will simplify regulations and create regulatory consistency. The Council plans to continue its consideration of increasing opportunities for the use of midwater gear, and new regulations are expected (the whiting cleanup rule), which will distinguish between whiting and nonwhiting midwater trawl trips. These regulations may provide greater regulatory specificity that will allow increased flexibility for some types of targeting but not others.

If the salmon bycatch rates in the shorebased fishery are higher from May 15 through June 14 than they are later in the year, there could be an impact on other whiting trawl sectors (C/P and mothership)—all of which together are under an aggregate limit of 11,000 Chinook under the NMFS biological opinion (NMFS, 2006) for salmon listed under the ESA—and the trawl fishery as a whole, which is under an aggregate limit of 20,000 Chinook.

Under the Action Alternative, the same amount of whiting and nonwhiting groundfish species will be available for harvest using midwater trawl gear as under the No Action Alternative. The proposed season

opening date change will give fishers in the Northern Fishery greater flexibility in maximizing net operating profits and social benefits from fixed amounts of fish (for which QS is required to cover impacts), thus a positive change in impact to the harvest sector is projected under the Action Alternative compared to the No Action Alternative (Table 4-12). No change in impact in the Central Fishery in the near term under the Action Alternative, because the fishery in that area has been inactive with the IFQ program in place.

Table 4-12. Potential impacts of Action Alternative compared to No Action Alternative: Socioeconomic Environment. A designation of no change (nc) means no change in impact compared to the No Action Alternative.

	Northern Fishery (North of 42 ° N. Lat.)	**Central Fishery (40° 30´→ 42° N. Lat.)**	**Southern Fishery (South of 40° 30´ N. Lat.)**
Sector	Action Alternative	Action Alternative	No Action
Harvest Sector	**Pos.**	nc	nc
Tribal Sector	nc.	nc	nc
Recreational Fishery	nc	nc	nc
First Receivers	nc	nc	nc
Fishing Communities	nc	nc	nc
Observer Providers [10]	nc	nc	nc
Government Entities	nc	nc	nc

4.3.2 Tribal Sector

Pacific Coast treaty Indian tribal allocations, set-asides, and regulations are specified during the biennial harvest specifications process. Tribal allocations and regulations are developed in consultation with the affected tribe(s). Fishing regulations such as fishing seasons and gear restrictions apply equally to tribal and nontribal fishers, except that tribal fishers are not subject to groundfish plan limited entry provisions (50 CFR § 660.50 Pacific Coast Treaty Indian fisheries). Regarding the Action Alternative proposed in this EA, there is no conflict with tribal regulations and proposed non-tribal regulations affecting primary whiting season start date, because the tribe currently opens their fisheries (shorebased and at-sea) on May 15 (Joe Petersen, Makah Tribe, December 2014 email).

It is projected that the proposed regulation changes contained in this EA will have no impact to the Tribal Sector because they already open their primary whiting season start date on May 15 (Table 4-12).

[10] Implementation of experimental Electronic (camera) Monitoring in the shorebased whiting fishery in 2015 is expected to have a much bigger impact than the whiting season date changes proposed in this EA.

4.3.3 Recreational Fishery

Relative to No Action, the Action Alternative impacts on the recreational fishery are negligible compared to commercial fishery impacts, as discussed in Section 3.3.3. Whiting is not taken in the recreational fishery. Pelagic rockfish are much more important to the recreational fishery than whiting, as discussed in Section 3.3.3. Change in the midwater trawl season opening date as proposed in this EA will have minimal effects on the species harvested and is therefore not projected to have any change in impact to the recreational fishery (Table 4-12).

4.3.4 First Receivers

Table 3-15 shows counts of first receivers of trawl and nontrawl caught fish during recent years. Those data show a declining trend in first receiver participation in West Coast groundfish fisheries. Whiting fishery and pelagic rockfish fishery landings are presented and discussed in Section 3.3.5.1 (by port area) and Table 3-7 (by general area), respectively.

The Action Alternative would extend the season length by moving the opening forward in the northern fishery area while reducing season length by cutting the early season in the central fishery area. Because there has been no midwater trawling off of northern California during the April 1 to May 15 fishing seasons present under the No Action Alternative (for neither whiting nor nonwhiting species), the closing of this period under the Action Alternatives is not expected to have any impact on first receivers, relative to No Action. See Section 4.3.5 for further discussion of impacts to northern California.

For the northern area, the Action Alternative would allow harvesters and first receivers to negotiate whether or not there would be deliveries in the earlier period for both whiting and nonwhiting species. For whiting, some factors that may negatively affect processor preferences for an earlier opening are the slightly smaller size of fish delivered and the possibility of market competition with the at-sea fleet. On the other hand, shorebased processors may be selling whiting into somewhat different markets than motherships, and may gain through an earlier season opening. For whiting and nonwhiting, spreading the fishery out over a longer period, through the early opening, may increase flexibility in marketing and rates of processing (the average weekly rate of processing might be reduced, extending the period of more active fishing, or the same rates may be maintained with an earlier end to the bulk of the fishing/processing activity). If some processors decide not to (or are unable to) take advantage of the earlier opening, those which open earlier may gain some advantage over processors which do not open earlier. However, such a differential in processor preferences has not been a concern during the present or previous deliberations on season opening dates.

If there are different delivery timing preferences between processors and vessels, projected benefits to the one sector from the Action Alternative (relative to No Action) may be partially offset by negative effects on the other. However, ultimately, market mechanisms (prices offered and accepted) will resolve the degree to which vessels and processors are able to take advantage of early opening and the distribution of the benefits between the harvesters and processors. In general, under the catch share program, harvesters and processors are both expected to achieve normal profit levels while any above normal profits (the results of improved efficiencies) accrue to the owners of the quota (for further explanation see Amendment 20, PFMC 2010, and the draft analysis of the electronic monitoring program, PFMC 2014e).

There are a variety of possible delivery timing preferences for processors, however, because of the active participation of first receiver representatives in the Council process and their support for this action, it is assumed that the outcome for first receivers will be accommodation of deliveries during the earlier opening, with no adverse impact and possible positive impact, i.e. processors are expected to modify their activities to accommodate the proposed season opening date changes analyzed in this EA. The impact to first receivers is projected to be neutral to positive for the Action Alternative as compared to the No Action Alternative (Table 4-12).

Because there are a number of catcher vessels that participate in both the shorebased and mothership fisheries, a common opening date for the two fisheries may thin the number of vessels available to deliver to motherships during the early period. This will not affect the total quota available to the mothership processors (which is set in regulation), and it is expected that there is ample catching capacity which will be managed by the catcher vessel cooperatives to ensure that mothership processing needs are met.

No explicit consensus industry agreements were made with respect to the change in the shorebased whiting fishery opening date (see Section 4.5 for further discussion).

4.3.5 Fishing Communities

In general, the Action Alternative will extend the season off of Washington and Oregon, contract the season off of northern California, and leave the southern season unchanged for all use of midwater trawl gear. For pelagic rockfish, which are non-migratory, these season changes are not expected to have an impact on the geographic distribution of harvest, relative to the No Action Alternative. For whiting, which are migratory, there could be some differences. However, the impacts for the northern California area are primarily hypothetical, since there has been no whiting fishery during the April to June 15 period in this areas. For the northern area, to the degree that whiting are distributed slightly farther to the south in the earlier period, in any given year there could be a minor southward shift in harvest.

Even though the fishery in the area off northern California has been minimal prior to the catch share program, and entirely absent since the catch share program implementation, there is a hypothetical possibility that if the opening was left at April 1 in some future year, a fishery could develop. Under such circumstances, to the degree that whiting are less available off of northern California (the central area fishery) after May 15, as compared to between the status quo April 1 opener and May 15, communities in this area into which whiting might be landed may be disadvantaged by the Action Alternative. Fish are more likely to have moved out of the area early in warmer water years than colder water years. While the opportunity to own QS ensures the right to harvest the whiting, if whiting are not available after May 15 in concentrations and conditions that allow economically competitive fishing, then any potential opportunity that could arise in the Northern California area might be dampened.

As mentioned in the introduction to this Chapter, there is a 5 percent cap which limits harvest in the early season fisheries off of California prior to the start of the fishery north of 42° N. latitude, protecting northern fisheries from pre-emptive harvest in the south. Since the only early season opening in California will be in the area south of 40° 10’ N. latitude, there could potentially be a greater harvest in that area than when the 5 percent cap was shared with the area off northern California. However, the Action Alternative is expected to have no impact relative to the No Action Alternative because there have not been any fisheries in this area.

As discussed above, it appears that, under the IFQ program, early season whiting fishing off California may have disappeared because of the elimination of the race for fish. Fishing communities in the northern fishing area (Washington and Oregon) stand to benefit from the proposed season opening date change to the extent that the flexibility provided by the earlier season yields benefits which accrue to the harvest and processor sectors in that area. Measurable geographic shifts in the areas of delivery are not expected. Therefore, the impact to fishing communities is projected to be the same under the Action Alternative compared to the No Action Alternative. This projection applies equally to all three fishing area analyzed in this report. The projection for the central area fishery is heavily weighted by the lack of whiting fishery participation in that area that has occurred since IFQ program implementation (Table 4-12).

4.3.6 Observer Providers

The longer whiting season off Oregon and Washington provided by the Action Alternative will not likely result in any change in the amount of vessel fishing days of observer coverage that will be required to observe 100 percent of whiting and nonwhiting midwater trawl trips (as compared to the No Action Alternative). The same observers are used for both the midwater bottom trawl, nonwhiting midwater trawl, and shorebased and at-sea whiting fisheries. The earlier opening may cause a minor redistribution of the days of observer work. The direction of the effect of this change on provider costs is uncertain, however, the primary observer provider for the area has indicated that the change in season date is unlikely to affect the fees they charge (Personal communication with Alaska Observers, Inc., November, 26 2014). The shorter season proposed for the Central Area Fishery will make little difference with regard to midwater trawl because, as discussed above, there has been no directed midwater trawl activity in this area since IFQ Program implementation. Catch monitoring costs for documenting discards contribute to the operating costs of vessels owners in pursuit or catching and landing their catches; observer costs erode net profits.

One observer provider (Alaska Observers) advertises that observers can expect a monthly compensation of between $3,450 and $4,275 per month based on 15 days at sea. The employee is also reimbursed for initial relocation to their designated home port for up to $350, and are compensated for travel expenses when away from their home port. The observer providers also have their own operating expenses and profit objectives to cover as part of the overall expense charged to the vessel owner.

One observer provider (David Edick, Alaska Observers, Inc.) was contacted for observer cost information. He reported that shorebased operations are charged $450/ day except when fishing and offloading occur on the same day, in which case the vessel owner and the first receiver each pay one-half of the daily charge ($225 each). However, in 2014 the Pacific States Marine Fisheries Commission paid $226 per day to the vessel for a full day and $112 per day for a half day, leaving the vessel to pay $234 for a full day and $113 for a half day. There was no charge when the contract vessel stayed in port and the observer was not on board. Observer travel costs are included in the daily observer costs, with some exceptions.

In 2011, the first year of the IFQ Program, 26 shorebased whiting vessels reported an average of 51 days at sea prosecuting whiting. Based on the previous observer cost information, the cost to contract for an onboard fishery observers computes to be in the range of $5,763 to $11,934 per vessel for an average whiting season. The actual cost to the vessel was probably closer to the lower end of the range because shorebased whiting vessels commonly fish and offload their catch on the same day. The following table (Table 4-13) shows average revenues and expenses for shorebased whiting vessels during 2009-2011. Observer expenses are considered to be a variable cost.

Table 4-13. Shorebased Pacific whiting fishery average variable cost and total cost net revenue. Average total revenue, variable costs, variable cost net revenue, fixed costs, and total cost net revenue in the Shorebased Pacific whiting fishery (N = number of EDC vessels with non-zero, non-NA responses). Fixed costs include capitalized expenditures, capital expenses, and other fixed costs (Steiner et al 2014).

	2009		2010		2011	
	Mean	N	Mean	N	Mean	N
Revenue	$188,057	35	$262,367	36	$821,419	26
(Variable cost)	($102,182)	35	($148,483)	36	($366,928)	26
Variable cost net revenue	$85,875	35	$113,884	36	$454,491	26
(Fixed costs)	($117,459)	35	($101,674)	36	($308,807)	26
Total cost net revenue	($31,585)	35	$12,211	36	$145,685	26

Electronic monitoring (EM, cameras) may be proposed in some fisheries as a replacement for the 100 percent observer coverage requirement. This proposal will be evaluated for use in the shorebased whiting fishery under EFP conditions beginning in 2015. EM will affect both observer providers and vessel operational expenses. Changes in EM policy are discussed in more detail under Cumulative Impacts in Section 4.4.4.1.1.

It is concluded for the purpose of analysis of potential impacts to Observer Providers stemming from implementation of the Action Alternative compared to the No Action Alternative, there would be no change in impacts (Table 4-12).

4.3.7 Government Entities

The Action Alternative would create a more consistent management regime for on-the-water monitoring for vessels using midwater gear north of 40° 30’ N. latitude by creating a single May 15 season opening date for both the at-sea whiting and shorebased midwater (whiting and nonwhiting) fishery in this area, as compared to the No Action Alternative, in which there is an April 1 shorebased midwater trawl opening off northern California, and a June 15 shorebased midwater trawl opening off Washington and Oregon. The single date may simplify monitoring for enforcement purposes. Monitoring for management (ensuring that vessels and sectors stay within their quotas) is not likely to be affected by the change.

Regulations are expected to be implemented by NMFS through a proposed and final rulemaking with required public notice and comment periods. The coastal states, which have regulatory authority over territorial waters (0-3 miles offshore), are expected to conform their regulations for territorial waters to those in place for the EEZ (3-200 miles offshore). Adoption of the Action Alternative is not expected to substantially affect shorebased marine fishery sampling, data collection programs, or other fishery management tasks. This is because their programs are conducted on a year-round basis within fixed budget constraints. They may be required to reallocate their personnel resources temporally, but their total expenditures are not expected to change either upward or downward. No change in impact to government agencies is projected under the Action Alternative compared to the No Action Alternative under the regulation change proposals contained in this EA (Table 4-12).

4.4 Cumulative Impacts

A cumulative effects analysis is required by the Council on Environmental Quality (CEQ) (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. A formal cumulative impact assessment is not necessarily required as part of an EA under NEPA as long as the significance of cumulative impacts has been considered (U.S. EPA 1999). The following addresses the significance of the expected cumulative impacts as they relate to the federally-managed groundfish fishery.

4.4.1 Consideration of the Affected Resources

In Chapter 3 (Description of the Affected Environment), the affected resources that exist within the fishery environment of Target and Non-Target species are identified. Therefore, the significance of the cumulative effects will be discussed in relation to these affected resources listed below.

1. Physical Environment, including EFH and Ecosystems.

2. Biological Resources, including:
- Groundfish Target Species,
- Non-target Fish Species,
- Protected Fish Species, including ESA, and
- Marine Mammals and Seabirds.

3. Socioeconomic Environment, including harvesters, first receivers, communities, observer providers and government.

4.4.2 Geographic Boundaries

The analysis of impacts focuses on actions related to the harvest of Pacific whiting and pelagic rockfish complex species. The core geographic scope for each of the affected resources listed above is focused on the Eastern Pacific Ocean (Chapter 3). The coastal stock of Pacific whiting is highly migratory in nature, spawning off southern California and northern Baja California during winter months and migrating north as adult fish during spring and summer months to feeding grounds primarily off Oregon, Washington, and Vancouver Island, Canada. The fish return to their spawning grounds primarily during fall and winter months. For habitat, the core geographic scope is focused on EFH within the EEZ, but includes all habitat utilized by Pacific whiting and other non-target species in the Eastern Pacific Ocean. Pelagic rockfish complex species tend to be more localized than Pacific whiting, although their young may distribute widely within the large California current system. 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.

4.4.3 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 (Section 3.2.3.3) and is largely focused on the 1980s and 1990s through the present, when NMFS began generating stock assessments for marine mammals and sea turtles that inhabit waters of the U.S. EEZ. The temporal scope of future actions for all affected resources extends about three years into the future. This period was chosen because the dynamic nature of resource management for this species and lack of information on projects that may occur in the future make it very difficult to predict impacts beyond this timeframe with any certainty.

4.4.4 Actions Other than the Proposed Action

4.4.4.1 *Past, Present, and Reasonably Foreseeable Future Actions*

4.4.4.1.1. Fishery-related Actions

The historical management practices of the Council have resulted in positive impacts on the health of the Pacific whiting stock and pelagic 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 the Council 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 the Pacific whiting stock and pelagic rockfish complex species.

In addition, the Council has developed harvest specifications for 2015 and 2016 for groundfish stocks. It is noted that the levels of whiting harvest will most likely increase in the near future. Additionally, ACLs for some pelagic rockfish species (yellowtail and widow rockfish) will be increased, in particular for widow rockfish, since it has been declared recovered from overfishing.

The Council is in the process of evaluating a change in the allocation of widow rockfish QS. Like whiting, the directed widow rockfish fishery is conducted primarily with midwater gear. The reallocation is being considered because of the newly rebuilt status of widow rockfish. Up through recent years, including the years on which allocation was based in the Amendment 20 widow QS allocation, widow rockfish has been used primarily to cover bycatch. If widow rockfish is reallocated to provide quota to permits for vessels that targeted it historically, there is likely to be an overlap with the permits and vessels that target whiting, and a potential benefit to those permits from the reallocation of widow rockfish.

The Council has recommended for 2015-2016 a 33 percent increase in the ACLs for widow rockfish and a 140 percent increase for yellowtail rockfish, the two primary pelagic species targeted with midwater trawl

gears. A slight decrease in the chilipepper rockfish ACL has been recommended. Changes to the whiting ACLs will not be recommended until the start of 2015.

The ACL levels recommended by the Council in the 2015-2016 harvest specifications are expected to bring an increase in benefits for the fishing industry. While these regulations include only nonwhiting species, whiting vessels will benefit from an increase in availability of IFQ bycatch species, and because many whiting vessels also participate in the nonwhiting fishery. Additional actions are outlined in the following section. Together, they are expected to have a synergistic effect, contributing further to the original goals and objectives set out for the trawl rationalization program in Amendment 20.

Trawl Rationalization Trailing Actions

The Council and NMFS continue to work together on the trawl rationalization trailing actions. All of these actions are expected to increase benefits from the fishery. Details on each action are available on the Council website http://www.pcouncil.org/groundfish/fishery-management-plan/trailing-actions/. The main trailing actions are as follows:

Trawl/Fixed gear permit stacking. This action allows fixed gear and trawl permits to be registered to the same vessel at the same time. Implementation is expected in the spring of 2016.

Observer/Catch Monitoring Rule. At its April 2012 meeting, the following additional NMFS-proposed trailing actions were approved for implementation. NMFS published a proposed rule for these actions (public comment deadline ended March 21, 2014). A final rule is expected in the spring of 2015.

- Implementation of certification and de-certification requirements for observer providers
- Numerous revisions to details of the observer program provisions
- Revision to briefing periods in catch monitor certification requirements

Continue Adaptive Management Program Pass-through. The current pass-through of the QP allocated for the QS set-aside for the adaptive management program (10 percent of the nonwhiting QS) was set to expire at the end of 2014. The Council has recommended a rule to continue that pass-through until after the trawl catch share program review. The final rule published December 17, 2014 (79 FR 75070).

Trawl Catch Share Program Review. The Council decided that it will commence its first review of the catch share program in November 2016.

Elimination of the Prohibition on Whiting At-sea Processing South of 42º N. latitude. During its next EFP cycle, the Council may consider issuing EFPs to allow this activity.

Widow Rockfish Reallocation. Widow rockfish is now rebuilt. At its November 2014 meeting, the Council began consideration of a revision to the widow rockfish QS allocations. A moratorium on the trading of QS remains in place until these deliberations are completed.

Gear Issues (under Council 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. The final chafing gear regulation to allow for increased codend coverage on midwater trawl nets was published on December 2, 2014.

Cost Recovery. Cost recovery was implemented in 2014, resulting in the collection of fees that may vary each year and are a percent of ex-vessel value of groundfish. The fees for 2014 were 3 percent of ex-vessel value for the shorebased fishery and lesser amounts for the at-sea fisheries. For details see: Compliance Guide Pacific Coast Groundfish Trawl Rationalization Program, Cost Recover (http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/groundfish/public_notices/cost-recovery-compliance-guide.pdf). In the context of this additional cost, alternatives which alleviate production costs or allow for the generation of more net revenue may be more beneficial to stability in the industry than would be the case if costs were otherwise expected to remain stable.

Quota Share/Quota Pound (QS/QP) Control Rules – Safe Harbors for Risk Pools. At its September 2011 meeting, the Council recommended providing risk pools a safe harbor from the QS control rules. At its September 2013 meeting, the Council agreed that implementation of this recommendation could wait until the five-year program review.

Surplus QP Carryover. As part of its action on the 2013-2014 specifications, the Council adopted an interim solution to partially address full implementation of the surplus carryover provision for nonwhiting species. The Council requested further analysis and development of options to ensure that, in the long term, the surplus carryover provisions can be implemented with greater certainty. Whiting is scheduled to be addressed after the trawl catch share program review that is scheduled for November 2016.

Whiting Cleanup Rule. The cleanup rule is expected to define a whiting trip as any trip with more than 50 percent whiting by weight (consistent with Amendment 20), provide rules for the disposition of prohibited species retained in the maximized retention fishery, and restrict the use of midwater gear in the RCAs to the area north of 40° 10'. It will interact with this rule in that the season opening specified here as a whiting season opening that allows the use of midwater gear for any species will be re-specified as an opening for the use of midwater gear to target whiting and an opening for the use of midwater gear to target nonwhiting species (mainly pelagic rockfish). The dates for both of these openings will be changes to comport with the alternative adopted pursuant to the decision which this EA supports. Implementation of the whiting cleanup rule is expected by May 2015.

Electronic Monitoring. EM (cameras) may be proposed as a replacement for the 100-percent observer coverage requirement. This proposal will be evaluated for use in the shorebased whiting fishery under EFP conditions beginning in 2015. EM policy has been under Council development since 2011 (http://www.pcouncil.org/groundfish/trawl-catch-share-program-em/). Some participants in the IFQ program have reported difficulties in securing observers in a timely or consistent manner, so vessels may prefer the flexibility to turn on an EM (or video monitoring) system and leave port immediately versus waiting for an observer (ibid). The EM system would perform the function of monitoring compliance with IFQs. Therefore, EM is being explored as a flexible and economically viable substitute for the use of human observers in the trawl catch share program. EM is planned to be implemented on an experimental basis in the directed shorebased whiting fishery in 2015.

Vessel owners or their representatives will be required to apply for and receive an EFP from NMFS, which will specify the conditions under with EM equipment may be used to monitor their fishing operations to document fishery discards. At its September 2014 meeting, the Council selected its final preferred alternatives for an EM program EFP for the Pacific coast limited entry trawl groundfish fishery catch shares

program beginning in 2015 (http://www.pcouncil.org/wp-content/uploads/blog_tables_Final_Preferred_Alts_FINAL.pdf).

Fishery Ecosystem Plan

The Fishery Ecosystem Plan (FEP) is a living document, which means that the Council plans to regularly amend and update it. The current FEP was adopted by the Council in April 2013 (see: http://www.pcouncil.org/wp-content/uploads/FEP_FINAL.pdf). The FEP is meant to be an informational document. It is not meant to be prescriptive relative to Council fisheries management. Information in the FEP, results of the Integrated Ecosystem Assessment, and the Annual State of the California Ecosystem Report may be available for consideration during the routine management processes for fisheries managed in each FMP. How exactly these items will affect fishery management decisions is at the discretion of the Council.

At its March 2015 meeting the Council is scheduled to consider final adoption of an FEP and accompanying amendments to each of its FMPs, including Amendment 25 to the groundfish FMP. Amendment 25 will restrict future development of fisheries for the suite of ecosystem component species shared between all four FMPs (groundfish, salmon, CPS, and HMS) until and unless the Council has had an adequate opportunity to both assess the scientific information relating to any proposed directed fishery and consider potential impacts to existing fisheries, fishing communities, and the greater marine ecosystem. Those ecosystem component species shared between all four FMPs are as follows: round herring, thread herring, mesopelagic fishes (families: *Myctophidae, Bathylagidae, Paralepididae,* and *Gonostomatidae*), Pacific sand lance; Pacific saury, silversides, smelts, and pelagic squids (families: *Cranchiidae, Gonatidae, Histioteuthidae*, *Octopoteuthidae,Ommastrephidae* (except Humboldt squid, *Dosidicus gigas*),*Onychoteuthidae*, and *Thysanoteuthidae*).

Area Modifications (EFH and RCAs)

Starting at its April 2015 meeting, the Council will be considering modifications to RCA lines and activity restrictions concurrent with its deliberations on an EFH amendment to the groundfish FMP.

4.4.4.1.2. 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.

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 regional fishery management councils are engaged in this review process by making comments and recommendations on any Federal or state action that may affect habitat, including EFH, for their managed species, and by commenting on actions likely to substantially affect habitat, including EFH. In addition, under the Fish and Wildlife Coordination Act (Section 662), “whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose 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 inter-annual 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 Pacific 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 inter-annual variability in ocean conditions, the North Pacific seems to exhibit substantial inter-decadal variability, which is referred to as the Pacific (inter) Decadal Oscillation.

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 trends 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.

4.4.5 Magnitude and Direction of Past, Present, and Reasonable Foreseeable Future Actions

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 first presents the effects of past, present, and reasonably foreseeable future actions on each of the managed resources. This is followed by a discussion on the synergistic effects of the proposed action, as well as past, present, and reasonably foreseeable future actions (Section 4.4.7.).

4.4.5.1 *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, are listed in Table 4-14, below. The direct and indirect negative impacts are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on habitat is expected to be limited (low) 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 impact on habitat and EFH is unquantifiable. As described above, 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 those actions could have on habitat utilized by resources under NMFS' jurisdiction.

Table 4-14. Summary of the effects of past, present, and reasonably foreseeable future actions on habitat.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Agricultural runoff	**Direct Negative - nearshore areas**		
Port maintenance	**Uncertain – Likely Direct Negative - nearshore areas**		
Offshore disposal of dredged materials	**Direct Negative - project area**		
Marine transportation	**Direct Negative - primarily in marine traffic corridors**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Direct Negative - project area**		
Offshore Energy Facilities (wind, tidal, etc.)			**Potentially Direct Negative - project area**
2015-2016 Biennial Harvest Specifications			**Positive**
Trawl Rationalization Trailing Actions			**Uncertain – Likely Direct and Positive**
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**		

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 such as coastal population growth and climate change (including related ocean acidification), which may indirectly adversely impact habitat and ecosystem productivity. Overall, the past, present, and reasonably foreseeable future actions affecting habitat have had a neutral to positive cumulative effect.

4.4.5.2 *Biological Environment*

Those past, present, and reasonably foreseeable future actions, and the direction of those potential impacts, are summarized in Table 4-15 below. The indirectly negative actions described in this table 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, 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.

Table 4-15. Summary of the effects of past, present, and reasonably foreseeable future actions on biological resources.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Agricultural runoff	**Indirect Negative - nearshore areas**		
Port maintenance	**Uncertain – Likely Indirect Negative - nearshore areas**		
Offshore disposal of dredged materials	**Indirect Negative - project area**		
Marine transportation	**Indirect Negative - primarily in marine traffic corridors**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Negative - project area**		
Offshore Energy Facilities (wind, tidal, etc.)			**Uncertain – Likely Indirect Negative - project area**
2015-2016 Biennial Harvest Specifications			**Indirect Positive**
Trawl Rationalization Trailing Actions			**Uncertain – mixed but most Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on the biological resources**		

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 4-15, 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 Pacific whiting and pelagic rockfish complex species productivities depend. In addition, past fishery management actions taken through the FMP process have mitigated the cumulative effect on ESA-listed and MMPA-protected species through implementation of gear requirements and area closures, as needed. It is anticipated that future management actions will result in 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 (high positive impact, relative to overexploitation).

4.4.5.3 *Socioeconomic Environment*

Those past, present, and reasonably foreseeable future actions, whose effects may impact the socioeconomic environment and the direction of those potential impacts, are summarized in Table 4-16 below. The indirectly negative actions described in this table 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, 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 high positive and some high short-term negative effects on the socioeconomic environment. The short-term negative effects are generally believed to be offset by the longer-term positive overall effects related to having a healthy and productive ocean environment, as compared to the situation of depleted resources and low productivity that would have been expected without those actions. It is anticipated that the future management actions, described in Table 4-16, will result in additional indirect high long-term positive effects to the socioeconomic environment through actions which achieve conservation objectives while providing a regulatory environment which allows the industry to maximize the socioeconomic value derivable from the resource.

Table 4-16. Summary of the effects of past, present, and reasonably foreseeable future actions on human communities.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Agricultural runoff	**Indirect Negative - nearshore areas**		
Port maintenance	**Uncertain – Likely Mixed - nearshore areas**		
Offshore disposal of dredged materials	**Indirect Negative - project area**		
Marine transportation	**Mixed - primarily in marine traffic corridors**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Mixed - project area**		
Offshore Energy Facilities (wind, tidal, etc.)			**Uncertain – Likely Mixed project area**
2015-2016 Biennial Harvest Specifications			**Indirect Positive**
Trawl Rationalization Trailing Actions			**Uncertain – Likely Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on human communities**		

4.4.6 Preferred Action on all of the Affected Resources

The following sections review the most important dynamic interactions between past, present, and reasonably foreseeable future actions and the alternatives. A summary is provided at the end.

4.4.6.1 *Physical Environment*

- Under the No Action Alternative, there may be some increase in impacts to the physical environment associated with increasing ACLs for yellowtail and widow rockfish which are targeted with midwater trawl gear. There may also be changing impacts associated with the whiting fishery depending on the ACLs for future years (the ACL for 2015 will not be set until the spring of 2015).
- Relative to this, the season changes entailed in the Action Alternative are not expected to increase impacts to the physical environment. Increased ACLs will expand allowable catches and therefore increased fishing opportunities, but any change in habitat impacts will likely be distributional in the case of the whiting fishery (southern shift), while impacts to hard bottom habitats where pelagic rockfish are found will be the same under either alternative.

4.4.6.2 *Biological Environment*

- Under the No Action Alternative, there may be some increase in impacts to the biological environment associated with increasing ACLs for yellowtail and widow rockfish, which are targeted with midwater trawl gear, and other increases and decreases to the ACLs which are anticipated to be implemented as part of the Council's recommendations for the 2015-2016 specifications. There may also be changing impacts associated with the whiting fishery depending on the ACLs for future years (the ACL for 2015 will not be set until the spring of 2015).
- Relative to this, the season changes entailed in the Action Alternative are not expected to affect harvest of bycatch species significantly enough to adversely affect the stock biomass of any species taken as bycatch, primarily because bycatch rates are so low. Where some seasonal differences exist (bycatch rates that are different in the May/June timeframe as compared to June/July), the impact on stock biomass may increase with increased ACLs for target species, but overall would still be expected to remain very low. Bycatch in the trawl fishery is carefully monitored, and adaptive response is possible if bycatch is higher than expected and becomes problematic from a conservation perspective.

4.4.6.3 •*Socioeconomic Environment*

- Under the No Action Alternative, there are numerous trawl trailing actions in progress which are expected to enhance benefits from the rationalized fishery. This action is one of those. Together they are expected to have a synergistic effect contributing further to the original goals and objectives set out for the trawl rationalization program in Amendment 20.
- Relative to this, the regulatory environment is extremely complex, and setting a single coastwide opening is expected to contribute at least some minor improvement to this situation, as well as simplify some of the enforcement challenges. Additionally, enhanced benefits to the fishery from the Action Alternative will offset some of the recent cost increases from the cost recovery plan and higher than expected participation costs due to expenses for observers.

4.4.6.4 *Summary*

The Action Alternative is described in Section 2.1.2. 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, are discussed throughout this section.

Impacts to the physical environment are projected to be neutral compared to the No Action Alternative (Table 4-17). The main impact of present actions that may affect the degree of impacts of the Action Alternative and the No Action Alternative is the increase in the ACLs for pelagic species pending for the 2015-2016 groundfish specifications currently under review by NMFS. Increases in these ACLs has been analyzed in the EIS accompanying those specifications (PFMC 2015). The increases in the ACLs may increase the overall impacts of midwater trawling activities on the physical environment, but the earlier season opening is not expected to noticeably add to or reduce those impacts (as discussed in Section 4.1).

Table 4-17. Magnitude and significance of the cumulative effects; the additive and synergistic effects of the proposed action, as well as past (P), present (Pr), and reasonably foreseeable future actions (RFF).

Affected Resources Affected Resources	**Status in 2013**	**Magnitude of Net Impact of P, Pr, and RFF Actions**	**Magnitude of the Impact of the Proposed Action**	**Significant Cumulative Effects**
Physical Resources, including Habitat	Complex and variable (Section 3.1)	Neutral Section 4.4.6.1	Neutral (Section 4.1)	**None**
Biological Resources	Complex and variable (Section 3.2)	Neutral Section 4.4.6.2	Neutral (Section 4.2)	**None**
Socioeconomic/ Human Communities	Complex and variable (Section 3.3)	Positive Section 4.4.6.3	Positive (Section Section 4.3)	**None**

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 whiting harvests vary in the between years, but have been relatively stable over time (see 2013-2014 biennial specifications for the groundfish fishery (PFMC 2012d), discussed in Section 3.2.1.1 of this EA). With a reduced population size there is reduced harvest opportunity for whiting by all fishers, which may shift effort to other fisheries to the degree that fishery or individual fisher quotas allow.

Processors and communities will also have reduced product and fishery income, respectively, from the whiting 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 which alleviate production costs may be

more beneficial to stability in the industry than would be the case if harvest levels were expected to remain stable. When the whiting population increases, the effects are reversed.

In addition, Pacific 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 alternative, as compared to a situation in which vessels relied only on the whiting or pelagic rockfish fisheries.

Therefore, when this 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. 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.

4.5 Consistency of Assessment with Regulatory Requirements

A framework is provided in 50 CFR 660.131 for changing the whiting season opening dates. The following are the regulatory requirements for that framework and the criteria that should be considered in changing the whiting season opening date.

> **50 CFR 660.131: Pacific whiting fishery management measures.**
>
> (b) Pacific whiting seasons-
>
> (2) North of 40° 30’ N. latitude, different starting dates may be established for the catcher/processor sector, the mothership sector, and in the Pacific whiting IFQ fishery for vessels delivering to IFQ, first receivers north of 42° N. latitude and vessels delivering to IFQ first receivers between 42° through 40° 30’ N. latitude
>
> (i) Procedures. The primary seasons for the whiting fishery north of 40° 30’ N. latitude generally will be established according to the procedures of the groundfish FMP for developing and implementing harvest specifications and apportionments. The season opening dates remain in effect unless changed, generally with the harvest specifications and management measures.
>
> (ii) Criteria. The start of a primary season may be changed based on a recommendation from the Council and consideration of the following factors, if applicable: size of the harvest guidelines for whiting and bycatch species; age/size structure of the whiting population; expected harvest of bycatch and prohibited species; availability and stock status of prohibited species; expected participation by catchers and processors; the period between when catcher vessels make annual processor obligations and the start of the fishery; environmental conditions; timing of alternate or competing fisheries; industry agreement; fishing or processing rates; and other relevant information.

The consistency of this EA with the aforementioned provisions are referenced or summarized in the following:

- **Consistency with the groundfish FMP**: these requirements are analyzed in Chapter 6, below.
- **Confirmation of the Council recommendation**: The Council recommendation regarding the proposed midwater trawl fishery date change is referenced and discussed in Chapter 1.
- **Size of the harvest guideline for whiting (and nonwhiting) and bycatch species**: The harvest guidelines for target species in the midwater trawl fishery are set based on the most recent stock assessments for those species, which are discussed in Section 3.2.1 and are implemented in the form of management measures (such as QS allocations, gear restrictions, and fishing season dates) as part of the Pacific Coast groundfish biennial specifications process. The same is true for non-target groundfish species including overfished groundfish. Various means are utilized to set catch or landing limits for non-target nongroundfish species. These including regulations based on biological opinions (salmon, eulachon, green sturgeon), international agreement (e.g., Pacific halibut), and recommendations regarding collective catch limits for other species of the Council's advisory bodies.
- **Size/Age structure of whiting stock**: These are biological parameters that are taken into account in the case of Pacific whiting as part of the U.S.-Canada joint stock assessment and allocation process. That process results in the adoption of management measures that are aimed at harvest sharing and overall sustainable yield management of the species. For other target species such as pelagic rockfish, age and fish size data are used in conducting stock assessments for those species, which are used in setting manage measures, also aimed at ensuring sustainable populations of spawning fish.
- **Expected harvest of bycatch and prohibited species**: These issues are discussed in sections 4.2.2 and 4.2.3.
- **Availability and stock status of prohibited species**: Catch levels of salmon, Dungeness crab, and Pacific halibut in the directed whiting fishery are presented and discussed in Section 3.2.2. These data are compared to indices of population size or allowable catch level.
- **Expected participation by catchers and processors**: This proposal does not affect the opportunity for participation by catcher vessels in delivery of whiting to at-sea motherships. As reported in Section 3.3.4, shorebased whiting processors have declined or consolidated in recent years. However, there is no reason to believe that participation by shorebased processors will be affected by the regulation change proposed in this EA. These processors are heavily capitalized in receiving and processing facilities and there is no reason to expect that they will not be ready to make optimal use of those facilities during the proposed extended season off Oregon and Washington, where the large majority of whiting (and nonwhiting) fishing and landing takes place. As discussed in Section 4.3.1, the shorter early season in the northern California area will not have an immediate impact because the fishery has been dormant in that area since the implementation of the IFQ program. See Sections 4.3.1 and 4.3.4 for additional discussion relevant to this criteria.
- **The period between when catcher vessels make annual processor obligations and the start of the fishery:** This regulatory proposal only applies to the start of the shorebased midwater trawl fishery and does not relate to or affect the start of the at-sea fisheries. Those fisheries (mothership and catcher/processor) are unaffected by this action, and remain at May 15, the same as proposed for the shorebased fishery north of 40° 30' N. latitude.

- **Environmental conditions:** The potentially affected physical environment is discussed in Section 3.1. The impacts of the Action Alternative to the physical environment compared to the No Action Alternative are assessed in Section 4.1 and found to have no differential effect.
- **Timing of alternate or competing fisheries:** The season start date change proposed in this EA for the northern fishery may increase completion between first receivers and motherships for catcher boats to deliver fish to them. The number of vessels that deliver fish to both sectors is discussed in Section 3.3.1.1. Under current regulations, catcher boats can work for motherships following their May 15 opening, then transition to shorebased delivery when the shorebased season opens on June 15. See Sections 4.3.1 and 4.3.4 for additional discussion relevant to this criteria.
- **Industry agreement:** While there was general support for this change, there were no explicit industry agreements on this action. See Sections 4.3.1 and 4.3.4 for additional discussion relevant to this criteria.
- **Fishing or processing rates:** The additional season length may or may not result in harvest being spread across a longer period (effectively slowing rates). The transition of the fishery to a catch share program has reduced the significance of this criteria. See Sections 4.3.1 and 4.3.4 for additional discussion relevant to this criteria.
- **Other relevant information**: Substantial additional information on impacts is provided in Sections 4.1 through 4.4.

Chapter 5 References

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Chapter 6 FMP AND MSA STANDARDS AND REQUIREMENTS

6.1 CONSISTENCY WITH THE FMP AND OTHER APPLICABLE LAWS

6.1.1 Pacific Coast Groundfish FMP

Chapter 2 of the FMP identifies the goals and objectives for managing the Pacific Coast groundfish fishery. The goals in order of priority include (1) Conservation, (2) Economics, and (3) Utilization. The FMP includes 17 objectives to implement these goals. When proposing new management measures these goals are to be considered in combination with the MSA National Standards. The following discussion considers the proposed action relative to the relevant FMP goals and the applicable objectives.

Conservation *Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources.*

> Objective 4. *Where conservation problems have been identified for non-groundfish species and the best scientific information shows that the groundfish fishery has a direct impact on the ability of that species to maintain its long-term reproductive health, the Council may consider establishing management measures to control the impacts of groundfish fishing on those species. Management measures may be imposed on the groundfish fishery to reduce fishing mortality of a non-groundfish species for documented conservation reasons. The action will be designed to minimize disruption of the groundfish fishery, in so far as consistent with the goal to minimize the bycatch of non-groundfish species, and will not preclude achievement of a quota, harvest guideline, or allocation of groundfish, if any, unless such action is required by other applicable law.*
>
> The proposed action applies to all midwater trawl gear, which is currently allowed north of 40°10' N. latitude 3-200 miles during the dates of the primary whiting season; and seaward of the RCAs south of 40°10' N. latitude. In 2012, widow rockfish was declared rebuilt. In 2013 the allocation of widow rockfish increased substantially. The ACLs for the two primary pelagic rockfish (widow rockfish and yellowtail) will increase in 2014 and 2015. This will likely result in more targeting of pelagic species other than Pacific whiting with midwater trawl gear. The ACL for the other pelagic rockfish, chilipepper rockfish, will likely remain stable. The incidental catch of other nongroundfish species will continue to be monitored (all trawl vessels are required to carry at least one groundfish observer) and catch is evaluated on an annual basis.
>
> Concern for nongroundfish species for which incidental catch could increase primarily include Pacific halibut, salmon, and forage fish, including ESA-listed eulachon. Midwater trawling for nonwhiting groundfish species in shelf areas could result in increased catch of Pacific halibut. Because the fishery is heavily monitored and halibut are managed with hard allocations, any potential increases would not affect the sustainability of the stock.

The most common forage fish observed in the at-sea whiting and tribal sectors of the midwater trawl fishery for Pacific whiting from 2005-2010, include squid, American shad, jack mackerel, shortbelly rockfish, Pacific herring, Pacific mackerel, lanternfish, Pacific sardine, and a variety of smelts including eulachon (Section 3.2.2.2.6). Relative to the midwater trawl gear used to target Pacific whiting, these forage fish species make up a small proportion of the overall catch and are expected to continue at levels similar to those observed in recent years and considered in previous NEPA documents, including the 2013-2014 and 2015-2016 proposed harvest specifications and management measures EISs. The analysis in Section 4.2.2.1 provides data on bycatch rates for whiting and the nonwhiting fishery, as reported by the WCGOP and considers whether changes relative to the targeting of nonwhiting species with midwater trawl gear with a season date change (the preferred Alternative) may result in an increase in bycatch for nongroundfish species. The catch in the nonwhiting target fisheries is difficult to project given the fishery may be substantially different from historical fisheries, however, data from the low level of targeting that has occurred in recent years shows very low levels of bycatch of non-target groundfish. The fishery will continue to be subject to 100 percent at-sea monitoring, and data will be available post season for use in an adaptive management response, if bycatch rates turn out to be higher than indicated by these data and problematic.

Objective 5. *Describe and identify EFH, adverse impacts on EFH, and other actions to conserve and enhance EFH, and adopt management measures that minimize, to the extent practicable, adverse impacts from fishing on EFH.*

Section 4.1.5 considered the impacts on EFH as a result of the proposed action. Midwater trawls, also called pelagic or off-bottom trawls, are trawls where the doors may be in contact with the seabed (although they usually are not), while the footrope generally remains suspended above the seafloor, but may contact the bottom on occasion. Midwater trawls are generally towed above the ocean floor, although they may be used near the bottom. They are also towed faster than bottom trawls to stay with the schooling fish they target. Towing time varies from a few minutes to several hours. When fishing close to the bottom, the footropes of pelagic trawls can cause benthic animals to be separated from the bottom. Because of the large mesh in the forward sections of the net, most bottom animals would be likely to fall through the mesh and be returned to the seafloor immediately. The unprotected footrope on midwater trawls effectively precludes the use of these nets on rough or hard substrates, meaning that they are not expected to affect the more complex habitats that occur on those substrates. Sessile organisms that create structural habitat may be uprooted or pass under pelagic trawl footropes, while those that are more mobile or attached to light substrates may pass over the footrope, with less resulting damage.

Although the trawl RCAs, which have been in place since 2002 during the trip limit management regime for the trawl fishery, were intended to minimize opportunities for trawl vessels to incidentally take overfished rockfish, the trawl RCAs have effectively removed all bottom trawling from a large portion of the EEZ. Since 2002, the RCAs have been closed to bottom trawling, although the boundaries of the RCAs have varied between years (Section 3.1.6). North of 40°10' N. latitude, the RCAs have continuously restricted much of the bottom trawling in waters between 75 and 200 fm. Given the absence of bottom trawling within the RCAs since 2002, the seafloor

habitats have likely recovered considerably from pre-RCA years. In other words, this analysis considers the effects of the action on a recovered habitat.

Midwater trawl gear used by vessels participating in the whiting fishery has been exempted from RCA restrictions in the area north of 40°10' N. latitude during the dates of the primary whiting season. However, beginning in 2011 north of 40°10' N. latitude, midwater gear has been used to target other groundfish species in the RCA during the dates of the primary whiting season. In addition, it is expected that more vessels (vessels targeting whiting plus nonwhiting vessels) will be making "occasional" contact with the benthic organisms and habitat than has been seen with the midwater fishery targeting Pacific whiting. Similarly, effort may increase in EFH conservation areas where only midwater gear is allowed, and where bottom trawling has been prohibited since 2005. The earlier opening provided by the Action Alternative might cause a slight southward shift in the distribution of fishing effort in the whiting fishery but will not expose any new areas to the fishery. No geographic redistribution is expected for the midwater trips targeting nonwhiting species (primarily pelagic rockfish). Total effort is not expected to change as a result of the Action Alternative, as compared to No Action, therefore any increase in impacts in one area will be offset by a reduction in some other area.

Utilization

Objective 11. *Develop management programs that reduce regulations-induced discard and/or which reduce economic incentives to discard fish. Develop management measures that minimize bycatch to the extent practicable and, to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. Promote and support monitoring programs to improve estimates of total fishing-related mortality and bycatch, as well as those to improve other information necessary to determine the extent to which it is practicable to reduce bycatch and bycatch mortality.*

No change in regulatory discard of groundfish are expected. Section 4.2.2 presented data regarding possible changes in bycatch as a result of the earlier season opening, the Action Alternative may result in slight changes (increases or decrease, depending on the species) in bycatch and bycatch mortality as compared to No Action, depending on the seasonal differences in bycatch rates. However, relative to No Action, the expected total change in bycatch from the Action Alternative is expected to be negligible with respect to relative stock biomass and consequently expected to have negligible impacts on stock conservation. The fishery will continue to be subject to 100 percent at-sea monitoring, and data will be available post season for use in an adaptive management response, if bycatch rates turn out to be higher than indicated by these data and problematic.

Objective 14. *When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.*

The purpose of this action is to provide the industry with increased flexibility in how it organizes its midwater trawl harvest under the trawl rationalization program. By definition this regulation will change the fishery and there was no way to achieve the desired effect (a season date change) that would have been less disruptive.

6.1.2 Magnuson-Stevens Conservation and Management Act

6.1.2.1 *National Standards*

An FMP or plan amendment and any pursuant regulations must be consistent with ten national standards contained in the MSA (§301). These are:

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

This action does not change the risk of exceeding an OFL for groundfish species. The trawl fishery is a catch share management fishery with 100 percent monitoring and 100 percent individual accountability that has been effective in keeping harvest within the trawl allocations and, thus, preventing overfishing.

For groundfish species managed with species-specific trawl allocations (including all overfished species), vessels are individually accountable for their catch. Therefore, the risk is low of the trawl sector overfishing those stocks. For groundfish species managed within complexes, the risk of overfishing is similar to that considered in the 2013-2014 and 2015-2016 proposed harvest specifications and management measures EISs. Some species managed within species complexes may be more vulnerable to overfishing due to the current composition of the complexes; this is particularly true for species identified as "highly vulnerable" to overfishing within the minor rockfish complexes. Species managed on a per trip basis, are not expected to be more vulnerable to overfishing than what was already considered in the 2013-2014 and 2015-2016 proposed harvest specifications and management measures EISs.

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

The analysis for the midwater season date change is based on the best scientific information available. Information to understand the baseline conditions and potential impacts were gathered from peer-reviewed literature, unpublished scientific reports, observer databases, PacFIN landing reports, Federal electronic fish tickets, the NMFS limited entry permit database, state logbooks, NMFS vessel monitoring systems and declarations data, as well as businesses and members of the fishing industry. Where quantitative data were not available on to the Pacific Coast groundfish fishery, data from other fisheries were used to identify potential environmental effects. The analysis was reviewed by EFH, protected resources, biological and economic experts.

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 2015-2016 Groundfish Harvest Specifications and Management Measures described the management units for Pacific coast groundfish. Pacific whiting is managed as a coastwide stock along the west coast of the U.S. and as an international stock in coordination with Canada pursuant to the Agreement with Canada on Pacific Hake/Whiting and the Pacific Whiting Act (16 U.S.C. 7001–7010). This action would not modify the management unit of the Pacific whiting stock or other groundfish management units.

National Standard 4 *states that conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishers, such allocation shall be (A) fair and equitable to all such fishers; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges*.

The proposed action will not discriminate between residents of different states. It creates an equal opportunity to harvest available shorebased trawl allocations for fishers off Washington, Oregon, and northern California. The proposed action does not reallocate among United States fishers.

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 proposed action considers efficiency in the utilization of fishery resources by adding flexibility which will allow the industry to more optimally organize itself (see discussion for each affected sector in Section 4.3). The proposed action will align the shorebased midwater trawl fishery north of 40°30' N. lat. to the U.S./Canada border with the at-sea midwater trawl fishery in the same area.

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 proposed action moves the season a month earlier off Washington and Oregon and a month and half later off northern California (north of 40°30' N. lat.). The proposed action will align the shorebased midwater trawl fishery north of 40°30' N. lat. to the U.S./Canada border with the at-sea midwater trawl fishery in the same area, in general, providing more opportunity to account for contingencies among fisheries and fishery resources. By providing a longer season off Washington and Oregon within the context of a trawl catch share program, the proposed action better allows for variations among, and contingencies in fisheries, relative to No Action. While the fishery off northern California would be a month later, there has been no fishing in that area for several years.

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

The proposed action simplifies the season regulatory structure by aligning the shorebased midwater trawl fishery north of 40°30' N. lat. to the U.S./Canada border with the at-sea midwater trawl fishery in the same area. The proposed action provides a longer season off Washington and Oregon within the context of a trawl catch share program, allowing the industry more flexibility to minimize its cost. While the fishery off northern California would be a month later, there has been no fishing in that area for several years.

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*.

The EA evaluates the effects of the proposed action on fishing communities (Section 4.3.5). The trawl rationalization program, implemented in 2011, considered communities, including allocation of 20% of whiting QS to processors, allocation of 10% of non-whiting QS to the adaptive management program (which may be used to address community stability), accumulation limits to prevent excessive control or consolidation, and the ability of communities to own QS. The shorebased midwater trawl fishery affected by this action is part of the trawl rationalization program.

For all midwater trawlers that deliver their fish to shorebased processors and buyers, the proposed action will extend the fishing season off of Washington and Oregon, contract the season off of northern California, and leave the southern season unchanged. For pelagic rockfish, which are non-migratory, these season changes are not expected to have an impact on the geographic distribution of harvest, relative to No Action. For whiting, which are migratory, there could be some differences. However, the impacts for the northern California area are primarily hypothetical, since there has been no whiting fishery in recent years during the April to June 15 period in this areas. For the northern area, to the degree that whiting are distributed slightly farther to the south in the earlier period in any given year, there could be a minor southward shift in harvest.

Fishing communities in the northern fishing area (Washington and Oregon) stand to benefit from the proposed season opening date change to the extent that the flexibility provided by the earlier season yields benefits which accrue to the harvest and processor sectors in that area. Measurable geographic shifts in the areas of delivery are not expected. Therefore, the impact to fishing communities is projected to be the same.

The proposed action provides for the sustained participation of fishing communities and, to the extent practicable, minimizes adverse economic impacts on communities.

National Standard 9 *states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.*

The trawl rationalization program implemented in 2011 was designed to improve total catch accounting (with 100% observer coverage in all sectors and, in the IFQ fishery, 100% dockside monitoring) and to reduce bycatch. The program was designed to reduce regulatory discards, increase target catches, and promote greater individual responsibility for avoiding bycatch. The program provides greater flexibility for fishermen to decide when, where, and how to fish. The proposed action would slightly modify when shorebased midwater trawlers can fish. The proposed action is expected to continue the benefits of reduced regulatory discards seen under the trawl rationalization program compared to pre-2011 trawl fisheries. Section 6.1.2 presents data regarding possible changes in bycatch as a result of the earlier season opening. The proposed action may result in slight changes (increases or decrease, depending on the species) in bycatch and bycatch mortality as compared to No Action, depending on the seasonal differences in bycatch rates. However, relative to No Action, the expected total change in bycatch is expected to be negligible with respect to relative stock biomass and consequently expected to have negligible impacts on stock conservation. The fishery will continue to be subject to 100 percent monitoring and data will be available post season for use in an adaptive management response, if bycatch rates turn out to be higher than expected and problematic.

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

The trawl rationalization program as implemented in 2011 provides fishermen with increased flexibility in determining when, where, and how to fish. The program 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. The proposed action to change the shorebased midwater trawl fishery season by approximately a month is not expected to substantially change the original program impacts described above. The proposed action will provide a slightly longer season off Washington and Oregon (where the fishery has occurred in the recent past) and, therefore, more opportunity to maximize net profits from a fixed amount of fish available for harvest while also balancing other social needs and concerns, such as safety.

6.1.3 Endangered Species Act

The ESA of 1973 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.

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 anticipated, the Reasonable and Prudent Measures (RPMs) necessary to minimize impacts from the take, and the Terms and Conditions with which the action agency must comply.

NMFS has issued biological opinions on the effects of the Pacific coast groundfish fishery on ESA-listed salmonids, other fish species, marine mammals, and seabirds.

NMFS issued biological opinions under the ESA on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999 pertaining to the effects of the groundfish FMP 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 concluded that implementation of the groundfish FMP is not expected to jeopardize the continued existence of any endangered or threatened salmonids 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 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.

NMFS has reinitiated section 7 consultation on the Pacific Coast Groundfish FMP with respect to its effects on listed salmonids. In the event the consultation identifies either reasonable and prudent alternatives to address jeopardy concerns or RPMs to minimize incidental take, NMFS would exercise necessary authorities, in coordination with the Council, to put such additional alternatives or measures into place. After reviewing the available information, NMFS has concluded that, consistent with sections 7(a)(2) and 7(d) of the ESA, this action will not jeopardize any listed species, would not adversely modify any designated critical habitat, and will not result in any irreversible or irretrievable commitment of resources that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures.

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, the southern DPS of green sturgeon, humpback whales, the eastern DPS of 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, SRKWs, Guadalupe fur seals, or the critical habitat for Steller sea lions. Since that biological opinion, the eastern DPS of Steller sea lions was delisted on November 4, 2013 (78 FR 66140); however, this delisting did not change the designation of the codified critical habitat for the eastern DPS of Steller sea lions. On January 21, 2013, NMFS informally consulted on the fishery's effects on eulachon to consider whether the 2012 opinion should be reconsidered for eulachon in light of new information from the 2011 fishery and the proposed chafing gear modifications. NMFS determined that information about bycatch of eulachon in 2011 and chafing gear regulations did not

change the effects that were analyzed in the December 7, 2012 biological opinion, or provide any other basis to reinitiate consultation.

As Steller sea lions and humpback whales are also protected under the Marine Mammal Protection Act, incidental take of these species from the groundfish fishery must be addressed under MMPA section 101(a)(5)(E) (see Section 6.1.4 of the EA).

This action is not expected to change the conclusions from the December and November 2012 biological opinions because it is a minor temporal shift without changing areas open to fishing or groundfish harvest amounts.

6.1.4 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 is the principal Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the USFWS is responsible for walrus, sea otters, and the West Indian manatee.

Off the west coast, the Guadalupe fur seal (*Arctocephalus townsendi*) and Southern sea otter (*Enhydra lutris*) California stock are listed as threatened under the ESA. The sperm whale (*Physeter macrocephalus*) Washington, Oregon, and California stock, humpback whale (*Megaptera novaeangliae*) Washington, Oregon, and California - Mexico Stock, blue whale (*Balaenoptera musculus*) eastern north Pacific stock, and Fin whale (*Balaenoptera physalus*) Washington, Oregon, and California stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

Pursuant to the MMPA, the List of Fisheries (LOF) classifies U.S. commercial fisheries into one of three Categories according to the level of incidental mortality or serious injury of marine mammals:

I. Frequent incidental mortality or serious injury of marine mammals
II. Occasional incidental mortality or serious injury of marine mammals
III. Remote likelihood of/no known incidental mortality or serious injury of marine mammals

The MMPA mandates that each fishery be classified by the level of serious injury and mortality of marine mammals that occurs incidental to each fishery, as reported in the annual Marine Mammal Stock Assessment Reports for each stock. West Coast pot fisheries for sablefish are considered Category II fisheries under the MMPA, indicating occasional interactions. All other West Coast groundfish fisheries, including the trawl fishery, are considered Category III fisheries under the MMPA, indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals. While the WA/OR/CA groundfish trawl fishery is a Category III fishery with remote likelihood of injuries or mortalities, the following marine mammals were documented in the 2015 List of Fisheries (79 FR 77919, 12/29/2014) to have been incidentally killed or injured in the fishery: California sea lion, Dall's porpoise, Harbor seal, Northern fur seal, Pacific white-sided dolphin, and Steller sea lion.

MMPA section 101(a)(5)(E) requires that NMFS authorize the taking of ESA-listed marine mammals incidental to U.S. commercial fisheries if it makes the requisite findings, including a finding that the incidental mortality and serious injury from commercial fisheries will have a negligible impact on the affected species or stock. As noted above, NMFS concluded in its biological opinion for the 2012 groundfish fisheries that these fisheries were not likely to jeopardize Steller sea lions or humpback whales. The eastern distinct population segment of Steller sea lions was delisted under the ESA on November 4, 2013 (78 FR 66140). On September 4, 2013, based on its negligible impact determination dated August 28, 2013, NMFS issued a permit for a period of three years to authorize the incidental taking of humpback whales by the sablefish pot fishery (78 FR 54553).

Section 3.2.3 describes the incidental take of marine mammals and Section 4.2.3.1 assesses the effects of the proposed action on marine mammals. There is no projected change in the trawl fishery impacts over what was previously considered in the 2013-2014 and 2015-2016 harvest specifications and management measures, EISs. The fishery will continue to be subject to 100 percent at-sea monitoring, and data will be available post-season for use in an adaptive management response, if incidental take rates turn out to be higher than expected and problematic.

6.1.5 Migratory Bird Treaty Act and Executive Order 13186

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.

EO 13186 supplements the MBTA by requiring Federal agencies to work with the USFWS to develop memoranda of understanding to conserve migratory birds. NMFS is in the process of implementing a memorandum of understanding. The protocols developed by this consultation will guide agency regulatory actions and policy decisions in order to address this conservation goal. The EO also directs agencies to evaluate the effects of their actions on migratory birds in environmental documents prepared pursuant to the NEPA.

The proposed action is unlikely to cause the incidental take of seabirds protected by the Migratory Bird Treaty Act to differ substantially from levels previously considered in the 2013-2014 and 2015-2016 harvest specifications and management measures, EISs. (Section 4.2.3.1 evaluated impacts of the proposed action on protected species, including seabirds).

6.1.6 Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act (CZMA) of 1972 requires all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. A determination as to whether the proposed action is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California was submitted to the responsible state agencies for review under Section 307(c)(1) of the CZMA. The relationship of the groundfish FMP with

the CZMA is discussed in Section 11.7.3 of the Groundfish FMP. The Groundfish FMP has been found to be consistent with the Washington, Oregon, and California coastal zone management programs.

6.1.7 Paperwork Reduction Act

The Paperwork Reduction Act requires that agency information collections minimize duplication and burden on the public, have practical utility, and support the proper performance of the agency's mission. There is no Paperwork Reduction Act collection associated with this action.

6.2 Executive Order 12866

EO 12866, Regulatory Planning and Review, covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions, called a Regulatory Impact Review (RIR). It directs agencies to choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach. The agency must assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only after reasoned determination the benefits of the intended regulation justify the costs. In reaching its decision, the agency must use the best reasonably obtainable information, including scientific, technical and economic data, about the need for and consequences of the intended regulation. NMFS requires the preparation of an RIR for all regulatory actions of public interest. The purpose of the analysis is to ensure the regulatory agency systematically and comprehensively considers all available alternatives, so the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of EO 12866. A separate RIR was prepared with the rulemaking and summarized in the classification section of the preamble to the rule.

This action is not significant under EO 12866. This action will not have a cumulative effect on the economy of $100 million or more, nor will it result in a major increase in costs to consumers, industries, government agencies, or geographical regions. No significant adverse impacts are anticipated on competition, employment, investments, productivity, innovation, or competitiveness of U.S.-based enterprises.

6.3 Executive Order 12898 (*Environmental Justice*)

EO 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance, NAO 216-6, at Section 7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes." Agencies should also encourage public participation, especially by affected communities during scoping, as part of a broader strategy to address environmental justice issues. The proposed action will not result in disproportionate adverse impacts to low income and minority communities.

6.4 Executive Order 13175 (*Tribal government)*

Executive Order 13175 is intended to ensure regular and meaningful 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 proposed action was developed after meaningful collaboration with Tribal officials from the area covered by the FMP. Under the Magnuson-Stevens Act at 16 U.S.C. 1852(b)(5), one of the voting members of the Council must be a representative of an Indian Tribe with federally-recognized fishing rights from the area of Council's jurisdiction. The proposed action has no direct effect on the tribes.

6.5 Executive Order 13132 (Federalism)

EO 13132, which revoked EO 12612, an earlier federalism EO, enumerates eight "fundamental federalism principles." The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the EO directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement." The proposed action does not have federalism implications subject to EO 13132.

6.6 Administrative Procedure Act

The Administrative Procedure Act, or APA, governs the Federal regulatory process and establishes standards for judicial review of Federal regulatory activities. Most Federal rulemaking, including regulations promulgated pursuant to the MSA, are considered "informal," which is determined by the controlling legislation. Provisions at 5 U.S.C. 553 establish rulemaking procedures applicable to the proposed action. The FMP requires a 'full notice-and-comment rulemaking' to implement the regulations necessary to implement the Council recommendation. The rulemaking associated with this proposed action will be conducted in accordance with the APA and procedures identified in section 304 of the MSA.

6.7 Regulatory Flexibility Act

The Regulatory Flexibility Act requires government agencies to assess the effects that regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. A fish-harvesting business is considered a "small" business by the Small Business Administration if it has annual receipts not in excess of $20.5 million. For related fish-processing businesses, a small business is one that employs 500 or fewer persons. For wholesale businesses, a small business is one that employs not more than 100 people. For marinas and charter/party boats, a small business is one with annual receipts not in excess of $7.5 million. If the projected impact of the regulation exceeds $100 million, it may be subject to additional scrutiny by the Office of Management and Budget.

NMFS develops the necessary analysis, called a Regulatory Flexibility Act Analysis, and documentation needed to address this mandate as part of the Federal rulemaking process. A separate Initial Regulatory Flexibility Analysis (IRFA) and Final Regulatory Flexibility Analysis (FRFA) were prepared with the rulemaking and summarized in the classification section of the preamble to the rule.

Chapter 7 NEPA

7.1 National Environmental Policy Act

The CEQ has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508), and NOAA's agency policy and procedures for NEPA can be found in NOAA Administrative Order 216-6 (NAO 216-6). The 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 the proposed action and the alternatives, and
4. The agencies and persons consulted.

7.2 Related NEPA Documents

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

- Draft Environmental Impact Statement: Harvest Specifications and Management Measures for 2015-2016 and Biennial Periods Thereafter; Includes the Reorganization of Groundfish Stock Complexes, Designation of Ecosystem Component Species and Amendment 24 to the Pacific Coast Groundfish Fishery Management Plan to Establish a Process for Determining Default Harvest Specifications (October 2014) (http://www.pcouncil.org/groundfish/fishery-management-plan/fmp-draft-amendment-24/)
- 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 the Council 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 the Council 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)

Information may be incorporated by reference from these documents into this EA. The 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 EA.

7.3 Finding of No Significant Impact (FONSI) for the Pacific Coast groundfish midwater trawl fishery season date change

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 Council on Environmental Quality 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?

While the target species for this action could be any groundfish species (including overfished species), the primary target species of the midwater trawl fishery include Pacific whiting, widow rockfish, yellowtail rockfish, and chilipepper rockfish. The potential biological effects on groundfish species are projected to be neutral because groundfish species are managed to stay within trawl fishery allocations and to prevent overfishing. The trawl allocation is divided between the shorebased IFQ program and the at-sea Pacific whiting fishery (including MS and CP Coops). The use of MS and CP Coop allocations, IFQs, trip limits and set-asides are effective in keeping the total catch within harvest specifications for the trawl fishery. The proposed action is not expected to result in increased catch of target species above allocations. Given the level of catch monitoring and inseason catch accounting, there is a low risk of exceeding a groundfish ACL and an even lower risk of exceeding an OFL as a result of the proposed action. Therefore, the proposed action is not expected to jeopardize the sustainability of any target species, as discussed further in Section 4.2.1 of the EA.

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

Impacts to non-target species are discussed in Section 4.2.2 of the EA. Non-target species are other groundfish species caught incidentally while targeting Pacific whiting, widow rockfish, yellowtail rockfish, and chilipepper rockfish with midwater trawl gear. Non-target species also include non-groundfish species caught with midwater trawl gear, including Pacific halibut, coastal pelagic species, highly migratory species, salmon, forage fish, and other non-groundfish species (see Section 4.2.2.5.2 of the EA). Changes in the impacts on non-groundfish species are primarily related to changes in fishing season, fishing locations, and intensity. The proposed action does not modify which target fisheries can use midwater trawl gear, where midwater trawl may be used, or the intensity. The intensity of fishing is primarily related to harvest specifications and allocations occurring under other related actions. However, the proposed action does modify when fishing may occur (i.e., the fishing season). In addition, while the proposed action does not modify where midwater trawl may be used off Washington, Oregon, and California, the change in fishing season may cause changes in fishing location.

The catch of non-target species by vessels targeting Pacific whiting is generally very low. While the proposed action may cause bycatch rates to be lower or higher for the shorebased whiting fishery, they are still expected to be so low as to have a negligible impact. Bycatch of non-target species are greater for midwater trips targeting nonwhiting species; however, significant seasonal differences are not expected to result from this small change of approximately a month. Moreover, with 100 percent at-sea monitoring, there will be ample information on fishery performance under the new opening date and opportunity for adaptive management response if unexpected and problematic bycatch levels occur. The proposed action is not expected to jeopardize the sustainability of any non-target species, relative to No Action.

(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?

The proposed action may result in changes in the distribution of impacts to some ocean and coastal habitats including areas designated as EFH. However, the total impacts to habitats, including EFH, are not expected to change because neither the manner in which the gear is deployed, the location of areas open to fishing, nor the total amount of fishing effort are expected to change. While there may be some redistribution of effort, the impact of midwater gear on the bottom habitat is generally low because the gear only occasionally touches bottom. EA Sections 4.1.3 through 4.1.6 further describe the impacts of the proposed action on habitats.

The main driver for any change in the distribution of midwater trawl effort would be the migratory patterns of whiting. For whiting targeted midwater trawl gear trips, there is some probability that fishing effort will occur in a slightly more southerly area, on average, because whiting tend to be more available in the south earlier in the season and migrate north as the season progresses. However, the total geographic region over which effort is dispersed is not expected to change. Other non-whiting species targeted with midwater trawl gear, such as pelagic rockfish, do not exhibit strong migratory patterns. Therefore, no geographic shift is expected for nonwhiting targeted midwater gear trips. Section 4.1.3 describes that an earlier season opening date in the Northern Fishing Area (off Oregon and Washington) may result in a redistribution of fishing effort among fishing grounds (the action will not open up new fishing grounds or result in fishing in areas where it has not occurred in the past). Conversely, the delayed opening date in the Central Area Fishery (Northern California) may reduce the timing of fishing effort in that area by a month and a half with an associated reduced risk to EFH (except there has been no midwater trawl activity in the area in recent years). While the distribution of habitat impacts may shift with increased impacts off Washington and Oregon and decreased impacts off Northern California, the overall impacts to habitat are not expected to change nor be significant.

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

The proposed action is not expected to have an effect on the safety of human life at sea because it does not change fishing practices such that it changes the safety risks over No Action.

(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 is not expected to have a significant adverse effect on endangered or threatened species, marine mammals, or critical habitat, as described further in Section 4.2.3 of the EA. The main species of concern with regard to the season change is salmon, particularly ESA-listed Chinook. Catch of other salmon species, including ESA-listed coho, is low with midwater trawl gear. Historical salmon bycatch rate data for the shorebased whiting fishery by fishery week are discussed in Section 4.2.2.4 of the EA and displayed in Table 4-9. Section 4.2.2.4 also discusses salmon bycatch in the nonwhiting midwater fishery. Data on the shorebased whiting fishery for the years 1992-2004 show that prediction of bycatch rates by season is difficult, but the greatest risk of elevated salmon bycatch seems to be in late April and early May. Table 4-10 in the EA shows that the higher volume whiting fishery tends to catch more Chinook (approximately 6,700) than the midwater nonwhiting fishery (approximately 800) although the nonwhiting fishery has a higher bycatch rate. Preliminary data from the Northwest Fisheries Science Center on Chinook catch in 2014 show Chinook in the shorebased midwater nonwhiting trawl fishery were predominately caught off of Washington. Those same data show the highest catches of Chinook in the shorebased midwater whiting fishery were caught off of Oregon. Based on this information, the shorebased midwater whiting and nonwhiting fisheries likely affect different salmon populations.

As described in Section 4.2.3.2.1, NMFS has reinitiated ESA Section 7 consultation on the Pacific Coast Groundfish FMP to address the effects on salmonids. While reinitiation was ongoing in 2014, the whiting fishery (at-sea (MS and CP) and shorebased) exceeded the 11,000 Chinook limit described in the incidental take statement from the 1999 biological opinion on the effects of the Pacific Coast Groundfish FMP on salmonids. The reinitiated consultation will include more recent data than the 1999 biological opinion, including new information on genetics of affected salmon ESUs and new information on the nonwhiting midwater trawl fishery. In the interim until the reinitiated consultation is complete, the proposed action is expected to have some adverse impact on endangered or threatened salmon. However, the adverse impact is not expected to be significant. Due to the highly variable nature of salmon bycatch in midwater trawl fisheries between years and due to the small change in timing of the fishery (approximately one month), the proposed action is expected, on average, to be no change from No Action. Salmon bycatch will continue to be monitored on all trawl trips and is expected to stay within thresholds identified in the 1999 ESA Section 7 biological opinion for the groundfish fishery.

No changes in impacts to seabirds and marine mammals are expected compared to No Action as discussed in Section 4.2.3.1 of the EA. In 2012 biological opinions (November 21, 2012 and December 7, 2012), NMFS and the U.S. Fish and Wildlife Service concluded that continued implementation of the Pacific Coast Groundfish FMP was not likely to jeopardize other, non-salmonid ESA-listed species under the respective agencies' jurisdictions. Incidental take statements were issued that covered several species, including eulachon, green sturgeon, and short-tailed albatross. Best available information indicates that catch of these species in ongoing groundfish fisheries is anticipated to be below the authorized incidental take amounts. The December 2012 biological opinion also considered the effects of groundfish fisheries on Southern Resident killer whales, namely on the impact of Chinook salmon take in groundfish fisheries and how that might affect prey availability for Southern Resident killer whales. The December 2012 biological opinion made a "not likely to adversely affect" determination based on the range of the whales and the minor reduction in adult equivalent Chinook available to Southern Resident killer whales (less than 1 percent). Changing the shorebased midwater season date may cause a minor temporal and spatial shift in fishing patterns, but would not change the areas open to fishing. The proposed action would not change the conclusions from the 2012 biological opinions. The conclusions from existing biological

opinions with respect to effects on designated critical habitats also remain valid. With 100 percent at-sea monitoring, there will be ample information on fishery performance under the new opening date and thus, opportunity for adaptive management response if unexpected and problematic bycatch levels occur.

(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 trophic interactions in the California Current ecosystem are extremely complex, with large fluctuations over years and decades, as discussed in Section 4.1.2 of the EA. Food webs are heavily structured around coastal pelagic species, which exhibit boom and bust cycles over decadal time scales in response to climate variability. The top trophic levels of such ecosystems are often dominated by 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. The Pacific Coast marine ecosystem is controlled by biological systems and environmental perturbations much larger in influence than the proposed action to shift the groundfish midwater trawl fishing season by approximately a month. Total fishing effort and the methods of fishing will not be changed as a result of the season change. The potential for a change in bycatch as a result of the proposed action is low, and effects to the population status and sustainability of the affected species or species groups may be either positive or negative, depending on the net effect of a shift in effort from a bit later in the year to a bit earlier off of Washington and Oregon. However, when considered within the context of the ecosystem, the expected impact is neutral.

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

The proposed action is expected to provide fishers and processors with greater flexibility in when they harvest fish, providing opportunity to generate greater social and economic benefits depending on the particular circumstances of any particular processor. For example, the industry is expected to have more opportunity to take advantage and balance seasonality in markets, product quality, fish availability, and opportunities in alternative fisheries. Section 4.3 of the EA provides more information on the impacts to the socioeconomic environment. Changing the shorebased midwater season date may cause a minor temporal and spatial shift in fishing patterns, but would not change the areas open to fishing or the overall amount of groundfish that can be harvested. As stated previously, no significant natural or physical environmental effects are expected as a result of the proposed action. Thus, the social and economic benefits of the proposed action are not expected to be interrelated with significant natural or physical environmental effects.

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

The effects on the quality of human environment are not expected to be highly controversial. Section 4.0 of the EA provides more information on the impacts to the human environment. The May 15 season opening for the shorebased midwater fishery was used in 1996. The history of changes to the season date are described in Section 1.4, with further details on the change from May 15 to June 15 in Section 2.2. The proposed action was vetted through the Pacific Fishery Management Council's public process where it was supported by all sectors of the industry, including shorebased processors in northern California. In

addition, the proposed action has been available for public comment through the EA and through the proposed and final rulemaking process.

(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?

There would be no alterations to terrestrial resources by the proposed action. The proposed action would only occur in marine waters off of Washington, Oregon, and California between 0 and 200 nautical miles. The proposed action would allow midwater trawling in areas with benthic substrate and habitat characteristics typical of areas currently subject to midwater trawl effort. No effects are anticipated on unique areas with historic or cultural importance.

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

The effects on the human environment are not likely to be highly uncertain or involve unique or unknown risks. As described further in section 4.2.2, there is some uncertainty about potential spatial changes to fishing patterns and changes to bycatch rates which will be encountered in the earlier opening timeframe provided by the proposed action; however, in general based on past experience with a fishery during this time period and the experience of the mothership fishery during the earlier opening, it is very unlikely that significantly greater bycatch rates will occur. Given the level of catch monitoring and accounting, any issues that arise would likely be identified early, reducing the risks on the human environment. With 100 percent at-sea monitoring, there will be ample information on fishery performance under the new opening date and thus, opportunity for adaptive management response if unexpected and problematic bycatch levels occur.

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

The cumulative impacts relative to other past, present, or reasonably foreseeable future actions are not expected to be significant, as discussed further in Section 4.4 of the EA and summarized in Section 4.4.6.4. The magnitude and direction of past, present, or reasonably foreseeable future actions are discussed in Section 4.4.5. Some of the other actions considered in Section 4.4 include the 2015-2016 harvest specifications, gear changes, closed area/EFH changes, electronic monitoring, and fishery ecosystem plan considerations. The main impact of present actions is the increase in the ACLs for pelagic species in the 2015-2016 groundfish harvest specifications. Increases in these ACLs have been analyzed in the EIS accompanying those specifications. The increases in the ACLs may increase the overall impacts of midwater trawling activities on the physical environment, but the earlier season opening is not expected to noticeably add to or reduce those impacts (as discussed in Section 4.1). The levels of whiting harvests vary between years. When there is a reduced population size, there is reduced harvest opportunity for whiting by all fishers, which may shift effort to other fisheries to the degree that fishery or individual fisher quotas allow. Pacific 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 alternative, as compared to a situation in which vessels relied only on the whiting or pelagic rockfish fisheries. When the 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. Based on the information and analyses presented in past FMP documents and in this EA, there are no significant cumulative effects associated with the proposed action.

In addition, the nature of the fishery management process is intended to provide the opportunity for the Council 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 rebuilding targets for overfished species and to comply with the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and other applicable law. Therefore, 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 environmental outcomes.

(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 is not anticipated to cause loss or destruction of objects listed in or eligible for listing in the National Register of Historic Places, with the possible exception of shipwrecks. Shipwrecks are the only known cultural objects potentially within the area by which fishers in the proposed action area are allowed to fish. However, fishermen will likely actively avoid any known sites to preserve the integrity of their fishing gear, and safety of their crew.

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

The proposed action will not provide any new vectors or opportunities for introduction or spread of non-indigenous species because it will not change how or where fishing can occur. The proposed action changes when fishing can occur by approximately one month.

(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?

Each future action related to the trawl fishery will require consideration relative to the effect on the human environment. The proposed action is not establishing a precedent for future actions because this season date has been used in the past. Therefore, the proposed action does not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration.

(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?

The proposed action has been reviewed for consistency with other Federal laws and Executive Orders and has been determined to be consistent. In addition, NMFS determined that this action is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management

programs of Washington, Oregon, and California. Therefore, the proposed action is not expected to threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment.

(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 described in Section 4.4 of the EA and summarized in Section 4.4.6.4, the proposed action is not expected to result in cumulative adverse effects that could have a substantial effect on target or non-target species. Some of the other actions considered in Section 4.4 include the 2015-2016 harvest specifications, gear changes, closed area/EFH changes, electronic monitoring, and fishery ecosystem plan considerations. As discussed in Section 4.4.5.2 on cumulative impacts to biological resources, 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 4-15, 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 Pacific whiting and pelagic rockfish complex species productivities depend. In addition, past fishery management actions taken through the FMP process have mitigated the cumulative effect on ESA-listed and MMPA-protected species through implementation of gear requirements and area closures, as needed. It is anticipated that future management actions, such as seabird avoidance measures, will result in 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.

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.

William Stelle

March 27, 2015

William W. Stelle, Jr.
Regional Administrator
West Coast Region, NMFS

Date

7.4 List of Persons and Agencies Consulted

This action is a Council-recommended action that includes all interested and potential cooperating agencies, such as the United States Fish and Wildlife Service, tribal government representatives, and state representatives for Washington, Oregon and California.

Main authors:

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Other Contributors:

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The following people were also consulted or were involved in reviewing Council drafts of the document:

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Sarah Biegel, NMFS West Coast Region, NEPA Coordinator
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Copies of this Environmental Assessment and Magnuson-Stevens Act Analysis and other supporting documents for this document are available from Jim Seger, Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220 and Jamie Goen, National Marine Fisheries Service, 7600 Sand Point Way NE, BIN C15700, Seattle, WA 98115-0070.