Amendment 29 to the Pacific Coast Groundfish Fishery Management Plan and 2021-22 Harvest Specifications and Management Measures

Draft Environmental Assessment/ Regulatory Impact Review/
Initial Regulatory Flexibility Analysis

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Acronyms and Abbreviations

ABC	Acceptable biological catch
ACL	Annual catch limit
ACS	American Community Survey
ACT	Annual catch target
AM	Accountability measure
APA	Administrative Procedures Act
B_0	Biomass, unfished
BIOP	Biological opinion
BRA	Bycatch reduction area
BRD	Bycatch reduction device
CalCOFI	California Cooperative Oceanic Fisheries Investigations
CA/OR/WA	California, Oregon, and Washington
CCA	Cowcod Conservation Area
CCE	California Current Ecosystem
CCIEA	California Current Integrated Ecosystem Assessment
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CP	Catcher-processor
CPFV	Commercial passenger fishing vessel
CPS	Coastal pelagic species
CPUE	Catch per unit of effort
CRFS	California Recreational Fisheries Survey
CV	Coefficient of variation
CZMA	Coastal Zone Management Act
DB-SRA	Depletion-based stock reduction analysis
DCAC	Depletion-corrected average catch
DO	Dissolved oxygen
DPS	Distinct population segment
DTL	Daily trip limit (fishery)
DTS	Dover sole, thornyheads, and sablefish
E	Exploitation
EA	Environmental Assessment
EC	Ecosystem component
EDC	Economic Data Collection (Program)
EEZ	Exclusive Economic Zone
EFH	Essential fish habitat
EFHRC	Essential Fish Habitat Review Committee
EFP	Exempted fishing permit
EIS	Environmental Impact Statement
ENSO	El Niño Southern Oscillation
EO	Executive Order
ESA	Endangered Species Act
ESU	Evolutionary significant unit
EwE	Ecopath with Ecosim
F	Fishing mortality
FEIS	Final Environmental Impact Statement
FEP	Fishery Ecosystem Plan
FM	Fathom or fathoms
FMP	Fishery Management Plan

GAP	Groundfish Advisory Subpanel
GCA	Groundfish Conservation Area
GIS	Geographic information system
GMT	Groundfish Management Team
h	Stock-recruitment steepness parameter
HA	Hectares
HAPC	Habitat Areas of Particular Concern
HCR	Harvest control rule
HG	Harvest guideline
HMS	Highly Migratory Species
IBQ	Individual bycatch quota
ID	Identification
IEA	Integrated Ecosystem Assessment
IFQ	Individual fishing quota
IOPAC	Input-output model for Pacific Coast fisheries
IPCC	Intergovernmental Panel on Climate Change
ITS	Incidental take statement
IUCN	International Union for the Conservation of Nature
LE	Limited entry
LEFG	Limited entry fixed gear
LOF	List of Fisheries
M	Instantaneous rate of natural mortality
MBTA	Migratory Bird Treaty Act
MEI	Multivariate ENSO Index
MFMT	Maximum Fishing Mortality Threshold
MHHW	Mean higher high water level
MMPA	Marine Mammal Protection Act
MPA	Marine Protected Area
MRFSS	Marine Recreational Fisheries Statistical Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSE	Management strategy evaluation
MSST	Minimum Stock Size Threshold
MSY	Maximum sustainable yield
MT	Metric ton
MTC	Mean temperature of catch
MTL	Mean trophic level
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NID	Negligible Impact Determination
NMFS	National Marine Fisheries Service
NMNU	Non-market and non-use
NOI	Notice of Intent
NORPAC	North Pacific Database Program
NPGO	North Pacific Gyre Oscillation
NWFSC	Northwest Fisheries Science Center
OA	Open access
ODFW	Oregon Department of Fish and Wildlife
OFL	Overfishing limit
OFS	Overfished species
ORBS	Ocean Recreational Boat Survey
OY	Optimum yield
P*	Overfishing probability
PacFIN	Pacific Fisheries Information Network

PBR	Potential biological removal
PCGW	Pacific Coast Groundfish and Endangered Species Workgroup
PDO	Pacific Decadal Oscillation
PMFC	Pacific Fishery Management Council (used in references)
POP	Pacific ocean perch
PPA	Preliminary Preferred Alternative
PR	Private/rental boats
PRD	NMFS Protected Resources Division
PSA	Productivity-susceptibility analysis
QP	Quota pounds
QS	Quota share
QSM	Quota species monitoring
Rec	Recreational
RecFIN	Recreational Fisheries Information Network
RBS	Rougheye/blackspotted/shortraker (rockfish complex)
RCA	Rockfish Conservation Area
RCG	Rockfish, cabezon, and greenling
RES	Research
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SCWC	South and Central Washington Coast
SFD	Sustained Fisheries Division
SPID	Species identification code
SPR	Spawning potential ratio
SSC	Scientific and Statistical Committee
STAR	Stock Assessment Review
SWFSC	Southwest Fisheries Science Center
TAC	Total allowable catch
TCEY	Total constant exploitation yield
USFWS	United States Fish and Wildlife Service
V	Vulnerability
VMS	Vessel monitoring system
WCGOP	West Coast Groundfish Observer Program
WCR	West Coast Region
WDFW	Washington Department of Fish and Wildlife
WOC	Washington, Oregon, and California
XDB-SRA	Extended Depletion-based Stock Reduction Analysis
YOY	Young-of-the-year
YRCA	Yelloweye rockfish Conservation Area

Chapter 1 Introduction

This document considers environmental effects resulting from setting groundfish harvest specifications and establishing related management measures under the Pacific Coast Groundfish Fishery Management Plan (PCGFMP) for the 2021-22 biennium. The Pacific Fishery Management Council (Council) in collaboration with the National Marine Fisheries Service (NMFS) adopt groundfish harvest specifications every two years for a biennial period/biennium, adjusting management measures for the groundfish fisheries, and implement management measures to keep catch within established limits. In addition to harvest specifications and management measures for the 2021-2022 biennium, this document evaluates the long-term impacts of changing the Council's default harvest control rule for five stocks: cowcod south of 40°10' N. lat., Petrale sole, Oregon black rockfish (as part of the Oregon black/blue/deacon rockfish complex), sablefish, and shortbelly rockfish. Changes to shortbelly rockfish would be undertaken through an amendment to the Pacific Coast Groundfish Fishery Management Plan (PCGFMP). These actions must conform to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ). This document fulfills all of the requirements for the National Environmental Policy Act (NEPA), the Magnuson-Stevens Act, Executive Order (EO) 12866, and the Regulatory Flexibility Act (RFA) for the Pacific Coast Groundfish fishery 2021–22 harvest specifications and management measures. This document is governed by the NEPA Regulations at 40 CFR 1500-1508 that were in effect on June 18, 2020 when the Council took its final action on the 2021-2022 management measures and NMFS initiated work on the EA.

NMFS and the Council support their Magnuson-Stevens Act decisions with an intensive public process that includes meetings, public comments, and release of analytical documents. Details of these processes can be found in Section 1.4.

This consolidated document provides assessments of the environmental impacts of an action and its reasonable alternatives (the EA), how the action meets the requirements of the Magnuson-Stevens Act (Magnuson-Stevens Act analysis), the economic benefits and costs of the action alternatives, as well as their distribution (the Regulatory Impact Review [RIR]), and the impacts of the action on directly regulated small entities (the Initial Regulatory Flexibility Analysis [IRFA]). A list of statutory and executive elements is found in Table 1. The Policy and Procedure for Compliance with the NEPA and Related Authorities1 recognizes that the advantages of preparing consolidated documents achieve the following:

> The CEQ regulations require that, to the fullest extent possible, draft NEPA documents should be prepared concurrently with and integrated with environmental impact analyses and related surveys and studies required by other federal statutes (p.22). Additionally, the CEQ regulations allow agencies to combine an environmental document prepared in compliance with NEPA with any other agency document to reduce duplication and paperwork. 40 C.F.R. 1506.4. Thus, the decision maker may combine a NEPA document

[1] http://www.nepa.noaa.gov/docs/NOAA-NAO-216-6A-Companion-Manual-03012018.pdf

with related plans, rules, or amendments as a single consolidated document. The consolidated document must contain and clearly identify the required sections of the NEPA document and must stand on its own as an analytical document which fully informs decision makers and the public of the environmental effects of the proposal and those of the reasonable alternatives. (Companion Manual for NOAA Administrative Order 216-6A).

Table 1. Directory of Statutory and Executive elements in the Consolidated Document for the Pacific Groundfish Fishery 2021–22 Harvest Specifications and Management Measures

Element	Location
Purpose and Need	Section 1.1
Proposed Action	Section 1.1
Scoping and Public Input	Section 1.4
Alternatives	Section 2.1 No Action Alternative Section 2.3 Harvest Specification Alternatives Section 2.2 Management Measures
Affected Environment	Chapter 3
Environmental Effects (Direct, Indirect and Cumulative)	Chapter 4 –Effects of the Alternatives Chapter 5 – Cumulative Effects
Listing of Agencies and Persons Consulted	Chapter 9
References	Chapter 10
Finding of No Significant Impact (FONSI)	To be completed with final rule
Elements satisfying other statutory and executive requirements	Location
Regulatory Impact Review	Chapter 6
Initial Regulatory Flexibility Analysis	Chapter 7
Magnuson-Stevens Act and FMP considerations	Chapter 8

1.1 Proposed Action, Purpose and Need

In accordance with MSA, the proposed action would implement the following:

1) Default harvest control rules, harvest specifications (overfishing limits [OFL], acceptable biological catches [ABC], annual catch limits [ACL], and allocations) for all Pacific Coast Groundfish Fishery Management Plan (PCGFMP) groundfish stocks and stock complexes "in the fishery" (except Pacific whiting);
2) Shortbelly rockfish as ecosystem component species (through amendment 29 to the PCGFMP); and
3) Management measures, including changes to some trawl/non-trawl allocations, to achieve, but not exceed, annual harvest specifications.

The purpose of this action is to prevent overfishing, rebuild overfished stocks, ensure long-term sustainability of a stock or stock complex biomass, facilitate long-term protection of essential fish habitat (EFH), and realize the full potential of the nation's fishery resources (MSA § 2(a)(6)).

The proposed action is needed to respond to new scientific data and information about the stocks and the needs of fishing communities, to provide additional tools to ensure ACLs and other federal

harvest guidelines are not exceeded, and to afford additional fishing opportunities where warranted. In all cases, the No Action Alternative is also considered. The harvest specifications are set consistent with the optimum yield (OY) harvest management framework described in Chapter 4 of the PCGFMP.

1.2 Tiered NEPA Analysis

NEPA regulations at 40 CFR 1508.28 define "tiering" as follows:

> *. . . the coverage of general matters in broad environmental impact statements (such as national program or policy documents) with subsequent narrower statements or environmental analyses (such as regional or basin wide program statements or ultimately site-specific statements), incorporating by reference the general discussion and concentrating solely on the issues specific to the statement subsequently prepared (40 CFR 1508.28).*

In 2015, NMFS published the 2015 EIS which analyzed the impacts of implementing harvest specifications and management measures for the 2015–2016 biennial period and the long-term impacts of developing default harvest control rules (DHCR) to set biennial harvest specifications. At that time, the proposed action included Amendment 24 to PCGFMP, which amended the PCGFMP to include a decision framework around default harvest specifications intended to streamline decision making for future biennial periods. PCGFMP Section 5.1 describes both how biennial harvest specifications are set and the default harvest specifications as the application of the best scientific information available to the harvest control rule (HCR) from the previous biennial period. The default represents the continuation of the existing policy. Unless the Council takes deliberate action to adopt a new HCR, the existing DHCR rolls over as the basis for harvest specifications in the subsequent biennial period. This decision-making framework is intended to complement the tiering concept; the impacts of a range of HCR policies were analyzed in the 2015 EIS. NEPA documents for subsequent biennial periods evaluated specifications under the default harvest control rules, as well as changing the default harvest rules for specific stocks and the environmental impacts from the resulting specifications. The 2021–22 range is the third biennial period since preparation of the 2015 EIS, and this EA also considers the actions and related impact analyses in the EAs prepared for the 2017–2018 biennial period (2016 EA) [2] and the 2019-20 biennial period (2018 EA)[3].

[2] The 2016 EA evaluated setting alternative harvest control rules and harvest specifications for darkblotched rockfish, big skate, California scorpionfish, canary rockfish, widow rockfish, and Pacific ocean perch, establishing five new management measures for the 2017–18 biennial period and beyond, revising federal regulations at 50 CFR 660, Subparts C through G, accordingly, and implementing Amendment 27 to the PCGFMP.

1.3 Description of the management area

The management area for this action is the EEZ—defined as 3 nautical miles to 200 nautical miles from state baselines along the coasts of Washington, Oregon, and California and the communities that engage in fishing in waters off these states. Figure 1 depicts this management area.

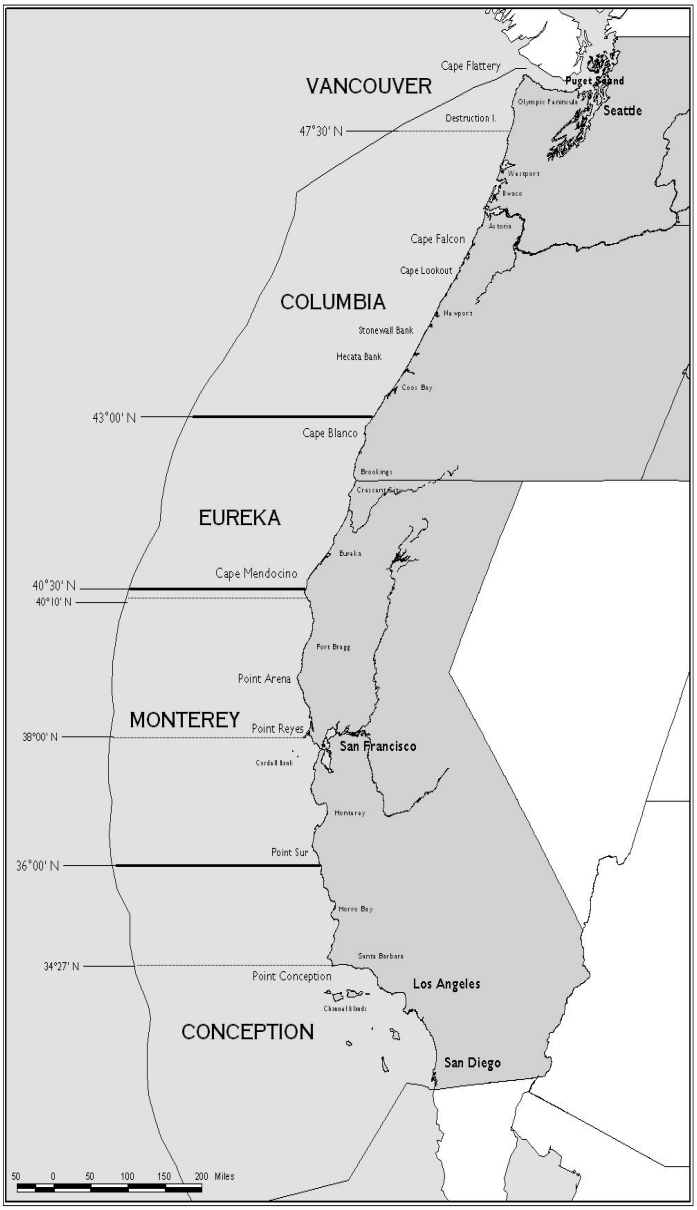


Figure 1. Geographic scope of the Pacific Coast Groundfish Fishery Management Plan. (Source PCGFMP, 2018)

1.4 Scoping and Public Input

Section 5.1 of the PCGFMP provides a general overview of the Council's biennial harvest specifications and management measures process. Section 5.4 specifies the specific implementation procedures for specifications and management measures.

The Council discussed the proposed 2021-22 harvest specifications and management measures at five meetings between November 2019 and June 2020. At each meeting, the public provided input into the development process of the 2021–22 harvest specifications and management measures through public comment at the Council meetings. Council meetings are noticed in the Federal Register and meetings are broadcast live and are recorded.

1.5 Public Comments

Public comment on this draft document will inform the final document and decisions.

Other consultations – the NOAA NEPA Companion Manual states (p 22)

- the EA/EIS should contain a section briefly listing the applicable requirements and how they have been or will be met (e.g., permits applied for or received, consultations initiated or concluded).
- The FONSI/ROD should also note whether other environmental documents are related to the scope of the action, such as the results of these consultations.

What is NMFS's plan for an EFH consultation under MSA for this action given the substantial (>1000 mi2?) non-trawl RCA openings. This section should also list any initiated ESA consultations (humpback)?

Chapter 2 describes the harvest specification alternatives (No Action, Alternative 1, and Alternative 2) for groundfish stocks and stock complexes that could be implemented to manage groundfish fisheries for the 2021-2022 biennial period. Impacts of these alternatives are discussed in Chapter 4. Harvest specifications include OFLs, ABCs, and ACLs for all stocks and stock complexes actively managed "in the fishery" under the PCGFMP. Management measures are discussed under each alternative and are designed to allow harvest of these stocks and stock complexes to reach but not exceed their ACLs. The proposed OFLs, ABCs, and ACLs are based on the best available biological and socioeconomic data, including projected biomass trends, information on assumed distribution of stock biomass, and revised technical methods used to calculate stock biomass. At the national level, National Standard 1 Guidelines at 50 CFR §600.310 define harvest specifications and what must be taken into account when specifying them.

2.1 Harvest Specifications Process

The PCGFMP specifies a series of three stock categories for the purpose of setting maximum sustainable yield (MSY), OFLs, ABCs, ACLs, and rebuilding standards. Category one represents the highest level of information quality available, while category three represents the lowest. Category one stocks are the relatively few stocks for which the NWFSC can conduct a "data rich," quantitative stock assessment that incorporates catch-at-age, catch-at-length, or other data. The Scientific and Statistical Committee (SSC) can generally calculate OFLs and overfished/rebuilding thresholds for these stocks, as well as ABCs, based on the uncertainty of the biomass estimated within an assessment or the variance in biomass estimates between assessments for all stocks in this category. The set of category two stocks includes a large number of stocks for which some biological indicators are available, yet status is based on a "data-moderate" quantitative assessment. The category three stocks include minor stocks which are caught, but for which there is, at best, only information on landed biomass. For stocks in this category, there is limited data available for the SSC to quantitatively determine MSY, OFL, or an overfished threshold. Typically, catch-based methods (e.g., depletion-based stock reduction analysis [DBSRA], depletion corrected average catch, and average catches) are used to determine the OFL for category three stocks. A detailed description of each of these categories can be found in Section 4.2 of the PCGFMP.

The OFL serves as the maximum amount of fish that can be caught in a year without resulting in overfishing. The SSC derives OFLs for groundfish stocks with stock assessments by applying the harvest rate to the current estimated biomass. A detailed description of the scientific basis for all of the SSC-recommended OFLs proposed in this rule is included in the Stock Assessment and Fishery Evaluation (SAFE) document for 2020, available at the Council's website, *www.pcouncil.org*.

The ABC is the stock or stock complex's OFL reduced by an amount associated with scientific uncertainty. The SSC-recommended P star-sigma approach determines the amount by which the OFL is reduced to account for this uncertainty. Under this approach, the SSC recommends a sigma (σ) value. The σ value is generally based on the scientific uncertainty in the biomass estimates generated from stock assessments and is usually related to the stock category. After the SSC

determines the appropriate σ value, the Council chooses a P star (P*) based on its chosen level of risk aversion considering the scientific uncertainties. A P* of 0.5 equates to no additional reduction for scientific uncertainty beyond the σ value reduction. The PCGFMP specifies that the upper limit of P* will be 0.45. The P*-sigma approach is discussed in detail in the analyses for the 2011–12 and 2013–14 biennial harvest specifications and management measures.

The SSC recently endorsed new σ values that increase the scientific uncertainty estimate and reduce the proposed ABCs and ACLs relative to what they could have been under the σ and P* values used in the previous biennium. The new σ values, endorsed by the Council at its March 2019 meeting, include a new base reduction for Category 1 stocks of 0.5 and an increase in the buffer between the OFL and ABC as the age of the assessment increases. Currently, σ is the same for each year regardless of the age of the assessment. Table 2 provides the σ values used in previous biennium (old) and the σ approach with a higher base year deduction and progressively increasing σ values used in this biennium (new).

Table 2. Old and new σ values for category 1-3 stocks over a 10 year period.

P*=0.45	Category 1 Stocks		Category 2 Stocks		Category 3 Stocks	
Year	Old σ	New σ	Old σ	New σ	Old σ	New σ
1	4.4%	6.1%	8.7%	11.8%	16.6%	22.2%
2	4.4%	6.5%	8.7%	12.6%	16.6%	22.2%
3	4.4%	7.0%	8.7%	13.5%	16.6%	22.2%
4	4.4%	7.4%	8.7%	14.3%	16.6%	22.2%
5	4.4%	7.8%	8.7%	15.1%	16.6%	22.2%
6	4.4%	8.3%	8.7%	15.9%	16.6%	22.2%
7	4.4%	8.7%	8.7%	16.7%	16.6%	22.2%
8	4.4%	9.1%	8.7%	17.4%	16.6%	22.2%
9	4.4%	9.6%	8.7%	18.2%	16.6%	22.2%
10	4.4%	10.0%	8.7%	19%	16.6%	22.2%

Based on the new methodology, the SSC quantified major sources of scientific uncertainty in the estimates of OFLs and generally recommended a σ value of 0.5 for category one stocks (previously 0.36), a σ value of 1.0 for category two stocks (previously 0.72), and a σ value of 2.0 for category three stocks (previously 1.44). For category two and three stocks, there is greater scientific uncertainty in the OFL estimate because the assessments for these stock assessments are informed by less data than the assessments for category one stocks. Therefore, the scientific uncertainty buffer is generally greater than that recommended for stocks with data-rich stock assessments. Assuming the same P* is applied, a larger σ value results in a larger reduction from the OFL.

For 2021–22, the Council continued the general policy of using the SSC-recommended σ values for each stock category. For 2021–22, the Council only considered the P* policies it established

for the previous biennium for most stocks, except Petrale sole, Oregon black rockfish, cowcod south of 40°10' N. lat., sablefish, and shortbelly rockfish. For these stocks the Council also considered alternative P* policies (Alternatives 1 and 2). See Tables 1-3 in Agenda Item H.8, Supplemental Attachment 2, September 2019 Council meeting for the full description of σ and P* values by stock.

The Council recommends ACLs for each stock and stock complex that is in need of conservation and management or "in the fishery," as defined in the PCGFMP. To determine the ACL for each stock, the Council will determine the best estimate of current stock abundance and its relation to the precautionary and overfished/rebuilding thresholds. Under the PCGFMP, the biomass level that produces MSY, or B_{MSY}, is defined as the precautionary threshold. When the biomass for an assessed category one or two stock falls below B_{MSY}, the ACL is set below the ABC using a harvest rate reduction to help the stock return to the B_{MSY} level, which is the management target for groundfish stocks. If a stock biomass is larger than B_{MSY}, the ACL may be set equal to the ABC, or the ACL may be set below the ABC to address conservation objectives, socioeconomic concerns, management uncertainty, or other factors necessary to meet management objectives. The overfished/rebuilding threshold is 25 percent of the estimated unfished biomass level for non-flatfish stocks or 50 percent of B_{MSY}, if known. The overfishing/rebuilding threshold for flatfish stocks is 12.5 percent of the estimated unfished biomass level. When a stock is below B_{MSY} (the precautionary threshold) but above the overfishing/rebuilding threshold, it is considered to be in the precautionary zone.

Under PCGFMP Amendment 24, the Council set up default harvest control rules, which established default policies that would be applied to the best available scientific information to set ACLs each biennial cycle, unless the Council choses to diverge from that harvest control rule. A complete description of the default harvest control rules for setting ACLs is described in the proposed and final rule for the 2015–16 harvest specifications and management measures and PCGFMP Amendment 24 (80 FR 687, January 6, 2015; 80 FR 12567, March 10, 2015).

The PCGFMP defines the 40-10 harvest control rule for stocks with a B_{MSY} proxy of $B_{40\%}$ that are in the precautionary zone as the standard reduction. The analogous harvest control rule with the standard reduction for assessed flatfish stocks is the 25-5 harvest control rule for flatfish stocks with a B_{MSY} proxy of $B_{25\%}$. The further the stock biomass is below the precautionary threshold, the greater the reduction in ACL relative to the ABC, until at $B_{10\%}$ for a stock with a B_{MSY} proxy of $B_{40\%}$, or $B_{5\%}$ for a stock with a B_{MSY} proxy of $B_{25\%}$, the ACL would be set at zero.

Under the PCGFMP, the Council may recommend setting the ACL at a different level than what the default harvest control rules specify as long as the ACL does not exceed the ABC and complies with the requirements of the Magnuson-Stevens Act.

Any revised or new P* policy or harvest control rules adopted by the Council and used to determine specifications for the subject biennial period becomes the new default for future biennial management bienniums. Alternatives for stocks under consideration for new default harvest control rules are summarized in Table 2-1 and detailed below in Sections 2.1 – 2.3.

2.2 No Action Alternative

Under the No Action alternative, the P* policies and default harvest control rules defined in the 2015-16 EIS, and updated through the 2017-18 EA and 2019-20 EA, were applied to the best scientific information available for all stocks and stock complexes actively managed by the Council to produce the OFLs, ABCs, and ACLs through the process described in Section 2.1. All ABCs and ACLs are set to ensure that catch does not exceed the OFL for that stock or stock complex and overfishing does not occur. Unless otherwise noted, the 2021-22 ACLs discussed below are within the range of projected ACLs evaluated in the 2015 EIS, 2017 EA, and 2019 EA.

The following is a brief description of the harvest specifications for each stock for 2021-22 under the No Action alternative. The description also includes discussion of the stock's harvest specifications distribution down to the lowest allocation (e.g., off-the-top deductions, harvest guidelines, trawl/non-trawl allocations, at-sea set-asides, IFQ allocations, LEFG and open access distribution, recreational sector distribution). This discussion is followed by a description of several general management measures that are not stock specific. These management measures would be implemented under the no action alternative as they are needed to help achieve but not exceed the groundfish stock and stock complex ACLs.

Arrowtooth Flounder

Arrowtooth flounder are a trawl dominant species that are not particularly valuable. An update of the full 2007 assessment of arrowtooth flounder was prepared in 2017 (Sampson, et al. 2017). The assessment update estimates spawning biomass of almost 57,000 mt, with a depletion of 87 percent in 2017, which is much higher than the B_{MSY} proxy of $B_{25\%}$ for Council managed flatfish species.

Under the no action alternative, the default harvest control rule for arrowtooth flounder (P*=0.40) is applied to the OFLs in 2021 (13,551 mt) and 2022 (11,764 mt) resulting in ABCs in 2021 and 2022 of 9,933 mt and 8,458 mt, respectively. ACLs are set equal to ABCs for arrowtooth flounder in both years. Under the no action, the ABCs are between 71 and 73 percent of the OFLs in 2021 and 2022. In each year, the ACL is reduced by 2,095 mt to account for mortality in the EFP (0.1 mt), OA (41 mt), research (12.98 mt), and Tribal (2,041 mt) fisheries, resulting in a fishery harvest guideline of 7,837.9 mt in 2021 and 6,362.9 mt in 2022. Arrowtooth Flounder has a fixed allocation under Amendment 21, therefore, the fishery harvest guideline is allocated based on the Amendment 21 allocation: 95 percent to the trawl fishery and five percent to the non-trawl fishery. In 2021 that results in 7,446 mt to the trawl fishery and 392.9 mt to the non-trawl fisheries. In 2022 those numbers decrease to 6,044.8 mt to the trawl fishery and 328.1 mt to the non-trawl fishery. An additional 70 mt is set-aside from the trawl allocation each year to account for expected bycatch in the at-sea fisheries. The remaining 7,376 mt in 2021 and 5,975 mt in 2022 goes to the shorebased IFQ fishery.

Big Skate

Beginning in the 2017-18 biennial biennium, big skate has been managed in the fishery and catch has been managed using trip limits for the IFQ sector. A full assessment for big skate was conducted for the first time as part of this biennium (Agenda Item H.5, Attachement 3, September 2019). According to the assessment, big skate is the second most abundant species in the fishery and survey catches after longnose skate. The 2019 spawning biomass is at 79.2 percent depletion

and well above the minimum stock size threshold ($B_{25\%}$). See Section 3.X for further information on big skate.

Under the no action alternative, the default harvest control rule for big skate (P*=0.45) is applied to the OFLs in 2021 (1,690 mt) and 2022 (1,606 mt) resulting in ABCs in 2021 and 2022 of 1,477 mt and 1,389 mt, respectively. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are between 86 and 87 percent of the OFLs in 2021 and 22. In each year, the ACL is reduced by 57.31 mt to account for mortality in the EFP, research, and tribal fisheries, resulting in a fishery harvest guideline of 1,419.7 mt in 2021 and 1,331.7 mt in 2022. Big skate allocations are decided each biennium. For 2021-22, the Council elected to maintain the current big skate split of 95 percent to the trawl fishery and five percent to the non-trawl fishery resulting in a trawl allocation of 1,348.7 mt and a non-trawl allocation of 71 mt. No further allocations or deductions are made. The trip limit for big skate in the IFQ fishery will be unlimited to begin 2021.

Black Rockfish (California)

A full assessment of black rockfish in waters off California was conducted in 2015 (Cope, et al. 2015a). This was the first assessment ever of the California black rockfish stock in isolation. The stock was projected to be above the biomass target by the start of 2017 due to the strength of very strong year classes in 2008 and 2009.

Under the no action alternative, the default harvest control rule for WA black rockfish (P*=0.45) is applied to the OFLs in 2021 and 2022 (379 mt) resulting in an ABC in 2021 of 348 mt and an ABC in 2022 of 341 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 92 and 90 percent of their respective OFLs. In each year, the ABC is reduced by 1.26 mt to account for mortality in the research (0.8 mt) and incidental open access (1.18 mt) fisheries. No deductions were made for EFP or tribal fisheries. The reduction to the ACL results in a fishery harvest guideline of 346.7 mt in 2021 and 339.7 mt in 2022.

Black Rockfish (Washington)

A new full assessment of black rockfish in waters off Washington was conducted in 2015 (Cope, et al. 2015a). The assessment estimated the Washington black rockfish stock was at a 43 percent depletion at the start of 2015.

Under the no action alternative, the default harvest control rule for WA black rockfish (P*=0.45) is applied to the OFLs in 2021 and 2022 (319 mt) resulting in an ABC in 2021 of 293 mt and an ABC in 2022 of 291 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 93 and 91 percent of their respective OFLs. In each year, the ABC is reduced by 18.10 mt to account for mortality in the tribal (18 mt) and research (0.10 mt) fisheries. No deductions were made for EFP or incidental open access. The reduction to the ACL results in a fishery harvest guideline of 274.9 mt in 2021 and 272.9 mt in 2022.

Blue/Deacon/Black Rockfish Complex

A new assessment of blue and deacon rockfish, assessed as a complex of the two species, was conducted in 2017 for the populations of these two species off Oregon (Dick, et al. 2017). The Oregon blue/deacon rockfish population is estimated to have been relatively lightly exploited, and to be at a depletion of 68.6 percent of the unfished spawning output in 2017. For 2021-22, the NWFSC conducted a catch-only projection update to the 2015 assessment for black rockfish by

adding catch data from 2015-2018 and estimates of catch for 2019 and 2020 (Agenda Item H.5. Attachment 15, September 2019).

Under the no action alternative, the default harvest control rule for blue/deacon and black rockfish complex (P*=0.45) is applied to the OFLs in 2021 (676 mt) and 2022 (672 mt) resulting in an ABC in 2021 of 603 mt and an ABC in 2022 of 600 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 93 and 91 percent of their respective OFLs. In each year, the ABC is reduced by 2.32 mt to account for mortality in the EFP (0.5), research (0.08 mt), and incidental open access (1.74 mt) fisheries. No deductions were made for Tribal fisheries. The reduction to the ACL results in a fishery harvest guideline of 600.7 mt in 2021 and 597.7 mt in 2022. No further reductions or distributions are made.

Bocaccio South of 40°10' N. lat.

A 2017 update to the 2015 stock assessment was completed for the 2019-20 harvest specifications biennium (He and Field 2018), which estimated a depletion in 2017 of 48.6 percent, which is above the B_{MSY} proxy of $B_{40\%}$. Bocaccio was declared rebuilt as part of the 2019-20 biennium (See Section 3.2.2.1 of the EA for the 2019-20 harvest specifications [NMFS 2018]).

Under the no action alternative, the default harvest control rule (P*=0.45) for bocaccio south of 40°10' N. lat. is applied to the OFLs in 2021 (1,887 mt) and 2022 (1,870 mt) resulting in an ABC in 2021 of 1,748 mt and an ABC in 2022 of 1,724 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABC in 2021 is about 93 percent and in 2022 is about 92 percent. In each year, 47.82 mt is deducted from the ACLs to account for mortality in EFP (40 mt), research (5.60 mt), and incidental open access (2.22 mt) fisheries. There is no deduction for tribal fisheries. The deductions from the ACLs result in a fishery harvest guideline in 2021 of 1,700.2 mt and 1,676.2 mt in 2022. In each year, the fishery harvest guideline is split with 39 percent going to the trawl sectors and 61 percent to the non-trawl sectors. For the trawl sector this results in an allocation of 663.8 mt in 2021 and 654.4 mt in 2022. The non-trawl sectors would receive 1,036.4 mt in 2021 and 1021.8 mt in 2022. The non-trawl allocation is then distributed between the commercial (nearshore and non-nearshore fisheries) and recreational sectors. In 2021, the commercial sector would receive 30.9 percent of the non-trawl allocation or 320.2 mt and the recreational sector would receive 716.2 mt. In 2022, the same percentage would remain in place with the commercial sector receiving 315.7 mt and the recreational sector receiving of 706.1 mt.

CA Cabezon

An assessment of Cabezon was conducted for the 2021-22 biennium (Cope et al. 2019). This included a completed full stock assessment for the California sub-stock of Cabezon. Based on this assessment, the stock is estimated to be above the management target of $SB_{40\%}$ (Agenda Item H.5. Attachment 1, September 2019), and has been mostly above this mark since the 2010.

Under the no action alternative, the default harvest control rule for CA Cabezon (P*=0.45) is applied to the OFLs in 2021 (225 mt) and 2022 (210 mt) resulting in an ABC in 2021 of 210 mt and an ABC in 2022 of 195 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 93 percent of their respective OFLs. In each year, the ACL is reduced by 1.28 mt to account for mortality in the EFP (1.0 mt), research (0.02 mt) and incidental open access (0.26 mt) fisheries. No deductions were made for tribal fisheries. The reduction to the

ACL results in a fishery harvest guideline of 209.2 mt in 2021 and 193.7 mt in 2022. No further allocations or distributions are made.

WA Cabezon/Kelp Greenling

An assessment of Cabezon was conducted for the 2021-22 biennium. This included a data-limited assessment of Cabezon in waters off of Washington (Agenda Item H.5. Attachment 1, September 2019).

Cabezon ACLs for 2017 and 2018 were 3.8 mt and 4.0 mt, respectively. Catches in Washington exceeded these catch limits in 2017. In response, the Council removed WA Cabezon from the "Other Fish" complex and combined it with WA kelp greenling, reduced the daily limit to one Cabezon in all marine areas, and removed the minimum size requirement effective 2019. Since then catch of Cabezon has remained within the ACL.

Under the no action alternative, the default harvest control rule for CA Cabezon (P*=0.45) and Kelp Greenling (P*=0.45) is applied to their respective stock specific harvest specifications which are then added together to result in harvest specifications for the complex. Therefore, the OFLs for the complex in 2021 (25 mt) and 2022 (22 mt) resulting in an ABC in 2021 of 20 mt and an ABC in 2022 of 17 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 80 and 83 percent of their OFLs, respectively. In each year, the ACL is reduced by 2 mt to account for mortality in tribal fisheries. The reduction to the ACL results in a fishery harvest guideline of 18 mt in 2021 and 15 mt in 2022. No further allocations or distributions are made.

OR Cabezon/Kelp Greenling

An assessment of Cabezon was conducted for the 2021-22 biennium. This included a completed full stock assessment for the Oregon sub-stock of Cabezon (Agenda Item H.5. Attachment 1, September 2019). Based on this assessment, stock size is estimated to be at the lowest level throughout the historic time series in 2014, but the stock is estimated to be above the management target of $SB_{40\%}$ at 53 percent. Berger et al. (2015) conducted an assessment of kelp greenling in Oregon waters and determined the population had a depletion of 80 percent at the start of 2015.

Under the no action alternative, the default harvest control rule for CA Cabezon (P*=0.45) and Kelp Greenling (P*=0.45) is applied to their respective stock specific harvest specifications which are then added together to result in harvest specifications for the complex. Therefore, the OFLs for the complex in 2021 (215 mt) and 2022 (208 mt) result in an ABC in 2021 of 198 mt and an ABC in 2022 of 190 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 92 and 91 percent of their OFLs, respectively. In each year, the ACL is reduced by 0.21 mt to account for mortality in EFP (0.1 mt), research (0.05 mt), and incidental open access (0.06 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 197.8 mt in 2021 and 189.8 mt in 2022. No further allocations or distributions are made.

CA Scorpionfish

A new full assessment of CA scorpionfish was conducted in 2017 and indicated the stock was healthy with a depletion of 54.3 percent at the start of 2017 (Monk, et al. 2018). The Council adopted a new harvest control rule for California scorpionfish of ACL = ABC under a P* of 0.45

starting in 2019 based on projections indicating the stock would remain healthy in the next ten years under this harvest control rule.

Under the no action alternative, the default harvest control rule for CA scorpionfish (P*=0.45) is applied to the OFLs in 2021 (319 mt) and 2022 (303 mt) resulting in an ABC in 2021 of 291 mt and an ABC in 2022 of 275 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 91 percent of their OFLs. In each year, the ACL is reduced by 3.89 mt to account for mortality in research (0.18 mt) and incidental open access (3.71 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 287.1 mt in 2021 and 271.1 mt in 2022. No further allocations or distributions are made.

Canary Rockfish

A full assessment of canary rockfish was conducted in 2015, which indicated the stock was rebuilt with a depletion of 56 percent at the start of 2015 (Thorson and Wetzel 2015). Catch-only projection updates were completed in 2017 to inform decisions in the 2019-20 biennium and in 2019 (Agenda Item H.5, Attachement 18, September 2019) for the 2021-22 biennium.

Under the no action alternative, the default harvest control rule for canary rockfish (P*=0.45) is applied to the OFLs in 2021 (1,459 mt) and 2022 (1,432 mt) resulting in an ABC in 2021 of 1,338 mt and an ABC in 2022 of 1,307 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 91 percent of their OFLs. In each year, the ACL is reduced by 69.39 mt to account for mortality in tribal (50 mt), EFP (8 mt), research (10.08 mt), and incidental open access (1.31 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,268.6 mt in 2021 and 1,237.6 mt in 2022. The fishery harvest guideline is then distributed to the trawl and non-trawl sectors with trawl receiving 72.3 percent and non-trawl sectors receiving 27.7 percent each year. In 2021, the trawl sector would receive 917 mt of canary rockfish, of which 36 mt would be deducted to account for bycatch in the at-sea sectors, and the remaining 881 mt would be distributed to the shorebased IFQ sector. The non-trawl sector would receive 351.4 mt which is distributed to the nearshore (126.6 mt, WA recreational (43.2 mt), OR recreational (65 mt), and CA recreational (116.7 mt) fisheries. In 2022, the trawl sector would receive 894.6 mt of canary rockfish, of which 36 mt would be deducted to account for bycatch in the at-sea sectors, and the remaining 858.6 mt would be distributed to the shorebased IFQ sector. The non-trawl sector would receive 343.1 mt which is distributed to the nearshore 123.5 mt, WA recreational (42.2 mt), OR recreational (63.5 mt), and CA recreational (113.9 mt) fisheries.

Chilipepper South of 40°10’ N. lat.

An update of the 2007 assessment of chilipepper rockfish south of 40° 10' N. lat. was conducted in 2015 (Field, et al. 2015), which indicated the stock was at 64 percent of its unfished biomass at the start of 2015.

Under the no action alternative, the default harvest control rule for chilipepper (P*=0.45) is applied to the OFLs in 2021 (2,571 mt) and 2022 (2,474 mt) resulting in an ABC in 2021 of 2,358 mt and an ABC in 2022 of 2,259 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are around 92 percent of their OFLs. In each year, the ACL is reduced by 97.70 mt to account for mortality in EFP (70 mt), research (14.04 mt), and incidental open access (13.66 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 2,260.3 mt in 2021 and 2,161.3 mt in 2022. Chilipepper is an Amendment 21 species with a trawl/non-trawl

allocation of 75 percent to trawl and 25 percent to non-trawl. In 2021, this distribution results in 1,695.2 mt to the trawl sectors and 565.1 mt to the non-trawl sectors. In 2022, these numbers decrease to 1,621 mt to the trawl sectors and 540.3 mt to the non-trawl sectors. No further allocations or distributions are made.

Cowcod South of 40 °10' N. lat.

A new full assessment for cowcod was conducted in 2019 for the 2021-22 specifications biennium (Dick and He 2019) (Agenda Item H.5, Attachement 9, September 2019). The 2019 assessment for the southern stock estimates the spawning output relative to the unfished spawning output, also known as depletion, to be at 57 percent. The current estimates indicate the stock is rebuilt--decades ahead of the rebuilding schedule.

Under the no action alternative, the default harvest control rule for cowcod (P*=0.45) is applied to the OFLs in 2021 (114 mt) and 2022 (113 mt) resulting in an ABC in 2021 of 98 mt and an ABC in 2022 of 96 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 86 and 85 percent of their OFLs, respectively. In each year, the ACL is reduced by 10.82 mt to account for mortality in EFP (0.65 mt), research (10 mt), and incidental open access (0.17 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 87.18 mt in 2021 and 85.18 mt in 2022. The fishery harvest guideline is then reduced further as a precautionary measure to an ACT of 50 mt. The ACT is then distributed to the trawl and non-trawl sectors with trawl receiving 36 percent and non-trawl sectors receiving 64 percent each year. In 2021 and 2022, the trawl sector would receive 18 mt of cowcod. The non-trawl sector would receive 32 mt which is distributed to the commercial (16 mt) and recreational (16 mt) fisheries.

Darkblotched Rockfish

A 2017 update to the 2015 full assessment of darkblotched rockfish was conducted (Wallace and Gertseva 2018), which estimated stock depletion at 40.03 percent at the start of 2017 or over the B_{MSY} proxy of $B_{40\%}$ and the stock was declared rebuilt in June 2017.

Under the no action alternative, the default harvest control rule for darkblotched rockfish (P*=0.45) is applied to the OFLs in 2021 (953 mt) and 2022 (901 mt) resulting in an ABC in 2021 of 882 mt and an ABC in 2022 of 831 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are around 93 and 92 percent of their OFLs, respectively. In each year, the ACL is reduced by 19.06 mt to account for mortality in tribal (0.2 mt), EFP (0.6 mt), research (8.46 mt), and incidental open access (9.8 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 862.9 mt in 2021 and 811.9 mt in 2022. Darkblotched rockfish is an Amendment 21 species with a trawl/non-trawl allocation of 95 percent to trawl andfive percent to non-trawl. In 2021, this distribution results in 805.7 mt to the trawl sectors and 42.4 mt to the non-trawl sectors. In 2022, these numbers decrease to 757.3 mt to the trawl sectors and 39.9 mt to the non-trawl sectors. No further allocations or distributions are made.

Dover sole

Last assessed in 2011(Hicks and Wetzel 2011), Dover sole is estimated to be well above the depletion target for flatfish at 83.7 percent depletion.

Under the no action alternative, the default harvest control rule for Dover sole (P*=0.45) is applied to the OFLs in 2021 (93,547 mt) and 2022 (87,540 mt) resulting in an ABC in 2021 of 84,192 mt

and an ABC in 2022 of 78,436 mt. The ABC is furher reduced to an ACL set at 50,000 mt in both years. Under the no action alternative, the ABCs are around 89 percent of their OFLs, and ACLs are 59 and 64 percent of their ABCs, respectively. In each year, the ACL is reduced by 1,597.21 mt to account for mortality in tribal (1,497 mt), EFP (0.1 mt), research (50.84 mt), and incidental open access (49.27 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 48,402.8 mt in each year. Dover sole is an Amendment 21 species with a trawl/non-trawl allocation of the fishery harvest guideline of 95 percent to trawl and five percent to non-trawl. In each year, this distribution results in 45,982.7 mt to the trawl sectors and 2,420.1 mt to the non-trawl sectors. No further allocations or distributions are made.

English sole

Cope et al. (2014) assessed English sole using the data-moderate exSSS model platform. The English sole assessment was conducted for a coastwide stock and stock depletion was estimated to be 88 percent at the start of 2013. The current spawning biomass was estimated to be 25,719 mt.

Under the no action alternative, the default harvest control rule for English sole (P*=0.45) is applied to the OFLs in 2021 (11,107 mt) and 2022 (11,127 mt) resulting in an ABC in 2021 of 9,175 mt and an ABC in 2022 of 9,101 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are around 83 and 81 percent of their OFLs, respectively. In each year, the ACL is reduced by 250.63 mt to account for mortality in tribal (200 mt), EFP (0.1 mt), research (8.01 mt), and incidental open access (45.52 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 8,924.1 mt in 2021 and 8,850.8 mt in 2022. English sole is an Amendment 21 species with a trawl/non-trawl allocation of 95 percent to trawl and five percent to non-trawl. In 2021, the distribution results in 8,477.9 mt to the trawl sectors and 446.2 mt to the non-trawl sectors. In 2022, the distribution results in 8,408.3 mt to the trawl sectors and 442.5 mt to the non-trawl sectors. No further allocations or distributions are made.

Lingcod north of 40°10’ N. lat.

A new full assessment of lingcod was conducted in 2017 for the northern (Washington and Oregon) stock (Haltuch, et al. 2018). The 2017 assessment indicated the stock was healthy in the north with a depletion of 57.9 percent at the start of 2017. The 2019-20 harvest specifications introduced a new default harvest control rule for Lingcod north of 40°10’ N. lat. (Section 2.1.5 of the 2018 EA). OFLs are projected based on the 2017 assessment. The relative biomass and OFLs are reapportioned north and south of the 40°10’ N. lat. management line by using the most recent 5-year average percentage of survey biomass of lingcod between 40°10' and 42° N. lat., which is 21.3% of the survey biomass in California.

Under the no action alternative, the default harvest control rule for lingcod north of 40°10’ N. lat. (P*=0.45) is applied to the OFLs in 2021 (5,816 mt) and 2022 (5,395 mt) resulting in an ABC in 2021 of 5,386 mt and an ABC in 2022 of 4,974 mt. Under the no action alternative, the ABCs are around 93 and 92 percent of their OFLs, respectively. In each year, the ABC is further reduced resulting in a 2021 ACL of 5,369 mt and a 2022 ACL of 4,958 mt. The ACLs are reduced by 279.88 mt to account for mortality in tribal (250 mt), EFP (1.6 mt), research (16.6 mt), and incidental open access (11.68 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 5,089.1 mt in 2021 and 4,678.1 mt in 2022. Lingcod north of 40°10’ N. lat. is an

Amendment 21 species with a trawl/non-trawl allocation of 45 percent to trawl and 55 percent to non-trawl. In 2021, the distribution results in 2,290.8 mt to the trawl sectors and 2,799.8 mt to the non-trawl sectors. In 2022, the distribution results in 2,105.8 mt to the trawl sectors and 2,573.8 mt to the non-trawl sectors. No further allocations or distributions are made.

Lingcod south of 40°10' N. lat.

A new full assessment of lingcod was conducted in 2017 for the southern (California) stock (Haltuch, et al. 2018). The 2017 assessment indicated the stock was in the precautionary zone in the south with a depletion of 32.9 percent at the start of 2017. The 2019-20 harvest specifications introduced a new default harvest control rule for Lingcod south of 40°10' N. lat. (Section 2.1.5 of the 2018 EA). OFLs are projected based on the 2017 assessment. The relative biomass and OFLs are reapportioned north and south of the 40°10' N. lat. management line by using the most recent 5-year average percentage of survey biomass of lingcod between 40°10' and 42° N. lat., which is 21.3% of the survey biomass in California.

Under the no action alternative, the default harvest control rule for lingcod north of 40°10' N. lat. (P*=0.45) is applied to the OFLs in 2021 (1,255 mt) and 2022 (1,334 mt) resulting in an ABC in 2021 of 1,162 mt and an ABC in 2022 of 1,230 mt. Under the no action alternative, the ABCs are around 93 and 92 percent of their OFLs, respectively. In each year, the ABC is further reduced resulting in a 2021 ACL of 1,102 mt and a 2022 ACL of 1,172 mt. The ACLs are reduced by 13 mt to account for mortality in EFP (1.5 mt), research (3.19 mt), and incidental open access (8.31 mt) fisheries. No deduction is made for tribal fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,089 mt in 2021 and 1,159 mt in 2022. Specifications of Lingcod south of 40°10' N. lat. were established through the biennial process with a trawl/non-trawl allocation for the 2021-22 specifications of 40 percent to trawl and 60 percent to non-trawl. In 2021, the distribution results in 490.1 mt to the trawl sectors and 599 mt to the non-trawl sectors. In 2022, the distribution results in 521.6 mt to the trawl sectors and 637.5 mt to the non-trawl sectors. No further allocations or distributeions are made.

Longnose Skate

Longnose skate was in 2019 for the 2021-22 biennium (Gertseva et al. 2019) (Agenda Item H.5., Attachment 5, September 2019). At the beginning of 2019, the spawning stock output was estimated to be 6,923 metric tons (95 percent confidence interval: 3,283–10,563 metric tons), which represents 57 percent depletion of the unfished spawning biomass.

Under the no action alternative, the default harvest control rule for longnose skate (P*=0.45) is applied to the OFLs in 2021 (2,086 mt) and 2022 (2,036 mt) resulting in an ABC in 2021 of 1,823 mt and an ABC in 2022 of 1,761 mt. Under the no action alternative, the ABCs are around 87 and 86 percent of their OFLs, respectively. In each year, the ABC is set equal to the ACL. The ACLs are reduced by 251.40 mt to account for mortality in tribal (220 mt), EFP (0.1 mt), research (12.46 mt), and incidental open access (18.84 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,571.6 mt in 2021 and 1,509.6 mt in 2022. Specifications of longnose skate were established through the biennial process with a trawl/non-trawl allocation for the 2021-22 specifications of 90 percent to trawl and 10 percent to non-trawl. In 2021, the distribution results in 1,414.4 mt to the trawl sectors and 157.2 mt to the non-trawl sectors. In 2022, the distribution

results in 1,358.6 mt to the trawl sectors and 151 mt to the non-trawl sectors. No further allocations or distributions are made.

Longspine Thornyhead

Longspine thornyhead were last assessed in 2013 (Stephens and Taylor 2013). The 2013 spawning biomass was estimated to be well above $SB_{40\%}$ at 75 percent. The 2021 projected stock depletion level, according to the 2013 stock assessment, is 50 percent.

Under the no action alternative, the default harvest control rule for longspine thornyhead (P*=0.40) is applied to the OFLs in 2021 (5,097 mt) and 2022 (4,838 mt) resulting in an ABC in 2021 of 3,466 mt and an ABC in 2022 of 3,227 mt. Under the no action alternative, the ABCs are around 68 and 67 percent of their OFLs, respectively. In each year, the ACLs are determined based on an apportionment of the ABC with 76 percent apportioned to the area north of 34°27' N. lat. and 24 percent apportioned to the area south of 34°27' N. lat. This apportionment is based on the 2003-2012 average swept area biomass estimated north and south of Pt. Conception at 34°27' N. lat. in the NWFSC trawl survey.

The 2021 ACL for longspine thornyhead north of 34°27' N. lat. is 2,452 mt, and the 2022 ACL is 2,634 mt. Each year, the ACL is reduced by 53.71 to account for mortality in tribal (30 mt), research (17.49 mt), and incidental open access (6.22 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 2,580.3 mt in 2021 and 2,398.7 mt in 2022. Longspine thornyhead north of 34°27' N. lat. is an Amendment 21 species with a trawl/non-trawl allocation of 95 percent to trawl and five percent to non-trawl. In 2021, the distribution results in 2,451.3 mt to the trawl sectors and 129 mt to the non-trawl sectors. In 2022, the distribution results in 2,278.4 mt to the trawl sectors and 119.9 mt to the non-trawl sectors. No further allocations or distributions are made.

The 2021 ACL for longspine thornyhead south of 34°27' N. lat. is 832 mt, and the 2022 ACL is 774 mt. Each year, the ACL is reduced by 2.24 to account for mortality in research (1.41 mt) and incidental open access (0.83 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 829.6 mt in 2021 and 772.2 mt in 2022. No further allocations or distributions are made.

Nearshore Rockfish Complexes

The nearshore rockfish complexes consist of several assessed stocks (black and yellow rockfish, blue and deacon rockfish in California, brown rockfish, China rockfish, copper rockfish, and gopher rockfish in California) and many unassessed stocks. These stocks are defined in Section 3.1.6 of the 2015-16 EIS.

The combined status of gopher and black-and-yellow rockfishes off California were assessed in 2019 for the 2021-22 biennium (Monk and He 2019) (Agenda Item H.5., Attachment 11, September 2019). The 2019 estimated spawning biomass was above the target ($SB_{40\%}$) at 43.82 percent. A new assessment of blue and deacon rockfish, assessed as a complex of the two species, was conducted in 2017 for the populations of these two species off California north of Pt. Conception and Oregon (Dick, et al. 2017). The California assessment estimates that the population reached a low depletion level of 15.6 percent in 2007, and had a projected depletion in 2019 at 42.1 percent above the target level. A single coastwide data-moderate assessment of brown

rockfish was conducted in 2013 (Cope, et al. 2014). The assessment estimated the brown rockfish stock to be at a depletion of 42 percent at the start of 2013. Finally, a full assessment of China rockfish was conducted in 2015 using the Stock Synthesis 3 modeling platform (Dick, et al. 2015). The spawning stock biomass for China rockfish is estimated to be above the B_{MSY} proxy of $B_{40\%}$ in the Northern and Central areas ($B_{73.4\%}$ and $B_{61.5\%}$, respectively at the start of 2015) and in the precautionary zone ($B_{29.6\%}$ at the start of 2015) in the Southern area, while increasing in recent years.

Under the no action alternative, the default harvest control rules for stocks in the nearshore rockfish complexes (P*=0.45) are applied to the OFLs for those stocks resulting in ABCs for each stock. The ABCs are set equal to the ACLs for each stock. Then each stock specific OFL, ABC, and ACL is added together to get the OFL, ABC, and ACL for the entire complex.

For the nearshore rockfish complex north of 40°10' N. lat., the 2021 OFL is 92 mt with an ABC of 77 mt, and the 2022 OFL is 91 mt with an ABC of 76 mt. The ABCs are 84 and 83 percent of the OFLs, respectively. The ACLs are set equal to the ABC. The ACL is reduced by 3.08 mt each year to account for total mortality in the Tribal (1.5 mt), EFP (0.5 mt), research (0.47 mt), and incidental open access (0.61 mt) fisheries resulting in a fishery harvest guideline in 2021 of 73.9 mt and in 2022 of 72.9 mt. No further allocations or distributions are made.

For the nearshore rockfish complex south of 40°10' N. lat., the 2021 OFL is 1,232 mt with an ABC of 1,016 mt, and the 2022 OFL is 1,233 mt with an ABC of 1,011 mt. The ABCs are about 82 percent of the OFLs, respectively. The ACLs are set equal to the ABC. The ACL is reduced by 4.42 mt each year to account for total mortality in the research (2.68 mt), and incidental open access (1.74 mt) fisheries. No deductions were made for Tribal or EFP fisheries. These deduction result in a fishery harvest guideline in 2021 of 1,011.6 mt and in 2022 of 1,005.6 mt. No further allocations or distributions are made.

Other Fish Complex

The Other Fish complex was restructured under the 2015-16 harvest specification to include kelp greenling off Washington, Oregon, and California, Washington Cabezon, and Leopard Shark. The Other Fish complex was again restructured in the 2019-20 biennium (See section 2.2.2.3 of the 2018 EA) to only include kelp greenling off California and leopard shark. Both of these stocks are unassessed and managed as Category 3 stocks.

Under the no action alternative, the default harvest control rule for leopard shark (P*=0.45) and kelp greenling (P*=0.45) are applied to their respective OFLs to get their stock specific ABCs which are then added together to result in harvest specifications for the complex. The OFL for the complex in each year is 286 mt with an ABC 223 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are about 92 and 91 percent of their OFLs, respectively. In each year, the ACL is reduced by 21.34 mt to account for mortality in EFP (0.1 mt), research (6.29 mt), and incidental open access (14.95 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 201.7 mt in both years. No further allocations or distributions are made.

Other Flatfish Complex

The Other Flatfish complex consists of several stocks of sole and Pacific sandabs. These stocks are defined in Section 3.1.6 of the 2015-16 EIS. Of these stocks, status information is only available for rex sole and Pacific sandabs.

A coastwide assessment of Pacific sanddab was done in 2013 indicating the stock was at 95.5 percent of its unfished biomass (He, et al. 2013) and concluded the stock's unfished biomass was well above the B_{MSY} proxy of $B_{25\%}$. A data-moderate assessment of rex sole was conducted in 2013, which indicated the stock was healthy with a depletion of 80 percent at the start of 2013 (Cope, et al. 2014).

Under the no action alternative, the default harvest control rules for stocks in the Other Flatfish complex (P*=0.40) are applied to the OFLs for those stocks resulting in ABCs for each stock. The ABCs are set equal to the ACLs for each stock. Then each stock specific OFL, ABC, and ACL is added together to get the OFL, ABC, and ACL for the entire complex.

For 2021, the OFL is 7,714 mt with an ABC of 4,802 mt, and the 2022 OFL is 7,808 mt with an ABC of 4,838 mt. The ABCs are about 82 percent of the OFLs, respectively. The ACLs are set equal to the ABC. The ACL is reduced by 220.89 mt each year to account for total mortality in the Tribal (60 mt), EFP (0.1 mt), research (23.63 mt), and incidental open access (137.16 mt) fisheries. These deduction result in a fishery harvest guideline in 2021 of 4,581.1 mt and in 2022 of 4,617.1 mt. The Other Flatfish complex is an Amendment 21 allocation. Therefore, the fishery harvest guideline is further allocated to the trawl and non-trawl sectors with 90 percent going to the trawl sectors and 10 percent to the non-trawl sectors. In 2021, this distribution results in 4,123 mt to the trawl sector and 458.1 mt to the non-trawl sector. In 2022, this distribution results in 4,155.4 mt to the trawl sector and 461.7 mt to the non-trawl sector. Of the amount going to the trawl sector, 35 mt is deducted each year from the trawl allocation to account for bycatch in the at-sea whiting sectors, with the remaining 4,088 mt in 2011 and 4,120.4 mt in 2022 going to the shorebased IFQ fishery. No further allocations or distributions are made.

Pacific Cod

The West Coast population of Pacific cod has never been formally assessed.

Under the no action alternative, the default harvest control rule for Pacific cod (P*=0.40) is applied to the OFLs in 2021 and 2022 (3,200 mt) resulting in ABCs in both years of 1,926 mt. Under the no action alternative, the ABCs are around 60 percent of the OFL. In each year, the ACL is set at 1,600 mt. The ACLs are reduced by 506.10 mt to account for mortality in tribal (500 mt), EFP (0.1 mt), research (5.47 mt), and incidental open access (0.53 mt) fisheries. The reductions to the ACLs result in a fishery harvest guideline of 1,093.9 each year. Allocations? of Pacific cod were established through Amendment 21 with trawl receiving 95 percent of the fishery harvest guideline each year and non-trawl receivingfive percent. In both 2021 and 2022, the trawl sectors will receive 1,039.2 mt and the non-trawl sectors will receive 54.7 mt. No further allocations or distributions are made.

Pacific Ocean Perch

A 2017 full assessment of POP indicated the stock was successfully rebuilt with an estimated depletion of 76.6 percent (above the target of $B_{40\%}$) at the start of 2017 (Wetzel, et al. 2017). See Section 3.2.2.3 in the 2018 EA for more information.

Under the no action alternative, the default harvest control rule for POP (P*=0.45) is applied to the OFLs in 2021 (4,497 mt) and 2022 (4,371 mt) resulting in an ABC in 2021 of 3,854 mt and an ABC in 2022 of 3,711 mt. Under the no action alternative, the ABCs are around 86 and 85 percent of their OFLs, respectively. In each year, the ABC is set equal to the ACL. The ACLs are reduced by 24.73 mt to account for mortality in Tribal (9.2 mt), EFP (0.1 mt), research (5.39 mt), and incidental open access (10.04 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 3,829.3 mt in 2021 and 3,686.3 mt in 2022. POP is an Amendment 21 species with a trawl/non-trawl allocation of the fishery harvest guideline of 95 percent to trawl and five percent to non-trawl. In 2021, the distribution results in 3,637.8 mt to the trawl sectors and 191.5 mt to the non-trawl sectors. In 2022, the distribution results in 3,502 mt to the trawl sectors and 184.3 mt to the non-trawl sectors. No further allocations or distributions are made.

Petrale sole

A new full assessment for Petrale was completed in 2019 for the 2021-22 biennium (Wetzel 2019) (Agenda Item H.5., Attachment 13, September 2019). The 2019 estimated spawning biomass relative to unfished equilibrium spawning biomass is above the target of 25 percent of unfished spawning biomass, at 39 percent.

Under the no action alternative, the Council's default harvest control rule (P*=0.45) for Petrale sole is applied to the OFLs in 2021 (4,402 mt) and 2022 (3,936 mt) resulting in ABCs of 4,115 mt in 2021 and 3,660 mt in 2022. For Petrale sole, the ABCs equal the ACLs in both years. Under the no action, the ABCs are 92 percent of the OFL in both 2021 and 2022. In each year, the ACL is reduced by 387.54 mt to account for mortality in Tribal (350 mt), EFP (0.1 mt), research (24.14 mt), and incidental open access (13.30 mt) fisheries, resulting in a fishery HG of 3,727.5 mt in 2021 and 3,272.5 mt in 2022. Petrale sole is an Amendment 21 species with a trawl/non-trawl allocation of the fishery harvest guideline of 95 percent to the trawl fishery and five percent to the non-trawl fishery. In 2021, the distribution results in 3,541.5 mt to the trawl sector and 186.5 mt to the non-trawl sector. In 2022, the trawl sector would receive 3,108.9 mt and the non-trawl sector would receive 163.3 mt. No further allocation or distributions are made.

Sablefish

A new full assessment of sablefish was completed in 2019 for the 2021-22 biennium. The 2019 estimate of spawning stock biomass is 39 percent depletion (Haltuch et al. 2019) (Agenda Item H.5., Attachment 7, September 2019).

Under the no action alternative, the default harvest control rule for sablefish (P*=0.40) is applied to the OFLs in 2021 (9,402 mt) and 2022 (9,040 mt) resulting in an ABC in 2021 of 8,208 mt and an ABC in 2022 of 7,811 mt. Under the no action alternative, the ABCs are around 87 and 86 percent of their OFLs, respectively. Historically, the coastwide sablefish ABC is apportioned north and south of 36° N. lat. based on the 2003-2018 average swept area biomass estimated in the NMFS Northwest Fisheries Science Center Bottom Trawl Survey. Beginning in 2021-22, the coastwide ABC will be apportioned north and south of 36° N. lat. with 78.4 percent apportioned to the area north of 36° N. lat. and 21.5 percent apportioned to the area south of 36° N. lat.

The 2021 ACL for sablefish north of 36° N. lat. is 6,435 mt, and the 2022 ACL is 6,124 mt. In 2021, the ACL is reduced by 635.8 to account for mortality in tribal (604 mt), EFP (1.1 mt), research (30.7 mt), and incidental open access (6.22 mt) fisheries. An additional 6 mt is deducted

to account for catch in recreational fisheries. The reduction to the ACL results in a commercial fishery harvest guideline of 5,793.2 mt in 2021. In 2022, the ACL is reduced by 606.8 to account for mortality in tribal (575 mt), EFP (1.1 mt), research (30.7 mt), and incidental open access (6.22 mt) fisheries. An additional 6 mt is deducted to account for catch in recreational fisheries. The reduction to the ACL results in a commercial fishery harvest guideline of 5,511.2 mt in 2022. The commercial harvest guideline is further distributed between the limited entry and open access fisheries with limited entry receiving 91 percent of the commercial harvest guideline and open access fisheries receiving nine percent. The limited entry share is then divided among the trawl sectors (58 percent) and the non-trawl sectors (42 percent). The limited entry trawl share is reduced to account for catch in the at-sea whiting sectors with the remaining going to the shorebased IFQ fishery. The limited entry fixed gear share is split between the sablefish primary fishery which receives 85 percent with the remaining amount going to the trip limit fishery. See table XX for the sablefish north of 36° N. lat. distribution under the no action alternative.

Table 3. Sablefish North of 36° N. lat. Allocations, 2021

Year	ACL	Set-asides		Recreational Estimate	EFP	Commercial HG	Limited Entry HG		Open Access HG	
		Tribal a/	Research				Percent	mt	Percent	mt b/
2021	6,892	689	30.7	6	1.1	6,156	91	5,586	9	580

Year	LE All	Limited Entry Trawl c/			Limited Entry Fixed Gear d/		
		All Trawl	At-sea Whiting	Shorebased IFQ	All FG	Primary	DTL
2021	5,586	3,240	100	3,140	2,346	1,994	352

a/ The tribal allocation is further reduced by 1.7 percent for discard mortality resulting.

b/ The open access HG is taken by the incidental OA fishery and the directed OA fishery.

c/ The trawl allocation is 58 percent of the limited entry HG.

d/ The limited entry fixed gear allocation is 42 percent of the limited entry HG.

The 2021 ACL for sablefish south of 36° N. lat. is 1,764.72 mt, and the 2022 ACL is 1,679.37 mt. Each year, the ACL is reduced by 27.40 mt to account for mortality in research (2.4 mt) and incidental open access (25 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,689.32 mt in 2021 and 1,651.97 mt in 2022. Sablefish south of 36° N. lat. is an Amendment 21 species with a trawl/non-trawl allocation of the fishery harvest guideline of 42 percent to the trawl fishery and 58 percent to the non-trawl fishery. In 2021, the distribution results in 895.1 mt to the trawl sector and 1,236.2 mt to the non-trawl sector. In 2022, the trawl sector would receive 851.3 mt and the non-trawl sector would receive 1,175.6 mt. The non-trawl allocation would be further split between the LEFG and OA fisheries with each receiving 50 percent of the non-trawl allocation in each year. No further allocations or distributions are made.

Shelf Rockfish Complexes

The shelf rockfish complexes consist of several assessed and unassessed stocks. These stocks are defined in Section 3.1.6 of the 2015-16 EIS. Of the stocks managed in the shelf rockfish complexes, chilipepper rockfish north of 40°10' N. lat. (the assessment for the northern stock only covers the area from 40°10' N. lat. to Cape Blanco, OR at 43° N. lat.), greenspotted rockfish, greenstriped rockfish, and stripetail rockfish have been assessed.

Greenspotted rockfish was last assessed in 2011 (Dick et al. 2011) as two separate stocks by areas (northern California defined as U.S. waters between the California-Oregon border [42° N. lat.] and Point Conception, and southern California defined as as U.S. waters south of Point Conception and north of the U.S.-Mexico border). Estimates of stock status in 2011 were 30.6 percent depltion in the northern California region and 37.4 percent in the southern California region. A coastwide assessment of greenstriped rockfish was done in 2009, which indicated stock depletion was at 81 percent of its unfished biomass at the start of 2009 (Hicks, et al. 2009). A new data-moderate assessment of stripetail rockfish was conducted in 2013, which indicated the stock was had a depletion exceeding 77.5 percent (Cope, et al. 2014).

Under the no action alternative, the default harvest control rules for stocks in the shelf rockfish complexes (P*=0.45) are applied to the OFLs for those stocks resulting in ABCs for each stock. The ABCs are set equal to the ACLs for each stock. Then each stock specific OFL, ABC, and ACL is added together to get the OFL, ABC, and ACL for the entire complex.

For the shelf rockfish complex north of 40°10' N. lat., the 2021 OFL is 1,888 mt with an ABC of 1,511 mt, and the 2022 OFL is 1,821 mt with an ABC of 1,450 mt. The ABCs are about 80 percent of the OFLs, respectively. The ACLs are set equal to the ABC. The ACL is reduced by 75.44 mt each year to account for total mortality in the Tribal (30 mt), EFP (4.5 mt), research (15.32 mt), and incidental open access (25.62 mt) fisheries resulting in a fishery harvest guideline in 2021 of 1,435.6 mt and in 2022 of 1,374.6 mt. Specifications for the shelf rockfish complex north of 40°10' N. lat. were established through the biennial process with a trawl/non-trawl allocation for the 2021-22 specifications of 60.2 percent to trawl sectors and 39.8 percent to non-trawl sectors. In 2021, the distribution results in 864.2 mt to the trawl sectors and 571.4 mt to the non-trawl sectors. In 2022, the distribution results in 827.5 mt to the trawl sectors and 547.1 mt to the non-trawl sectors. Of the amount going to the trawl sector, 35 mt is deducted each year from the trawl allocation to account for bycatch in the at-sea whiting sectors, with the remaining 829.2 mt in 2011 and 792.49 mt in 2022 going to the shorebased IFQ fishery. No further allocations or distributions are made.

For the shelf rockfish complex south of 40°10' N. lat., the 2021 OFL is 1,842 mt with an ABC of 1,439 mt, and the 2022 OFL is 1,832 mt with an ABC of 1,429 mt. The ABCs are about 78 percent of the OFLs, respectively. The ACLs are set equal just below the ABC at 1,438 mt in 2021 and 1,428 mt in 2022. The ACL is reduced by 112.77 mt each year to account for total mortality in the EFP (30 mt), research (15.10 mt), and incidental open access (67.67 mt) fisheries resulting in a fishery harvest guideline in 2021 of 1,325 mt and in 2022 of 1,315.2 mt. Specifications for the shelf rockfish complex south of 40°10' N. lat. were established through the biennial process with a trawl/non-trawl allocation for the 2021-22 specifications of 12.2 percent to trawl sectors and 87.8 percent to non-trawl sectors. In 2021, the distribution results in 161.7 mt to the trawl sectors and 1,163.6 mt to the non-trawl sectors. In 2022, the distribution results in 160.5 mt to the trawl sectors and 1,154.8 mt to the non-trawl sectors. No further allocations or distributions are made.

Shortbelly Rockfish

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

Under the no action alternative, the Council's default harvest control rule (P*=0.40) for shortbelly rockfish is applied to the 2021 and 2022 OFLs (6,950 mt) resulting in ABCs of 4,184 mt in both years. For shortbelly rockfish, the ABC is further reduced to an ACL set at 500 mt in both years. This constant ACL was first implemented in 2015 in anticipation of the re-emergence of the midwater trawl rockfish fishery after widow and canary rockfish were declared rebuilt. In both years, under the no action, the ABCs are 60 percent of the OFLs, and the ACLs are 12 percent of the OFL. In each year, the ACL is reduced by 29.87 mt to account for mortality in EFP (0.1 mt), research (8.2 mt), and incidental open access (21.57 mt) fisheries, resulting in a fishery HG of 470.13 mt in both years. No further allocation or distributions are made.

Shortspine Thornyhead

Shortspine thornyheads were last assessed in 2013. The 2013 stock assessment estimated the shortspine thornyhead spawning stock biomass to be at 74.2 percent depletion of its unfished biomass in 2013 (Taylor and Stephens 2013).

Under the no action alternative, the default harvest control rule for shortspine thornyhead (P*=0.40) is applied to the OFLs in 2021 (3,211 mt) and 2022 (3,194 mt) resulting in an ABC in 2021 of 2,183 mt and an ABC in 2022 of 2,130 mt. Under the no action alternative, the ABCs are around 68 and 67 percent of their OFLs, respectively. In each year, ACLs are determined based on an apportionment of the coastwide ABC north (65.4 percent) and south (34.6 percent) of 34°27' N. lat. based on the 2003-2012 average swept area biomass estimated north and south of Pt. Conception at 34°27' N. lat. in the NWFSC trawl survey.

The 2021 ACL for shortspine thornyhead north of 34°27' N. lat. is 1,428mt, and the 2022 ACL is 1,393 mt. Each year, the ACL is reduced by 78.40 mt to account for mortality in Tribal (50 mt), EFP (0.1 mt), research (10.48 mt), and incidental open access (17.82 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,349.6 mt in 2021 and 1,314.6 mt in 2022. Shortspine thornyhead north of 34°27' N. lat. is an Amendment 21 species with a trawl/non-trawl

allocation of 95 percent to trawl and five percent to non-trawl. In 2021, the distribution results in 1,281.1 mt to the trawl sectors and 67.5 mt to the non-trawl sectors. In 2022, the distribution results in 1,248.9 mt to the trawl sectors and 65.7 mt to the non-trawl sectors. The trawl allocation is reduced by 70 mt to account for bycatch in the at-sea whiting sector, the remaining amount (1,212.1 mt in 2021 and 1,178.9 mt in 2022) would be distributed to the shorebased IFQ fishery. No further allocations or distributions are made.

The 2021 ACL for shortspine thornyhead south of 34°27' N. lat. is 756 mt, and the 2022 ACL is 737 mt. Each year, the ACL is reduced by 6.71 mt to account for mortality in research (0.71 mt) and incidental open access (6 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 749.3 mt in 2021 and 730.3 mt in 2022. Shortspine thornyhead south of 34°27' N. lat. is an Amendment 21 species with a trawl/non-trawl allocation of 0.067 percent to trawl and 99.933 percent to non-trawl. In 2021, the distribution results in 50 mt to the trawl sectors and 706 mt to the non-trawl sectors. In 2022, the distribution results in 50 mt to the trawl sectors and 687 mt to the non-trawl sectors. No further allocations or distributions are made.

Slope Rockfish Complexes

The slope rockfish complexes consist of several assessed and unassessed stocks. These stocks are defined in Section 3.1.6 of the 2015-16 EIS. Of the stocks managed in the slope rockfish complexes, aurora rockfish, blackgill rockfish south of 40°10' N. lat., rougheye rockfish (and blackspotted rockfish), and sharpchin rockfish have been assessed.

The first assessment of the West Coast stock of aurora rockfish was conducted in 2013 (Hamel, et al. 2013); the assessment estimated stock depletion was at 64 percent at the start of 2013. A catch-only update of the 2011 blackgill assessment was conducted in 2019 for the 2021-22 biennium (Hamel and Kapur 2019) (Agenda Item H.5., Attachment 16, September 2019) which estimated stock depletion will be above the target level of 40 percent, and out of the precautionary zone, by 2021. Therefore, the 40:10 adjustment is no longer applied. A catch only projection of the 2013 assessment for rogheye rockfish and blackspotted rockfish, as a complex, was completed for the 2021-22 biennium (Hamel 2019) (Agenda Item H.5., Attachement 24, September 2019). The estimated depletion for both species combined is above the 40 percent target.

Under the no action alternative, the default harvest control rules for stocks in the nearshore rockfish complexes (P*=0.45) are applied to the OFLs for those stocks resulting in ABCs for each stock. The ABCs are set equal to the ACLs for each stock. Then each stock specific OFL, ABC, and ACL is added together to get the OFL, ABC, and ACL for the entire complex.

For the slope rockfish complex north of 40°10' N. lat., the 2021 OFL is 1,862 mt with an ABC of 1,595 mt, and the 2022 OFL is 1,842 mt with an ABC of 1,568 mt. The ABCs are 86 and 85 percent of the OFLs, respectively. The ACLs are set equal to the ABC. The ACL is reduced by 66.89 mt each year to account for total mortality in the Tribal (36 mt), EFP (1.5 mt), research (10.51 mt), and incidental open access (18.88 mt) fisheries resulting in a fishery harvest guideline in 2021 of 1,528.1 mt and in 2022 of 1,501.1 mt. The slope rockfish complex north of 40°10' N. lat. is an Amendment 21 allocation with a trawl/non-trawl allocation of 81 percent to trawl and 19 percent to non-trawl. In 2021, the distribution results in 1,237.8 mt to the trawl sectors and 290.3 mt to the non-trawl sectors. In 2022, the distribution results in 1,215.9 mt to the trawl sectors and 285.2 mt to the non-trawl sectors. The trawl allocation is reduced by 300 mt to account for bycatch

in the at-sea whiting sector, the remaining amount (937.8 mt in 2021 and 915.9 mt in 2022) would be distributed to the shorebased IFQ fishery. No further allocations or distributions are made.

For the slope rockfish complex south of 40°10' N. lat., the 2021 OFL is 873 mt with an ABC of 709 mt, and the 2022 OFL is 871 mt with an ABC of 705 mt. The ABCs are 81 percent of the OFLs, respectively. The ACLs are set equal to the ABC. The ACL is reduced by 38.94 mt each year to account for total mortality in the EFP (1 mt), research (18.21 mt), and incidental open access (19.73 mt) fisheries resulting in a fishery harvest guideline in 2021 of 670.1 mt and in 2022 of 666.1 mt. The slope rockfish complex south of 40°10' N. lat. is an Amendment 21 allocation with a trawl/non-trawl allocation of 63 percent to trawl and 37 percent to non-trawl. In 2021, the distribution results in 422.1 mt to the trawl sectors and 247.9 mt to the non-trawl sectors. In 2022, the distribution results in 419.6 mt to the trawl sectors and 246.4 mt to the non-trawl sectors. No further allocations or distributions are made.

Spiny Dogfish

Spiny Dogfish was last assessed in 2011 (Gertseva and Taylor 2011). At the time, spiny dogfish had an estimated depletion level of 63 percent.

Under the no action alternative, the default harvest control rule for spiny dogfish (P*=0.40) is applied to the OFLs in 2021 (2,479 mt) and 2022 (2,469 mt) resulting in an ABC in 2021 of 1,621 mt and an ABC in 2022 of 1,585 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are around 65 and 64 percent of their OFLs, respectively. In each year, the ACL is reduced by 344 mt to account for mortality in Tribal (275 mt), EFP (1.1 mt), research (34.27 mt), and incidental open access (33.63 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,277 mt in 2021 and 1,241 mt in 2022. No further allocations or distributions are made.

Splitnose

Splitnose was last assessed in 2009 (Gertseva et al. 2009). The 2009 estimated depletion level was 66 percent.

Under the no action alternative, the default harvest control rule for splitnose (P*=0.45) is applied to the OFLs in 2021 (1,868 mt) and 2022 (1,837 mt) resulting in an ABC in 2021 of 1,666 mt and an ABC in 2022 of 1,630 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are around 65 and 64 percent of their OFLs, respectively. In each year, the ACL is reduced by 344 mt to account for mortality in Tribal (275 mt), EFP (1.1 mt), research (34.27 mt), and incidental open access (33.63 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,277 mt in 2021 and 1,241 mt in 2022. No further allocations or distributions are made.

Starry Flounder

A DB-SRA for Starry Flounder in U.S. waters off the West Coast was conducted in 2017 and had an assumed average depletion of 56 percent (Dick et al. 2017).

Under the no action alternative, the Council's default harvest control rule (P*=0.40) for starry flounder is applied to the 2021 and 2022 OFLs (652 mt) resulting in ABCs of 392 mt in both years. The ACLs are set equal to the ABCs in both years. In both years, under the no action, the ABCs

are 60 percent of the OFLs. In each year, the ACL is reduced by 48.38 mt to account for mortality in Tribal (2 mt), EFP (0.1 mt), research (0.57 mt), and incidental open access (45.71 mt) fisheries, resulting in a fishery HG of 343.6 mt in both years. Starry flounder is an Amendment 21 species with a trawl/non-trawl allocation of 50 percent to trawl and 50 percent to non-trawl. For both years, each sector would receive 171.8 mt of the fishery harvest guideline. No further allocation or distributions are made.

Widow Rockfish

A new stock assessment update for widow rockfish was completed in 2019 for the 2021-22 biennium (Adams et al. 2019) (Agenda Item H.5., Attachment 14, September 2019). The 2019 spawning biomass relative to unfished equilibrium spawning biomass is 91.9 percent, well above the target of $B_{40\%}$ of unfished spawning biomass

Under the no action alternative, the default harvest control rule for widow rockfish (P*=0.45) is applied to the OFLs in 2021 (15,749 mt) and 2022 (14,826 mt) resulting in an ABC in 2021 of 14,725 mt and an ABC in 2022 of 13,788 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are around 93 percent of their OFLs, respectively. In each year, the ACL is reduced by 248.32 mt to account for mortality in Tribal (200 mt), EFP (28 mt), research (17.27 mt), and incidental open access (3.05 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 14,476.7 mt in 2021 and 13,539.7 mt in 2022. Specifications for widow rockfish were established through the biennial process with a set allocation for the non-trawl sectors for the 2021-22 specifications. The remainder of the fishery harvest guideline would go to the trawl sector. In 2021, the distribution results in 14,076.7 mt to the trawl sectors and 400 mt to the non-trawl sectors. In 2022, the distribution results in 13,139.7 mt to the trawl sectors and 400 mt to the non-trawl sectors. Of the amount allocated to the trawl sector, 476 mt is distributed to the at-sea whiting sectors to account for bycatch, and the remaining amount (13,600.7 in 2021 and 13,139.7 mt in 2022) would be distributed to the shorebased IFQ fishery. No further allocations or distributions are made.

Yelloweye Rockfish

Yelloweye rockfish was declared overfished in 2002 and is now rebuilding. A full yelloweye assessment was conducted in 2017 indicated the stock was at a 28.4% depletion at the start of 2017 (Gertseva and Cope 2017b). The Council adopted a new yelloweye rockfish rebuilding plan in 2019 (Appendix B from 2019-20 spex). The target year for rebuilding the yelloweye rockfish stock to B_{msy} is 2029.

Under the no action alternative, the Council's default harvest control rule (P*=0.40), as updated through the 2017 rebuilding analysis, is applied to the OFLs in 2021 (97 mt) and 2022 (98 mt) resulting in ABCs of 83 mt, or about 85 percent of the OFL, in both years. The ACLs are further reduced based on the projections in the 2017 yelloweye rebuilding analysis to 50 mt in 2021 and 51 mt in 2022. The ACLs are 60 and 61 percent of the ABCs, respectively, and are similar to the 2020 ACL (49 mt). The ACLs are further reduced each year by 8.85 mt to account for mortality in Tribal (5 mt), EFP (0.24 mt), research (2.92 mt), and incidental open access (0.69 mt), resulting in a fishery HG of 41.2 mt in 2021 and 42.2 mt in 2022. The fishery harvest guideline is then further distributed as 92 percent to the non-trawl fishery and 8 percent to the trawl fishery. Specifications for yelloweye rockfish were decided through the biennial process with a trawl/non-

trawl allocation of 8 percent to the trawl sector and 92 percent to the non-trawl sector. For 2021, this distribution results in 3.3 mt to the trawl sector and 37.9 mt to the non-trawl sector. The non-trawl portion of the yelloweye harvest guideline is then distributed to the nearshore sector (4.6 mt), non-nearshore sector (1.6 mt), and each state's recreational sector (WA: 7.5 mt, OR: 6.9 mt, and CA: 8.9 mt). For 2022, this distribution results in 3.4 mt to the trawl sector and 38.8 mt to the non-trawl sector. The non-trawl portion of the yelloweye harvest guideline is then distributed to the nearshore sector (4.7 mt), non-nearshore sector (1.6 mt), and each state's recreational sector (WA: 7.8 mt, OR: 7.1 mt, and CA: 9.2 mt).

Yellowtail Rockfish N. of 40°10' N. lat.

A full assessment of yellowtail rockfish north of 40°10' N lat. was conducted in 2017, which indicated the stock was healthy with a 75 percent depletion at the start of 2017 (Stephens and Taylor 2017).

Under the no action alternative, the default harvest control rule for yellowtail rockfish (P*=0.45) is applied to the OFLs in 2021 (6,534 mt) and 2022 (6,324 mt) resulting in an ABC in 2021 of 6,050 mt and an ABC in 2022 of 5,831 mt. ACLs are set equal to ABCs in both years. Under the no action alternative, the ABCs are 93 and 92 percent of their OFLs, respectively. In each year, the ACL is reduced by 1,067.55 mt to account for mortality in Tribal (1,000 mt), EFP (40 mt), research (20.55 mt), and incidental open access (7 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 4,982.5 mt in 2021 and 4,763.5mt in 2022. Specifications for widow rockfish were established through the biennial process with a set allocation for the non-trawl sectors for the 2021-22 specifications. The remainder of the fishery harvest guideline would go to the trawl sector. In 2021, the distribution results in 14,076.7 mt to the trawl sectors and 400 mt to the non-trawl sectors. In 2022, the distribution results in 13,139.7 mt to the trawl sectors and 400 mt to the non-trawl sectors. Of the amount allocated to the trawl sector, 476 mt is distributed to the at-sea whiting sectors to account for bycatch, and the remaining amount (13,600.7 in 2021 and 13,139.7 mt in 2022) would be distributed to the shorebased IFQ fishery. No further allocations or distributions are made.

2.3 Management Measures

As described in the PCGMP, the Council uses management measures to: reduce bycatch and bycatch mortality (Section 6.5); authorize or prohibit gear, gear configurations, and deployment strategies (Section 6.6); restrict catch through landing, trip frequency, bag, and size limits (Section 6.7); establish fishing seasons and closed areas (Section 6.8), and; limit fishing capacity through permits, licenses, endorsements, and quotas (Section 6.9). Management measures are tools used to help sectors of the fishery achieve and not exceed ACLs established in the biennial specifications process. Therefore, the management measures are not expected to have impacts that are different than the impacts considered in the analysis of the harvest specification alternatives in this document. Most of the management measures the Council recommended for the 2021–22 biennium are minor variations to existing management measures (i.e., bag limits, trip limits, and recreational season structures). Therefore, they do not represent a change from current management measures and are not discussed in detail in this analysis. For the 2021-22 biennium, the Council did recommend the following management measures which represent more than a slight variation to existing management measures used by the Council. All of the management

measures discussed in this document support the proposed action under each of the alterantives and are used by the Council to help achieve but not exceed harvest specifications. As these management measures are designed to help the fishery achieve but not exceed the harvest specifications, the measures are not expected to have impacts outside of the impacts of the proposed harvest specifications under each alternative. Therefore, the management measures would be the same under each alternative.

2.3.1 Retention of Yellowtail Rockfish within the Non-Trawl RCA in the Salmon Troll Fishery South of 40°10' N. lat.

Mid-water rockfish are occasionally caught as a non-target species by the salmon troll fishery throughout the entire coast. Under the current Federal regulations, salmon trollers are allowed to harvest and land the open access trip limits of groundfish throughout the entire coast, but only when fishing outside of the non-trawl RCA and abiding by other Federal regulations (e.g., vessel monitoring systems). Inside the non-trawl RCA and north of 40°10′ N. lat., salmon trollers are only allowed to retain lingcod and yellowtail rockfish. South of 40°10′ N. lat. these fish must still be discarded inside the non-trawl RCA. Rather than discard these fish, which currently have a 100 percent mortality rate, the Salmon Advisory Subpanel (SAS) requested that the Council explore retention of rockfish caught within the RCA by the salmon troll fishery (Agenda Item H.2.a. Supplemental SAS Report 2, September 2019). Based on the analysis presented to the Council (Agenda Item G.6, Attachment 3, April 2020), the Council recommended a change to the ratio of pounds of yellowtail rockfish to pounds of salmon per trip and a change to the monthly yellowtail rockfish limit for salmon trollers north of 40° 10' N. lat.

As of 2020, commercial salmon trollers south of 40°10' N. lat. cannot retain incidentally caught yellowtail rockfish. The Council recommended establishing a yellowtail rockfish trip limit south of 40°10' N. lat. in the commercial salmon troll fishery. Yellowtail rockfish, in this area, are managed under a cumulative open access trip limit for shelf rockfish complex south of 40°10' N. lat.; therefore, the Council also recommended adjusting the incidental open access ACL deduction for shelf rockfish south of 40°10' N. lat. in order to accommodate projected yellowtail rockfish catch by salmon trollers. The proposed changes of the retention of yellowtail rockfish in the salmon troll fishery would help the fishery achieve but not exceed the harvest specifications considered under each alternative. .

2.3.2 Shortspine and Longspine Thornyhead North of 34°27' N. lat. allocations and trip limits

Retention of thornyheads was prohibited north of 34°27' N. lat. prior to 2019. Beginning with the 2019-20 biennium, the Council allowed retention of thorynheads for the open access sector north of 40°10' N. lat. Open access trip limits already existed for shortspine and longspine thornyhead south of 34° 27' N. lat. Therefore, by opening only the area north of 40°10 N. lat., the Council inadvertently prohibited retention of thornyheads for the open access sector in the area between 34°27' N. lat. and 40°10' N. lat. only. This error was brought to the Council's attention late in the 2019-20 biennium and therefore could not be addressed prior to implementation of the 2019-20 harvest specifications and management measures.

As part of the 2021-22 biennium, the Council recommended establishing trip limits for shortspine and longspine thornyhead between 40°10' N. lat. and 34°27' N. lat. This will allow retention of longspine and shortspine thornyheads coastwide. The proposed changes to allocations and trip limits for shortspine and longspine thornyhead would help the fishery achieve but not exceed the harvest specifications considered under each alternative.

2.3.3 Modifications to Rockfish Conservation Areas

RCAs are large, depth-based closures intended to reduce the catch of rockfish and other groundfish. The boundaries for RCAs are defined by straight lines that connect a series of latitude and longitude coordinates that approximate depth contours. A set of coordinates are defined for each depth contour (50 CFR §660.71). RCAs are implemented by gear and/or fishery (e.g. non-trawl RCA, recreational RCA, etc.). As part of the biennial cycles, the Council routinely makes updates to coordinates to more closely approximate the boundaries with depth contours that are based on the best available depth data. Additionally, the Council may consider adjustments to RCAs to provide improved and more efficient access to target species, while minimizing interactions to rebuilding species. For more information see the analysis on these openings (Agenda Item F.1.a., Supplemental GMT Report 4, June 2020). The proposed changes to the RCA are expected to help fishermen access underattained stocks for which the Council recommends harvest specifications. Therefore, the impacts of opening these areas is discussed in terms of the access it would provide to allow fishermen to better attain these stocks. The impacts of these RCA changes are discussed further in Chapter 4.

2.3.3.1 Waypoint Corrections to the Non-trawl Rockfish Conservation Area Coordinates

The Council recommended the 40 fathom (fm) depth contour for the non-trawl RCA be modified offshore of San Mateo County in central California. The modification of the coordinates is intended to better align with corresponding isobaths and would increase the available fishing area by 6.3 miles^2.

The Council also recommended modifying the 100 fm RCA depth curve south of 34°27' N. lat. to remove a crossover with the 75 fm depth curve. If the 100 fm boundary line were utilized as currently listed in regulation these crossovers would create new closed areas in locations that are currently open to fishing activity utilizing the 75 fm line.

Finally, the Council recommended adding waypoints to approximate the 100 fm curve around the northern Channel Islands as they do not currently exist in regulation even though a 75 fm line and a 150 fm line do exist in regulation.

For more information on these waypoint changes see the California Department of Fish and Wildlife (CDFW) report (Agenda Item H.4.a., Supplemental CDFW Report 1, March 2020).

2.3.3.2 Adjustments to the Commercial Non-Trawl Rockfish Conservation Area between 40°10' N. lat. and 46° 16' N. lat. (Northern California/Oregon)

In June 2020, the Council considered adjusting the shoreward boundary of the non-trawl RCA between 40°10' N. lat. and 46°16' N. lat. from 30 fm to 40 fm and maintaining the seaward boundary at 100 fm (Figures 2 through 4). The purpose of opening this depth range north of 40°10' N. lat. is to provide access to underutilized target groundfish stocks that occur on the shelf (Agenda

Item H.8.a, Supplemental ODFW/CDFW Report 1, April 2020; Agenda Item F.1., Attachment 8, June 2020).

Originally implemented in 2003 to protect yelloweye rockfish, the shoreward boundary has proved constraining for vessels attempting to target other rockfish in shallower waters. Since yelloweye rockfish is schedule to be rebuilt ahead of schedule, and the Council has increased the harvest guidelines for yelloweye rockfish in the last biennium, members of industry requested the Council consider providing some access to these shallower waters. After consideration of potential impacts to habitat and associated species, discussed in Chapter 4, the Council recommended moving the shoreward boundary, but restricting the gears permitted in the area between 30-40 fathoms to only hook-and-line gear excluding bottom longline and dinglebar, as defined in federal regulations at 50 CFR §660.11.

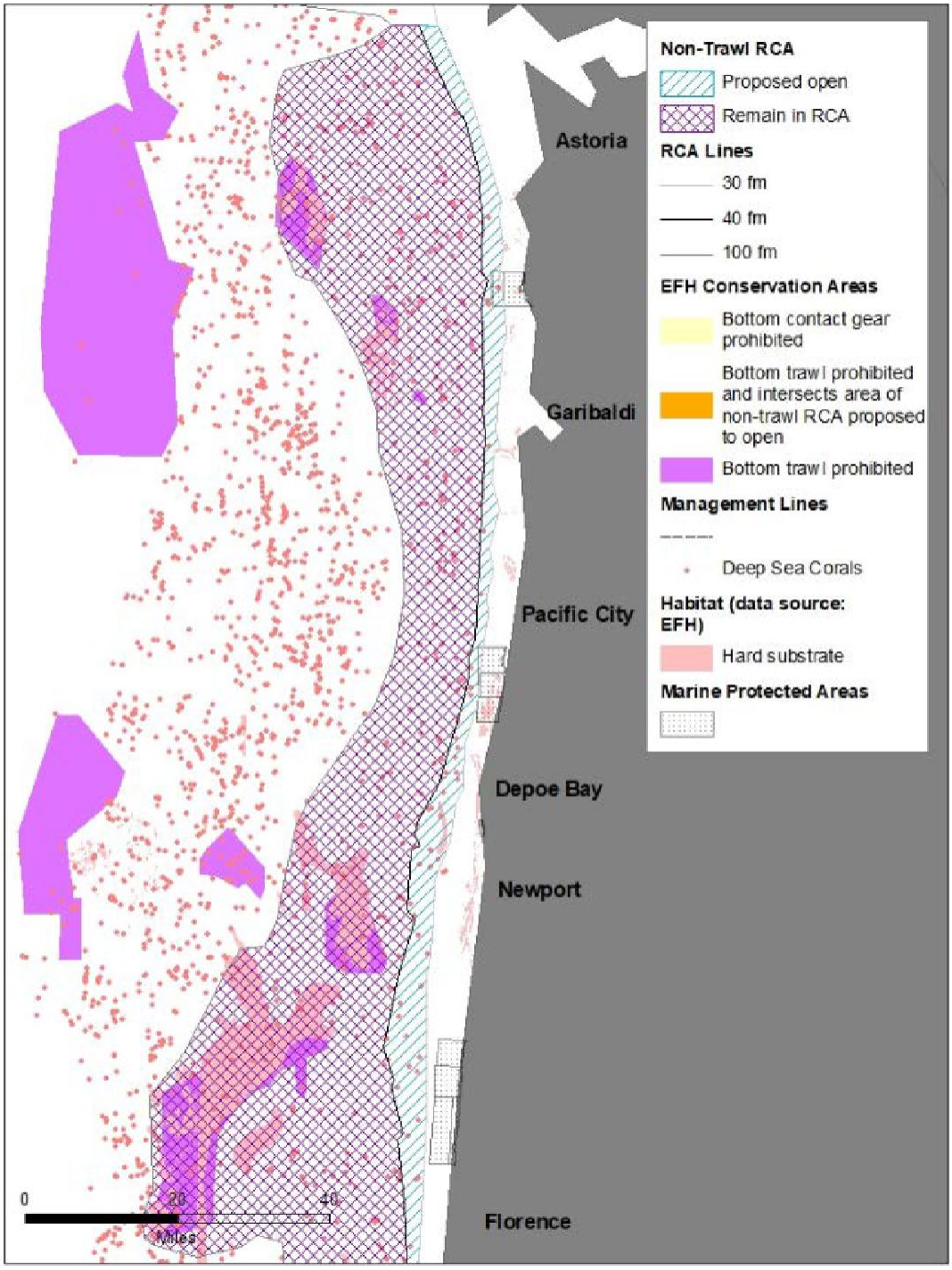


Figure 2. Recommended closure of the non-trawl RCA between 40 fm and 100 fm off Oregon.

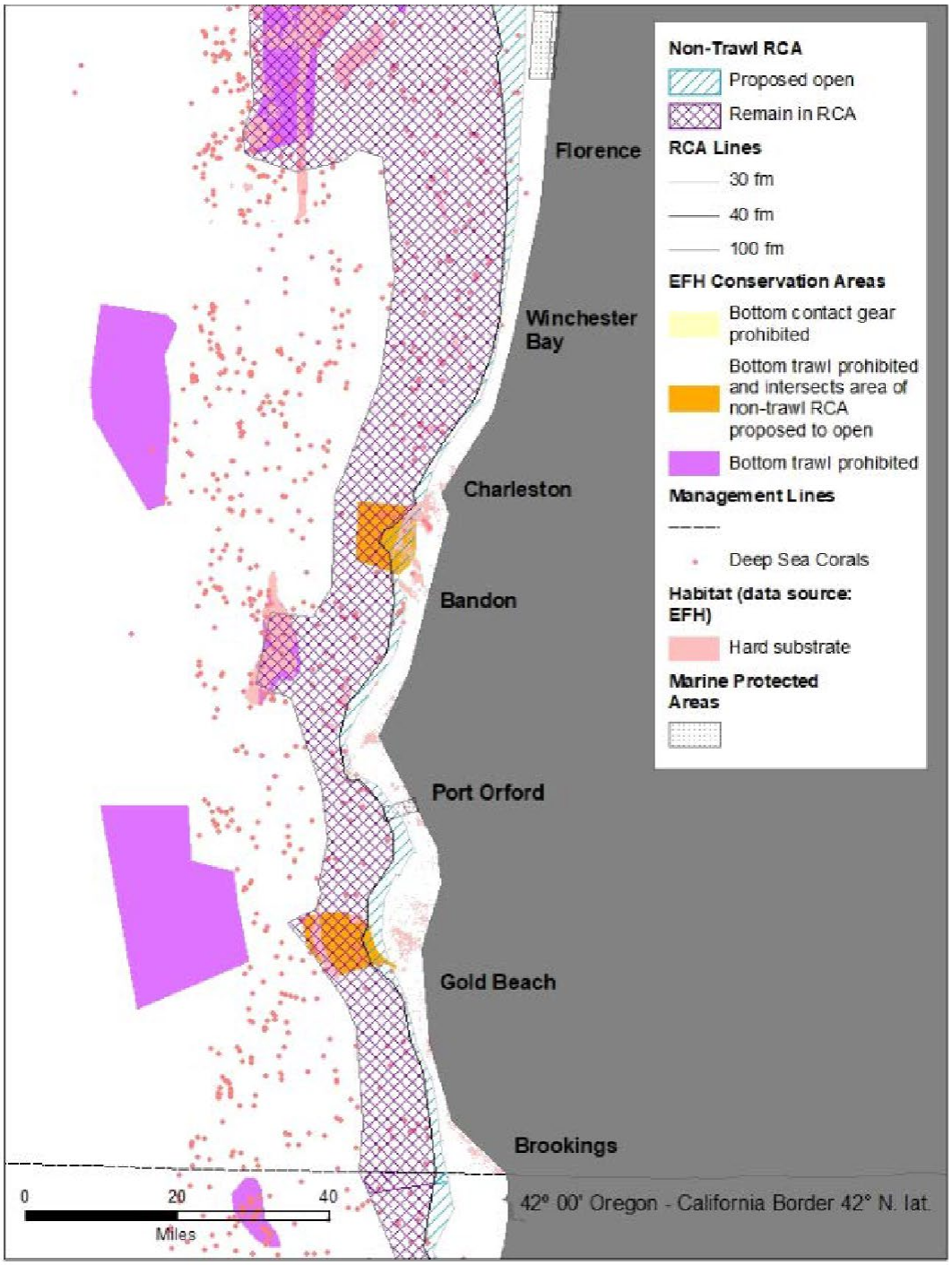


Figure 3. Recommended closure of the non-trawl RCA between 40 fm and 100 fm off northern California and Oregon.

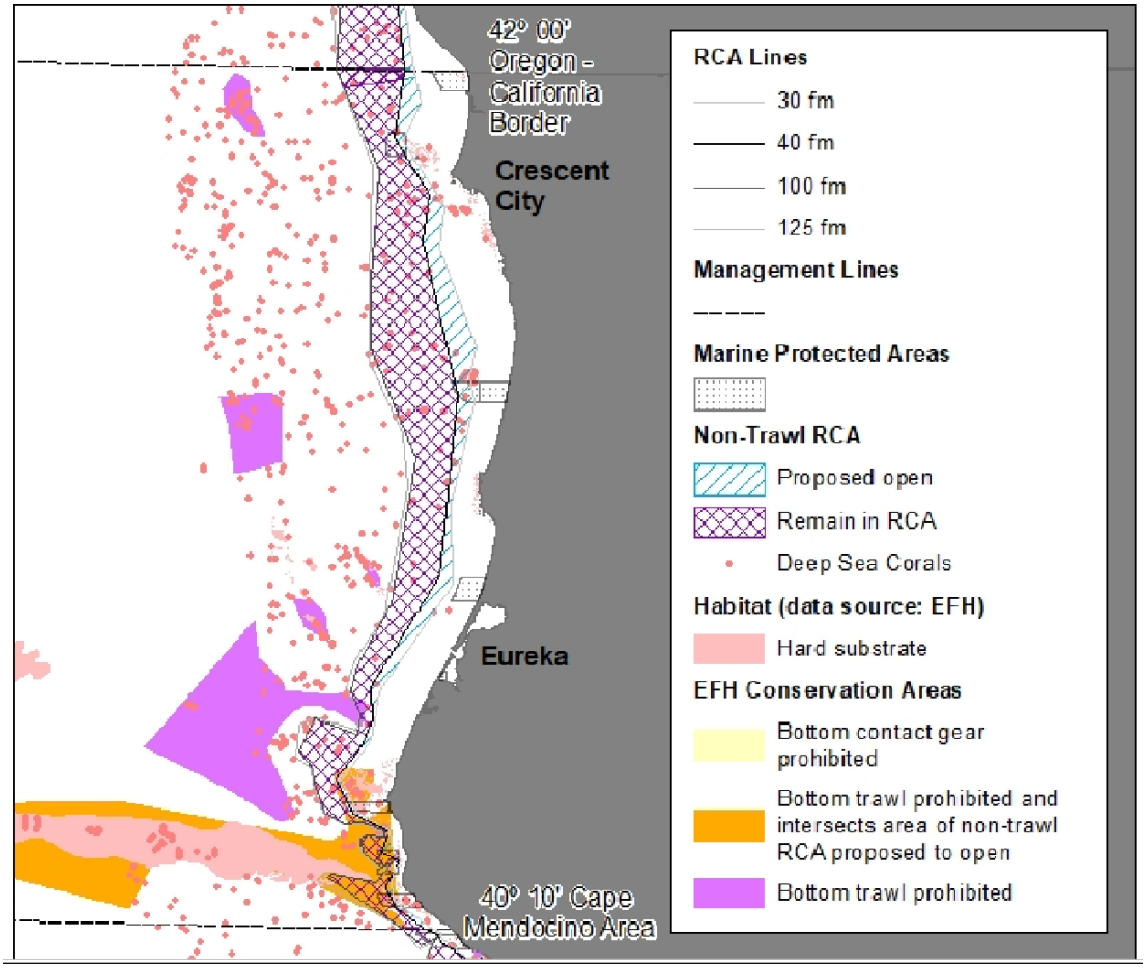


Figure 4. Recommended closure of the non-trawl RCA between 40 fm and 100 fm off northern California.

2.3.3.3 Adjustments to the Commercial Non-Trawl Rockfish Conservation Areas, South of 40°10' N. lat. (California)

These proposals would adjust the commercial non-trawl RCA boundaries for south of 40° 10' N. lat. to proide access to healthy and underattained groundfish stocks. Similar to the changes discussed above for Oregon/Northern California, the newly rebuilt status of several groundfish stocks (i.e., canary, cowcod, and bocaccio) has resulted in less need to maintain groundfish management measure which were first implemented to reduce effort on these stocks. Therefore, the Council recommended the following commercial RCA boundary line changes:

- Implement a new management line at 38°57.5′ N. lat., (Point Arena) for purposes of defining RCA boundaries.
- In the area between 38°57.5′ and 34°27′ N. lat., (Point Arena to Point Conception): Increase the depth of the shoreward RCA boundary from 40 to 50 fathoms, resulting in an RCA in this area between 50 and 100 fm. [NOTE: The shoreward RCA depth between 40°10′ N. lat. and 38°57.5′N. lat. would remain unchanged; at 40 fathoms.]

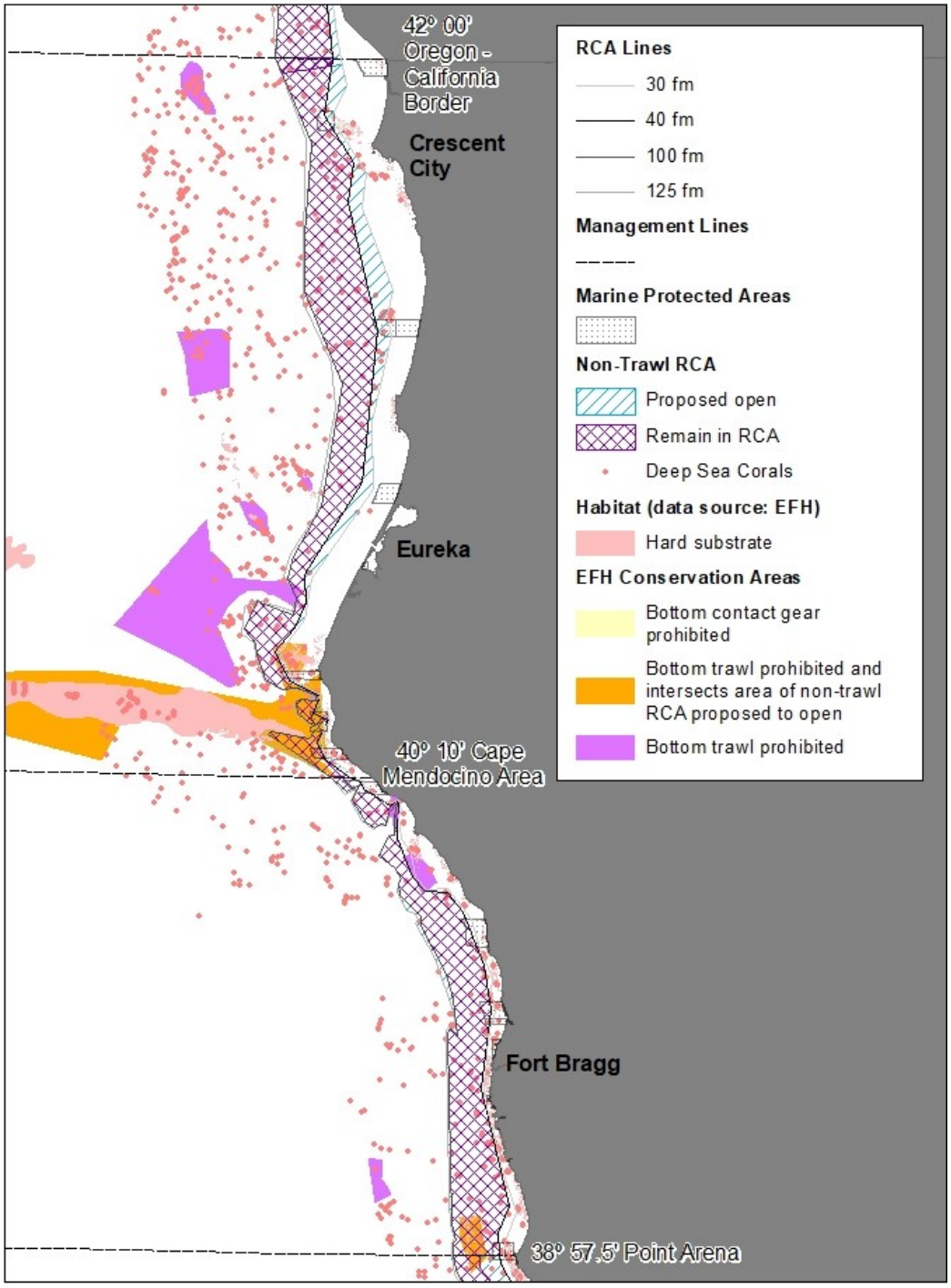
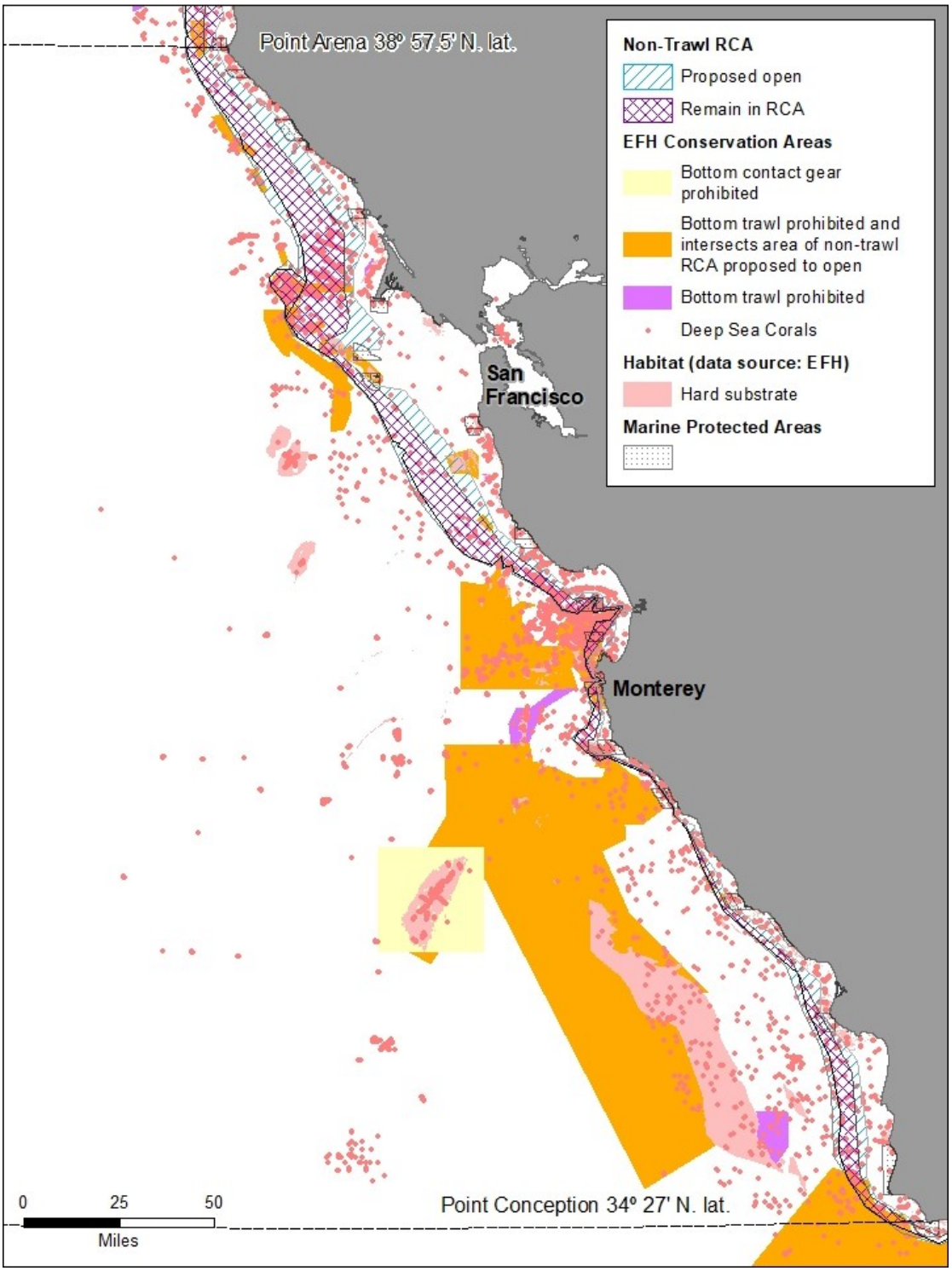


Figure 5. Recommended non-trawl RCA closure from 40 fm to 100 fm from Cape Mendocino south to Point Arena.



- From 34°27′ N. lat. (Point Conception) to the U.S.-Mexico border: Increase the depth of the shoreward RCA boundary from 75 fathoms to 100 fathoms, making the RCA boundary configuration in this area 100 fm to 150 fm.

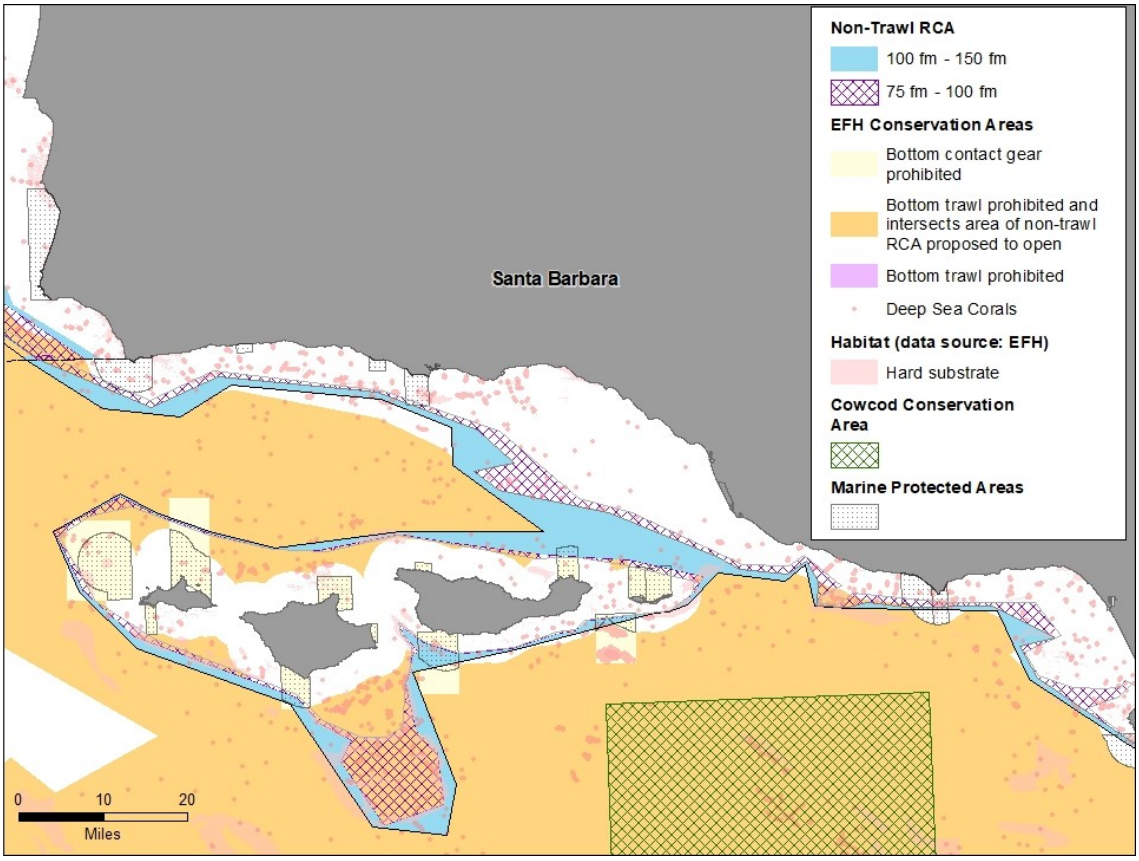


Figure 6. Recommended non-trawl RCA closure from 100 fm to 150 fm off California from Point Conception to the U.S./Mexico border.

2.3.3.4 Removal of South Coast and Westport Offshore Yelloweye Rockfish Conservation Areas (YRCA) in Washington

The Council considered two proposals to remove YRCAs in Washington. These two YRCAs account for approximately five square miles of the roughly 11,000 square miles of available fishing area off Westport (i.e. Marine Area 2). The two areas were open to recreational fishing prior to 2007, but were closed that year to recreational fishing to protect yelloweye and canary rockfish. However, much of these two areas may have been open in part to commercial trawling and fixed gear. Since canary rockfish has been rebuilt and the recreational harvest guidelines for yelloweye rockfish have increased, these management measures that close these small areas to recreational fishing are no longer necessary. Therefore, the Council recommended removing the existing South Coast and Westport Offshore YRCAs. These areas would open to allow for recreational fishing of groundfish and Pacific halibut year-round.

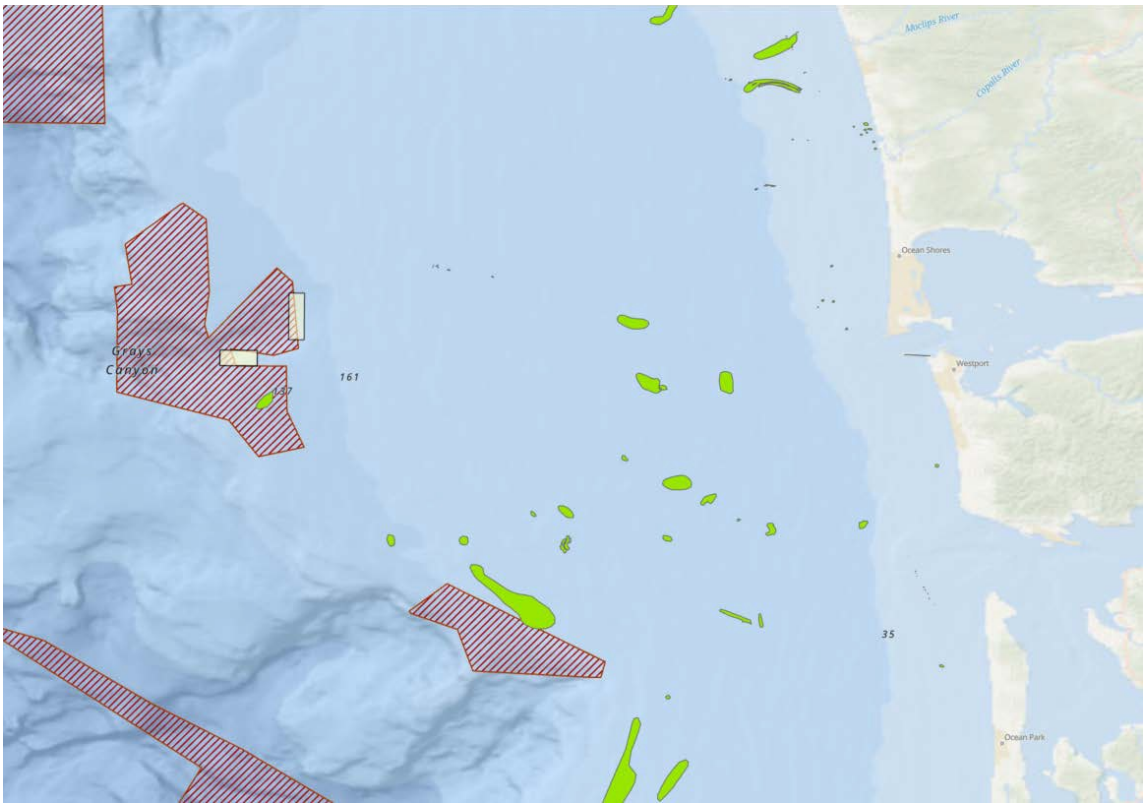


Figure 7. Yelloweye Rockfish Conservation Areas (YRCA) proposed for opening off of Washington's coast, along with rocky reef habitat and Essential Fish Habitat in the region.

2.3.4 Longleader Gear and All-Depth Halibut in the Oregon Recreational Fishery

During the 2019 Pacific halibut Catch Sharing Plan process, Oregon anglers put in a request to be allowed to fish in the longleader gear fishery and all-depth Pacific halibut fishery on the same trip. Currently, the combination of those two trip types is prohibited in both the sport bottomfish and sport Pacific halibut regulations.

The longleader gear, also known as Holloway Gear, was recommend for use in the Oregon recreational fishery by the Council in 2016 and implemented in federal regulations in 2018. Thatregulation allowed the use of the gear (description below) outside of the 40-fathom regulatory line April through Septemberin areas and times open to sport bottomfish in Oregon. It also prohibited combining a longleader gear trip with a "regular" bottomfish trip and Pacific halibut trips. Retention was also limited to 10 species of midwater rockfish in state regulation; and retention of lingcod was specifically prohibited. All of these restrictions were implemented to limit interactions with yelloweye rockfish which at the time was overfished.

The Council recommended allowing both longleader gear fishing and all-depth Pacific halibut fishing to be allowed on the same trip in the Oregon recreational fishery. This action affects midwater rockfish stocks, primarily yellowtail, widow, and canary rockfish as the target for the longleader gear. Pacific halibut is the target of the all-depth halibut fishery. This measure will

directly affect the Oregon recreational groundfish and halibut fisheries. Discussion of these impacts is in Chapter 4.

2.3.5 Removal of "Other Flatfish" Gear Restriction for S. of 42° N. lat.

Current Federal regulations include an exemption to the RCAs for vessels targeting stocks in the Other Flatfish complex while using hook-and-line gear with no more than 12 hooks per line, and no larger than 'Number 2' hooks, which measure 0.44 inches (in) (11 milimeters [mm]) point to shank, and up to two 1 pound (lb) (0.45 kilogram [kg]) weight per line. This management measure was originally implemented in 2003 to protect bocaccio rockfish, which at the time was overfished, while allowing the small artisanal Pacific sanddab fishery in southern California to continue operation. During the 2009-2010 management cycle, similar flatfish gear restrictions for the recreational fishery were removed, due to the inefficacy of the restrictions in preventing bycatch of overfished species. Further, bycatch rates when targeting 'other flatfish' were and are very low irrespective of the gear employed. Therefore, it was decided that these gear restrictions were not needed to limit bycatch. As these gear restrictions are not needed to prevent bycatch in the commercial fishery, particularly since bocaccio south of 40°10 N. lat. was rebuilt, the Council recommended the removal of this language to simplify regulations and allow the fixed gear fleet to more effectively target and attain trip limits of species in the 'other flatfish' complex.

2.4 Alternative Harvest Specifications

As discussed above, under Amendment 24, the Council adopted default harvest control rules, which established default policies that would be applied to the best available scientific information to set ACLs each biennial cycle, unless the Council choses to diverge from that harvest control rule. For the 2021-22 biennial cycle, the Council evaluating diverging from the default harvest control rule for five groundfish stocks: cowcod south of 40°10' N lat., Oregon black rockfish, petrale sole, shortbelly rockfish and sablefish. Alternative harvest specifications are often based on the most recent assessments for actively managed stocks, including those managed in stock complexes. Results from new assessments conducted in 2019 were used to develop potential alternative 2021 and 2022 harvest specifications for cowcod south of 40°10' N lat., Oregon black rockfish, petrale sole, and sablefish. Alternative harvest specifications for shortbelly rockfish were analyzed due to ACL overages in recent years (2018 and 2019). For the remaining stocks in the groundfish fishery, the Council has recommended harvest specifications under the default harvest control rules, as described in the No Action Alternative above. Therefore, the havest specifications for all stocks under the default harvest control rules would be the same under each alternative and are not repeated outside of the No Action Alternative. Proposed alternative harvest specifications can be found in Table 3. All management measures included in Sections 2.2 would be the same under all the alternatives (No Action, Alternative 1, and Alternative 2) because these management measures are meant to help achieve but not exceed the harvest specifications under consideration. Therefore, the management measures are only described under the No Action alternative.

Table 4. Alternative 2021 and 2022 harvest specifications (in mt) for select West Coast groundfish stocks

Stock	Alternative	2021			2022			Harvest Control Rule
		OFL	ABC	ACL	OFL	ABC	ACL	
Black Rockfish in Oregon	No Action	570	479	479	569	474	474	ACL = ABC (P* = 0.45)
	Alt. 1	570	512	512	566	512	512	ACL = 2020 ABC (P* = 0.45)
Cowcod South of 40°10' N. lat.	No Action	114	98	98	113	96	96	ACL = ABC (P* = 0.45)
	Alt. 1	114	87	87	113	85	85	ACL = ABC (P* = 0.4)
	Alt. 2	114	69	69	113	66	66	ACL = ABC (P* = 0.3)
Petrale Sole	No Action	4,402	4,115	4,115	3,936	3,660	3,660	ACL = ABC (P* = 0.45)
	Alt. 1	4,402	3,843	3,843	3,999	3,455	3,455	ACL = ABC (P* = 0.4)
	Alt. 2	4,402	4,115	3,600	4,054	3,770	3,600	"Stair Step" ACLs
Sablefish	No Action	9,402	8,208	North-6,435 mt, South-1,765 mt	9,040	7,811	North-6,124 mt, South-1679 mt	ACL = ABC (P* = 0.4)
	Alt. 1	9,402	8,791	North-6,479 mt, South-2,312 mt	9,005	8,375	North-6,172 mt, South-2,203 mt	ACL = ABC (P* = 0.45)
Shortbelly Rockfish	No Action	6,950	4,184	500	6,950	4,184	500	ACL = 500 mt
	Alt. 1	6,950	4,184	2,000	6,950	4,184	2,000	ACL = 2,000 mt
	Alt. 2	NA			NA			EC Species

2.4.1 Alternative 1

The five stocks with alternative harvest specifications considered for 2021 and 2022 are black rockfish in Oregon, cowcod south of 40°10' N lat., petrale sole, sablefish, and shortbelly rockfish (Table 3).

Blue/Deacon and Black Rockfish Complex

Black rockfish is the primary target for the Oregon recreational and commercial nearshore fisheries. In 2017, Oregon recreational fisheries were shut down early because of black rockfish concerns, and the Council received public testimony as to the severe negative consequences for charter business operators and tourist-revenue dependent coastal communities resulting from this closure. Due to the constraining nature of black rockfish in Oregon and the biomass level being above the precautionary threshold, Oregon Department of Fish and Wildlife (ODFW) requested the Council consider an alternative for the 2021–22 biennium where the 2020 ABC (512 mt) blue/deacon and black rockfish complex is specified for 2021 and 2022, and the ACLs are set equal to ABCs. The Magnuson-Stevens Act and the PCGFMP allow the SSC to recommend an ABC that differs from the ABC control rule on a case by case basis, provided the SSC offers justification for its recommended deviation. In 2023, the default harvest control rule (ABC=ACL, P* of 0.45) would once again apply to Oregon black rockfish. In this case, long-term projections under the Council's default harvest control rule and the alternative 2021 and 2022 ABC both result in a projected stock biomass at 54 percent of its unfished spawning output in 2030. Stocks with biomass estimates greater than 40 percent depletion are above the precautionary thresholds in the PCGFMP. Therefore, the SSC recommending deviating from the default harvest control rule because…The Council did not consider alternative harvest specifications for blue/deacon rockfishes within the complex.

Under Alternative 1, the default harvest control rule for the blue/deacon and black rockfish complex (P*=0.45) is applied to the OFLs in 2021 (676 mt) and 2022 (672 mt) resulting in an ABC in 2021 of 603 mt and an ABC in 2022 of 600 mt. The ACL under Alternative 1 are set at the 2020 ACL of 512 mt, deviating from the default harvest control rule. The Alternative 1 ABCs are about 93 and 91 percent of their respective OFLs and the ACLs are 85 percent of their respective ABCs. In each year, the ACL is reduced by 2.32 mt to account for mortality in the EFP (0.5), research (0.08 mt), and incidental open access (1.74 mt) fisheries. No deductions were made for Tribal fisheries. The reduction to the ACL results in a fishery harvest guideline of 509.68 mt for both years. No further reductions or distributions are made.

Alternative 1 was compelled by changes to the scientific uncertainty parameter, sigma, which informs the ABC for a stock. The Council recommended Alternative 1 as their preferred harvest specifications for Oregon black rockfish.

Cowcod South of 40°10' N lat.

A new cowcod assessment conducted by the NWFSC in 2019 indicated the stock south of 40°10' N lat. had transitioned from a rebuilding stock (status was below the precautionary level with a depletion of 40 percent unfished biomass) to a stock with depletion estimate at the start of 2019 of 57 percent of unfished spawning output (Agenda Item H.5. Attachment 9, September 2019), above

the precautionary threshold of 40 percent. When a stock is determined to be rebuilt, its harvest control rule automatically reverts back to the default harvest control rule for the next biennium. For the 2021–22 biennium, cowcod south of 40°10' N. lat. was the only stock declared rebuilt. Because cowcod is bebuilt, the default harvest control rule would apply for the 2021-22 bienium.

However, under Alternative 1, the Council recommended a lower P* value for cowcod south of 40°10' N. lat. than what would have been applied under the default P* value (P*=0.45) to address the relatively high uncertainty in the estimated biomass and productivity in the cowcod assessment due to a lack of adequate data (particularly age data) for estimating growth, natural mortality, and recruitment. Under Alternative 1, the new default harvest control rule for cowcod south of 40°10 N. lat. (P*=0.40) is applied to the OFLs in 2021 (114 mt) and 2022 (113 mt) resulting in an ABC in 2021 of 84 mt and an ABC in 2022 of 82 mt. The revised P* value of 0.40 is consistent with other category two stocks. ACLs are set equal to ABCs in both years.

Under Alternative 1, the ABCs are about 74 and 73 percent of their OFLs, respectively. In each year, the ACL is reduced by 10.82 mt to account for mortality in EFP (0.65 mt), research (10 mt), and incidental open access (0.17 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 73.18 mt in 2021 and 71.18 mt in 2022. The fishery harvest guideline is then reduced further as a precautionary measure to an ACT of 50 mt. The ACT is then distributed to the trawl and non-trawl sectors with trawl receiving 36 percent and non-trawl sectors receiving 64 percent each year. In 2021 and 2022, the trawl sector would receive 18 mt of cowcod. The non-trawl sector would receive 32 mt which is distributed to the commercial (16 mt) and recreational (16 mt) fisheries.

Alternative 1 (using on a lower P* value) results in a more conservative ACL than under No Action. As discussed above, the primary rationale? for more conservative harvest specifications is the relatively high uncertainty in the estimated biomass and productivity in the cowcod assessment as noted by the SSC in their September 2019 report. Further, the SSC pointed out the cowcod harvest rate under the No Action Alternative results in near-term ABCs/ACLs, "… substantially above the long-term equilibrium MSY estimate (73 mt) for this stock." The Council adopted Alternative 1 as their preferred harvest specifications for cowcod south of 40°10' N. lat.

Petrale sole

Uncertainty in projected biomass in the 2019 petrale sole stock assessment update suggested the need to consider alternative harvest specificaitons. The current depletion estimate for 2019 is 39 percent; however, the trajectory of the stock is forecast to decline as the large 2006-2008 cohorts are fished down and as recent recruitments (2010-2016) have been below average. Therefore, under Alternative 1, the Council suggested a more restrictive harvest control rule of P*=0.40 be implemented as the harvest control rule ,. The new harvest control rule (P*=0.40) will be applied to the OFLs in 2021 and 2020 resulting in ABCs of 3,843 mt and 3,503 mt in 2021 and 2022 respectively. These ABCs are 87 percent of the OFLs. The same off the top deductions would apply under Alternative 1 as under the No Action alternative (387.54 mt) (Table XX). The resulting fishery HGs of 3,455 mt in 2021 and 3,115 mt in 2022 would be lower than under the No Action alternative. The same distribution to the trawl/non-trawl sectors would apply.

Sablefish

The NWFSC completed a full stock assessment for sablefish in 2019 (Agenda Item H.5. Attachment 7, September 2019). In 2019, the sablefish stock is estimated to be at 39 percent of unfished spawning output. However, biomass is projected to increase, and the spawning output is projected to be above the precautionary threshold (B_{40}) in 2021. The expected increase in biomass is driven in part by the estimated, but highly uncertain, size of the 2016-year class. Now that sablefish biomass is projected to be above B_{MSY}, the Council considered alternative harvest specifications for the 2021–22 biennium.

Under Alternative 1, the new harvest control rule for sablefish (P*=0.45) is applied to the OFLs in 2021 (9,402 mt) and 2022 (9,040 mt) resulting in an ABC in 2021 of 8,791 mt and an ABC in 2022 of 8,375 mt. Under Alternative 1, the ABCs are around 94 and 93 percent of their OFLs, respectively. The 2021 and 2022 ABCs are 6.6 percent and 6.7 percent higher, respectively under Alternative 1 than under the No Action Alternative. The predicted ten-year trajectories under Alternative 1 indicates the stock remains above target B_{MSY}.

Historically, the coastwide sablefish ABC is apportionment north and south of 36° N. lat. was based on the 2003-2018 average swept area biomass estimated in the NMFS NWFSC Bottom Trawl Survey. Beginning with 2021-22, the Council recommended using a 5-year rolling average of the swept area biomass, which more closely resembles the actual catches over the past 5 years, and results in an ACL apportionment of 78.4 percent to the north and 21.5 percent to the south. Under Alternative 1, the 2021 ACL for sablefish north of 36° N. lat. is 6,892 mt, and the 2022 ACL is 6,566 mt. In 2021, the ACL is reduced by 635.8 to account for mortality in tribal (604 mt), EFP (1.1 mt), research (30.7 mt), and incidental open access (6.22 mt) fisheries. An additional 6 mt is deducted to account for catch in recreational fisheries. The reduction to the ACL results in a commercial fishery harvest guideline of 6,250.2 mt in 2021. In 2022, the ACL is reduced by 606.8 to account for mortality in tribal (575 mt), EFP (1.1 mt), research (30.7 mt), and incidental open access (6.22 mt) fisheries. An additional 6 mt is deducted to account for catch in recreational fisheries. The reduction to the ACL results in a commercial fishery harvest guideline of 5,511.2 mt in 2022. The commercial harvest guideline is further distributed between the limited entry and open access fisheries with limited entry receiving 91 percent of the commercial harvest guideline and open access fisheries receiving nine percent. The limited entry share is then divided among the trawl sectors. Historically this percentage has been 58 percent to the trawl sectors and 42 percent to the non-trawl sectors and was based on the average swept area biomass from the NWFSC's trawl survey. The limited entry trawl share is reduced to account for catch in the at-sea whiting sectors with the remaining going to the shorebased IFQ fishery. The limited entry fixed gear share is split between the sablefish primary fishery which receives 85 percent with the remaining amount going to the trip limit fishery. See table XX for the sablefish north of 36° N. lat. distribution under the no action alternative.

Table 5. Alternative 1 Sablefish north of 36° N. lat. harvest specifications

Year	ACL	Set-asides		Recreational Estimate	EFP	Commercial HG	Limited Entry HG		Open Access HG	
		Tribal a/	Research				Percent	mt	Percent	mt b/
2021	6,892	689	30.7	6	1.1	6,156	91	5,586	9	580

Year	LE All	Limited Entry Trawl c/			Limited Entry Fixed Gear d/		
		All Trawl	At-sea Whiting	Shorebased IFQ	All FG	Primary	DTL
2021	5,586	3,240	100	3,140	2,346	1,994	352

a/ The tribal allocation is further reduced by 1.7 percent for discard mortality resulting.

b/ The open access HG is taken by the incidental OA fishery and the directed OA fishery.

c/ The trawl allocation is 58 percent of the limited entry HG.

d/ The limited entry fixed gear allocation is 42 percent of the limited entry HG.

Under Alternative 1, the 2021 ACL for sablefish south of 36° N. lat. is 1,899 mt, and the 2022 ACL is 1,809 mt. Each year, the ACL is reduced by 27.40 to account for mortality in research (2.4 mt) and incidental open access (25 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 1,718.6 mt in 2021 and 1,781.6 mt in 2022. Sablefish south of 36° N. lat. is an Amendment 21 species with a trawl/non-trawl allocation of the fishery harvest guideline of 42 percent to the trawl fishery and 58 percent to the non-trawl fishery. In 2021 and 2022, the distribution results in 895.1 mt to the trawl sector and 1,236.2 mt to the non-trawl sector. In 2022, the trawl sector would receive 851.3 mt and the non-trawl sector would receive 1,175.6 mt. The non-trawl allocation would be further split between the LEFG and OA fisheries with each receiving 50 percent of the non-trawl allocation in each year. No further allocations or distributions are made.

The Council adopted Alternative 1 as their preferred alternative in April 2020.

Shortbelly Rockfish

In 2020, the Council recommended, and NMFS implemented, an increase to the shortbelly rockfish ACL for the remaineder of the 2020 fishing year. Without any action by the Council through the 2021-22 bienniucm, the ACL for shortbelly rockfish would revert back to the default under the No Action alternative. After reviewing the available information on shortbelly, including available information on exceeding the ACLs in 2018 and 2019, the Council included an alternative that would increase the shortbelly ACL in 2021 and 2022 to 3,000 mt. This is the same amount the Council chose to increase the shortbelly ACL to in 2020. However, the Council further refined Alternative 1 during their PPA selection in April 2020 to reduce the shortbelly ACL under this alterantive to 2,000 mt.

Under Alternative 1, the Council's default harvest control rule (P*=0.40) for shortbelly rockfish is applied to the 2021 and 2022 OFLs (6,950 mt) resulting in ABCs of 4,184 mt in both years. For shortbelly rockfish, the ACLs would be set at 2,000 mt in both years which the Council determined would be enough to cover the recent high bycatch in the Pacific whiting fishery while also staying well below the ABC for shortbelly rockfish, which is the conservation reference point for the shortbelly rockfish stocks. In both years, the ABCs are 60 percent of the OFLs, and the ACLs are 48 percent of the ABCs. In each year, the ACL is reduced by 29.87 mt to account for mortality in EFP (0.1 mt), research (8.2 mt), and incidental open access (21.57 mt) fisheries, resulting in a fishery HG of 1970.13 mt in both years. No further allocation or distributions are made.

2.4.2 Alternative 2

Cowcod South of 40°10' N lat.

Because of the uncertainties in the stock assessment described under Alternative 1 for cowcod south of 40°10' N. lat. the Council also considered an additional, even more conservative P* value which would futher constrain the fisheries in the face of uncertainty. Under Alternative 2, the new default harvest control rule for cowcod (P*=0.30) is applied to the OFLs in 2021 (114 mt) and 2022 (113 mt) resulting in an ABC in 2021 of 61 mt and an ABC in 2022 of 58 mt. ACLs are set equal to ABCs in both years. Under Alternative 1, the ABCs are about 54 and 53 percent of their OFLs, respectively. In each year, the ACL is reduced by 10.82 mt to account for mortality in EFP

(0.65 mt), research (10 mt), and incidental open access (0.17 mt) fisheries. The reduction to the ACL results in a fishery harvest guideline of 50.18 mt in 2021 and 47.18 mt in 2022. The fishery harvest guideline is then reduced further as a precautionary measure to an ACT of 50. The ACT is then distributed to the trawl and non-trawl sectors with trawl receiving 36 percent and non-trawl sectors receiving 64 percent each year. In 2021, the trawl sector would receive 18 mt of cowcod. The non-trawl sector would receive 36 mt which is distributed to the commercial (18 mt) and recreational (18 mt) fisheries. In 2022, the trawl sector would receive 16.9 mt of cowcod. The non-trawl sector would receive 30.2 mt which is distributed to the commercial (15.1 mt) and recreational (15.1 mt) fisheries.

Petrale sole

Under Alternative 2, the Council suggested a new harvest control rule known as a "stair-step" approach be applied to the ACLs and implemented under this alternative. The "stair-step" approach is different than the No Action and Alterantive 1 approaches, because it would establish a constant catch ACL that would slowly decrease ACL over time, if the Council chose not to take action in subsequent biennium. Alternative 2 would also result in an ACL that is lower than the ABC each year.

Beginning in 2021-22 biennium, the ACLs would be at their highest. The ACL is then reduced each biennium by a predetermined amount starting with the largest deductions occurring between the 2021-22 biennium and the 2023-24 biennium and then getting smaller each subsequent biennium (Table 6). For example, the ACL in 2021 and 2022 would be 3,600 mt annually or 87 percent of the ABC in 2021 and 98 percent of the ABC in 2022. Without future action by the Council, the ACLs in 2023 and 2024 would be 3,300 mt. The same off the top deductions would apply to Alternative 2 as under the No Action alternative (Table XX), resulting in a fishery HGs of 3,212.5 mt for 2021 and 2022. The same distribution as under the No Action alternative would apply to the trawl/non-trawl sectors.

Table 6. Long-term harvest specifications (mt) under Alternative 2 for petrale sole.

Year	OFL	ABC	ACL
2021	4,402	4,115	3,600
2022	4,054	3,770	3,600
2023	3,762	3,483	3,300
2024	3,607	3,325	3,300
2025	3,511	3,219	3,100
2026	3,499	3,195	3,100
2027	3,509	3,190	3,000
2028	3,548	3,207	3,000

Year	OFL	ABC	ACL
2029	3,584	3,226	3,000
2030	3,616	3,240	3,000

Shortbelly Rockfish

Under Alternative 2, Shortbelly rockfish would be designated as an ecosystem component species. As discussed above, section 4.2 of the PCGFMP defines species categories for stocks and stocks complexes. The first three categories are identified for those stocks that need conservation or management and for which the Council sets biennial harvest specifications. The fourth category of species is identified as ecosystem component species. These species are not determined to be in need of conservation and management and therefore the Council and NMFS do not actively manage them with harvest specifications. Ecosystem component species are not targeted in any fishery and are not generally retained for sale or personal use. As an ecosystem species, shortbelly rockfish would not be managed harvest specifications. However, the stock will continue to be monitored to ascertain stock status.

In determining whether or not to designate shortbelly rockfish as an ecosystem component species, the Council considered whether or not shortbelly rockfish is in need of conservation and management. Historically, shortbelly rockfish were most abundant off central California from Monterey Bay to Point Reyes, common in southern California, and only rarely encountered north of Cape Mendocino, California. In recent years, shortbelly rockfish distribution has extended north of Cape Mendocino, California and into Oregon and Washington waters, the principal fishing areas the midwater trawl fishery operates in to harvest Pacific whiting. While shortbelly rockfish bycatch was historically low in the Pacific whiting fishery, the recent shift in distribution and a likely increase in abundance, has resulted in increased bycatch of shortbelly rockfish in the Pacific whiting midwater trawl fishery.

2.5 The Preferred Alternative

The Council's recommended itspreferred harvest specifications alternatives in April 2020 and June 2020. The Council recommended the No Action alternative for all stocks and stock complexes except cowcod south of 40°10' N. lat, Oregon black rockfish (as part of the black, blue, deacon rockfish complex), sablefish, and shortbelly rockfish. For all of these stocks, except shortbelly rockfish, the Council recommended Alternative 1. For shortbelly rockfish, the Council selected Alternative 2. Each of these alternatives is described above and the impacts are discussed in Chapter 4. A summary of the Council's preferred harvest specifications and allocations down to the trawl/non-trawl sectors is provided in Table 5 (2021) and Table 6 (2022).

NMFS - Please confirm in this EA that the Council's preferred alternative is the same as NMFS's. Or that NMFS has not decided and will decide after the Draft EA.

Table 7. Preferred harvest specifications and allocations for the 2021 fishing year. Rebuilding stocks are listed first and are capitalized.

Stock Complex	Area	Category	P* (ABC Buffer)	OFL	ABC	ACL	Set Asides				Fishery HG (ACT)	Trawl Allocation	At-sea	IFQ	Non-Trawl Allocation (ACT)
							Tribal	EFP	Research	IOA					
YELLOWEYE ROCKFISH	CW	1 (Year Based)	0.40 (0.144)	97	83	50	5	0.24	2.92	0.69	41.2	3.3	-	3.3	37.9 (29.5)
Arrowtooth Flounder	CW	2 (Year Based)	0.40 (0.267)	13,551	9,933	9,933	2041	0.1	12.98	41	7,837.9	7446	70	7,376.0	391.9
Big Skate	CW	2 (Year Based)	0.45 (0.126)	1,690	1,477	1,477	15	0.1	5.49	36.72	1,419.7	1348.7		1,348.7	71
Black Rockfish	WA	1 (Year Based)	0.45 (0.083)	319	293	293	18	0	0.1	0	274.9	-			-
Black Rockfish	CA	1 (Year Based)	0.45 (0.083)	379	348	348	-	1	0.08	1.18	345.7	-			-
Bocaccio	S of 4010	1 (Year Based)	0.45 (0.074)	1,887	1,748	1,748	-	40	5.6	2.22	1,700.2	-			1036.4
Cabezon	CA			225	210	210	-	1	0.02	0.26	208.7	663.8		663.8	
California Scorpionfish	CW	CA Scorpionfish (Year Based)	0.45 (0.086)	319	291	291	-	0	0.18	3.71	287.1				
Canary Rockfish	CW	1 (Year Based)	0.45 (0.083)	1,459	1,338	1,338	50	8	10.08	1.31	1,268.6	917	36	881.0	351.6
Chilipepper	S of 4010	1 (Year Based)	0.45 (0.083)	2,571	2,358	2,358	-	70	14.04	13.66	2,260.3	1695.2		1,695.2	565.1
Cowcod (Alternative 1)	S of 4010			114	84	84	-	1	10	0.17	72.8 (50)	18		18.0	32
Cowcod	*S of 3427*	*2 (Year Based)*	*0.40 (0.238)*	*95*	*72*	*72*	-	-	-	-					-
Cowcod	*3427 - 4010*	*3 (Year Based)*	*0.40 (0.398)*	*19*	*11*	*11*	-	-	-	-					-
Darkblotched Rockfish	CW	1 (Year Based)	0.45 (0.074)	953	882	882	0.2	0.6	8.46	9.8	862.9	819.8	76.4	743.4	43.1
Dover Sole	CW	1 (Year Based)	0.45 (0.100)	93,547	84,192	50,000	1497	0.1	50.84	49.27	48,402.8	45982.7	10	45,972.7	2420.1

Stock Complex	Area	Category	P* (ABC Buffer)	OFL	ABC	ACL	Set Asides				Fishery HG (ACT)	Trawl Allocation	At-sea	IFQ	Non-Trawl Allocation (ACT)
							Tribal	EFP	Research	IOA					
English Sole	CW	2 (Year Based)	0.45 (0.174)	11,107	9,175	9,175	200	0.1	8.01	42.52	8,924.4	8477.9	-	8,477.9	446.2
Lingcod	N of 4010	1 (Year Based)	0.45 (0.074)	5,816	5,386	5,369	250	0.1	16.6	11.68	5,090.6	2290.8	15	2,275.8	2799.8
Lingcod	S of 4010	1 (Year Based)	0.45 (0.074)	1,255	1,162	1,102	-	1.5	3.19	8.31	1,089.0	435.6		435.6	653.4
Longnose Skate	CW	2 (Year Based)	0.45 (0.126)	2,086	1,823	1,823	220	0.1	12.46	18.84	1,571.6	1414.4	5	1,409.4	157.2
Longspine Thornyhead	CW	2 (Year Based)	0.40 (0.320)	5,097	3,466		-	-	-	-			-		
Longspine Thornyhead	N of 3427	2 (Year Based)	0.40 (0.320)			2,634	30	0	17.49	6.22	2,580.3	2451.3	-	2,451.3	129
Longspine Thornyhead	S of 3427	2 (Year Based)	0.40 (0.320)			832	-	0	1.41	0.83	829.8	-			
Pacific Cod	CW	3 (Year Based)	0.40 (0.398)	3,200	1,926	1,600	500	0.1	5.47	0.53	1,093.9	1039.2	-	1,039.2	54.7
Pacific Ocean Perch	N of 4010	2 (Year Based)	0.45 (0.143)	4,497	3,854	3,854	9.2	0.1	5.39	10.04	3,829.3	3637.9	300	3,337.9	191.5
Pacific whiting	CW			TBD	TBD	TBD	TBD	1.1	TBD	1,500.00					
Petrale Sole	CW	1 (Year Based)	0.45 (0.065)	4,402	4,115	4,115	350	0.1	24.14	13.3	3,727.5	3697.9	5	3,692.9	30
Sablefish (Alternative 1)	CW	1 (Year Based)	0.45 (0.065)	9,402	8,791		-	-	-	-		-			
Sablefish	N of 36	1 (Year Based)	0.45 (0.065)			6,892	689.2	1.1	30.7		6,165.0	3240	100	3,140.0	
Sablefish	S of 36	1 (Year Based)	0.45 (0.065)			2,312	-	0	2.4	25	2,284.6	782.3		782.3	1080.3
Shortspine Thornyhead	CW	2 (Year Based)	0.40 (0.320)	3,211	2,183							-			
Shortspine Thornyhead	N of 3427	2 (Year Based)	0.40 (0.320)			1,428	50	0.1	10.48	17.82	1,349.6	1282.1	70	1,212.1	67.5
Shortspine Thornyhead	S of 3427	2 (Year Based)	0.40 (0.320)			756	-	0	0.71	6	749.3	50		50.0	699.3
Spiny Dogfish	CW	2 (Year Based)	0.40 (0.346)	2,479	1,621	1,621	275	1.1	34.27	33.63	1,277.0	-			-

Stock Complex	Area	Category	P* (ABC Buffer)	OFL	ABC	ACL	Set Asides				Fishery HG (ACT)	Trawl Allocation	At-sea	IFQ	Non-Trawl Allocation (ACT)
							Tribal	EFP	Research	IOA					
Splitnose	S of 4010	1 (Year Based)	0.45 (0.108)	1,868	1,666	1,666	-	1.5	11.17	5.75	1,647.6	1565.2		1,565.2	82.4
Starry Flounder	CW	3 (Year Based)	0.40 (0.398)	652	392	392	2	0.1	0.57	45.71	343.6	171.8	-	171.8	171.8
Widow Rockfish	CW	1 (Year Based)	0.45 (0.065)	15,749	14,725	14,725	200	28	17.27	3.05	14,476.7	14076.7	476	13,600.7	400
Yellowtail Rockfish	N of 4010	1 (Year Based)	0.45 (0.074)	6,534	6,050	6,050	1000	20	20.55	7	5,002.5	4402.2	320	4,082.2	600.3
Blue/Deacon/Black Rockfish (Alternative 1 for Black Rockfish)	OR		0.45 (0.044)	676	603	603	-	0.5	0.08	1.74	600.7	-			-
Cabezon/Kelp Greenling	WA			25	20	20	2	0	-	-	18.0	-			-
Cabezon/Kelp Greenling	OR			215	198	198	-	0.1	0.05	0.06	197.8	-			-
Nearshore Rockfish North	N of 4010			94	79	79	1.5	0.5	0.47	0.61	75.9	-			-
Nearshore Rockfish South	S of 4010			1,232	1,016	1,016	-	0	2.68	1.74	1,011.6	-			-
Other Fish	CW			286	223	223	-	0.1	6.29	14.95	201.7	-			-
Other Flatfish	CW			7,714	4,802	4,802	60	0.1	23.63	137.16	4,581.1	4123	35	4,088.0	458.1
Shelf Rockfish North	N of 4010			1,888	1,511	1,511	30	1.5	15.32	25.62	1,438.6	864.2	35	829.2	571.4
Shelf Rockfish South	S of 4010			1,842	1,439	1,438	-	50	15.1	67.67	1,305.2	159.2		159.2	1146
Slope Rockfish North	N of 4010			1,862	1,595	1,595	36	0.5	10.51	18.88	1,529.1	1237.8	300	937.8	290.3
Slope Rockfish South	S of 4010			873	709	709	-	1	18.21	19.73	670.1	526.4		526.4	143.7

Table 8. Preferred harvest specifications and allocations for the 2022 fishing year. Rebuilding stocks are capitalized and listed first.

Stock Complex	Area	Cat.	P* (ABC Buffer)	OFL	ABC	ACL	Set Asides				Fishery HG	ACT	Trawl Allocation	At-sea	IFQ	Non-Trawl Allocation (ACT)
							Tribal	EFP	Research	IOA						
YELLOWEYE ROCKFISH	CW	1 (Year Based)	0.40 (0.152)	98	83	51	5.00	0.24	2.92	0.69	42.2		3.4	0	3.4	38.8 (30.4)
Arrowtooth Flounder	CW	2 (Year Based)	0.40 (0.281)	11,764	8,458	8,458	2,041.00	0.10	12.98	41.00	6,362.9		6,044.80	70	5974.8	318.1
Big Skate	CW	2 (Year Based)	0.45 (0.135)	1,606	1,389	1,389	15.00	0.10	5.49	36.72	1,331.7		1265.1			66.6
Black Rockfish	CA	1 (Year Based)	0.45 (0.087)	373	341	341	-	1.00	0.08	1.18	338.7		-			
Black Rockfish	WA	1 (Year Based)	0.45 (0.087)	319	291	291	18.14	0.00	0.10	0.00	272.8		-			
Bocaccio	S of 4010	1 (Year Based)	0.45 (0.078)	1,870	1,724	1,724	-	40.00	5.60	2.22	1,676.2		654.4		654.4	1021.8
Cabezon	CA			210	195	195	-	1.00	0.02	0.26	193.7		-			-
California Scorpionfish	CW	CA Scorpionfish (Year Based)	0.45 (0.091)	303	275	275	-	0.00	0.18	3.71	271.1		-			-
Canary Rockfish	CW	1 (Year Based)	0.45 (0.087)	1,432	1,307	1,307	50.00	8.00	10.08	1.31	1,237.6		894.6	36	858.6	343.1
Chilipepper	S of 4010	1 (Year Based)	0.45 (0.087)	2,474	2,259	2,259	-	70.00	14.04	13.66	2,161.3		1,621.00		1621	540.3
Cowcod (Alternative 1)	S of 4010			113	82	82	-	1.00	10.00	0.17	70.8	50	18		18	32
Cowcod	*S of 3427*	*2 (Year Based)*	*0.40 (0.253)*	*94*	*70*	*70*	-	-	-	-	70.1					
Cowcod	*3427 - 4010*	*3 (Year Based)*	*0.40 (0.398)*	*19*	*12*	*12*	-	-	-	-	11.6					
Darkblotched Rockfish	CW	1 (Year Based)	0.45 (0.078)	901	831	831	0.20	0.60	8.46	9.80	811.9		771.3	76.4	694.9	40.6
Dover Sole	CW	1 (Year Based)	0.45 (0.104)	87,540	78,436	50,000	1,497.00	0.10	50.84	49.27	48,402.8		45982.7	10	45972.7	2420.1

Stock Complex	Area	Cat.	P* (ABC Buffer)	OFL	ABC	ACL	Set Asides				Fishery HG	ACT	Trawl Allocation	At-sea	IFQ	Non-Trawl Allocation (ACT)
							Tribal	EFP	Research	IOA						
English Sole	CW	2 (Year Based)	0.45 (0.182)	11,127	9,101	9,101	200.00	0.10	8.01	42.52	8,850.4		8408.3	-	8408.3	442.5
Lingcod	N of 4010	1 (Year Based)	0.45 (0.078)	5,395	4,974	4,958	250.00	0.10	16.60	11.68	4,679.6		2105.8	15	2090.8	2573.8
Lingcod	S of 4010	1 (Year Based)	0.45 (0.078)	1,334	1,230	1,172	-	1.50	3.19	8.31	1,159.0		463.6		463.6	695.4
Longnose Skate	CW	2 (Year Based)	0.45 (0.135)	2,036	1,761	1,761	220.00	0.10	12.46	18.84	1,509.6		1358.6	5		151
Longspine Thornyhead	CW	2 (Year Based)	0.40 (0.333)	4,838	3,227		-	-	-	-	0.0	-	-	-		-
Longspine Thornyhead	N of 3427	2 (Year Based)	0.40 (0.333)			2,452	30.00	0.00	17.49	6.22	2,398.3		2278.4	-	2278.4	119.9
Longspine Thornyhead	S of 3427	2 (Year Based)	0.40 (0.333)			774	-	0.00	1.41	0.83	771.8		-			-
Pacific Cod	CW	3 (Year Based)	0.40 (0.398)	3,200	1,926	1,600	500.00	0.10	5.47	0.53	1,093.9		1039.2	-	1039.2	54.7
Pacific Ocean Perch	N of 4010	2 (Year Based)	0.45 (0.151)	4,371	3,711	3,711	9.20	0.10	5.39	10.04	3,686.3		3502	300	3202	184.3
Pacific whiting	CW			TBD	TBD	TBD	TBD	1.10	*TBD*	1,500.00	TBD				169126	-
Petrale Sole	CW	1 (Year Based)	0.45 (0.070)	3,936	3,660	3,660	350.00	0.10	24.14	13.30	3,272.5		3242.5	5	3237.5	30
Sablefish (Alternative 1)	CW	1 (Year Based)	0.45 (0.070)	9,005	8,375		-	-	-	-	0.0	-	-			-
Sablefish	N of 36	1 (Year Based)	0.45 (0.070)			6,566	656.60	1.10	30.70				3085	100	2985	
Sablefish	S of 36	1 (Year Based)	0.45 (0.070)			2,203	-	0.00	2.40	25.00	2,175.6		744.9		744.9	1028.7
Shortspine Thornyhead	CW	2 (Year Based)	0.40 (0.333)	3,194	2,130		-	0.10	8.20	21.57			-			-
Shortspine Thornyhead	N of 3427	2 (Year Based)	0.40 (0.333)			1,393	50.00	0.10	10.48	17.82	1,314.6		1248.9	70	1178.9	65.7
Shortspine Thornyhead	S of 3427	2 (Year Based)	0.40 (0.333)			737	-	0.00	0.71	6.00	730.3		50		50	680.3
Spiny Dogfish	CW	2 (Year Based)	0.40 (0.358)	2,469	1,585	1,585	275.00	1.10	34.27	33.63	1,241.0		-			-
Splitnose	S of 4010	1 (Year Based)	0.45 (0.113)	1,837	1,630	1,630	-	1.50	11.17	5.75	1,611.6		1531		1531	80.6

Stock Complex	Area	Cat.	P* (ABC Buffer)	OFL	ABC	ACL	Set Asides				Fishery HG	ACT	Trawl Allocation	At-sea	IFQ	Non-Trawl Allocation (ACT)
							Tribal	EFP	Research	IOA						
Starry Flounder	CW	3 (Year Based)	0.40 (0.398)	652	392	392	2.00	0.10	0.57	45.71	343.6		171.8	-	171.8	171.8
Widow Rockfish	CW	1 (Year Based)	0.45 (0.070)	14,826	13,788	13,788	200.00	28.00	17.27	3.05	13,539.7		13139.7	476	12663.7	400
Yellowtail Rockfish	N of 4010	1 (Year Based)	0.45 (0.078)	6,324	5,831	5,831	1,000.00	10.00	20.55	7.00	4,793.5		4209.4	320	3889.4	574
Blue/Deacon/Black Rockfish (Alternative 1 for Black Rockfish)	OR		0.45 (0.044)	672	600	600	-	0.5	0.08	1.74	597.7		-			-
Cabezon/Kelp Greenling	WA			22	17	17	2	0.1	-	-	14.9		-			
Cabezon/Kelp Greenling	OR			208	190	190	-	0.0	0.05	0.06	189.9		-			
Nearshore Rockfish North	N of 4010			93	77	77	1.5	0.5	0.47	0.61	73.9		-			
Nearshore Rockfish South	S of 4010			1,233	1,011	1,010	-	0.0	2.68	1.74	1,005.6		-			
Other Fish	CW			286	223	223	-	0.1	6.29	14.95	201.7		-			
Other Flatfish	CW			7,808	4,838	4,838	60	0.1	23.63	137.16	4,617.1		4155.4	35	4120.4	461.7
Shelf Rockfish North	N of 4010			1,821	1,450	1,450	30	1.5	15.32	25.62	1,377.6		827.5	35	792.5	547.1
Shelf Rockfish South	S of 4010			1,832	1,429	1,428	-	50.0	15.1	67.67	1,295.2		158		158	1137.2
Slope Rockfish North	N of 4010			1,842	1,568	1,568	36	0.5	10.51	18.88	1,502.1		1215.9	300	915.9	285.2
Slope Rockfish South	S of 4010			871	705	705	-	1.0	18.21	19.73	666.1		515.6		515.6	142.1

2.6 Alternatives Considered but not Analyzed Further

Modifications to the Non-Trawl RCA Boundary South of 40°10' N. lat.

Under No Action, the Council considered additional changes to the non-trawl RCA south of 40° 10' N. lat. that were not adopted as part of the preferred alternative:

- Establishing a management line at Pigeon Point (37°11' N lat.; as specified in CFR50 § 660.310). The Council recommended adjusting the shoreward RCA boundary line in the entire area between Pt Arena and Pt Conception from 40 fm to 50 fm; therefore this change wasn't necessary. The Pigeon Pt line was only needed if the Council chose to change the non-trawl RCA boundary from Pigeon Pt to Pt Conception.
- Move the seaward boundary from 150 fm to 100 fm south of 34° 27' N. lat. and from 125 fm to 100 fm between 34° 27' N. lat and 40° 10' N. lat. While these changes would have permitted some additional access to deeper waters off California than those adopted in the preferred alternative, there were concerns by the Council that there was not sufficient analysis regarding potential habitat impacts in those deeper depths.

Accountability Measures for Shortbelly Rockfish

As the shortbelly rockfish ACL has been exceeded more than once in the last four years (2018 and 2019), the National Standard Guidelines require that the Council reassess its accountability measures related to shortbelly rockfish management. The Council initially considered a range of new management measures related to shortbelly rockfish, including the setting of an annual catch target below the ACL (with associated closures) and the prohibition of directed fishing. The range of ACT options analyzed by the GMT can be found in Agenda Item F.1.a, Supplemental GMT Report 1, June 2020 and a history of the Council's deliberations on directed fishing in Agenda Item F.1.a, Supplemental GMT Report 3, June 2020. Given that the Council's preferred alternative was to make shortbelly an EC species, there were no accountability measures recommended for 2021-2022 as EC species are deemed to not be in need of management or conservation.

Council on Environmental Quality (CEQ) regulations at 40 CFR §1502.15 state that the EA "shall succinctly describe" the environmental components potentially affected by the proposed action. The level of detail "shall be commensurate with the importance of the impact." This EA tiers from the 2015 EIS, 2016 EA, and the 2018 EA incorporating by reference the description of the affected environment and only presenting updates to the descriptions of the affected environment where necessary. Furthermore, the 2020 Groundfish Stock Assessment and Fishery Evaluation (SAFE) (PFMC 2020) details the status of groundfish stocks, the fisheries and fishing communities, essential fish habitat (EFH), and factors affecting safety of life at sea. Information from the SAFE is incorporated by reference and summarized here as necessary. The Groundfish SAFE document further describes the status and biology of all stocks managed under the PCGFMP. The SAFE is updated for all stocks on a biennial basis. Information from the SAFE is incorporated by reference and summarized here as necessary. The 2015 EIS described these environmental components:

- Essential fish habitat (EFH)
- The California Current Ecosystem (CCE)
- Groundfish
- Protected and Prohibited Resources
- Non-groundfish species, other than protected resources, caught in groundfish fisheries
- The socioeconomic environment including fishing communities.

The species composition of non-groundfish species caught in groundfish fisheries is described in Section 3.6 in the 2015 EIS. There have been no changes in harvest policies or fishery performance since that time that would be expected to result in a substantive change in the composition in incidentally caught non-groundfish. Based on this information, scoping concluded that the proposed action will not engender substantially different effects on non-groundfish species than what was disclosed in the 2015 EIS. Therefore, those environmental components are not further considered in this EA. The remaining environmental components are discussed below.

3.1 Essential Fish Habitat

EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity".

Section 3.3 in the 2015 FEIS and Section 3 of Amendment 28 FEIS (NMFS 2019) describe the habitat resources and baseline conditions for groundfish EFH. Sections 3.3.1 and 3.3.2 of Amendment 19 FEIS (NMFS 2005) and Section 4.2.1 of Amendment 28 FEIS describe the impacts of fishing gear on groundfish EFH; effects vary by gear and benthic substrate type. Generally, bottom trawl gear has the largest negative impact on benthic habitat.

3.2 The California Current Ecosystem

The 2015 EIS evaluated the California Current Ecosystem (see Section 3.4 of the 2015 EIS). The 2020 California Current Integrated Ecosystem and Integrated Assessment (IEA) Reports (Agenda Item G.1.a, IEA Team Report 1 and Report 2, March 2020) assess the current status of the CCE.

These IEA reports noted that in 2019 several ecological indicators implied above-average productivity in 2019:

- The copepod community off Oregon was high in cool-water, lipid-rich species in summer
- Anchovy densities continued to increase along most of the coast
- Juvenile Chinook and coho salmon catches off Oregon and Washington were average, and
- Sea lion pup growth on San Miguel Island was above average.

However, there was evidence of unfavorable conditions in 2019, particularly off central and northern California:

- Krill densities off central and northern California and Oregon were very low
- Pyrosomes (warm-water tunicates) were abundant in the central CCE
- Juvenile rockfish, a key forage group in this region, had low abundance, and
- Seabird colonies at the Farallon Islands and Año Nuevo had poor production.

The CCE forage community is a diverse portfolio of species and life history stages, varying in behavior, energy content, and availability to predators. The species summarized below represent a substantial portion of the available forage in the CCE. The regional surveys that produce CCE forage data use different methods (e.g., gear, timing, survey design), which makes regional comparisons difficult. Therefore, the Council's Ecosystem Team uses cluster analysis (Thompson et al. 2019a) to identify and compare regional shifts in forage composition. These plots can be found in the IEA Report 1 and are incorporated here by reference.

Northern CCE: The northern CCE survey off Washington and Oregon targets juvenile salmon in surface waters, but also samples surface-oriented fishes, squid and jellies. This forage assembly has had several recent shifts since the onset of the 2014-2016 marine heatwave. Since the most recent shift prior to 2018, market squid, juvenile coho and chum salmon, and several jellies have been abundant. Some species that were abundant during the previous marine heatwave (e.g., pompano, water jelly, egg yolk jelly) were less abundant in 2018-2019. Related surveys off Oregon and southern Washington indicated that krill abundance was very low in 2019, and has been for several years.

Central CCE: Data presented here are from the "Core area" of a survey that targets pelagic juvenile rockfishes, but also samples other pelagic species. Since 2018, this forage base has been dominated by anchovy, with adult anchovy more abundant in 2019 than any previous year surveyed. Adult sardine in 2019 were the most abundant in a decade, though not as abundant as in the 2000s. Market squid remained abundant, as did several myctophids. However, juvenile rockfish, hake,

and flatfish, which had been abundant from 2013-2017, have declined to low abundances in the past two years. A concerning sign was that krill catches were the lowest of the time series.

Southern CCE: Forage data for the Southern CCE come from the California Cooperative Oceanic Fisheries Investigations (CalCOFI) larval fish surveys. The larval biomass of forage species is assumed to correlate with regional abundance of adult forage species. The southern forage assemblage has experienced 6 substantial shifts from 1998-2019. Since 2017, the community has been characterized by abundant larval anchovy and warm-water mesopelagic fishes. Larval anchovy abundance was the greatest it has been in the history of the CalCOFI time series. Larvae of other forage species were near long-term averages (e.g., rockfish, English sole, market squid) or below average (cool water mesopelagics, sardine, mackerels, sanddabs).

3.3 Groundfish Stocks

Section 3.3.1 describes the status of the stocks—cowcod south of 40°10' N. lat., Oregon black rockfish, sablefish, petrale sole and shortbelly rockfish—where the Council is considering deviating from the default HCR. Section 3.3.2 also describes stocks whose proposed 2021-22 harvest specifications fall outside the range of projected annual catches as evaluated in the 2015 EIS.

3.3.1 Stocks with Proposed Changes to the Default Harvest Control Rule

<u>Cowcod South of 40°10' N. lat.</u>

Cowcod is a species of large rockfish with a distribution from Newport, Oregon, to central Baja California, Mexico (Love et al., 2002). They are most common from Cape Mendocino (California) to northern Baja California, in depths from 50-300 meters (m). Cowcod are a long-lived, slow-growing species that require a decade or more to reach sexual maturity.

NMFS declared cowcod in the Conception and Monterey management areas overfished in January 2000, after Butler et al. (1999b) estimated the 1998 spawning biomass to be at 7 percent of B_0, well below the 25 percent minimum stock size threshold.

The current assessment (2019) for cowcod south of Point Conception (Agenda Item H.5, Attachment 9, September) uses the Stock Synthesis model rather than the Bayesian surplus production model used in the 2013 assessment. The new assessment includes indices from six fishery-independent data sources (most of which were also included in the 2013 model), as well as length and age composition data. A major contributor of uncertainty with the cowcod assessment is the lack of adequate data (particularly age data) for estimating growth, natural mortality, and recruitment. The base model estimates that spawning output has been steadily increasing since the late 1980s when the stock was estimated to be at 9 percent of unfished level.

The current depletion estimate is above the management target at 57 percent of unfished spawning output in 2019 (Figure 2). Sensitivity analyses demonstrate that when the lower productivity assumptions associated with the 2013 model are applied to the current model (e.g., lower steepness and M), the model results are very comparable to those of the 2013 model.

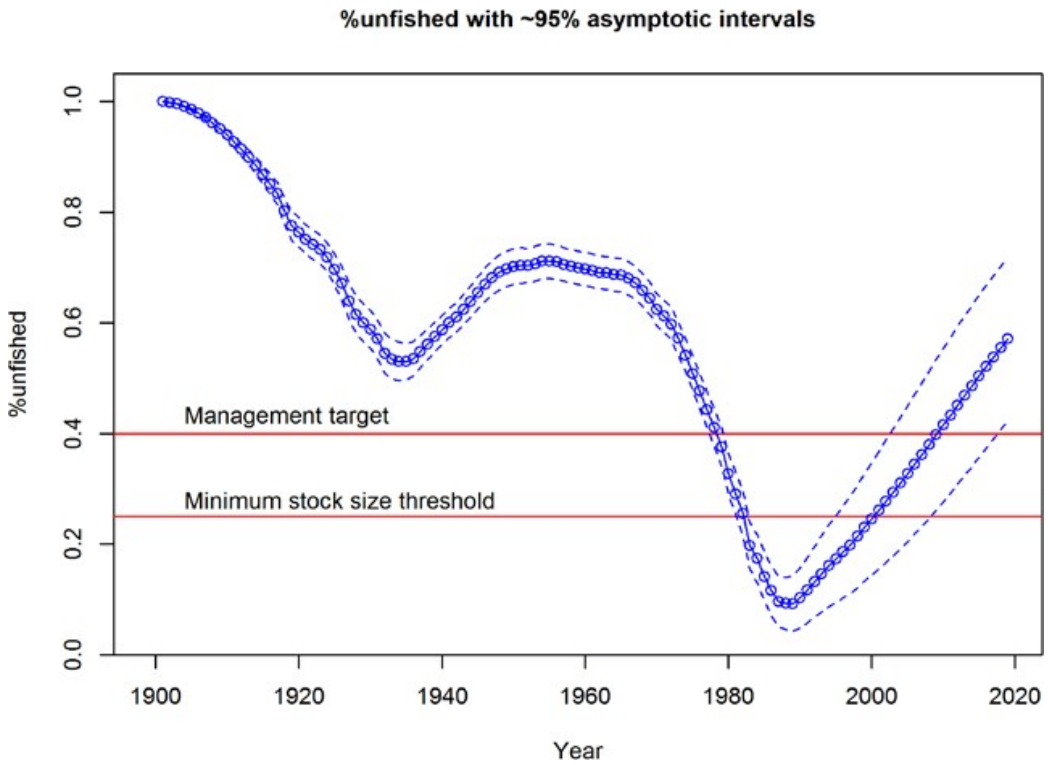


Figure 8. Spawning output relative to depletion with 95 percent internavls for the base case model.

Oregon Black Rockfish

Oregon black rockfish is a category two stock, managed as part of the Oregon blue/deacon/black rockfish complex. In 2019, the Oregon black rockfish stock was estimated to be at 56 percent of its unfished spawning output. Because Oregon black rockfish is a category two stock, a base σ value of 1.0 was applied to years 2021-2030 (Table 1-2 in Agenda Item H.5, Attachment 15, September 2019). Black rockfish was last assessed in 2015, so the stock is also subject to further σ value reductions.

For the 2021-22 biennium, a catch-only update was completed for black rockfish. The black rockfish catch-only projection added realized catches from 2015 to 2018, and projected catches for 2019 and 2020. In California, the realized catches (2015-2018) were lower than projections, resulting in OFL projections for 2021 and 2022 that are higher than those in the 2015 assessment. In Oregon, realized catches were closer to projected catches in 2015-2017, but lower in 2018.

Resulting OFL projections for 2021 and 2022 are slightly higher than the previous assessment. In Washington, realized catches were higher than the projections in 2015 and 2016, but lower in 2017-2018. Updated OFL projections for 2021 and 2022 are slightly higher than in the previous assessment.

Petrale sole

The petrale sole assessment update (Agenda Item H.5, Attachment 13, September 2020) is the first update of a 2015 assessment, which was an update to a 2013 full assessment. The most influential new information is the updated WCGBTS index, which initially continued the sharply increasing trend observed in the 2011-2014 time period, with indications of a leveling off and a downturn in the latest year (2018) (Figure 5). Landings have increased in the last four years (2015-2018) relative to the previous four years (2011-2014), consistent with the stock being rebuilt and continuing to increase in abundance. The current depletion estimate for 2019 is 39 percent (Figure 3); however, the trajectory of the stock is forecast to decline as the large 2006-2008 cohorts are fished down, as recent recruitments (2010-2016) have been below average. The estimated steepness in the new assessment declined slightly (from 0.90 to 0.84) relative to the 2015 assessment estimate.

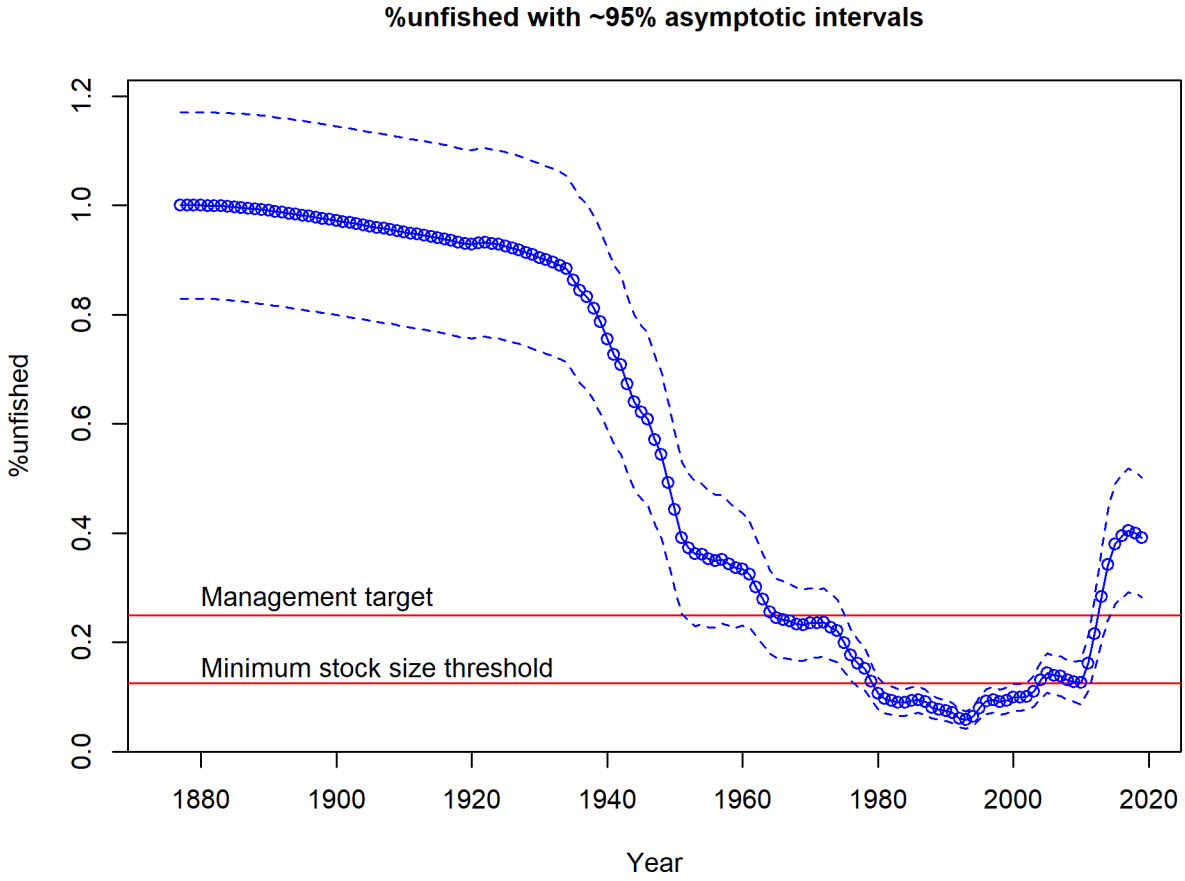


Figure . Estimated time-series of depletion for Petrale sole.

Sablefish

West coast sablefish has long been managed in a precautionary manner due to the stock's importance and value to the fishery and its persistence in the precautionary zone (i.e., below target biomass (B_{MSY} < 40% depletion)). The precautionary zone status in recent years led to an automatic reduction of 10 percent of the ACL relative to the ABC known as the 40-10 rule.

The last full assessment of sablefish for the U.S. West Coast was in 2011, with an update completed in 2015. Major changes in the 2019 assessment (Agenda Item H.5, Attachment 7, September 2019) include pooling of hook-and-line and pot gear into a single fixed gear fishery, the exclusion of all the length composition data (except data associated with the WCGBTS) due to tensions among data sources in the model, a change in the fixed steepness value from 0.60 to 0.70, and the inclusion of a recruitment index based on the environmental time series of sea level. In addition to tension between length and age data, other major uncertainties were associated with spatial and temporal variability in growth, spatial stock structure, and the modeling of retention curves. Despite these uncertainties, the WCGBTS index and compositional data are informative with respect to both abundance trends and recruitment variability.

Spawning output has been relatively stable over the past decade with depletion close to the management target level during that time (Figure 4). In 2019, the sablefish stock is estimated to be at 39 percent of unfished spawning output. However, abundance is projected to increase, and the spawning output is projected to be above the target level in 2021. This trend is driven in part by the estimated, but highly uncertain, size of the 2016 year class. As the assessment has reliable age composition data to inform growth and recruitment and an informative survey trend, the SSC recommends that sablefish be assigned to category 1.

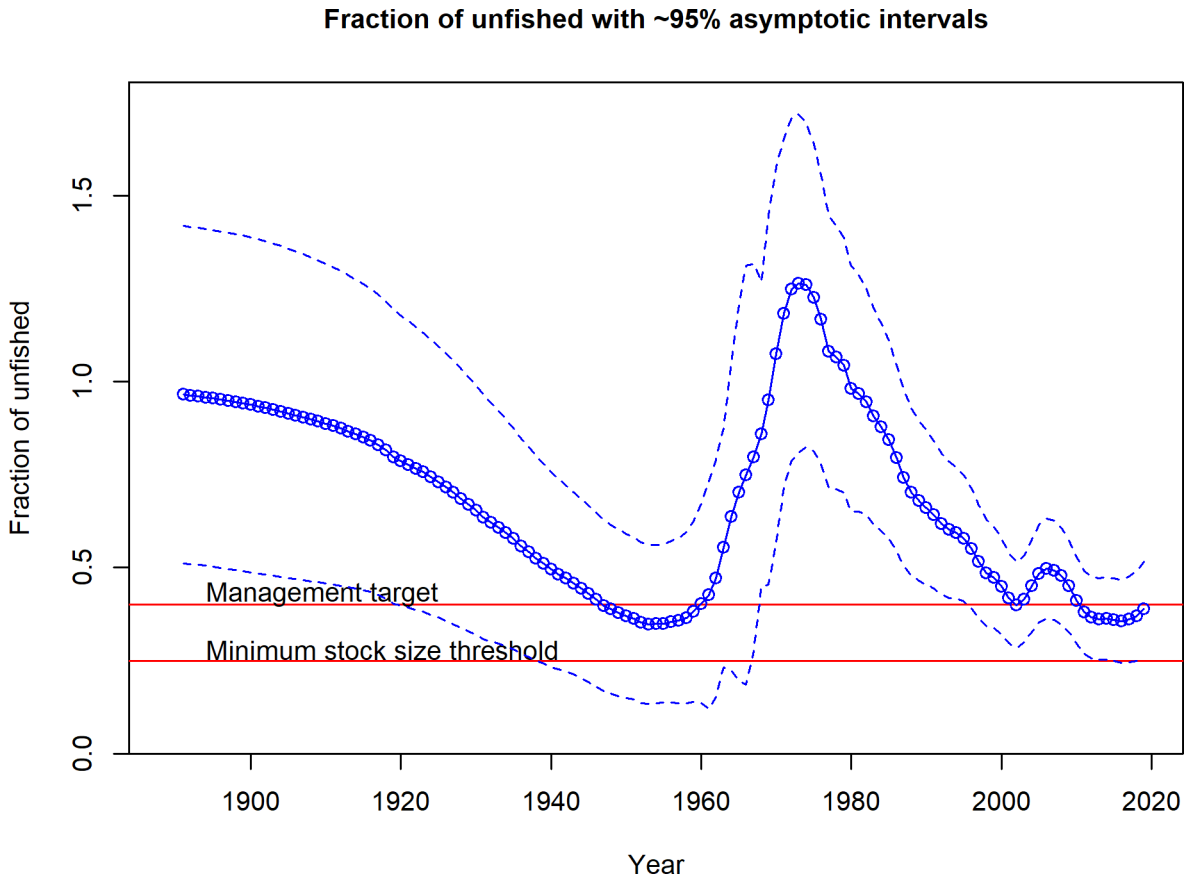


Figure 9. Time series of estimated depletion with 95 percent confidence intervals.

Shortbelly Rockfish

Shortbelly rockfish is a healthy and valuable forage species and estimated to have the highest productivity of any West Coast rockfish (Field, et al. 2007a,b). Shortbelly rockfish is not targeted in any commercial or recreational fisheries and is only taken as bycatch. The stock was last assessed as a research assessment, and biomass was estimated to be at 67 percent depletion in 2005 (Field, et al. 2007a,b). Shortbelly rockfish are recognized as an important forage species in the CCE with the center of its population distribution historically on the shelf/slope break off central California (Field, et al. 2008). The Shortbelly rockfish ACL has been set between 1 and 10 percent of the ABC since the 2015-16 biennium in order to provide an amount for incidental bycatch.

Incidental bycatch of shortbelly rockfish remained low until 2017 when it abruptly increased by an order of magnitude and has been increasing since (Table 10 and Figures 9). Most of this bycatch occurred in the Pacific whiting midwater trawl fisheries north of 40°10' N lat. (Figure 9). A comparison of cumulative catches of Pacific whiting and shortbelly rockfish by week of the 2019 and 2020 shoreside (Figure 10) and at-sea (Figure 11) whiting fisheries indicates the at-sea fleets,

which are more mobile than the shoreside fleet, dramatically reduced their shortbelly rockfish bycatch rate from 2019 to 2020.

Figure 10. Total fishing-related mortality of shortbelly rockfish on the West Coast, 2002-2019. Mortalities in 2019 are preliminary estimates. The dotted horizontal line is the No Action ACL. MW=Midwater

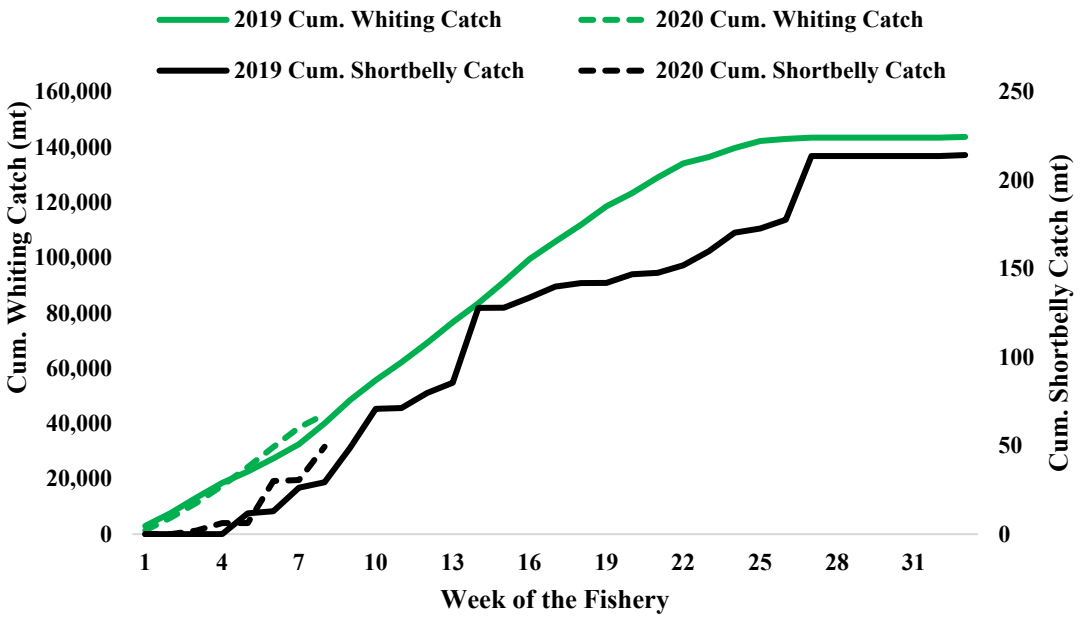


Figure 11. Cumulative catches of Pacific whiting and shortbelly rockfish by week in the 2019 and 2020 (catches to date) shoreside whiting trawl fishery.

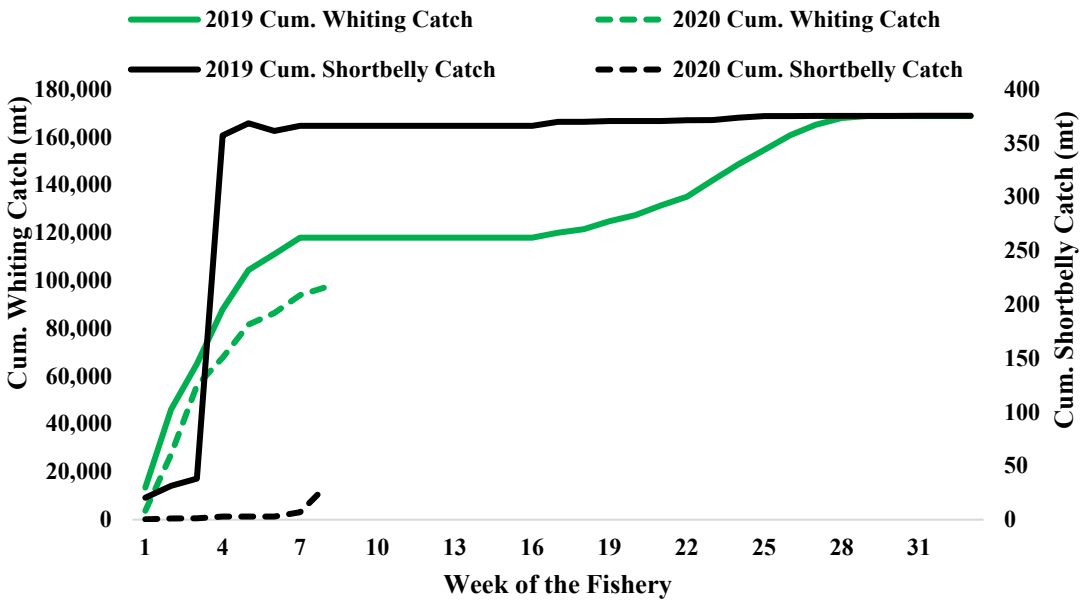


Figure 12. Cumulative catches of Pacific whiting and shortbelly rockfish by week in the 2019 and 2020 (catches to date) at-sea whiting trawl fishery.

It is posited the order of magnitude increase in shortbelly rockfish bycatch since 2017 was due to a climate change-driven northerly range extension potentially accompanied by exceptionally large recruitment (Schroeder et al. 2019, Thompson et al. 2019). Pink shrimp trawl bycatch of shortbelly rockfish in 2017 increased by nearly an order of magnitude relative to the average bycatch in the previous 15 years before returning to an average level in 2018 (21.54 mt of the 2017 Non-IFQ mortality of 21.57 mt occurred in the pink shrimp fishery; (Figure 9). Incidental rockfish caught in recent year pink shrimp fisheries tend to be very small young-of-the-year fish given the fish excluder grates mandated in pink shrimp trawls. The 2017 spike in shortbelly rockfish bycatch in the pink shrimp fishery could be indicative of a large recruitment.

Given that the population size of shortbelly is known to be highly dynamic (Moser et al., 2000; Field et al., 2007a,b), it is possible that the population size and distribution changed in the ensuing years since the last assessment in 2005. The Rockfish Recruitment and Ecosystem Analysis Survey (RREAS) and CalCOFI survey sets were examined as part of the analysis to support the Council's 2019 action to increase the shortbelly rockfish ACL in 2020 to provide some insight into overall population size and distribution, respectively (NMFS 2020). In 2019, the RREAS data and aging analyses indicated that 12-year old shortbelly rockfish are common. However, abundances begin to drop off rapidly at 13+ years. Shortbelly rockfish achieve maturation at 6 inches in length and 3 years of age. They achieve a maximum length of 12 inches at 10 years of age. This suggests a strong recruitment class is likely to comprise a significant portion of the adult population from 2 to 12 years after birth.

Shortbelly recruitment was high in several regions off California in 2013 (Schroeder et al. 2018) (Figure 15). With the exception of the South California Bight (southern California), all RREAS regions recorded historically high shortbelly rockfish recruitment between 2013 and 2016, and recruitment in the Core region[4] in 2013 was more than an order of magnitude higher than previous values dating back to 1990. Recruitment remained high in 2017 throughout California, and in 2017 recruitment was at its second highest level since 2013 in the North and third highest since 2004 in the South. The extraordinarily high recruitment events between 2013 and 2017 suggest that overall adult shortbelly population size was very high in 2018 and 2019 (Field et al. 2007a,b). The large recruitment events that occurred between 2014 and 2017 would be expected to contribute to a larger overall biomass until these cohorts are removed from the population through either fishing or natural mortality.

Taken together, RREAS and CalCOFI surveys suggest that the overall shortbelly rockfish population was very high in 2018-2019, and that the population size in southern California is at close to average level. The presence of shortbelly rockfish in southern California does not necessarily preclude the possibility that the bulk of the population moved from central or northern California into Oregon and Washington, but it does show that this species has not abandoned the southern portion of its range within California. For more information on the RREAS and CalCOFI surveys see the 2020 Shortbelly/Cowcod EA (NMFS 2020).

Schroeder et al. (2018) indicate that several strong recruitment years could continue to impact the midwater trawl fishery in 2020 and beyond. The 2018 and 2019 high bycatch levels were driven by relatively strong 2013 and 2014 year classes off central California. As the shortbelly rockfish recruits aged, the population appears to have extended north into Oregon and Washington. If individuals from this record year class continue to remain in the north, off Oregon and Washington, they will continue to be encountered as bycatch in coming years. Furthermore, Schroeder et al. (2018) showed that there were also atypically high year classes in 2014, 2015, and 2016 that could have begun to be encountered as bycatch in 2019, and beyond.

[4] The Core region in the RREAS is the area between Cypress Point off southern Monterey Bay (36° 35' N. lat.) and Point Reyes (38°10' N. lat.)

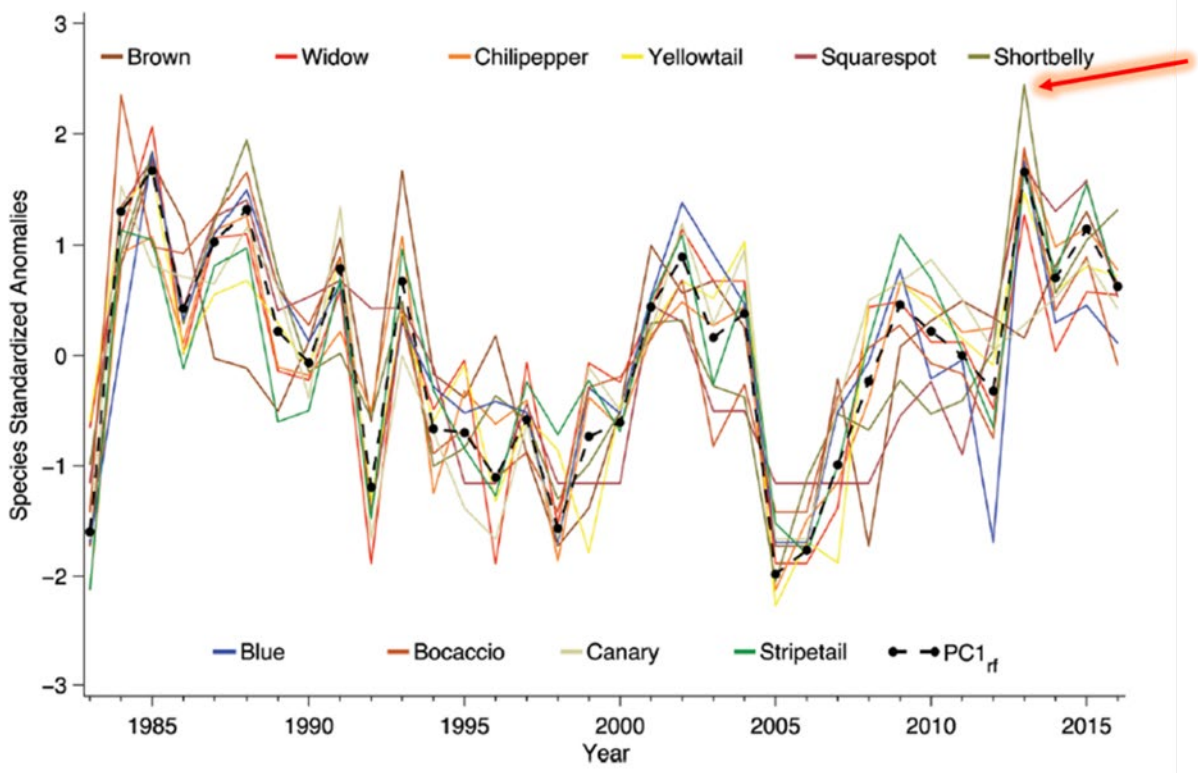


Figure 13. Standardized abundance anomalies of the top ten most abundant pelagic juvenile rockfish species and the common trend (Principle Component 1 rockfish; PC1rf) collected by the RREAS midwater trawls from 1983-2016 (this is figure 3 from Schroeder et al. 2018)

Encounters of shortbelly rockfish in the NMFS West Coast Bottom Trawl Survey were also explored to ascertain whether there was a recent distribution shift of shortbelly rockfish northward or whether the increased bycatch in trawl fisheries north of 40°10' N lat. may have been the result of increased coastwide recruitment. While the bottom trawl survey does not deploy gear selective to a pelagic rockfish such as shortbelly rockfish, the relative encounter rate of shortbelly rockfish north and south in the survey over time shows there have been increased encounters of shortbelly rockfish in the survey off Oregon and Washington since 2013. In addition, there has been a significantly increased encounter rate in the north since 2015 without a coincident decrease in the shortbelly rockfish encounter rate off California (Figure 16). This supports the conclusion that the shortbelly rockfish population did not simply shift to northern waters and the relative abundance of shortbelly rockfish in waters off California has not decreased in recent years. Increased encounters of shortbelly rockfish in northern midwater trawl fisheries is more likely the result of increased recruitment and biomass coastwide coupled with an expansion of its geographic range on the West Coast. It is unclear whether this pattern of abundance and distribution will persist.

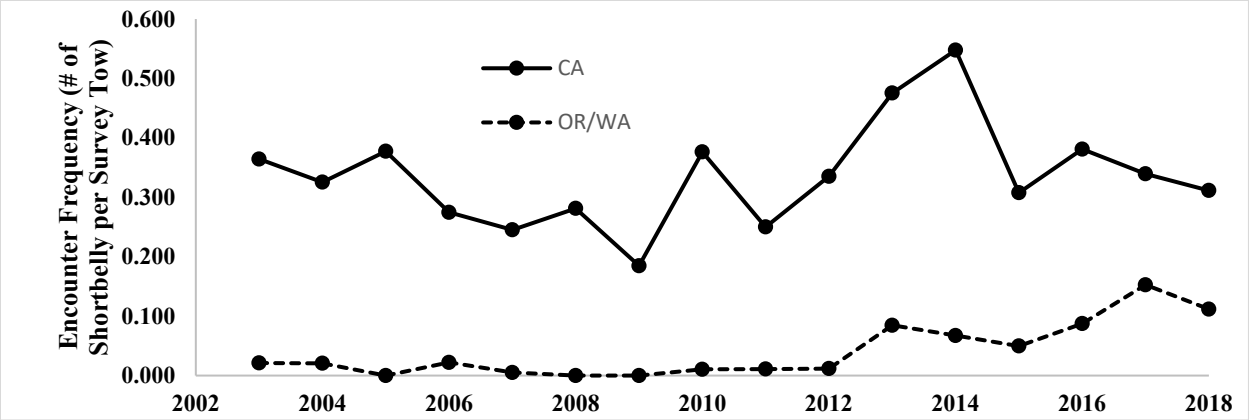


Figure 14. Encounter frequency (number of positive tows with shortbelly rockfish/total number of tows each year) of shortbelly rockfish in the NMFS West Coast Bottom Trawl Survey, 2003-2018.

The standardized abundance anomalies shown in Figure 15 from Schroeder et al. (2018) can obscure the massive strength of the 2013-2016 year classes and expected population boom, because standardized anomalies put all species on the same scale so that the data can be used in a multivariate Principle Components Analysis. To better understand and put into context the actual abundance differences, RREAS abundance data from 1990-2016 for the 10 rockfish species analyzed by Schroeder et al. (2018) were used to calculate mean abundances for each species in each year using delta means (delta mean is a technique to calculate means for data that are zero-inflated). Evaluation of mean abundance rather than standardized anomalies illuminates the scale of shortbelly rockfish recruitment from 2013-2016 (Figure 17). Shortbelly rockfish mean recruit abundance in 2013 was 25 times higher than the next largest non-shortbelly yearly mean (chilipepper rockfish in 1993). Further, shortbelly rockfish recruitment in 2013 was more than three orders of magnitude (4,303) times higher than the average yearly recruitment among all rockfishes from 1990-2012. Each of the shortbelly recruitment classes from 2013-2016 were larger than any recruitment class for any species besides shortbelly from 1990-2012. These high shortbelly rockfish recruitments would suggest the current adult populations would be much larger than what was seen in previous decades.

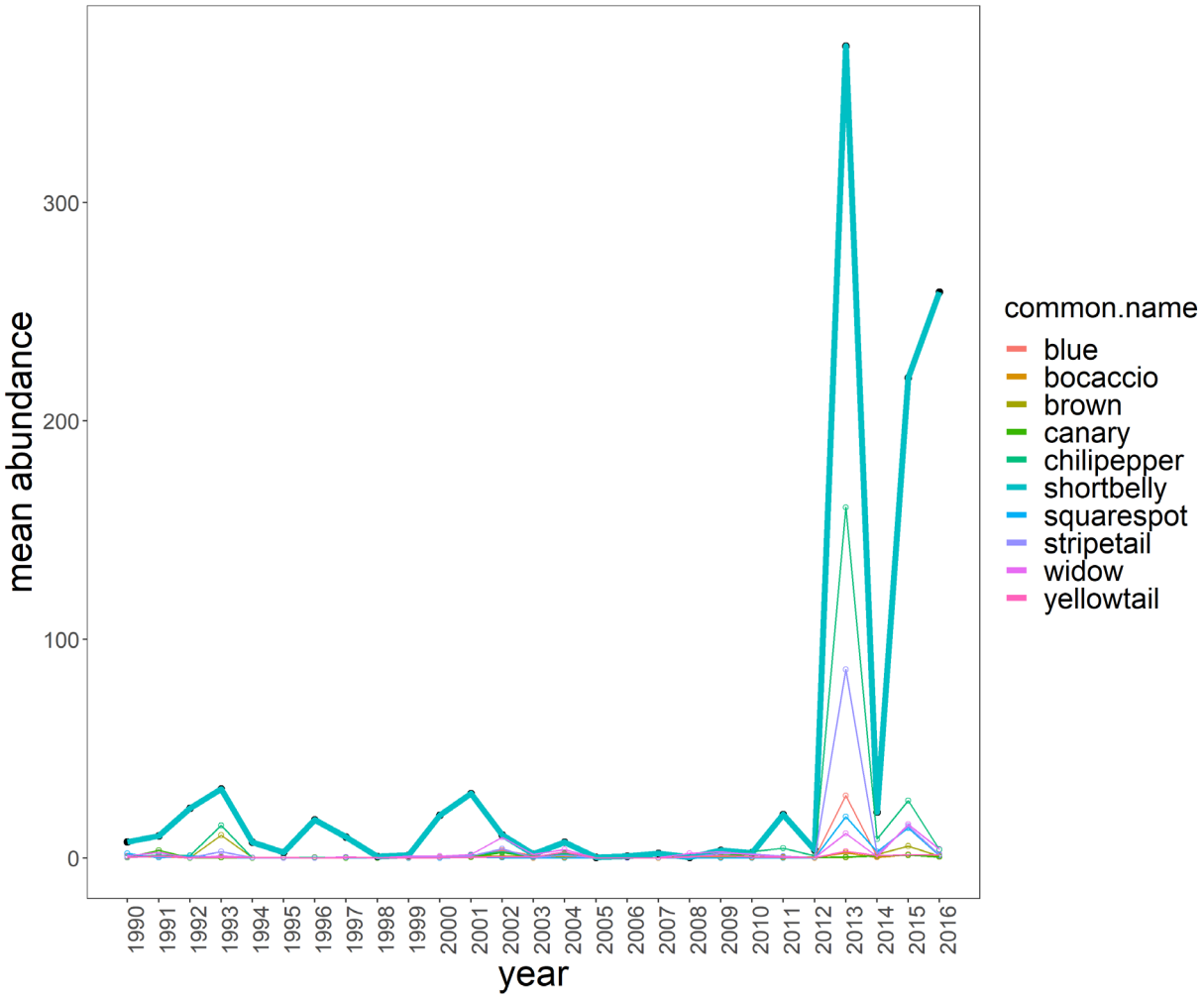


Figure 15. Mean yearly abundances, based on number of individuals per 15-minute tow time, from 1990-2016 for the ten rockfishes analyzed by Schroeder et al. (2018). The heavy, turquoise line depicts shortbelly rockfish.

3.3.2 Stocks where the ACL under the Default Harvest Control Rule is outside the Range Projected in the 2015 EIS

In the 2015 EIS (Section 4.8), the biological impacts of alternative harvest specification policies were evaluated over a 10-year period based on projections from then current stock assessments. The purpose of these projections was to evaluate the long-term implications of pursuing a particular harvest policy. Projections were run under three alternative "states of nature," which capture the principal source of uncertainty in the relevant stock assessment. Generally, these alternative estimates of a key parameter in the stock assessment produce a range of outcomes based on their representation of stock productivity. The high state of nature scenario represents the belief

that the stock is relatively more productive (and thus able to produce higher yields) while the low state of nature represents a less productive or more pessimistic view of productivity (with lower yields). The third state of nature is the base case representing the most likely estimate of the parameter being varied across the projection scenarios.

Table 9 shows the stocks for which the 2021–22 ACLs under the preferred alternative are outside the range analyzed in the 2015 EIS. This table does not include stocks for which the Council is considering alternative harvest specifications during the 2021-22 biennium (e.g., cowcod south of 40°10' N. lat., sablefish, petrale sole, and shortbelly rockfish). For all stocks, the maximum catch was produced under the high state of nature and catches at the ABC level when p* = 0.45. The minimum catch was produced under the low state of nature when catches are at a constant level based either on average recorded catch in the recent past or the ACL applicable in 2014.

Table 9. Stocks where the proposed 2021-22 ACLs are outside the ACL range projected in the 2015 EIS.

Stock	2021 ACL (mt)	Range of annual catches (mt) in the 2015–24 projection period	
		Minimum	Maximum
Big Skate	1,477	None provided-EC Species	None provided-EC Species
California Cabezon	210	None provided	None provided
Chilipepper south of 40°10' N. lat.	2,358	330	2,252
English sole	9,175	207	7,461
Starry Flounder	392	None provided	None provided

Big Skate

Big skate are caught in commercial and recreational fisheries on the West Coast using line and trawl gears. Big skate are commercially utilized to a limited extent by removing the pectoral fins (skate wings) for sale in fresh fish markets. Big skate were managed in the Other Fish complex until 2015 when they were designated an EC species. In 2017, the Council recommended bringing big skate back into the fishery as catches were beginning to increase.

Table 10 provides a summary of 12-year projections beginning in 2019 for alternative states of nature based on the axis of uncertainty for the model. Columns range over low, mid, and high states of nature associated with the WCGBT survey catchability values of 0.96 for low state, 0.668 for the base state, and 0.465 for the high state (where higher catability is associated with lower stock size). Rows range over different assumptions of catch levels. As can be seen from this table, the range of impacts from these harvest control rules are from 473 mt to 2,896 mt.

Table 10. States of nature for Big Skate from the 2019 stock assessment.

			States of Nature					
			Low State (q=0.96)		Base State (q=0.668)		High State (q=0.465)	
	Year	Catch	Spawning Biomass	Fraction Unfished	Spawning Biomass	Fraction Unfished	Spawning Biomass	Fraction Unfished
Low catch, 250 mt	2019	241.3	1130	0.629	1999	0.792	2829	0.854
	2020	241.3	1137	0.633	2005	0.794	2834	0.855
	2021	250.0	1145	0.638	2012	0.797	2840	0.857
	2022	250.0	1154	0.643	2019	0.800	2847	0.859
	2023	250.0	1165	0.649	2028	0.803	2856	0.862
	2024	250.0	1177	0.655	2039	0.808	2865	0.865
	2025	250.0	1189	0.662	2049	0.812	2875	0.868
	2026	250.0	1200	0.668	2057	0.815	2882	0.870
	2027	250.0	1208	0.673	2063	0.817	2888	0.872
	2028	250.0	1214	0.676	2067	0.819	2891	0.873
	2029	250.0	1218	0.678	2070	0.820	2894	0.873
	2030	250.0	1223	0.681	2074	0.821	2896	0.874
Middle catch, 494 mt	2019	241.3	1130	0.629	1999	0.792	2829	0.854
	2020	241.3	1137	0.633	2005	0.794	2834	0.855
	2021	494.0	1145	0.638	2012	0.797	2840	0.857
	2022	494.0	1131	0.630	1997	0.791	2825	0.853
	2023	494.0	1119	0.623	1984	0.786	2812	0.849
	2024	494.0	1107	0.617	1971	0.781	2799	0.845
	2025	494.0	1095	0.610	1958	0.776	2786	0.841
	2026	494.0	1082	0.602	1944	0.770	2772	0.836
	2027	494.0	1066	0.594	1929	0.764	2756	0.832
	2028	494.0	1051	0.585	1914	0.758	2740	0.827
	2029	494.0	1038	0.578	1900	0.753	2727	0.823
	2030	494.0	1027	0.572	1890	0.749	2717	0.820
Default harvest, for base state	2019	241.3	1130	0.629	1999	0.792	2829	0.854
	2020	241.3	1137	0.633	2005	0.794	2834	0.855
	2021	1476.8	1145	0.638	2012	0.797	2840	0.857
	2022	1389.0	1040	0.579	1908	0.756	2737	0.826
	2023	1320.5	943	0.525	1812	0.718	2642	0.797
	2024	1267.1	852	0.475	1724	0.683	2554	0.771
	2025	1224.5	768	0.428	1641	0.650	2471	0.746
	2026	1187.7	690	0.384	1563	0.619	2394	0.722
	2027	1155.0	620	0.345	1492	0.591	2323	0.701
	2028	1122.0	560	0.312	1432	0.567	2263	0.683
	2029	1089.6	512	0.285	1385	0.549	2218	0.669
	2030	1059.3	473	0.263	1353	0.536	2187	0.660

CA Cabezon

A new assessment for cabezon in U.S. waters off the coast of southern California, northern California, and Oregon with consideration for setting catch limits in Washington was conducted in 2019. This is the fourth full assessment of the population status of Cabezon, including two California sub-stocks, off the west coast of the U.S., but the first in 10 years. The southern California stock for cabezon is estimated to be at 49 percent depletion (Figure 10 and Table 11). The northern California stock is estimated to be at 65 percent depletion (Figure 10 and Table 12). Both stocks are above their management target B_{40}.

Figure 16. Estimated relative depletion with 95 percent confidence intervals. Top panel=southern California, middle panel=northern California, and lower panel=Oregon.

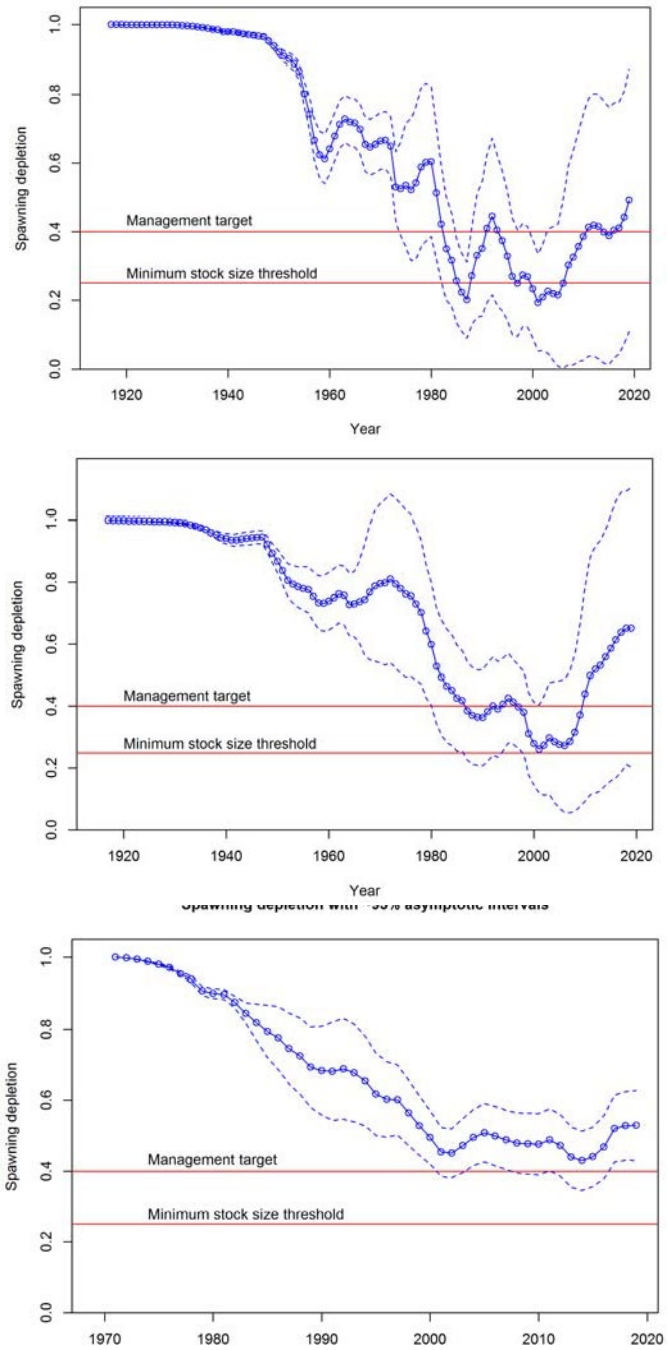


Table 11. Decision table summarizing 12-year projections (2019-2030) for southern California cabezon.

			States of Nature					
			Low		Reference		High	
			Female M = 0.18		Female M = 0.26		Female M = 0.35	
Catch Streetm	Year	Catch (mt)	Spawning Biomass	Depletion	Spawning Biomass	Depletion	Spawning Biomass	Depletion
Low state projections	2019	77.81	54	22%	101	49%	143	73%
	2020	77.81	56	23%	101	49%	134	68%
	2021	76.59	58	24%	98	48%	123	62%
	2022	80.39	63	26%	95	47%	112	57%
	2023	82.75	68	28%	92	45%	103	52%
	2024	83.93	72	30%	90	44%	96	49%
	2025	84.33	76	31%	88	43%	92	46%
	2026	84.56	79	33%	86	42%	88	45%
	2027	84.72	82	34%	85	41%	86	44%
	2028	84.78	85	35%	84	41%	84	43%
	2029	84.89	87	36%	83	41%	82	42%
	2030	84.92	89	37%	82	40%	81	41%
Reference model projections	2019	77.81	54	22%	101	49%	143	73%
	2020	77.81	56	23%	106	52%	151	77%
	2021	188.71	58	24%	111	54%	155	79%
	2022	174.46	54	22%	107	52%	149	76%
	2023	162.01	50	21%	103	50%	143	73%

	2024	151.48	47	20%	100	49%	138	70%
	2025	142.99	46	19%	97	47%	135	68%
	2026	136.70	44	18%	94	46%	133	67%
	2027	131.95	43	18%	93	45%	131	66%
	2028	128.14	42	17%	92	45%	130	66%
	2029	125.23	41	17%	91	44%	129	65%
	2030	122.85	40	17%	90	44%	128	65%
High state projections	2019	77.81	54	22%	101	49%	143	73%
	2020	77.81	56	23%	106	52%	151	77%
	2021	424.33	58	24%	111	54%	155	79%
	2022	353.19	43	18%	95	46%	138	70%
	2023	304.02	31	13%	82	40%	124	63%
	2024	270.91	22	9%	73	36%	113	57%
	2025	249.51	15	6%	67	33%	105	53%
	2026	236.17	9	4%	63	31%	100	51%
	2027	227.05	4	2%	60	30%	96	49%
	2028	219.87	0	0%	58	28%	93	47%
	2029	214.26	0	0%	56	27%	91	46%
	2030	209.63	0	0%	54	26%	90	46%

Table 12. Decision table summarizing 12-year projections (2019-2030) for northern California cabezon.

			State of Nature					
			Low		Reference		High	
			Female M = 0.18		Female M = 0.26		Female M = 0.35	
Catch Streetm	Year	Catch (mt)	Spawning Biomass	Depletion	Spawning Biomass	Depletion	Spawning Biomass	Depletion
Low state projections	2019	77.81	352	33%	639	65%	939	91%
	2020	77.81	361	34%	585	60%	752	73%
	2021	76.59	379	36%	554	56%	659	64%
	2022	80.39	395	37%	527	54%	595	58%
	2023	82.75	405	38%	500	51%	544	53%
	2024	83.93	411	39%	476	48%	507	49%
	2025	84.33	414	39%	456	46%	480	46%
	2026	84.56	416	39%	440	45%	461	45%
	2027	84.72	418	40%	428	44%	447	43%
	2028	84.78	421	40%	419	43%	436	42%
	2029	84.89	423	40%	412	42%	428	41%
	2030	84.92	425	40%	406	41%	422	41%
Reference model projections	2019	77.81	352	33%	639	65%	939	91%
	2020	77.81	361	34%	653	66%	945	91%
	2021	188.71	379	36%	673	68%	961	93%
	2022	174.46	336	32%	620	63%	903	87%
	2023	162.01	302	29%	573	58%	849	82%
	2024	151.48	276	26%	534	54%	804	78%
	2025	142.99	258	24%	505	51%	770	75%
	2026	136.70	246	23%	483	49%	747	72%

			State of Nature					
			Low		Reference		High	
	2027	131.95	238	23%	468	48%	731	71%
	2028	128.14	232	22%	456	46%	720	70%
	2029	125.23	227	22%	448	46%	712	69%
	2030	122.85	223	21%	441	45%	707	68%
High state projections	2019	77.81	352	33%	639	65%	939	91%
	2020	77.81	401	38%	691	70%	945	91%
	2021	424.33	456	43%	746	76%	961	93%
	2022	353.19	265	25%	550	56%	784	76%
	2023	304.02	135	13%	409	42%	662	64%
	2024	270.91	57	5%	313	32%	584	56%
	2025	249.51	20	2%	249	25%	537	52%
	2026	236.17	15	1%	207	21%	509	49%
	2027	227.05	0	0%	176	18%	491	48%

Chilipepper south of 40°10' N. lat.

A catch-only projection update for chilipepper rockfish was provided in 2017 to inform management decisions for 2019 and beyond. For chilipepper rockfish, spawning output is reported in the millions of larvae produced, rather than spawning stock biomass (Figure 10). The estimated depletion in 2017 was 69.2 percent of the estimated unfished spawning output, well above the 40 percent target level.

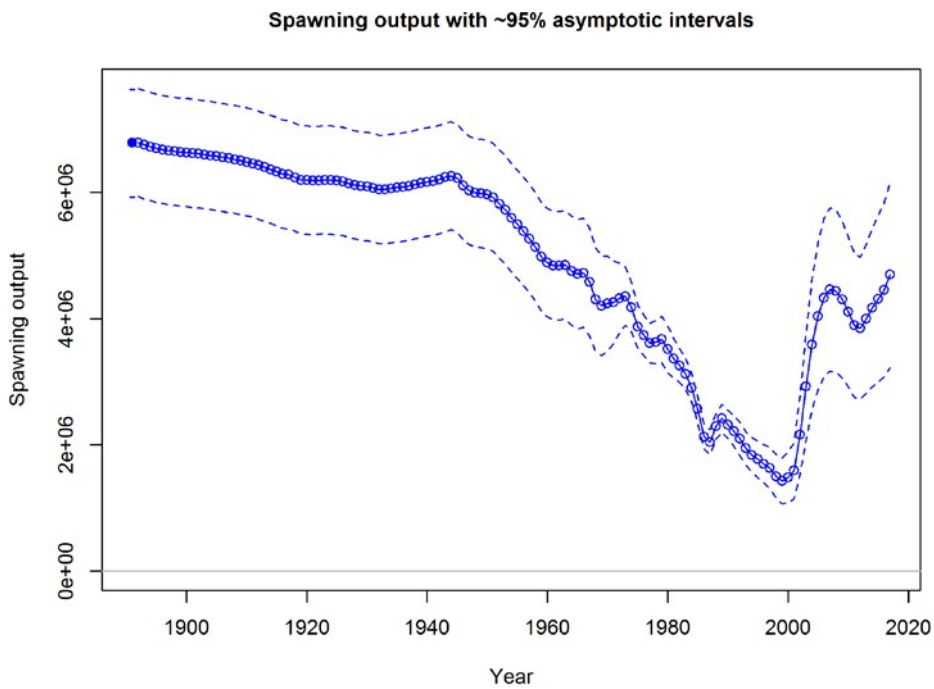


Figure 17. Spawning output (larvae, in 1000s) with approximate 95% confidence intervals.

The decision table (Table 13) follows the 2015 update (and 2007 assessment) format, with the two alternative states of nature equating to low (steepness set to 0.34) and high (steepness set to 0.81) productivity assumptions. Catches are based on either the status quo for the "low" catch scenario (average catch over the 5 year period used in the 2015 assessment), on the default harvest control rule (0.954% of the OFL) from 2017 onward, and on the base model OFL for 2017 onward. As chilipepper is considered a category 1 stock with a P* = 0.45 in recent years, the difference between ACL and OFL catch streams is minor. Under the base and high productivity scenarios, none of these catch streams lead to conservation concerns, however under the low productivity scenario (h=0.34), the stock rebuilds to target levels with status quo catches, but declines below the overfished threshold by 2019 with ACL or OFL catches.

Table 13. Decision table for chilipepper rockfish south of 40'10" N. lat.

Year	Status quo catches	State 1 (h=0.34)		Base (h=0.57)		State 2 (h=0.81)	
		Larvae (millions)	Depletion	Larvae (millions)	Depletion	Larvae (millions)	Depletion
2017	346	3082	0.36	4707	0.69	5162	0.85
2018	346	3108	0.36	4843	0.71	5292	0.87
2019	346	3130	0.36	4947	0.73	5379	0.88
2020	346	3161	0.36	5032	0.74	5434	0.89
2021	346	3206	0.37	5110	0.75	5472	0.90
2022	346	3265	0.38	5185	0.76	5499	0.90
2023	346	3334	0.38	5256	0.77	5519	0.91
2024	346	3409	0.39	5325	0.78	5533	0.91
2025	346	3489	0.40	5391	0.79	5544	0.91
2026	346	3572	0.41	5453	0.80	5552	0.91
2027	346	3655	0.42	5513	0.81	5559	0.91
2028	346	3740	0.43	5569	0.82	5565	0.91

Year	ACL catches	Larvae (millions)	Depletion	Larvae (millions)	Depletion	Larvae (millions)	Depletion
2017	3033	3082	0.36	4707	0.69	5162	0.85
2018	2873	2704	0.31	4454	0.65	4905	0.81
2019	2749	2382	0.28	4215	0.62	4648	0.76
2020	2622	2113	0.25	3998	0.59	4401	0.72
2021	2504	1898	0.22	3814	0.56	4179	0.69
2022	2407	1725	0.20	3664	0.54	3988	0.65
2023	2333	1577	0.18	3543	0.52	3826	0.63
2024	2274	1442	0.17	3443	0.51	3690	0.61
2025	2226	1310	0.15	3360	0.49	3576	0.59
2026	2185	1178	0.14	3290	0.48	3481	0.57
2027	2149	1044	0.12	3229	0.47	3401	0.56
2028	2116	907	0.11	3176	0.47	3335	0.55

Year	OFL catches	Larvae (millions)	Depletion	Larvae (millions)	Depletion	Larvae (millions)	Depletion
2017	3173	3082	0.36	4707	0.69	5162	0.85
2018	2993	2697	0.31	4434	0.65	4882	0.80
2019	2852	2360	0.27	4179	0.61	4609	0.76
2020	2711	2079	0.24	3950	0.58	4349	0.71
2021	2581	1855	0.21	3756	0.55	4118	0.68
2022	2476	1675	0.19	3599	0.53	3920	0.64
2023	2395	1522	0.18	3472	0.51	3754	0.62
2024	2331	1381	0.16	3369	0.50	3615	0.59
2025	2278	1243	0.14	3282	0.48	3499	0.57

2026	2233	1105	0.13	3209	0.47	3404	0.56
2027	2194	965	0.11	3146	0.46	3324	0.55
2028	2159	822	0.10	3091	0.45	3259	0.53

English sole

English sole is a medium-sized wide ranging and common flatfish species from Baja, California to Alaska. English sole have been captured by the bottom trawl fishery operating off the western coast of North America for over a century. Cope et al. (2014) assessed English sole using a data-moderate model platform. Catches of English sole, have significantly declined since the 1980s and are currently at historic lows. This landings history, coupled with fairly high productivity and relatively low maximum ages (20+ years old), determines a vulnerability to overfishing as one of the lowest of the groundfishes. The English sole assessment was conducted for a coastwide stock and stock depletion was estimated to be percent at the start of 2013. The current spawning biomass was estimated to be 25,719 mt. Since the new English sole assessment was conducting using data-moderate methods, the stock was downgraded from a category 1 to a category 2 stock.

Figure 18. Decision table for English sole from the 2014 assessment.

			State of nature					
			Low		Base		High	
Quantiles			0-0.25		0.25-0.75		0.75-1.0	
	Year	Catch	Spawning Biomass	Depletion	Spawning Biomass	Depletion	Spawning Biomass	Depletion
Low Catches	2015	8,909	33,061	86.2%	24,798	90.7%	24,306	94.0%
	2016	7,247	26,491	67.9%	18,414	67.2%	18,274	71.1%
	2017	6,146	21,871	56.6%	14,277	52.0%	14,593	56.8%
	2018	5,379	18,728	48.7%	11,709	42.6%	12,608	48.6%
	2019	4,858	16,631	43.3%	10,061	37.1%	11,880	44.2%
	2020	4,529	15,286	39.7%	9,293	34.0%	11,515	43.0%
	2021	4,305	14,401	97.2%	8,908	32.3%	11,386	42.1%
	2022	4,151	13,766	35.5%	8,606	31.3%	11,128	41.4%
	2023	4,018	13,279	34.3%	8,424	30.7%	11,077	41.8%
	2024	3,939	12,947	33.4%	8,319	30.2%	10,982	42.0%
Medium	2015	9,452	33,131	86.2%	24,735	90.7%	24,844	94.1%
	2016	4,098	26,338	67.7%	18,131	65.7%	16,751	63.2%
	2017	5,733	61,662	55.5%	14,115	50.8%	12,720	47.3%
	2018	4,972	18,441	47.3%	11,791	42.4%	10,602	39.6%
	2019	4,574	16,343	42.0%	10,538	37.9%	9,587	36.0%

			State of nature					
			Low		Base		High	
Catches	2020	4,332	14,991	38.6%	9,810	65.4%	9,065	34.3%
	2021	4,184	41,092	36.4%	9,401	34.0%	8,727	33.2%
	2022	4,073	13,465	34.8%	9,096	33.1%	8,490	32.6%
	2023	3,992	13,008	33.7%	8,916	32.4%	8,428	32.1%
	2024	3,922	12,662	33.0%	8,768	31.9%	8,340	31.7%
High Catches	2015	11,901	32,854	86.3%	25,220	90.6%	25,473	94.1%
	2016	2,368	23,791	61.8%	16,600	59.1%	17,158	63.6%
	2017	6,790	23,311	60.9%	16,346	58.2%	17,307	63.7%
	2018	5,975	19,630	51.5%	13,092	46.5%	14,308	53.7%
	2019	5,691	16,975	44.7%	10,874	38.8%	12,784	47.7%
	2020	5,446	14,926	39.1%	9,324	33.2%	11,642	43.0%
	2021	5,258	13,185	34.9%	8,098	29.1%	10,594	40.1%
	2022	5,106	12,087	31.5%	7,196	26.3%	10,178	38.2%
	2023	5,007	11,004	28.6%	6,557	24.3%	9,903	36.7%
	2024	4,960	10,260	26.4%	6,114	22.6%	9,600	36.2%
Average Catches	2015	224	33,061	85.9%	25,473	90.7%	25,687	94.0%
	2016	224	33,694	87.3%	24,996	91.8%	25,853	94.6%
	2017	224	34,117	88.5%	25,186	92.6%	25,981	95.1%
	2018	224	34,518	89.6%	25,377	93.3%	26,078	95.4%
	2019	224	34,916	90.6%	25,522	93.8%	26,153	95.7%
	2020	224	35,358	91.4%	25,635	94.3%	26,210	96.0%
	2021	224	35,746	92.1%	25,725	94.6%	26,253	96.0%
	2022	224	36,087	82.6%	25,798	94.9%	26,286	96.3%
	2023	224	36,387	93.2%	25,857	95.1%	26,312	96.4%
	2024	224	36,651	93.6%	25,904	95.3%	26,332	96.6%

Starry Flounder

Starry flounder was last assessed in 2005. A DB-SRA was completed for Starry Flounder in 2017 (Agenda Item F.6., Attachment 3, November 2017) to inform harvest specifications going forward. Stock status is highly uncertain. However, in 2005, the stock was thought to be above 40 percent depletion (the management target), and we know that removals since then have been below the MSY proxies, 818 mt for the Washington/Oregon stock and 353 mt for the California stock). Therefore, we can assume that the stock size has not decreased significantly since the 2005 assessment.

3.4 Prohibited and Protected Species

Prohibited species are defined in federal regulations as those species and species groups whose retention is prohibited unless authorized by provisions of the groundfish regulations (50 CFR §660.11) 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 PCGFMP for which quotas have been achieved and/or the fishery closed.

The term "protected species" refers to organisms for which killing, capture, or harm is prohibited under several Federal laws, unless authorized. Incidental take of these species during operations may be allowed under provisions of applicable laws, including the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the Migratory Bird Treaty (MBTA), and Executive Order (EO) 13186—EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02).

In accordance with Section 7 of Endangered Species Act of 1973 (ESA) (16 U.S.C. §§ 1531 et seq.), the NOAA completes ESA consultation evaluating the effects of a proposed action on ESA-listed species and critical habitat and issues its written conclusion (i.e. a biological opinion (BiOp)). Section 7(b)(4) and section 7(o)(2) of the ESA provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of an Incidental Take Statement in a BiOp. Table 11 provides a list of ESA-listed species and incidental take amounts or extent as established in their respective BiOps. The proposed action for these biological opinions was the continuing operation of the groundfish fishery.

Table 14. Species and Incidental Take Statements Amounts from Biological Opinions.

Species	Incidental Take Amount or Extent of Take from BiOps
Eulachon	Bycatch/handling or mortality: – The precautionary and reinitiation thresholds are five year geometric means of 0.01% and 0.02% of minimum Columbia River abundance

Species	Incidental Take Amount or Extent of Take from BiOps
Green Sturgeon	Non-lethal bycatch/handling in the fishery: – 28 fish/year expected and up to 86 fish/year in no more than 2 years within a period of 9 consecutive years; Lethal bycatch in the fishery: – 2 fish/year expected and up to 7 fish/year in no more than 2 years within a period of 9 consecutive years.
Humpback Whales	Injury or mortality from entanglement: – 5-year average of 1 whale/year and up to 3 whales/year in a single year.
Short-tailed albatross	Injury or mortality: – should not exceed an estimated five albatross in a two-year period or one observed albatross in a two- year period
Salmon	The take guideline for the whiting sector trawl fishery is 11,000 Chinook and 474 coho salmon. The take guideline for the non-whiting fishery sectors (including trawl, commercial fixed gear, and recreational) is 5,500 Chinook and 560 coho salmon. These values exclude the Chinook Bycatch Reserve amount of 3,500 fish considered for extreme bycatch events.

The Groundfish Endangered Species Workgroup (ESA Workgroup) met April 30-May 1, 2019 in Seattle, Washington to receive presentations on fishing effort and listed species (see the Workgoup's June 2019 report summarizing their meeting and recommendations Agenda Item I.4.a., Groundfish Endanagered Species Workgroup Report, June 2019). The Workgroup's objectives and duties are to recommend new analyses to improve bycatch estimates, consider whether ITS amounts are appropriate, consider whether new information reveals effects not considered in the BiOps, and propose for Council consideration conservation and management measures to minimize bycatch of listed species, if needed, in the groundfish fishery. After receiving presentations, the ESA Workgroup only had recommendations relative to the take of short-tailed albatross and humpback whale (discussed below).

Based on the relevant BiOps and ESA Workgroup recommendations, this EA evaluates the impacts of the proposed action on eulachon, green sturgeon, humpback whale, short-tailed albatross, and salmon. Information on status is provided below.

3.5.1 Eulachon

The 2019 report on eulachon bycatch prepared by NMFS for review by the ESA Workgroup (Agenda Item I.4.a, NMFS Report 2, June 2019) summarizes life history and distribution. The following information comes from Agenda Item I.4.a, Groundfish Endangered Species Act Workgroup Report, June 2019.

The 2018 BiOp for eulachon includes two incidental take thresholds that are designed to take the fluctuating abundance of eulachon into account. The precautionary and reinitiation thresholds are five year geometric means of 0.01% and 0.02% of minimum Columbia River abundance. These thresholds are meant to be compared to a five year geometric mean bycatch estimate for eulachon, which is based on the mean generation time of the species and is calculated from the most recent year's and the four preceding year's bycatch count estimates in the West Coast groundfish fishery.

3.5.2 Green Sturgeon

The 2019 report on green sturgeon bycatch prepared by NMFS for review by the ESA Workgroup (Agenda Item i.4.a, NMFS Report 3, June 2019) summarizes life history and distribution.

The following information comes from Agenda Item I.4.a, Groundfish Endangered Species Act Workgroup Report, June 2019.

There are two distinct population segments (DPS) for green sturgeon on the West Coast: Southern DPS and Northern DPS. Only the Southern DPS is listed under the ESA. The annual take of Southern DPS green sturgeon was estimated based on the combination of individual assignments of genetic stock identification and an estimated ratio of Southern to Northern DPS by given catch area (48 percent for Washington and Oregon, and 96 percent for California coast). The estimated number based on the most recent data available of Southern DPS green sturgeon encountered was 26 individuals in 2016 and 2 individuals in 2017. Therefore, the estimated bycatch of the Southern DPS of green sturgeon has not exceeded ITS amount of 28 fish per year.

3.5.3 Humpback Whales

The 2019 report on humpback whale bycatch prepared by NMFS for review by the ESA Workgroup (Agenda Item.4.a. NMFS Report 4, June 2019) summarizes the life history and distribution of humpback whales.

There have been two documented takes of a humpback whale in the Pacific Coast groundfish fisheries—one in the Limited Entry sablefish pot fishery sector in 2014 and one in the Open Access Fixed Gear pot fishery sector in 2016. Although there have been no other observed takes in Pacific coast groundfish fisheries since data collection began in 2002, pot and trap fisheries generally represent the majority of documented fishery interactions with humpbacks along the U.S. west coast.

In 2016, NMFS revised the listing of humpback whales from a single global listing to fourteen Distinct Population Segments (DPS) of humpback whales, each having their own status under ESA (81 FR 62260). Humpback whales found in waters off the Oregon, Washington, and California coast are from the Mexico, Central America, and Hawaii DPSs. Under the ESA, the Mexico DPS was listed as threatened, the Central America DPS was listed as endangered, and the Hawaiian DPS was not warranted for listing. This change in listing status trigger reintiation of ESA consultation for the 2012 BiOp evaluating the impact of the groundfish fishery on non-salmonids, including humpbacks. While the estimated fleet-wide entanglements/takes in the LE

Sablefish pot sector were consistently below the 5-year running average take threshold established in the 2012 BiOp, the estimated fleet-wide entanglements/takes in the Open Access Fixed Gear pot sector was consistently above the 5-year running average threshold. Based on the analysis in the bycatch report, the ESA workgroup concluded in 2019 that the incidental take amount from the 2012 BiOp was exceeded, a second trigger for reintiation of the 2012 BiOp.

The incidental take of a second humpback whale in the federally managed groundfish fisheries within the last five years highlights the need for additional actions to improve the precision of interactions estimates and to identify potential mitigation measures. Therefore, the Workgroup discussed several of the recommendations from the humpback whale bycatch report including gear marking issues, storing gear at sea, and los fishing gear.

NMFS reinitated consultation on humpback whales in 2019 and expects to complete the consultation by January 1, 2021.

3.5.4 Seabirds and Short-Tailed Albatross

Agenda Item I.4.a, NMFS Report 6 from the June 2019 Council meeting, provides the most recent information regarding bycatch in groundfish fisheries. Based on the analysis presented in the bycatch report, the groundfish fishery did not exceed the ITS thresholds of an estimated five albatross in a two-year period or one observed albatross in a two-year period. The bottom trawl fishery is restricted to ITS for short-tailed albatross under the 2017 BiOp for seabirds (NMFS 2017). Section 6.1.2 and 6.2 of the Biological Opinion discusses take in the trawl fishery.

Bycatch of short-tailed albatrosses in commercial fisheries throughout the Pacific continues to be a major conservation concern. Since 1983, 19 short-tailed albatross takes have been documented throughout the North Pacific. The lone short-tailed albatross mortality in the Pacific Coast Groundfish Fisheries was documented off the Oregon coast on April 11, 2011 in the limited-entry sablefish longline fishery. From 2013-2019, no short-tailed albatross takes were documented in the West Coast groundfish fisheries. Short-tailed albatross continue to be seen feeding next to vessels fishing with bottom trawl, midwater trawl, pot gear and bottom longline gear.

In response to the mortality, the Council adopted recommendations for seabird bycatch mitigation, requiring streamer lines be deployed during setting operations on commercial fixed gear vessels 55 feet (17 m) or greater in length. Outreach efforts have increased seabird bycatch awareness as has voluntary use of seabird deterrents throughout the U.S. portion of the range of this species. NMFS implemented regulations consistent with these recommendations on January 10, 2020. Industry had raised safety and operational concerns at the April 2019 Council meeting about a potential requirement for smaller vessels that use floated gear to fish at night. Based on these discussions, the ESA workgroup recommended the Council support efforts that explore ways to improve streamer lines or gear configuration for the purpose of mitigating seabird interactions. The ESA workgroup noted one way may be an EFP to test alternative mitigation measures for floated longline gear that are designed to further reduce bycatch of seabirds.

3.5.5 Salmon

Historically, salmon bycatch in groundfish fisheries has mostly comprised Chinook salmon with small amounts of coho salmon. Salmon bycatch has been subject to Section 7 ESA consultations since 1990 and several species of Chinook, Coho and steelhead are listed as either threatened or endangered. NMFS finalized a new BiOp in December 2017(NOAA 2017). In the BiOp incidental take statement (ITS), incidental take is described in numbers of salmon, both listed and non-listed. Incidental take of Chinook may not exceed 11,000 in the whiting sector and 5,500 in the nonwhiting sector, including the Chinook Bycatch Reserve of 2,500 Chinook salmon per year in the event that bycatch increases unexpectedly. The Council took action in November 2019 to develop rules for managing the groundfish fisheries to prevent exceedance of the ITS (Agenda Item H9, Attachment 1 - November 2019). The Council also developed other mitigation tools, including block area closures and selective flatfish trawl gear requirements. NMFS monitors the catch of salmon in near real time with observers at sea and catch monitors at point of landing. Recent (2018-2019) bycatch numbers by fishery?

3.5 Marine Mammals

Marine mammal species that are not listed under the ESA occur in the action area. The taking of marine mammals (whether or not listed under the ESA) is subject to the requirements of the Marine Mammal Protection Act of 1972 as amended (MMPA). Take as defined under the MMPA means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. 1362). It is further defined by regulation (50 CFR 216.3) as "to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal. This includes, without limitation, any of the following:

- The collection of dead animals, or parts thereof.
- The restraint or detention of a marine mammal, no matter how temporary.
- Tagging a marine mammal.
- The negligent or intentional operation of an aircraft or vessel.
- The doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal.
- Feeding or attempting to feed a marine mammal in the wild."

The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. The MMPA was amended in 1994 to, among other things, establish a process for authorizing fisheries to incidentally take marine mammals. In support of this, NMFS developed the List Of Fisheries (LOF) document. The classification of a fishery on the LOF determines whether participants in that fishery may be required to comply with certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. Under this Authorization Program all commercial fisheries must be categorized based on the relative frequency of incidental mortalities and serious injuries of marine mammals in the fishery:

1. Category I designates fisheries with frequent mortalities and serious injuries incidental to commercial fishing;
2. Category II designates fisheries with occasional mortalities and serious injuries;
3. Category III designates fisheries with a remote likelihood or no known mortalities or serious injuries.

According to the 2020 List of Fisheries (85 FR 21079; April 16, 2020) the WA/OR/CA sablefish pot fishery is Category II because of takes of the CA/OR/WA humpback whale stock. All other Federally managed Pacific Coast groundfish fisheries are Category III. The List of Fisheries identifies the following marine mammal stocks taken in the groundfish trawl fishery: California sea lion (U.S.) Dall's porpoise (CA/OR/WA) harbor seal (OR/WA coast), northern fur seal (Eastern Pacific) white-sided dolphin (CA/OR/WA) Steller sea lion (Eastern U.S.). The List of Fisheries identifies the following marine mammal stocks taken in the WA/OR/CA groundfish, bottomfish longline/set line fishery: bottlenose dolphin (CA/OR/WA offshore), California sea lion (U.S.), Northern elephant seal (California breeding), Sperm whale, Stellar sea lion (Eastern U.S.). The California halibut bottom trawl fishery is a state managed fishery (not under the PCFMP) but is listed as a category III fishery due to takes of California sea lion, (U.S.), harbor seal, Northern elephant seal (California breeding), Stellar sea lion (Eastern U.S.).

3.6 The socioeconomic environment

Section 3.2 in 2015 EISand the Groundfish SAFE (2020) provide detailed characterizations of the Pacific coast groundfish fishery. These groupings can further be specified into sectors (commercial) and modes (recreational). This information is incorporated by reference with some updates below.

3.6.1 Groundfish Fishery Sectors

Commercial fisheries on the West Coast are generally considered to have two sectors, the whiting sector, and the non-whiting sector.

Whiting Sector–These vessels use midwater trawl net in their operations and strictly target Pacific whiting (hereinafter whiting). Within the whiting sector, there are two fishery designations , at-sea and shoreside. The ex-vessel revenue for the whiting sector, combined, has averaged about $52.4 million per year ($64.9 million in 2019)[5] since the 2015 EIS.

> **At-Sea**–The at-sea fleet consists of the catcher-processor and mothership sectors. Catcher processors (CP) both catch and process whiting at sea; whereas, motherships (MS) receives and processes whiting catch supplied by catcher vessels (MSCV).

[5] Data from PacFIN, accessed 4/28/2020 and is inflation adjusted

Shoreside–The shoreside fleet consists of vessels who catch and deliver it to a shoreside plant for processing; however, some shoreside whiting vessels do regularly participate as MCSV for motherships.

Non-Whiting–This sector of the fishery includes the non-whiting groundfish trawl (bottom and midwater trawl gear) and fixed gear (hook & line, and pot gear) fisheries. The commercial non-whiting sector has averaged $83.7 million annually since 2015 ($83.3 million)6. The highest ex-vessel revenue has historically been derived from sablefish, rockfish, thornyheads, flatfish (e.g. Dover and petrale sole), and lingcod.

Trawl–The non-whiting trawl fishery operates under the shorebased IFQ program and is comprised of two primary gear types that target groundfish: midwater trawl and bottom trawl. While trawling portfolios are made up of a variety of groundfish species, the non-whiting midwater trawl fishery primarily targets widow and yellowtail rockfish while bottom trawlers typically target sablefish, dover sole, thornyheads (i.e. the DTS complex), and other flatfish species.

Fixed gear–This sector targets groundfish via longline (hook gear) and/or pot gear. This fishery is divided between "limited entry" and "open access" from a regulatory standpoint, but fishery managers more commonly characterize a "non-nearshore" sector which primarily targets sablefish, a "non-nearshore non-sablefish" sector which targets groundfish other than sablefish, and a "nearshore" sector, which targets various nearshore groundfish species off of Oregon and California, including blue/deacon and black rockfish. Also included in this designation are a subset of shorebased IFQ vessels known as "gear switchers", which are trawl endorsed vessels that use fixed gear to target such species as sablefish.

Incidental Open Access–This sector includes a number of non-groundfish fisheries that take groundfish incidentally and have been characterized as groundfish incidental OA for the purpose of management and data presentation. In aggregate they account for a very small proportion of groundfish landings and revenue.

The ten most common species, or species groups, landed by the aforementioned sectors accounted for nearly 72 percent of nominal shoreside ex-vessel revenue in during 2012-2019. Of this amount, Pacific whiting (shoreside), rockfish (combined), flatfish (combined), petrale sole, Dover sole, and sablefish, accounted for 65 percent of revenue in 2019 in shoreside fisheries.

A variety of other mostly incidental groundfish sectors have been characterized for the purpose of management and data presentation, but in aggregate they account for a very small proportion of groundfish landings and revenue. Vessels that target non-groundfish species, (e.g. pink shrimp, sea cucumber, etc.) operate under groundfish set-asides, where, in some cases, incidentally, caught groundfish may be retained and sold. Research and exempted fishing permit (EFP) vessels also operate under set-asides and can, in some instances, sell their catch

[6] Data from PacFIN, accessed 4/28/2020 and is inflation adjusted

Recreational fishery-This fishery primarily targets groundfish via hook and line, though some spear effort exists, from a variety of platforms. Groundfish species can be caught from shore, man-made structures, and boats; however, the primary platform for anglers targeting groundfish species are the boat-based modes. These modes are private boats and commercial passenger fishing vessels/charter boats. Recreational fisheries are an important part of fishery-related economic activity. Because recreational catch is not sold, however, it is more difficult to impute the economic value of these fisheries. Past Groundfish Harvest Specifications EISs have characterized recreational fisheries in terms of fishing effort (angler trips) to quantify spatio-temporal differences in West Coast recreational fisheries. It is important to note that due to the sampling and fishery estimation methodologies, recreational estimates of catch and effort for a California, Oregon, and Washington is not generally available on the same timeline as commercial data. An initial set of catch and effort estimates is generally available in March for the year prior. For example, 2019 data will be finalized in late winter of 2020. Therefore, analyses for the recreational fishery under like past bienniums, analysis of the recreational groundfish management measures largely relies on data from the year prior to what is considered the baseline year of 2019 or are estimates from 2019.

Tribal Groundfish Fisheries-Several Pacific Northwest Indian tribes have treaty rights to fish for groundfish in their Usual and Accustomed (U&A) fishing grounds. The Federal government has established a regulatory process by which to manage these fishereis 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. Treaties specify the rights of the Tribes to harvest federally managed groundfish in their U&A fishing areas (§660.4). Under these treaties, the tribes manage the fisheries in which their members participate. On average, the treaty fisheries have generated an average of about $4.1 million (inflation adjusted) per year since the publication of the 2015 EIS.

The PCGFMP details the provisions for allocations or set-asides of certain species to ensure treaty rights are implemented. Tribal catches are accounted for through set-asides. Like other groundfish management on the west coast, these amounts are developed as part of the biennial harvest specification and management measure process. Tribes prosecute the commercial fishery in the same manner as described above under 3.2.1.1 as, in terms of vessels, gear, and target. The Makah Tribe participates in whiting fisheries with both a mothership and shorebased component. The Quileute Tribe, Quinault Indian Nation, Makah Indian Tribe, and Hoh Indian Tribe (collectively, "the Pacific Coast Tribes") have fixed gear vessels and the Makah are active in the bottom trawl and midwater fisheries as well. At the November 2019 Council meeting, the Quinault Nation indicated they would participate in the 2020 groundfish fishery and indicated their desire to continue into the next biennium.

3.7 Revenue Trends for Commercially Important Groundfish

The PCGFMP accounts for over 90 species; however, relatively few species account for the majority of the fishery's revenue. Table 12 shows the top three species groups ranked by revenue [sablefish, Pacific whiting (hake), and Rockfish not elsewhere identified (NEI)] accounted for 74% of total inflation adjusted groundfish ex-vessel revenue. Adding in the next two most important

species groups, Dover sole and petrale sole, accounts for another 15% of total inflation adjusted groundfish ex-vessel revenue during the 2003-2019 period. Data for the 2017-2018 biennial specifications period show the highest average annual inflation-adjusted landings revenue over the period shown. Revenues from Pacific whiting and Rockfish NEI have been particularly strong in recent years.

Although 2019 data presented here is preliminary, and therefore incomplete, total revenue has increased since by $16 million, or 16 percent, from the 2015-2016 biennial period and is comparable to the 2011-2012 biennial period. However, compared to the 2017-2018 biennial period, average ex-vessel revenue is down by 14 percent. The fluctuations could be a response to market conditions rather than landings. Notably, sablefish landings have averaged 5,337 mt per year with little variability per year in terms of amount landed. Whiting, however, has increased in landings over the 2003-2019 period, but as shown in Table 3-2, ex-vessel revenue remains fairly flat over the 2003-2019. While there is fluctuation in ex-vessel revenue, overall, it has remained fairly steady in recent years.

Table 15. Average annual inflation adjusted ex-vessel revenue, $1,000s by groundfish species for 2003-2010 and bienniums starting in 2011. (Source: Groundfish SAFE Table 12b and PacFIN comprehensive ft 01/16/2020).

	2003-2010		2011-2012		2013-2014	
	Revenue	**Percent**	**Revenue**	**Percent**	**Revenue**	**Percent**
Sablefish	$35,819	41%	$45,323	44%	$25,269	29%
P. Whiting	$15,830	18%	$27,337	27%	$29,740	34%
Dover Sole	$9,953	11%	$8,452	8%	$8,163	9%
Rockfish NEI[a/]	$5,856	7%	$6,789	7%	$6,631	8%
Petrale Sole	$6,733	8%	$3,998	4%	$7,016	8%
Thornyheads	$5,615	6%	$4,839	5%	$4,640	5%
Roundfish NEI[a/]	$2,980	3%	$3,191	3%	$2,847	3%
Flatfish NEI[a/]	$3,183	4%	$1,820	2%	$1,660	2%
Other	$1,136	1%	$1,375	1%	$1,325	2%
Total	$87,104	100%	$103,124	100%	$87,291	100%

	2015-2016		2017-2018		2019 (preliminary)	
	Revenue	**Percent**	**Revenue**	**Percent**	**Revenue**	**Percent**
Sablefish	$41,425	48%	$54,750	47%	$40,252	39%
P. Whiting	$12,470	14%	$23,957	21%	$29,246	28%
Dover Sole	$7,171	8%	$7,044	6%	$5,368	5%
Rockfish NEI[a/]	$7,029	8%	$12,047	10%	$13,862	14%
Petrale Sole	$7,685	9%	$7,897	7%	$6,650	6%
Thornyheads	$4,144	5%	$5,032	4%	$2,995	3%
Roundfish NEI[a/]	$3,529	4%	$3,419	3%	$3,038	3%
Flatfish NEI[a/]	$1,411	2%	$1,061	1%	$604	1%
Other	$1,471	2%	$908	1%	$610	1%
Total	$86,336	100%	$116,116	100%	$102,626	100%

a/NEI indicates species not elsewhere identified

3.7.1 Landings and Revenue for Commercial Fishery Sectors

The following sections provide information on revenue for the commercial fishery by sectors.

3.7.1.1 Non-whiting Fishery Sectors

The ex-vessel revenue for the main non-whiting sectors is shown in Table 13 during 2013 – 2019. This table excludes shoreside whiting IFQ. Based on the table below the shoreside non-whiting IFQ (trawl and non-trawl) fisheries ex-vessel revenue accounts for an estimated 59 percent of revenue in the non-whiting groundfish fishery. The non-nearshore and nearshore fixed gear fisheries combined account for 39 percent of the ex-vessel revenue and the remaining fisheries (OA, EFP, IOA, and research [Res] fisheries), which account for about 2.1 percent of ex-vessel revenue in the non-whiting groundfish fishery. Overall, ex-vessel revenue averaged $57 million on an annual basis.

Table 16. Groundfish ex-vessel revenue, excluding shoreside whiting, in current dollars(inflation adjusted), $1,000, by shoreside commercial fishing sectors. (Source: PacFIN SAFE Table 12b, accessed 4/28/2020)

Year	Shoreside IFQ Trawl (Non-whiting)	Shoreside IFQ Non-trawl	Non-Nearshore Fixed Gear	Nearshore Fixed Gear	Non-fixed gear OA	IOA	EFP, Res., Misc.	Annual Total
2013	$27,688	$3,049	$13,409	$4,014	$56	$90	$1,200	$49,506
2014	$26,682	$4,883	$14,712	$3,943	$75	$134	$461	$50,890
2015	$28,042	$5,528	$17,147	$4,605	$97	$180	$474	$56,073
2016	$27,844	$6,733	$18,850	$3,728	$44	$184	$644	$58,027
2017	$32,303	$6,431	$21,765	$4,173	$31	$196	$1,665	$66,564
2018	$26,994	$4,259	$17,708	$4,133	$33	$166	$1,683	$54,976
2019 a/	$26,215	$4,102	$15,025	$4,254	$34	$207	$379	$50,216
Avg.	$28,280	$5,411	$18,099	$4,179	$48	$187	$969	$57,171

a/ 2019 is considered preliminary at time of data download

3.7.1.2 Whiting Fishery Sector

Whiting sector ex-vessel revenue trends from 2013 to 2019 are shown below in Table 14. The whiting sectors, combined, have averaged $53 million in ex-vessel revenue since 2015. In terms of total ex-vessel revenue, 2015 was the low when compared the years 2016-2019. Since 2015, ex-vessel-revenue, combined, has increased by a factor of about two. Further examination of the data shows ex-vessel revenue is variable by year by sector, however, the general trend, for the CP and shoreside sectors shows increasing ex-vessel revenue -excepting 2018- over the 2015-2018 period. The mothership sector appears to be declining in ex-vessel revenue over the same period. In 2019, the CP sector accounted for approximately 37 percent of ex-vessel revenue, the mothership sector at about 17 percent, and shoreside at approximately 46 percent.

Table 17. Ex-vessel revenue, current 2020 dollars (inflation adjusted), $1,000s, by whiting sectors. (Source, PacFIN SAFE table 14b, accessed 4/28/2020)

Sector	2015	2016	2017	2018	2019 a/
Catcher-Processor	$11,933	$22,612	$25,687	$20,654	$24,292
Mothership	$4,694	$12,954	$11,825	$11,760	$10,703
Shoreside Whiting	$10,131	$14,671	$25,182	$22,767	$30,068
Total	$29,282	$51,402	$64,610	$56,276	$65,366

a/ 2019 is considered preliminary at time of data download

3.7.1.3 Midwater Trawl Fishery

The rebuilding of canary and widow rockfish has stimulated the reemergence of a fishery using midwater trawl gear to target pelagic rockfish, principally widow and yellowtail rockfish. Widow rockfish was declared overfished in 2001 and declared rebuilt in 2011. Canary was declared overfished in 2000 and declared rebuilt in 2015. While canary was not a target, its frequency as bycatch presented a potential constraint on the midwater fishery. Figure 18 shows revenue from landings of widow, yellowtail, and chilipepper rockfish since 1981. From 1994 onward only landings from the non-whiting portion of the midwater trawl fishery are included; data prior to that year may include some whiting trips, however during that time the domestic shorebased whiting fishery was somewhat smaller than it is currently and non-whiting species landings tend to be very low. Therefore, the figure adequately represents the trend for midwater rockfish trawl fishery ex-vessel revenue. The figure shows landings steadily declined beginning the late 1980s, with the exception of 2000 and 2001. The non-whiting midwater trawl fishery essentially ceased while widow rockfish was rebuilding after 2001 until 2011, but has shown notable growth since.

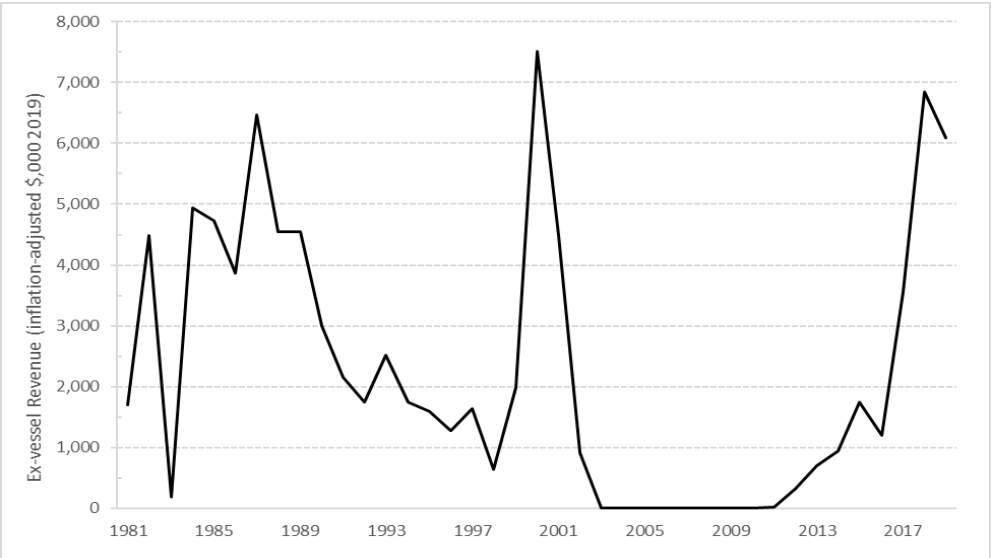


Figure 19. Inflation adjusted ex-vessel revenue ($1,000s) from landings of pelagic rockfish (widow, yellowtail, chilipepper), by midwater trawl gear in the non-whiting groundfish trawl sector, 1981-2019. Landings from 2004 to 2009 excluded due to data confidentiality

Table 16 provides a snapshot of the pelagic rockfish fishery over the past eight years (2019 data should be considered preliminary). The data include landings made under EFPs which prior to 2017 would have been for purposes other than targeting pelagic rockfish. The fishery has ramped

up substantially in recent years. Since 2012, participation (number of vessels) increased by 47 percent and landings revenue by nearly twenty-fold; ex-vessel revenue in 2018 and preliminary ex-vessel revenue in 2019 exceeded $6 million.

Table 18. Landings (mt), inflation adjusted ex-vessel revenue, and number of vessels making landings of pelagic rockfish (chilipepper, widow, and yellowtail rockfish) with midwater trawl gear, 2012-2017. (Source: PacFIN comprehensive ft, 1/16/2020).

Values	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019[a/]**
Metric tons	249	606	836	1,674	1,138	5,257	11,291	9,732
Thousands of dollars	$318	$698	$945	$1,743	$1,200	$3,558	$6,852	$6,095
Number of vessels	17	12	24	37	10	16	24	25

a/ 2019 data is considered preliminary

3.7.1.4 Tribal Groundfish Fisheries

Table 3 7 shows ex-vessel revenue in tribal fisheries using hook-and-line and trawl gear. Pacific Coast tribes participate in whiting fisheries with both a mothership and shorebased component; however, the landings and revenue from tribal fisheries cannot be reported due to data confidentiality restrictions. Landings from net and pot gear cannot be reported due to data confidentiality restrictions. Landings from shrimp trawl are not reported because these fisheries do not target groundfish although they do land incidentally-caught groundfish. Revenue from groundfish landings in the tribal net, pot and shrimp fisheries averaged less than $70,000 annually during 2013-2018. Hook-and-line gear accounted for nearly two thirds of revenue reported in the table.

Table 19. Treaty non-whiting groundfish ex-vessel revenue for hook-and-line and trawl gear (from groundfish only) 2013-2019, in inflation-adjusted $1,000s. (Source: Groundfish SAFE Table 13b and PacFIN comprehensive ft, 1/16/2020).

Year	Hook-and-Line	Trawl	Total
2013	$2,161	$1,777	$3,938
2014	$3,315	$1,106	$4,421
2015	$3,311	$1,795	$5,106
2016	$3,576	$1,864	$5,440
2017	$3,754	$2,030	$5,784
2018	$2,529	$1,722	$4,251
2019[a/]	$1,120	$860	$1,980
Average Annual	$2,824	$1,593	$4,417

a/ 2019 data is considered preliminary.

3.7.1.5 Recreational fishery

Recreational fisheries are an important part of fishery-related economic activity. However, it is more difficult to impute the economic value of these fisheries because recreational catch is not sold. Past Groundfish Harvest Specifications documents have characterized recreational fisheries in terms of fishing effort (angler trips) to quantify spatio-temporal differences in West Coast recreational fisheries. Income and employment impacts derived from IOPAC model impact coefficients applied to GMT estimates of effort under the Alternatives are reported in section Chapter 4. Recreational fisheries are broadly subdivided between private anglers and those fishing from commercial passenger fishing vessels, commonly referred to as charter vessels. Private anglers fish from shore or from private boats, while charter vessels take paying passengers.

Table 17 shows the annual average bottomfish/halibut angler trips compared to trips targeting other species during 2012 - 2018. Overall private and charter trips targeting bottomfish/halibut comprised 27 percent of all trips and modes during the 2012-2018 period. Table 18 shows the annual average counts of bottomfish/halibut and other trip type marine angler trips by state and reporting area. California accounts for 84 percent of bottomfish/halibut angler trips, with the southern California region accounting for 47 percent of coastwide trips due to its large coastal population and potential year-round fishery. Figure 19 summarizes bottomfish/halibut trips by state and year during 2007 to 2018. The number of bottomfish/halibut marine angler trips peaked in 2014 at 981,000 trips and subsequently declined slightly. Nonetheless, the 869,000 trips in 2018 exceeded the 12-year 2007-2018 average by 11 percent.

Table 20. Total coastwide recreational angler trips by type and mode, 2012-2018. (Source: GMT state reps, RecFIN).

Trip Type:	Bottomfish+Halibut		Other Trip Types[a/]		Total	
Mode	Annual Avg	Percent of All Trips	Annual Avg.	Percent of All Trips	Annual Avg.	Percent
Beach/Bank	0	0%	928,132	26%	928,132	26%
Man-made	77,455	2%	1,031,863	29%	1,109,318	30%
Charter	576,540	16%	150,183	4%	726,723	20%
Private	305,105	9%	473,469	13%	778,574	22%
Total	959,099	27%	2,583,648	73%	3,542,747	100%

a/ Other trip types: Salmon, HMS, combo, other.

Table 21. 2012–18 average annual bottomfish plus Pacific halibut marine angler boat trips (private and charter) by reporting area. (Source: GMT state reps, RecFIN).

Trip Type:	Bottomfish + Halibut		Other Trip Types[a/]		Total	
State/Region	Annual Average	% of Bottomfish + Halibut Trips	Annual Average	% Other Trips	Annual Average	% of All Trips
La Push-Neah Bay	15,338	2%	10,466	0%	25,804	1%
Westport	20,529	2%	40,864	2%	61,394	2%
Ilwaco-Chinook	3,400	0%	55,890	2%	59,290	2%
Washington Subtotal	39,268	4%	107,220	4%	146,487	4%
Astoria	613	0%	7,787	0%	8,400	0%
Tillamook	18,088	2%	18,091	1%	36,179	1%
Newport	55,185	6%	26,681	1%	81,866	2%
Coos Bay	17,417	2%	24,567	1%	41,984	1%
Brookings	22,177	2%	14,158	1%	36,335	1%
Oregon Subtotal	113,480	12%	91,285	4%	204,765	6%
North Coast: Humboldt and Del Norte	38,256	4%	58,860	2%	97,116	3%
Wine District: Mendocino	19,331	2%	44,637	2%	63,968	2%
SF District: San Mateo through Sonoma	74,075	8%	308,055	12%	382,130	11%
Central Coast: San Luis Obispo through Santa Cruz	122,147	13%	317,124	12%	439,271	12%
Channel: Ventura and Santa Barbara	97,510	10%	304,403	12%	401,913	11%
South Coast: San Diego, Orange, and Los Angeles	455,033	47%	1,352,065	52%	1,807,098	51%
California Subtotal	806,352	84%	2,385,143	92%	3,191,495	90%
Grand Total	959,099	100%	2,583,648	100%	3,542,747	100%

a/ Other trip types: Salmon, HMS, combo, other.

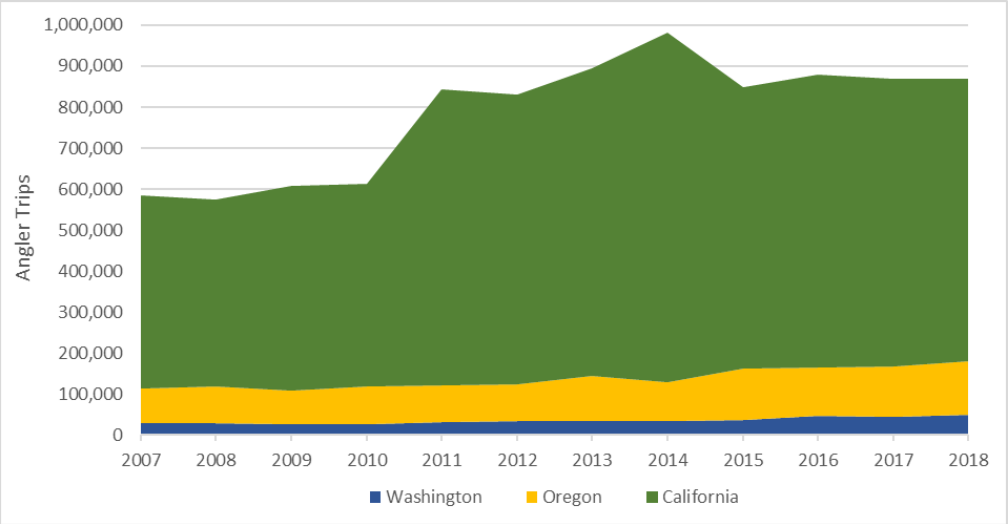


Figure 20 . Total bottomfish plus Pacific halibut marine angler boat trips (private and charter) by state, 2007 to 2018. (Source: GMT state reps, RecFIN).

3.7.2 Fishing Communities

As in the 2015 EIS and previous analytical documents for other biennial cycles, involvement by fishing communities in commercial groundfish fisheries is described below in terms of landings and ex-vessel revenue by West Coast Fisheries (IOPAC) port group.[7] IOPAC is used to evaluate personal income and employment impacts of the alternatives.

Table 19 shows inflation-adjusted ex-vessel revenue from non-tribal groundfish landings in aggregate over 2013-2019 by port group and groundfish fishery sector. Note that in some cases adjacent port groups were aggregated to avoid disclosure of confidential data. Landings and revenue tend to be concentrated in relatively few ports. The four top ranked ports of the 10 shown accounted for 77 percent of coastwide revenue during the period. Astoria-Tillamook is the top-ranked port overall, accounting for 26 percent of coastwide groundfish revenue shown. Newport ranks second at 23 percent of coastwide revenue, and the combined Washington port groups third at 17 percent. Whiting landings occur in only three of the port areas shown, which are also the top three ranked groundfish ports overall (Astoria-Tillamook, Newport, and Washington). Astoria-Tillamook and Newport also rank first and second, respectively, for revenue from the non-whiting IFQ sector (combining trawl and non-trawl IFQ landings), while Coos Bay-Brookings ranks third by this measure. The combined Washington ports rank first for revenues from the non-nearshore (sablefish) fixed gear fishery followed by Newport, coos Bay-Brookings and Morro Bay-Santa Barbara. Morro Bay-Santa Barbara is top ranked for the nearshore fixed gear fishery followed by Coos Bay-Brookings, Monterey, and Crescent City-Eureka.

Focusing on the shoreside IFQ non-whiting sector, revenues from fixed gear landings increasing from approximately 10 percent of the sector total in 2013 to 28 percent in 2018. Preliminary data show fixed gear landings were approximately 31 percent of the IFQ non-whiting sector total in

[7] See Table 9 in the NOAA Technical Memorandum NMFS-Northwest Fisheries Science Center (Leonard and Watson (2011)) for individual ports included in these port groups.

2019. For data confidentiality reasons revenue from the IFQ fixed gear sector cannot be reported for many individual ports.

Table 22. Total ex-vessel revenue (inflation-adjusted $1,000s) from groundfish landings, 2013-2019, by IOPAC port group and fishery sector. (Port groups have been aggregated to avoid disclosing confidential data, 2019 data is preliminary).

Port Group	Shoreside IFQ Non-whiting[a]	Shoreside IFQ Trawl Whiting	Non-Nearshore Fixed Gear	Nearshore Fixed Gear	Other Directed and Incidental Groundfish	Grand Total	Annual Average
Washington	22,410	41,640	44,295	0	479	108,824	15,546
Astoria-Tillamook	88,805	61,504	8,909	1,256	3,437	163,910	23,416
Newport	50,312	57,236	35,697	519	1,673	145,436	20,777
Coos Bay-Brookings	34,254	-	25,945	8,121	814	69,134	9,876
Crescent City-Eureka	30,235	-	6,934	2,378	63	39,609	5,658
Fort Bragg	14,328	-	11,434	1,419	155	27,336	3,905
San Francisco (incl. Bodega Bay)	4,095	-	8,169	1,155	403	13,822	1,975
Monterey	2,056	-	5,544	2,402	133	10,134	1,448
Morro Bay-Santa Barbara	6,845	-	24,465	10,182	1,100	42,591	6,084
Los Angeles	-	-	3,480	401	167	4,047	578
San Diego	-	-	4,490	129	113	4,732	676

Chapter 4 evaluates how harvest specifications and management measures impact the physical, biological, and socioeconomic environments. Harvest specifications affect managed groundfish stocks by setting limits on how much of each stock may be caught. It is important to note that the stock assessments and projections underlying this evaluation assume that ACLs are fully attained during the projection period as a default; that is, realized catch equals the ACL. For most stocks, however, catch has historically been less than the ACL. If roughly similar patterns persist in the 2021-22 biennial period, the actual impact of fishing mortality on the future status of most stocks is likely to be less than is forecast in the assessment projections.

4.1 Impacts of the 2021-22 Harvest Specifications

The Council and NMFS manage groundfish stocks with harvest specifications that are expected by the Council and the Council's SSC to ensure that overfishing does not occur. The Council's preferred 2021 and 2022 harvest specifications include the No Action for all stocks and stock complexes, except for cowcod south of 40°10' N lat., black rockfish in Oregon, sablefish, and shortbelly rockfish. While the No Action harvest specifications (OFLs, ABCs, and ACLs) are based on the same HCRs used in the previous biennium (2019-20), the values have changed for some important stocks resulting in different ACLs under the No Action alternative than were implemented in 2020 (Table 21). Most of these changes are based on new 2019 assessments. The largest percent difference in the ACL from 2020 to 2021 is for cowcod south of 40°10' N lat. where the ACL under the No Action alternative is almost an order of magnitude higher than in 2020 (98 mt and 10 mt in 2021 and 2020, respectively) based on the default rule described in the PCGFMP for a stock transitioning from a stock size below the target (e.g., under rebuilding) to above the MSY biomass target (e.g., rebuilt). The increase for cowcod south of 40°10' N lat. under the Council's preferred alternative is 740 percent (Table 21) discussed further below.

Increased preferred ACLs relative to 2020 are noted for cabezon, big skate, petrale sole, sablefish, and widow rockfish based on the results of new assessments for these stocks indicating a higher status and/or a higher exploitable biomass. In most other cases, the ACLs under the No Action alternative are decreasing from 2020 based on the higher sigma values used to determine ABC buffers for all stock categories. Time-varying sigmas increase with increased age of the assessment for category 1 and 2 stocks accounting for most of the changes in stocks without a new assessment in 2019. The magnitude of the decrease in ACLs from the new sigma framework was mitigated somewhat for those stocks with new catch-only projections and resulted in increased ACLs for black rockfish in Washington, darkblotched rockfish, the northern and southern lingcod stocks, and the northern and southern longspine thornyhead stocks (Table 21).

Table 23. Comparison of 2020 and preferred 2021 and 2022 groundfish ACLs. Rebuidling stocks are capitalized.

Stock/Complex	Area	ACL (mt)			% Change 2020 to 2021
		2020	2021	2022	
YELLOWEYE ROCKFISH	CW	49	50	51	2.0%
Arrowtooth Flounder	CW	12,750	9,933	8,458	-22.1%
Big Skate	CW	494	1,477	1,389	199.0%
Black Rockfish	CA	297	293	291	-1.3%

Stock/Complex	Area	ACL (mt)			% Change 2020 to 2021
		2020	2021	2022	
Black Rockfish	WA	326	348	341	6.7%
Bocaccio	S of 4010	2,011	1,748	1,724	-13.1%
Cabezon	CA	146	210	195	43.6%
California Scorpionfish	CW	307	291	275	-5.4%
Canary Rockfish	CW	1,368	1,338	1,307	-2.2%
Chilipepper	S of 4010	2,410	2,358	2,259	-2.2%
Cowcod	S of 4010	10	84	82	740.0%
Darkblotched Rockfish	CW	815	882	831	8.2%
Dover Sole	CW	50,000	50,000	50,000	0.0%
English Sole	CW	10,135	9,175	9,101	-9.5%
Lingcod	N of 4010	4,541	5,369	4,958	18.2%
Lingcod	S of 4010	869	1,102	1,172	26.9%
Longnose Skate	CW	2,000	1,823	1,761	-8.9%
Longspine Thornyhead	N of 3427	2,470	2,634	2,452	6.7%
Longspine Thornyhead	S of 3427	780	832	774	6.7%
Pacific Cod	CW	1,600	1,600	1,600	0.0%
Pacific Ocean Perch	N of 4010	4,229	3,854	3,711	-8.9%
Petrale Sole	CW	2,845	4,115	3,660	44.6%
Sablefish (Alternative 1)	N of 36	5,723	6,892	6,566	20.4%
Sablefish (Alternative 1)	S of 36	2,032	1,899	1,809	-6.6%
Shortbelly (Alternative 2)	CW	500	N/A	N/A	N/A
Shortspine Thornyhead	N of 3427	1,669	1,428	1,393	-14.4%
Shortspine Thornyhead	S of 3427	883	756	737	-14.4%
Spiny Dogfish	CW	2,059	1,621	1,585	-21.3%
Splitnose	S of 4010	1,731	1,666	1,630	-3.7%
Starry Flounder	Coastwide	452	392	392	-13.3%
Widow Rockfish	CW	11,199	14,725	13,788	31.5%
Yellowtail Rockfish	N of 4010	5,986	6,050	5,831	1.1%
Stock Complexes					
Blue/Deacon/Black Rockfish (Alternative 1 for Black Rockfish; no action for Blue and Deacon Rockfishes)	OR	611	603	600	-1.2%
Cabezon/Kelp Greenling	WA	10	20	17	100%
Cabezon/Kelp Greenling	OR	204	198	190	-3.1%
Nearshore Rockfish North	N of 4010	82	77	76	-6.2%
Nearshore Rockfish South	S of 4010	1,163	1,016	1,010	-12.6%
Other Fish	CW	239	223	223	-6.5%
Other Flatfish	CW	6,041	4,802	4,838	-20.5%
Shelf Rockfish North	N of 4010	2,048	1,511	1,450	-26.2%

Stock/Complex	Area	ACL (mt)			% Change 2020 to 2021
		2020	2021	2022	
Shelf Rockfish South	S of 4010	1,625	1,438	1,428	-11.5%
Slope Rockfish North	N of 4010	1,732	1,595	1,568	-7.9%
Slope Rockfish South	S of 4010	743	709	705	-4.5%

Additionally, as mentioned in Chapter 3, the 2015 EIS relied on ranges for projected impacts of groundfish stocks. Therefore, Table 24 provides a list of those stocks and stock complexes for which the preferred ACLs for the 2021-22 biennium are outside the projected range in the 2015 EIS. Several of these stocks have new assessments for this biennium while others have had new assessments completed in previous biennium; however the projected range of impacts was never updated. The ACLs for these stocks are discussed below.

Table 24. Stocks and stock complexes that have ACLs for 2021-22 that are outside the range provided in the 2015 EIS and these ranges have not been updated in subsequent biennium.

Oregon Black Rockfish (as part of the black/blue/deacon complex)
Big skate
Chilipepper
California Cabezon
Cowcod S. of 40°10' N. lat.
English Sole
Petrale sole
Shortbelly rockfish
Starry Flounder

4.1.1 No Action

Under the No Action alternative, the Council would use the harvest control rule from the 2019-20 biennium, which is now the default harvest control rule, and apply them to the best scientific information available for each stock or stock complex. Under this alternative, 43 stocks and stock complexes are managed by the Council and NMFS with stock, stock by area, or stock complex ACLs. Of these 43 stocks, more than half have ACLs lower under the no action alternative, using the default harvest control rule, than was implemented in the 2019-20 biennium.

Overall, under the No Action alternative, 27 stocks and stock complexes have ACLs less than or equal to what in place in 2020 (Table 24). For these stocks, if the impacts of the ACLs under the No Action alternative have already been discussed in previous analyses, then will not be discussed further here, unless there is an alternative ACL for that stock being considered for the 2021-22 biennium (i.e. cowcod south of 40°10' N. lat, petrae sole, sablefish, shortbelly rockfish, and Oregon black rockfish). However, if the impacts have not been previously discussed, or the ACLs for the 2021-22 biennium are outside the range previously analyzed (Table 25), the impacts of the 2021-22 harvest specifications for those stocks isdiscussed further below.

Table 24. No action ACLs for all stocks and stock complexes in 2020, 2021, and 2022. Rebuilding stocks are capitalized.

Stock/Complex	Area	ACL (mt)			% Change 2020 to 2021
		2020	2021	2022	
YELLOWEYE ROCKFISH	CW	49	50	51	2.0%
Arrowtooth Flounder	CW	12,750	9,933	8,458	-22.1%
Big Skate	CW	494	1,477	1,389	199.0%
Black Rockfish	CA	297	293	291	-1.3%
Black Rockfish	WA	326	348	341	6.7%
Bocaccio	S of 4010	2,011	1,748	1,724	-13.1%
Cabezon	CA	146	210	195	43.6%
California Scorpionfish	CW	307	291	275	-5.4%
Canary Rockfish	CW	1,368	1,338	1,307	-2.2%
Chilipepper	S of 4010	2,410	2,358	2,259	-2.2%
Cowcod	S of 4010	10	98	96	880%
Darkblotched Rockfish	CW	815	882	831	8.2%
Dover Sole	CW	50,000	50,000	50,000	0.0%
English Sole	CW	10,135	9,175	9,101	-9.5%
Lingcod	N of 4010	4,541	5,369	4,958	18.2%
Lingcod	S of 4010	869	1,102	1,172	26.9%
Longnose Skate	CW	2,000	1,823	1,761	-8.9%
Longspine Thornyhead	N of 3427	2,470	2,634	2,452	6.7%
Longspine Thornyhead	S of 3427	780	832	774	6.7%
Pacific Cod	CW	1,600	1,600	1,600	0.0%
Pacific Ocean Perch	N of 4010	4,229	3,854	3,711	-8.9%
Petrale Sole	CW	2,845	4,115	3,660	44.6%
Sablefish	N of 36	5,723	6,435	6,124	12.4%
Sablefish	S of 36	2,032	1,765	1,679	-13%
Shortbelly	CW	500	N/A	N/A	N/A
Shortspine Thornyhead	N of 3427	1,669	1,428	1,393	-14.4%
Shortspine Thornyhead	S of 3427	883	756	737	-14.4%
Spiny Dogfish	CW	2,059	1,621	1,585	-21.3%
Splitnose	S of 4010	1,731	1,666	1,630	-3.7%
Starry Flounder	Coastwide	452	392	392	-13.3%
Widow Rockfish	CW	11,199	14,725	13,788	31.5%
Yellowtail Rockfish	N of 4010	5,986	6,050	5,831	1.1%
Stock Complexes					
Blue/Deacon/Black Rockfish (Alternative 1 for Black Rockfish; no action for Blue and Deacon Rockfishes)	OR	611	603	600	-1.2%
Cabezon/Kelp Greenling	WA	10	20	17	100%

Stock/Complex	Area	ACL (mt)			% Change 2020 to 2021
		2020	2021	2022	
Cabezon/Kelp Greenling	OR	204	198	190	-3.1%
Nearshore Rockfish North	N of 4010	82	77	76	-6.2%
Nearshore Rockfish South	S of 4010	1,163	1,016	1,010	-12.6%
Other Fish	CW	239	223	223	-6.5%
Other Flatfish	CW	6,041	4,802	4,838	-20.5%
Shelf Rockfish North	N of 4010	2,048	1,511	1,450	-26.2%
Shelf Rockfish South	S of 4010	1,625	1,438	1,428	-11.5%
Slope Rockfish North	N of 4010	1,732	1,595	1,568	-7.9%
Slope Rockfish South	S of 4010	743	709	705	-4.5%

4.1.1.1 Physical Environmental Impacts

To understand the impacts to the physical environment under the No Action alternative these impacts are discussed holistically for the groundfish fisheries. Changes to the physical environment can result from opening or closing areas to different gear types, as well as increasing or decreasing effort in areas. Additional details on stock specific impacts to the physical environment are discussed only for those stocks where the impacts have not been disclosed in previous analyses.

4.1.1.1.1 EFH (Bottom Substrate)

The No Action alternative is not expected to significantly impact groundfish EFH beyond those impacts previously disclosed in the 2015 EIS. Section 4.1.1 in the 2015 EIS evaluates the long-term impacts of groundfish fishery management on EFH. Effects on EFH are a function of the distribution of fishing effort by gear type. Generally, for a given habitat type, trawl gear use in fisheries is likely to have a greater effect than other bottom contacting gear types (e.g., demersal longline and pot gear, recreational gear), because the contact is more extensive (See Appendix C of the PCGFMP for more details).

To be consistent with the discussion for 40 fm San Mateo, and to substantiate a finding, please indicate what is the net area opened/closed by the proposed change for each area in 2.2.3 and address each of these individually (talking about EFHCAs, HFIs, gear, etc), by fishery (trawl, rec, commercial) and discussing changes based on openings and ACLs, and then an overall summary of net effects with a conclusion justifying the significance finding.

- Waypoint correction – 40fm San Mateo (6.3mi2)
- 100fm crossover correction S of 34-27
- Commercial - 30 to 40 fm change from 40-10 to 46-16 with only hook and line
- Commercial - 40 to 50 fm P.Arena to Conception
- Commercial - 75fm to 100 fm (Conception to Mexico)
- Recreational - 20 to 30 fm S of 40-10 rec (Mendecino to Arena)
- Recreational- 75fm to 100 fm (Conception to Mexico)

- Recreational - 40 fm to 50 fm Arena to Pigeon
- YRCA

Trawl Impacts

When considering the stocks with ACLs increasing in 2020-21, only big skate, petrale sole, and widow rockfish are trawl dominant species caught with high attainment percentages by groundfish trawl fisheries. Of these three species, big skate and petrale sole are caught primarily with bottom trawl gear over soft bottom; whereas widow rockfish is a midwater rockfish species. Sablefish north of 36° N. lat. is harvested by both bottom trawl and by midwater gear as bycatch in the whiting fishery. Shortbelly rockfish is primarily caught as bycatch in the whiting fisheries using midwater gear.

Increases in the ACLs for petrale sole, big skate and sablefish are expected to result in additional harvest in the IFQ bottom trawl sector. As these species are predominantly found over soft bottom, increased effort to target these species could result in a negative impact to that habitat type; however, as described in both Appendix C of the PCGFMP and in Section 4.1.1 of Amendment 28 EIS, soft bottom substrate is the fastest to recover from fishing gear disturbances. Therefore, any impacts would likely be short-term. As no new areas would be open to trawl gear under the proposed action, the overall impact of the increased ACLs on EFH for these trawl dominant species is similar to the impacts disclosed in the 2019-20 harvest specifications and management measures, as well as Amendment 28 to the PCGFMP.

Midwater gear is associated with little overall impact on bottom habitat as it is believed that gear does not tend to touch bottom habitat (Section 4.2 of Appendix C to the PCGFMP). Impacts of the midwater trawl to bottom habitats when they do come into contact are likely to be similar to what is described for bottom trawls over similar habitats, though the geographic extent and frequency of impacts would be much smaller (Appendix C Part 1. of the Pacific Coast PCGFMP) (Whitmire and Wakefield, 2019).

While the ACLs are for slope rockfish south of 40° 10' N. lat. are lower than those in 2020 under the No Action alternative, the Council recommended a change to slope rockfish south complex management of blackgill rockfish and other slope rockfish species. Historically, the stock complex was managed under Amendment 21 allocations, which allocated 63 percent to trawl and 37 percent to non-trawl. For 2021-2022, the Council recommended creating custom allocations of blackgill rockfish and the other slope species within the slope rockfish complex. Blackgill rockfish south of 40°10' N. lat. is to be allocated 41 percent to trawl, 59 percent to non-trawl; the other slope rockfish complex south of 40°10' N. lat. species are allocated 91 percent to trawl, 9 percent to non-trawl.[8] While this change may incrementally increase the amount of other slope species taken with trawl gear and increase the amount of blackgill rockfish taken with non-trawl gear, the impacts to EFH are not expected to be significantly different than previously anticipated as the overall harvest levels for these species remains the same. Even if additional trawl effort were to occur under the higher ACLs or with the reallocation of the southern slope complex, the impacts of any additional

[8] For the distribution of the ACLs, see Table 4-65 of Agenda Item F.1., Attachment 8, June 2020.

effort would be limited to those areas not designated as prohibited to bottom trawl gear under federal regulations at 50 CFR 660.12.

Non-Trawl Impacts

There are recommended changes to the non-trawl and recreational RCAs in the 2021-2022 biennium. In places where the non-trawl and recreational RCAs overlap with EFHCAs, the EFHCA protections would remain in place and are not impacted by this rule. None of the recommended changes are expected to impact EFH as they are opening fishing area to non-trawl gears, which have a smaller impact than trawl gear, and/or are providing access to areas already open to other gears.

Between 40°10' - 46°16' N. lat.(Northern California and Oregon)

Gear impacts to habitat are fully disclosed in Agenda Item F.1, Supplemental GMT Report 4, June 2020. In summary, non-trawl gear (e.g., pot, longline, etc.) will cause some level of habitat disturbance; however, due to the lack of data surrounding the impact of these gear types on habitat in the eastern Pacific, the extent of the impact is uncertain and difficult to quantify; therefore must largely be described qualitatively. Any impacts can be mitigated through the Council's ability to reduce catch through decrease in bag and trip limits for LEFG and open access fisheries, as well as their ability to close these areas again, inseason. In addition to limiting effort via gear types, VMS requirements may also limit new participation in this area given that VMS is required to retain groundfish in federal waters, and for that reason many folks choose not to fish in federal waters, and as the state waters boundaries lie within the 30-40 fm depth bin, prohibitive for some fishermen.

Overall gear impacts are described in Appendix C-1 of the PCGFMP and notes some gear may have higher impacts than other gear types. Components of gear that contact the seafloor (e.g., weights, pots, mainline, etc.) has the potential to disturb bottom habitat from such means as gear landing footprint, dragging or sweeping across the bottom, hooking or snagging habitat forming invertebrates, etc. Across all bottom types, average impacts in terms of both habitat sensitivity and recovery time are low. In terms of habitat impacts, and as noted in Appendix C-1, of the three general bottom type categories (hard, mixed, soft), hard bottom is the most sensitive to fixed gear compared to the other two bottom types (mixed and soft). Though counter to sensitivity, recovery time is lowest for hard substrates and highest for soft bottom. In general, recreational gear has a low habitat impact relative to commercial gear. Recreational gear in general has limited bottom contact but weights and hooks can impact rocky reef and habitat forming invertebrates. The impacts to habitat are likely to be incremental as fishermen return to these areas. Cumulatively, impacts will link to area use and overlap of recreational and commercial effort.

For the commercial non-trawl RCA changes off of Oregon and California, the habitat impacts are could increase over what is currently occurring in these areas due to the introduction of additional effort from the non-trawl commercial fishery. Between 40° 10' N. lat. and 46° 16' N. lat, the shoreward boundary of the non-trawl RCA would be moved from 30 fm to 40 fm; however, only hook and line gears, with the exception of dinglebar and longline (defined at 50 CFR 660.11), would be allowed in this area. Longlines and dinglebar gear were excluded from the allowed gear list as there is more uncertainty around the amount of activity (and therefore impacts) that may occur in that depth bin with these gears Pot gear was also not included in the recommended gear types as it would have greater habitat impacts than hook-and-line gear.

While it is assumed that there could be additional impacts from non-trawl gear, it is unlikely that these impacts would be consistent across the coast. As described in Agenda Item F.1.a, Supplemental GMT Report 4, June 2020, while there are other fisheries, including recreational fisheries with similar gear types, operating in the area to be opened, there could be localized impacts to rocky reefs in certain areas where little recreational fisheries currently occurs (e.g., Port Orford) and where commercial fishermen could congregate. However, overall impacts are still likely to be less than the current recreational fishery that takes place in this area due to the higher volume of fishermen in the recreational fishery.

South of 40° 10' N. lat.,

The shoreward boundary would be moved from 40 to 50 fm from 38° 57.5' N. lat.- 34° 27' N. lat and 75 to 100 fm south of 34° 27' N. lat. As described in Agenda Item F.1.a, Supplemental GMT Report 4, June 2020, other fishing activity, including trawling, is allowed in these areas. Specifically, for the area between Point Arena and 34° 27' N. lat., hook and line gear is already allowed for non-groundfish targeting in addition to other trawl fisheries (Table C-7 in Agenda Item F.1.a, Supplemental GMT Report 4), therefore there is likely little additional impact to sensitive habitats in this areas.

For the changes south of 34° 27' N. lat., there are bottom contact gears (bottom trawl, pot, and hook and line fisheries) being used to target fish and invertebrates between 75-100 fathoms (see Table C-12 in Agenda Item F.1.a, Supplemental GMT Report 4), However, as noted in that report, hard substrate would be open to additional effort near the Channel Islands (primarily west of Anacapa Island and southeast of Santa Rosa Island). Given that it would be opening these areas up to hook and line gear to target rockfish, there are likely additional negative impacts; however, the extent of these impacts is uncertain and can be mitigated inseason through trip limits and closing this areas of the nontrawl RCA if needed.

As noted in Appendix C of the PCGFMP, hook and line gear has low impact to hard non-biotic structures, i.e. rocks. Areas with habitat forming invertebrates (e.g., sponges, corals) could experience localized impact; however, the resiliency of these organisms to hook and line gear is high. Changes to the 40 fm and 100 fm non-trawl RCA waypoints (as described in Agenda Item F.1., Attachment 8, June 2020) would provide corrections to better align the boundaries with depth contours. The 40 fm corrections would increase the amount of available fishing area by 6.3 mi^2. An evaluation of the NOAA Deep Sea Coral database reveals that these modifications do not open any fishing areas that overlap areas known to support deep sea coral ecosystems. For the 100 fm corrections, current waypoints for the 100 fm boundary crossover the current 75 fm boundary line. Under the recommended configuration for south of 34° 27' N. lat. discussed above, the crossover points of the 100 fm boundary and the existing boundaries would inadvertently create new closed areas for those fisheries using the 75 fm boundary; therefore, the Council recommended the aforementioned waypoints to correct this issue. This measure would also create a 100 fm line around the northern Channel Islands, where there are only 75 and 150 fathom boundaries available.

Recreational Impacts

For the recreational RCA changes off of California, as shown in *Table 26* below, the Mendocino recreational management area is currently open in all depths during November and December, therefore, no new areas within this management area are proposed to be opened. Furthermore, other hook and line gears and trawl gears operate in this area as shown in Agenda Item F.1.a,

Supplemental GMT Report 4, June 2020 (Table C-6). For the San Francisco and Southern recreational management areas, the openings are the same as those recommended for the commercial fishery above. The impacts would therefore likely be the same as described under the commercial RCA changes or potentially less given that recreational fishers harvest with hook and line gear as opposed to pot or longline gear. However, as above, it would be opening rocky substrate areas around the Channel Islands up to hook and line gear to target rockfish, and therefore, there are likely result in some minor additional negative impacts over what is currently occurring. However, as with all closures discussed in this document, the Council has the ability to close these areas again inseason if there are concerns about impacts.

Off Washington, the Council recommended opening the Westport Offshore YRCA and the South Coast YRCA (shown in Figure 4-23 of Agenda Item F.1., Attachment 8, June 2020) to recreational fishing for groundfish and halibut year-round. This recommendation would open up a total of five square miles off the Washington coast to recreational fishing. As described in Agenda Item F.1.a, Supplemental GMT Report 4, June 2020, commercial fishing is currently allowed in these areas. Furthermore, there are minimal sensitive habitats, such as rocky reefs or corals, within these areas (see Figure A-1 in Agenda Item F.1.a, Supplemental GMT Report 4, June 2020). Therefore, the habitat impacts are expected to be neutral.

The overall impacts to the physical environments of all area management proposals are unlikely to be significant. While there is likely to be some impacts to habitat, areas that are currently protected from bottom contact gear will remain closed and all groundfish species impacts are likely to be within allowable catch limits. Additionally, all areas that are proposed for opening are already open to other fisheries with both similar and dissimilar gears. Opening these areas to other gear groups or sectors is not likely to result in a significant increase in negative impacts to habitat.

4.1.1.2 California Current Ecosystem

The No Action alternative is expected to have similar impacts on the CCE to those impacts previously disclosed in the 2015 EIS and updated through subsequent biennium.

As discussed in Chapter 3, the IEA State of California Report for 2020 characterizes the current status of the CCE. The 2015 EIS evaluated the effect of groundfish fishery removals under different harvest polices on trophic composition and interactions (see Section 4.5 in the 2015 EIS). Ongoing management of the fishery under No Action alterantive would not have discernable impacts different from those disclosed in that 2015 EIS given that the No Action does not change the overall groundfish catch composition, general gear types used, or interactions with the CCE.

4.1.1.3 Biological Environmental Impacts

The biological impacts discussed below include: (1) impacts by stock or stock complex under the No Action alternative for target stocks with ACLs in the 2021-22 biennium that are higher than those implemented through the 2019-20 biennium but still in the projected range in the 2015 EIS, (2) impacts under the No Action by stock or stock complex for stocks with alternative specifications considered in the 2021-22 biennium (3) impacts by stock or stock complex under the No Action alternative for target stocks with ACLs in the 2021-22 biennium that are outside the

range provided for impacts in the 2015-16 EIS and which have not been discussed in subsequent biennium, (4) protected resources, and (5) prohibited resources

Stocks and Stock Complexes with ACLs Increases in 2021-22

Big Skate

Under the No Action alternative, the default harvest control rule for big skate (P* of 0.45) is applied to the 2019 stock assessment information, which was the first full assessment completed for big skate. ACLs are set equal to the ABCs and would be 1,477 mt and 1,389 mt in 2021 and 2022, respectively. These ACLs represent an average increase of 190 percent from 2019 and 2020 (494 mt). While the assessment is uncertain in terms of the scale of the population, the previous harvest specifications were based on data poor methodology, which likely underestimated the size of the population (Taylor, et. al., 2019).

Big skate was declared an EC species in 2015-16 but was brought back "into the fishery" with management via trip limits in 2017-2018 after the species was discovered to be targeted by bottom trawl vessels in the IFQ fishery in 2014. However, attainment in 2018-2019 declined to less than 50 percent as the vessels that mainly targeted big skate retired from the fishery. Attainment is expected to remain at levels similar to 2018-2019 in the 2021-2022 biennium. This is based on the trawl mortality estimates, which decreased from a high of 431.8 mt in 2014 to only 148.5 mt in 2018. (Agenda Item H.8.a, Supplemental GMT Report 3, November 2019, and Section 4.4.4.1 of Agenda Item F.1., Attachment 8, June 2020). Based on the 2019 assessment, the stock is expected to stay above B_{40} even assuming full ACL removals, which has not occurred since big skate was brought back into the fishery.

Given the increase in the ACLs and the lack of effort seen in recent years, the Council recommended that the trip limit for big skate in the IFQ fishery be unlimited. Catch of big skate in the IFQ fishery is expected to increase with an unlimited trip limit, but to what degree is uncertain because most vessels were rarely catching the lower trip limits in 2019, the last year for which we have complete data. An unlimited trip limit would allow IFQ participants more opportunity to target big skate when there is market demand, which industry indicates can be intermittent. If attainment rates were to unexpectedly increase by high amounts, then the trip limit could be reduced inseason.

California Cabezon

As described in Section 2.4, the new 2019 assessment for California cabezon showed both portions (north and south of 40° 10' N. lat.) of the stock above B40 and at a higher stock biomass than the previous assessment. Under the default harvest control rule (P*=0.45 and ABC=ACL) and full ABC attainment, both portions of the stock are expected to be at 44.9 percent (north) and 43.9 percent (south) of their biomass by 2030. For 2021 and 2022, the ACLs are 43.6 percent and 33.6 percent above the 2020 ACL respectively (Table 21).

For the 2021-2022 biennium, 1.28 mt is deducted from the ACL to account for expected mortality in the IOA fisheries, research, and EFPs. California cabezon is primarily taken south of 40° 10' N. lat. in the nearshore and recreational fisheries, with approximately 80 percent of the total directed fishery mortality taken in the area in 2019. Overall, the total attainment has declined in the last few years, with 2019 ACL attainment estimated at 32 percent (PacFIN scorecard). This

decline in attainment could be due to change in recreational sampling methods in the CERFS program in addition to a shift in the fishery to deeper depths with RCA changes that have occurred over recent years.

The Council recommended removing the sub-bag limit for cabezon within the California recreational fishery of three fish and allowing anglers to take up to 10 as a part of the rockfish/cabezon/greenling bag limit of 10 fish, which is expected to only increase mortality by less than two mt (Agenda Item F.1., Attachment 8, June 2020). For the nearshore fisheries, mortality is expected to increase from 22.9 mt in 2019 to 65 mt in 2021-2022. While the federal trip limit tables have an unlimited trip limit for cabezon, the state of California has trip limits in place and also require the use of a shallow nearshore permit for commercial take. The 65 mt is the maximum expected mortality based on the informal recreational/commercial shares of the non-trawl allocation and the expectation for more entrants with the deeper and shallow nearshore permits now transferable allowing for easier access.

Under the proposed RCA changes described under Section 4.1.1.1.1, there are no additional expected impacts to California cabezon as depths in which cabezon occupy are already available to participants. Given recent historical trends and under the preferred management measures, total mortality is expected to remain below the ACL.

Washington Cabezon/Kelp Greenling

Washington cabezon had never been assessed prior to 2019. For 2019-2020, a DB-SRA was used to determine OFLs. Based on the Simple Stock Synthesis model in 2019, cabezon off Washington were estimated to be at a depletion of 65 percent in 2018 using length-based spawning potential ratio. Washington cabezon is managed in a complex with kelp greenling, whose overall complex ACL increased from 10 mt in 2020 to 20 mt in 2021 and 17 mt in 2022. The majority of the increase for the complex was a result of the new 2019 assessment for Washington cabezon, which increased from 4.5 mt in 2020 to 14.2 mt in 2021 and 11.6 mt in 2022 under a P* of 0.45. Under the new sigmas for the 2021-2022 to address increased uncertainty with stock assessments, the kelp greenling ACLs decreased from 5.9 mt in 2020 to 5.5238 mt in 2021 and 2022.

Prior to 2019-20, cabezon was managed as a part of the Other Fish complex. In 2017 and 2018, catches exceeded the component OFLs. In order to address these overages, in 2019, the Council began managing Washington cabezon and kelp greenling in a single complex and reduced the recreational bag limit to one cabezon in all marine areas to control catch in addition to removing the size limit. The 2019 preliminary data shows that total mortality of 10.65 was within the complex ACL of 11 mt, however, cabezon catches of 9.01 mt exceeded the component OFL of 5.5 mt; however, this OFL was based on the prior assessment.

The Treaty tribes will manage to a 2 mt cabezon set aside. This set-aside is new for 2021-2022 and results in an HG of 18 mt and 15 mt, respectively, for 2021 and 2022. The Treaty tribes historically have encountered this species in their nearshore hook and line fisheries in low amounts. Under the Council's preferred season structure for Washington recreational fisheries, the bag limit will still remain at one cabezon in all marine areas. Mortality for the complex is projected to be 10.64 mt under the Council's preferred recreational management measures for 2021-2022, with mortality for cabezon expected to be within the component ACL.

It is unlikely that the recommended removal of the YRCAs off of Washington will cause impacts to the cabezon/kelp greenling complex as the majority of cabezon is caught off northern Washington and the YRCAs are likely too deep for cabezon/kelp greenling habitat.

Lingcod north of 40°10' N. lat.

As described in Table 2-3, lingcod is assessed north and south of the Oregon-California border (42°N. lat.) and then the biomass is apportioned north and south of 40° 10' N. lat. for management purposes. Based on the 2019 catch only update for lingcod north of 42° N. lat. which used actual 2017 and 2018 catches in the 2017 assessment model, the respective ACLs for lingcod north of 40°10' N. lat. for 2021 and 2022 increased by 18 percent and 9 percent compared to 2022. Based on the new projections, the northern lingcod stock (north of 42° N. lat.) is expected to be at 42.8 percent depletion by 2030 even under full ACL attainment. However, attainment is likely to be less than full ABC removals. Even with changes in the stock status of yelloweye rockfish allowing for liberalizations of management measures in 2019, ACL attainment for lingcod north of 40° 10' N. lat. is estimated at 21 percent (PacFIN Scorecard).

In 2021 and 2022, 278 mt are to be deducted from the ACL in each year to account for tribal harvest, research, IOA fisheries, and EFPs. The resulting fishery HG for 2021 is 5,090.6 mt and for 2022, 4,679.6 mt, which are then allocated to the fisheries with 45 percent to trawl and 55 percent to non-trawl. For the 2021-2022 biennium, the Council is proposing to increase trip limits as a part of its precautionary ramp up strategy to provide more access with the rebuilding of yelloweye rockfish; however, the largest barrier to increased attainment of lingcod is access to areas currently closed to fixed gear by the non-trawl RCA. Under the proposed action, the non-trawl RCA would remain in place between 40 and 75 fms, and therefore the low attainment trends are expected to remain in 2021-2022.

With increases to lingcod trip limits and changes to the non-trawl RCA, there are potential impacts to yelloweye rockfish. In 2019-2020, yelloweye rockfish in the non-trawl sectors were managed with sector specific HGs and ACTs (2019-2020 Biennial Harvest Specifications EA). For 2021-2022, the Council recommended merging the non-nearshore and nearshore HGs and ACTs to provide greater flexibility in managing co-occurring stocks (such as lingcod) as the nearshore and non-nearshore fisheries are subject to the same trip limits. Under the recommended trip limits (see SectionXTZ)) and the RCA changes, yelloweye rockfish mortality is expected to increase by 1.3-1.8 mt compared to No Action, but will remain well within the ACTs and HGs for 2021-2022.

Table 25. Yelloweye rockfish projected mortalities for 2021-2022 under the preferred trip limits for LE and OA fixed gear and RCA recommended changes compared to No Action.

Option	Projected mortality	ACT	HG
No Action	3.2	6.2 (2021) 6.4 (2022)	7.9 (2021) 8.1 (2022)
Recommended trip limits and RCA structure	4.5-5		

Lingcod south of 40° 10' N. lat.

Under No Action specifications (P*=0.45, ABC=ACL), the ACLs for lingcod south of 40° 10' N. lat. saw a 26.9 percent increase from 2020 to 2021 and 34.9 percent for 2022. Based on the new projections from the catch only update, the southern lingcod stock (south of 42° N. lat.) is expected to be below B40 by 2030 with depletion at 37.3 percent if ACLs are fully attained annually. However, given historical trends as discussed above for lingcod north and shown in Table 4-63 of Agenda Item F.1., Attachment 8, June 2020, it is likely that the stock will continue to be under attained, especially with the non-trawl RCA expected to remain in place in most areas between 40 and 75 fms.

There are 13 mt taken off the top of the ACL to account to estimated mortality in research activities, IOA fisheries, and EFPs, resulting in fishery HGs of 1,089 mt and 1,159 mt for 2021-2022. The Council adopted a two-year allocation structure for lingcod south of 40°10′ N. lat. of 40 percent trawl and 60 percent non-trawl, which moved five percent from the trawl sector allocation under Amendment 21 (45 percent) to the non-trawl sector (55 percent in 2020). Trawl sector attainments in the south have averaged 11 percent per year since 2017, with a maximum of 18 percent in 2018; whereas, the non-trawl sector has averaged 63 percent in the same period, with a maximum of 74 percent. This preferred allocation scheme is not expected to constrain trawl fisheries on the fleet or individual level, while still allowing for reestablishment of the IFQ fisheries off California (see Agenda Item G.6.a, Supplemental GMT Report 1, April 2020). For 2021-2022, there are increases to the LE and OA trip limits in addition to maintaining a two fish recreational bag limit for lingcod in all management areas. Even with the increases in trip limits and the modifications to the non-trawl RCAs described above in Section 4.1.1.1.1, the projected catch is 490 mt, well within the non-trawl allocations of 653.4 mt and 695.4 mt for 2021-2022.

As described above for lingcod north, even with the potential increase in lingcod catch, the overall projected yelloweye rockfish mortality is within the 2021-2022 ACTs and HGs (Chapter 2, YE rockfish table).

Widow rockfish

Based on the 2019 update assessment and the default harvest control rule (P* of 0.45), the 2021 and 2022 ACLs for widow rockfish are 14,725 mt and 13,788 mt under No Action. These represent an increase of 3,526 mt and 2,589 mt from 2020. Widow is estimated to be at 91.9 percent depletion in 2019 and the stock is expected to remain well above B40 by 2030 even with full ACL removals. Widow rockfish are one of the most abundant and economically important groundfish stocks on the West Coast. The vast majority (97.8 percent) of total mortality for all groundfish fisheries in 2019 was attributed to the IFQ sector, of which they are the main target stock of the mid-water rockfish trawl fishery that re-emerged in 2017. Widow rockfish are also encountered as bycatch in the at-sea (and shoreside) whiting fisheries and are a relatively minor target stock in the recreational and fixed gear fisheries (2002-2019 average = 10 mt; maximum = 31 mt).

In the 2021-2022 biennium, 248.3 mt would be deducted from the ACL to account for off-the-top deductions. Historically, widow rockfish has been managed under the Amendment 21 formula in which 91 percent of the fishery harvest guideline was allocated to trawl and nine percent to non-trawl. However, under the Council's preferred alternative, widow rockfish would become a two year allocation species with 400 mt of the fishery harvest guideline allocated to non-trawl in 2021-2022 and the remainder to trawl. While the Council recommended increases to trip limits and

liberalizations to the non-trawl RCA (discussed in Section 4.1.1.1.1) which could increase widow catch in the non-trawl sector, total mortality is projected to remain well within the 400 mt allocation and not constrain fisheries. The Council chose to select a set aside value of 476 mt, the historical maximum mortality from 2015-2019, for the at-sea sectors, as opposed to maintaining the Amendment 21 structure which would have set aside 764.1 and 714.6 mt for 2021-2022. The latter would have likely stranded between 200-500 mt in the at-sea sector that could also be used in the IFQ sector. Even with increased quotas, the attainment of widow rockfish in the IFQ sector is projected to remain high at approximately 92 percent given recent attainment trends (~95 percent in 2018-2019) with the re-emergence of the midwater rockfish fishery (see Table 4-22 of Agenda Item F.1., Attachment 8, June 2020).

With increases in the widow rockfish ACL, there could be associated increases in catch of yellowtail and canary rockfish, as these species co-occur in the midwater. However, even with these potential increases, there is no risk to the ACL as overall attainment of these stocks is expected to remain similar to recent years, with canary rockfish at an estimated 39 percent and yellowtail north of 40° 10' N. lat at 59 percent in 2019 (PacFIN scorecard). Conclusion?

Stocks and Stock Complexes with Alternative Harvest Specifications in 2021-22

Oregon black rockfish

In 2019-2020, the Council recommended managing Oregon black rockfish within a complex with Oregon blue/deacon rockfish. Under the No Action harvest control rule (ABC=ACL, P*=0.45), the complex ACLs would decrease by 41 and 49 mt compared to 2020 (611 mt) due to the time based sigma penalty associated with the stock assessment. The primary driver of the decrease is black rockfish, whose component ACL decreased by 33 mt and 39 mt compared to 2020.

For the 2021-2022 biennium, 2.32 mt is deducted off-the-top for research activities, EFPs, and IOA fisheries, resulting in a fishery HG of 567.7 mt and 559.7. There is no trawl allocation for the complex, but the Oregon Department of Fish and Wildlife use the component ACLs as the basis for state allocations between the recreational and commercial non-trawl fisheries (described in Section 4.4.6.5 and 4.4.9 in Agenda Item F.1, Attachment 8, June 2020). Black rockfish in Oregon is one, if not the most, constraining species to the recreational and commercial nearshore fisheries. The recent ACLs and catch levels have resulted in inseason actions at the state level to lower trip limits, bag limits, or implement depth restrictions in recent years to keep catch within the HG. The estimated 2019 attainment is approximately 71 percent, with the Oregon recreational fleet as the primary source of fishing mortality(52 percent) followed by the commercial nearshore fleet (19 percent). The trends are expected to continue in 2021-2022. Based on past performance, the state of Oregon is expected to manage to their within-state HGs. With the proposed RCA changes described at Section 4.1.1.1.1, there may be additional impacts to the stock complex with increased effort expected within the 30 to 40 fm opened area off the Oregon coast. However, the state of Oregon will manage to the within state HGs for the complex to prevent catch from exceeding the ACL. Additionally, the Council can recommend changes to trip limits or could close this part of the RCA to reduce impacts to the stock complex.

C*owcod south of 40°10' N. lat.*

Based on the 2019 stock assessment, cowcod is rebuilt at an estimated 57.1 percent depletion in 2019. Under No Action, cowcod would be managed with a harvest control rule of ACL = ABC

(P*=0.45), resulting in a 98 mt ACL in 2021 and a 96 mt ACL in 2022. This represents an 88 and 86 mt increase from the 2020 ACL, respectively. As described in Section Chapter 3, the cowcod stock is projected to be at 56 percent depletion under the base case assuming full ABC removals by 2030. However, under the low state of nature assuming full ACL attainment, the stock would fall below B_{40} to 35.6 percent under full ABC removals. Given the uncertainty and Council's decision to be precautionary, the Council set an ACT of 50 mt to manage to, which is not expected to constrain fisheries.

The trawl allocation would continue to be set at 36 percent of the fishery HG, and would be 18 mt. The entire trawl allocation is allocated to the IFQ fishery since there are no at-sea set-asides for cowcod due to the prohibition on processing at-sea south of 42° N. lat. Trawl effort is predicted to remain low in the species center of abundance, the Southern California Bight, where average trawl mortality while the stock was overfished was less than 1 mt per year. However, historical trawl landings in this area were oftentimes as high as 40-60 mt per year during the 1960s-1980s (see Figure 5 of the 2019 Cowcod assessment). Future IFQ attainments may continue to be at lower levels similar to the overfished era due to the reduction in the fleet and the 2020 closure of the California Bight to bottom trawl as a new EFHCA (Amendment 28 to the PCGFMP).While additional IFQ cowcod impacts would be expected in 2021-22, as all trawl sector mortality is managed with quota and 100 percent monitoring, it is still expected to be below the trawl allocation.

The remaining 64 percent would be allocated to the non-trawl sector, where cowcod landings are to remain prohibited. There are no survival credits provided to commercial fisheries due to the depth fish are typically caught; however, in the recreational fishery, there are credits provided with the use of descending devices in depths of less than 50 fm (Table 1-19 in SAFE document). Even with the descending device credits, the recreational fishery is the primary source of mortality for cowcod, which is monitored inseason by the California Recreational Fishery Survey (Table 1-11 in Agenda Item F.1., Attachment 8, June 2020).

With the proposed changes to the RCAs outlined in Section 4.1.1.1.11 above, there are potential additional impacts to cowcod. Specifically, more cowcod habitat will become accessible with the change of the shoreward boundary from 75 to 100 fm for the Southern Management Area in the recreational fisheries or south of 34°27' N. lat. for the commercial non-trawl RCA. However, projected impacts are expected to be well within the commercial and recreational HGs of 16 mt respectively (see Table C-3 and page 19 of Agenda Item F.1.a, Supplemental GMT Report 4, June 2020). For the commercial fisheries specifically, there are no proposed changes to the CCA boundaries and the Council will continue to prohibit retention of cowcod (thereby incentivizing avoidance), in order to remain precautionary in response to the uncertainty in the assessment. For the recreational fisheries, cowcod mortality will be monitored inseason by CDFW, who can implement season, depth, or bag limits as needed to mitigate additional mortality and stay within the recreational HG.

Considering the combination of reporting found in both trawl and non-trawl sectors, the projected catch, and the amount between the ACT and ACL, the risk of exceeding the ACL is very low.

Significance conclusion especially given the rebuilding?

Petrale sole

Under the No Action alternative, the default harvest control rule for petrale (P*=0.45) is applied to the 2019 updated stock assessment information. ACLs are set equal to ABCs and would be 4,115 mt and 3,660 mt in 2021 and 2022, respectively. These ACLs represent an increase of greater than 28 percent over the petrale ACL in 2020 (2,845 mt) which is a result of the new stock assessment. Petrale sole, which is a trawl dominant stock, has been highly attained over the past few years with more than 88 percent of the stock's ACL attained in each of the past four years (2016-2019), including in 2017 when the ACL was just barely exceeded (100.38 percent). It is likely that a similar attainment trend would continue even under higher ACLs. The stock is estimated to be around 39 percent depletion in 2019, and under No Action, would have a low likelihood of declining below the management target for flatfish of 25 percent in the next ten years.

Under the No Action alternative, 387.5 mt of petrale would be deducted from the ACL to accommodate natural mortality in research, tribal, incidental open access, and exempted fishing permits. The majority of the off-the-top deduction (350 mt) would go to the Tribal fisheries to account for catch in those fisheries. This is an increase of 60 mt over the 2019-20 Tribal off the top deduction of 290 mt. Petrale sole is a high attainment stock within the treaty small footrope bottom trawl fishery. The treaty set aside was fully attained in both 2016 and 2018, when the set aside was 220 mt. In 2021-22, the Quinault Indian Nation will continue to exercise their treaty rights to groundfish and plan to develop a bottom trawl fishery. The additional petrale sole would provide the Tribes with enough petrale to cover anticipated mortality in 2021 and 2022. The 2005-2018 average value of 13.3 mt of petrale sole is expected to accommodate annual IOA bycatch, as they have taken less than that each year during the IFQ era (2011-2018).

The Council adopted a new two-year allocation structure for petrale sole whereby 30 mt would be allocated to the non-trawl sector with the remainder to trawl for 2021-2022. This is a change from previous biennium in which it was managed under a 95 percent trawl, 5 percent non-trawl split. This change will reduce the non-trawl sector's allocation by shifting 156.4 mt in 2021 and 133.6 mt in 2022 to the trawl sector. The non-trawl allocation of 30 mt is nearly double the historical maximum mortality (since 2002), and predicted mortality for 2021 and 2022, of 14 mt. Therefore, the change to the trawl/non-trawl allocation is not expected to constrain the non-trawl sector and will provide much needed petrale to the trawl sector. While mortality has historically been low (0.002 mt combined from 2011-2019), the Council recommended maintaining the set aside of 5 mt from the trawl allocation for the at-sea whiting fisheries as in the 2019-2020 biennium. Attainments in the IFQ sector, which receives the remainder of the trawl allocation, are expected to remain above 99 percent. (See Table 4-22 of Agenda Item F.1., Attachment 8, June 2020).

Sablefish north of 36° N. lat.

Sablefish is assessed coastwide and managed north and south of 36° N. lat. As of 2020, the stock is expected to be above B40 and therefore no longer managed with the 40:10 rule applied to precautionary zone stocks (See section 4.6.1 of the PCGFMP). Under the No Action harvest specifications with a ABC=ACL and a P*=0.4 and assuming full ACL removals, the stock is expected to remain above 40 percent depletion in the next ten years reaching 45.12 percent in 2030. However, if the assessment is underestimating the size of the population (i.e. biomass), the low state of nature has the stock increasing to above B40 until 2026 and then returning to the precautionary zone. Again, this is assuming full ABC removals for the coastwide stock, which as

discussed below, is unlikely and has not happened in the past 10 years (as shown in Table 3 of the 2019 Assessment).

The Council's preferred apportionment method for sablefish results in 78.4 percent of the coastwide ABC apportioned to north of 36° N. lat. compared to 73.6 percent as used in the 2019-20 biennium. Under No Action (P*=0.4), this apportionment results in ACLs for sablefish north of 36° N. lat of 6,435 mt and 6,124 mt for 2021 and 2022, respectively. This is a 712 mt in 2021 and a 401 mt increase in 2022 from the ACL in 2020. Sablefish north is a highly attained stock harvested by vessels using both trawl and fixed gear, with 2019 ACL attainment estimated at 97.9 percent (PacFIN scorecard). The southern management area on the other hand has seen less than 25 percent attainment in 2018-2019 and those trends are expected to continue (see Agenda Item G.6., Attachment 2, April 2020). With the attainment patterns in each management area expected to continue in 2021-2022, the coastwide sablefish stock is expected to take less than full ABC removals. The remainder of this section discusses the specific biological impacts related to the northern stock only which is always more highliy attained than the southern stock.

Under the Amendment 8 allocation structure, 10 percent of the northern ACL is deducted from the ACL for the Treaty tribes. Based on new Tribal fisheries data, the Treaty tribes will use a discard mortality rate of 1.7 percent compared to 1.5 percent used in the previous biennium to account for total mortality within their allocation (see Section 3.2.7 of Agenda Item F.1., Attachment 8, June 2020). An additional 37.8 mt is taken off the top to account for research, recreational fisheries, and EFPs. These deductions result in a commercial HG of 6165 mt for 2021 and 5871.6 mt for 2022.

Within the HG, 90.6 percent is allocated to limited entry fisheries and the remaining 9.4 percent to open access fisheries. Of the limited entry HG, 52 percent is allocated to trawl and 48 percent to non-trawl fisheries. In 2021-2022, the Council chose to raise the set aside for at-sea fisheries from 50 mt to 100 mt given the increasing trend in bycatch in the fleet (averaging 113.7 mt in the last three years). In 2017, the sablefish north ACL was exceeded partially due to the 100 mt overage by the at-sea fisheries. The IFQ fishery receives the remainder of the trawl allocation, which it is projected to take over 98 percent. With the sum of the ACLs now summing to the ABC, there will no longer be carryover issued for the sablefish stock in 2021-2022, reducing the risk of the ACL being exceeded. For the non-trawl fisheries, the primary tier and DTL fisheries (LE and OA) are proposed to have increased in cumulative landing limits based on the increase in ACL. DTL fisheries are managed inseason and trip limits can be lowered if projections are higher than the landings target.

With increases in sablefish north ACLs, there may also be co-occurring increases in the amount of Dover sole or thornyheads caught in the bottom trawl fishery given that these species are generally targeted in a complex. As described in Informational Report 2, June 2020, increased ACLs may allow for increased catch or harvest if sablefish north is a constraining species for accessing the DTS complex; however, if it is a market based issue, then there might not be a corresponding increase in other trawl species.

Shortbelly Rockfish

Shortbelly rockfish are managed coastwide with constant 6,950 mt OFL and a 4,184 mt ABC (P*0.40) for both 2021-22. The current 500 mt ACL was exceeded in both 2018 (508 mt; source = GEMM) and 2019 (655 mt projection; source = PacFIN). The majority of impacts have been

attributed to the whiting fisheries, to lesser degrees by the non-whiting trawl fisheries, and with negligible non-trawl impacts (< 1 mt). Subsequently, the Council took action in 2019, which was implemented by NMFS (effective June 18, 2020) to address these overages. After careful consideration, the Council chose to increase the 2020 ACL to 3,000 mt. Under No Action alternative, the ACL for shortbelly rockfish would once again revert back to the original constant 500 mt ACL and a 470.1 mt fishery HG, under which all groundfish fisheries would be managed together (i.e. no sector allocations).

Initial projections by the GMT showed that 40 percent of bootstrap simulations of fishery bycatch exceeding 500 mt with some projections as high as 1,000 mt (Agenda Item F.1.a., Supplemental GMT Report 3, June 2020). However, as discussed in Agenda Item F.1.a, GMT Report 1, June 2020, Schroeder et al. 2018 indicated that the population boom of shortbelly rockfish could last a decade or longer and therefore bycatch could be higher than the previous projections. As described in Section 3.2.2.2 of the 2020 EA/RIR/IRFA for Cowcod and Shortbelly Rockfish, the impacts of the No Action alternative would be the similar as the impacts under the preferred alternative as described in the 2019-2020 EA. The overall stock would likely remain highly abundant with the recent high recruitment events, as the recent strong year classes continue to mature and contribute to the spawning stock biomass. It is unclear whether shortbelly rockfish distribution will return to a more limited range in southern waters or remain abundant in northern waters as seen in past three years.

The Council ultimately decided not to develop accountability measures for shortbelly rockfish under the No action alternative. Therefore, if shortbelly harvest were to exceed the 500 mt ACL again in 2021, the Council would have no predetermined response.

Stocks and Stock Complexes with ACLs Outside the Range in the 2015 EIS

OR Black Rockfish (as part of the black/blue/deacon complex)
Big skate
Chilipepper
CA Cabezon
Cowcod S. of 40°10' N. lat.
English Sole
Petrale sole
Shortbelly rockfish
Starry Flounder

4.1.1.4 Impacts of Management Measures

In the 2021-2022 biennium, there are several management measures that affect stocks not discussed above or affect multiple stocks. Therefore, additional information is provided on the potential impacts resulting from these measures.

Salmon troll incidental catch limits

The Council recommended an increase to the salmon troll trip limits for incidentally caught yellowtail rockfish north of 40°10′ N. lat. from a ratio of 1 lb of yellowtail rockfish for every 2 lbs

of salmon landed, with a cumulative limit of 200 lbs per month[9] to a monthly limit of 500 lbs. of yellowtail rockfish with no ratio (i.e. yellowtail rockfish may be landed as long as salmon is present), both within and outside the RCA. As described in Agenda Item G.6.a, Supplemental GMT Report 1, April 2020, the increased trip limit may increase attainment of yellowtail rockfish north of 40°10′ N. lat.; however, the increased trip limit is not expected to create behavioral changes or increase catch by salmon trollers that results in catch levels above the current IOA set-aside of 7 mt (Agenda Item G.6, Attachment 3, April 2020). The IOA set aside is based on the historical maximum mortality in 2005, and catches have been less than 4.6 mt since that time with an average of 2.7 mt. Given that ACL attainments for yellowtail rockfish north of 40° 10' N. lat. has averaged 59 percent in the last two years (WCGOP Total Mortality Report, PacFIN scorecard), there is low risk to the ACL even if the full IOA off the top deduction was caught or exceeded.

Additionally, the Council established a trip limit for incidentally caught yellowtail rockfish south of 40°10′ N. lat. in the salmon troll fishery. Historically, yellowtail rockfish was prohibited from being retained on salmon troll trips south of 40° 10' N. lat. The recommended trip limit is 1 lb. of yellowtail rockfish per 2 lb. of Chinook salmon landed, with a cumulative monthly limit of 200 lbs. of yellowtail rockfish, both within and outside the RCA. This limit would be within, not in addition, to the Council preferred open access shelf rockfish complex south of 40° 10′ N. lat. trip limit (.). Unlike yellowtail north, which is managed with species specific harvest specifications, yellowtail rockfish south of 40° 10′ N. lat. are managed within the Shelf Rockfish Complex south. Similar to the above recommendation for yellowtail rockfish north of 40° 10′ N. lat., any additional mortality associated with the new trip limit for the salmon troll fisheries south of 40° 10' N. lat. is expected to be within the off the top deduction for IOA of 67.7 mt, which is based on the historic high of the IOA fisheries. Given that the fisheries have taken less than that on average in recent years (recent five-year average of 19.98 mt from 2014-18 with a high of 67.7 mt in 2018), there was no additional deduction needed. Furthermore, it is unlikely to endanger the ACL as ACL attainment was 38 percent in 2018 (WCGOP Total Mortality report) and estimated to be 46 percent in 2019. For 2021 and 2022, both trawl and non-trawl attainment are projected to remain well below their respective allocations (see Sections 4.3.4 and 4.3.5 of Agenda Item F.1., Attachment 8, June 2020).

Retention of thornyheads between 40° 10' N. lat. and 34° 27' N. lat.

The Council recommended the implementation of a trip limit for shortspine and longspine thornyheads in the area between 40° 10' N. lat. and 34° 27' N. lat. for the open access fixed gear fisheries. This area is currently closed to retention of shortspine and longspine thornyheads by the OA fisheries. As described in Agenda Item F.1., Attachment 8, June 2020, in 2019-2020, the Council established a trip limit for north of 40° 10' N. lat. where retention was previously prohibited. When this was done, the Central California area was inadvertently left out of this change and retention remained prohibited. While higher trip limits were considered for 2021-2022

[9] This limit was within a 200 lb per month combined limit for widow rockfish, shelf rockfish north of 40° 10' N. lat., and yellowtail rockfish, not in addition. Note that as part of the 2017-2018 biennial biennium, yellowtail rockfish was removed from the open access multi-stock trip limit, and a new separate trip limit was set at 500 lbs. per month; however, the salmon troll yellowtail rockfish trip limit did not reflect this change.

for both north of 40° 10' N. lat. and between 34° 27' N. lat. and 40° 10' N. lat., there was insufficient non-trawl allocation for shortspine thornyhead to support higher limits. The PPA for this area therefore matches the trip limit the Council adopted for the area north of 40° 10' N. lat., which is separate 50 lb. monthly limits for shortspine thornyhead and longspine thornyhead.

With this new trip limit, landings for both shortspine and longspine for 2021-2022 are expected to increase, though marginally, as this trip limit will allow retention of fish previously discarded (Table 4-30 in Agenda Item F.1., Attachment 8, June 2020). **Error! Reference source not found.** below shows that while the non-trawl allocation of shortspine will likely be highly attained, the IFQ sector is expected to have less than 40 percent mortality, resulting in a fishery HG attainment of less than 40 percent. Longspine mortality is only expected to increase by 0.1 mt, and therefore attainment is likely to be similar to 2019 at an estimated 10 percent (PacFIN Scorecard).

Table 26. Projected mortality of shortspine thornyhead north of 34° 27' by sector and total for 2021-2022.

	Non-trawl		IFQ		Total	
Year	Projected mort.	Allocation	Projected mort.	Allocation	Projected mt	Fishery HG
2021	60-64	67.5	458-472	1282.1	518-536	1349.6
2022		65.6		1248.9		1314.6

Removal of gear restrictions for flatfish within the RCA

The Council recommended removing the following gear restrictions associated with the Other Flatfish complex in 2021 and beyond.

> *South of 42° N. lat., when fishing for 'other flatfish', vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than 'Number 2' hooks, which measure 0.44 (11 mm) point to shank, and up to two 1 lb. (0.45kg) weights per line are not subject to the RCAs." 'Other flatfish' are specified in regulation to include butter sole, curlfin sole, Pacific sanddab, rex sole, rock sole, and sand sole (50 CFR § 660.11).*

As described in Agenda Item F.1., Attachment 8, June 2020, this management measure was originally put in place in 2003 to protect bocaccio rockfish--now rebuilt-- and was thought to provide protections to other overfished groundfish stocks in following years (e.g. petrale sole). The intent was to permit an artisanal sanddab fishery off California while still providing protections to overfished stocks. Similar restrictions were removed in the recreational fishery during the 2009-2010 management biennium. The Council considered removing this regulation for commercial fisheries during the 2015-2016 biennium; however due to bycatch concerns (e.g. petrale sole, which was declared rebuilt in 2016) and uncertainty surrounding bycatch rates using commercial longline gears to target Other Flatfish, the Council did not recommend eliminating the regulation at that time and suggested to wait until new information was available.

Since removal of this management measure was first considered for the commercial fixed gear sector, all overfished stocks of groundfish have been declared rebuilt, except for yelloweye rockfish—projected to be rebuild in 2029. However, yelloweye rockfish impacts are not a concern here because habitat preferences of yelloweye rockfish (hard substrate, pinnacles) and the habitat

preferences of the species comprising the other flatfish (sandy, soft bottom) complex are vastly different (Stock Assessment and Fishery Evaluation, November 2018). In addition to the differential habitat preferences between other flatfish and yelloweye rockfish, other overfished species which may have been encountered incidentally have rebuilt, leading to de minimus bycatch concerns should this gear restriction be removed. Furthermore, using historic landing receipt data (which may bias rates high due to differing retention restrictions in place at that time), the analysis found that bycatch rates were relatively minimal. In 2017, the Council adopted new discard mortality rates specifically for hook and line commercial fisheries (see Section 1.2 of the Groundfish SAFE), which further mitigate mortality caused by unlikely encounters with rockfish species which are generally not distributed across sandy bottom habitat.

Overall, the other flatfish complex ACL has been under attained in recent years with an estimated 653 mt total fishing mortality of the 6,498mt ACL in 2019 (or 10 percent of the ACL). The ACL for other flatfish is managed coastwide with an allocation of 90 percent trawl and 10 percent non-trawl and attainment of the non-trawl allocation has been low. In 2019, this equated to a non-trawl allocation of 624.9 mt and the sector is estimated to only attained four percent of its allocation. Given this low attainment which is expected to continue in 2021-2022, there is little risk to other sectors or exceeding the ACL.

4.1.1.5 Protected and Prohibited Species

As discussed in Section 3.6, protected species include those that are protected under the Marine Mammal Protection Act, Endangered Species Act except for salmon, and the Migratory Bird Treaty Act. Prohibited species include any species of salmonid even those protected under the ESA, Pacific halibut, and Dungeness crab caught seaward of Washington or Oregon.

The No Action alternative is not likely to result in significant impacts to protected and prohibited species, and any impacts are likely to be similar to those that have been discussed in previous biennial analyses. As mentioned above under physical impacts to habitat, increases to ACLs for big skate, petrale sole, and widow rockfish could result in some additional effort in the trawl fishery. Additional effort in the trawl fishery could result in additional retention of eulachon; however, this is unlikely. According to the ESA workgroup, eulachon catch has been decreasing in recent years. Even though the groundfish trawl fisheries no longer have a minimum mesh size for groundfish bottom or midwater trawl, the incentive to use a mesh size that allows small species like eulachon to pass through remains. Catching large amounts of eulachon, which cannot be sold, can clog the trawl net increasing drag and fuel costs (Section 3.2.3.3 of EA for Gear Changes for the Pacific Coast Groundfish Fishery's Trawl Catch Share Program). Therefore, trawl vessels are unlikely to reduce their mesh size to a size that would result in additional impacts to eulachon.

Additional impacts to green sturgeon could also result from increased bottom trawl effort from increases to petrale and big skate ACLs (Section 3.2.3.2 of the EA for Gear Changes). However, known areas of green sturgeon critical habitat will continue to be protected under the No Action alternative and no new areas will be opened to trawling. Additionally, because the trawl fisheries are 100 percent monitored through observers or electronic monitoring, any take of protected and prohibited species would be known quickly and accountability measures, including block area closures for the groundfish bottom trawl fishery, could be implemented to reduce interactions with protected and prohibited species. Therefore, increasing the ACLs for trawl dominant species is

likely to result in similar impacts to what we have seen in past bienniums and are not likely to result in significant impacts to protected and prohibited species.

As detailed in Section 3.5.3, there was one documented take in the open access fixed gear fishery targeting sablefish, specifically in pot gear, in 2016. Humpback whales have not been observed having interactions with any other groundfish gear types. The ESA Workgroup noted in their June 2019 report to the Council (Agenda Item I.4.a, Groundfish Endangered Species Workgroup Report) that some increases in trawl and pot gear effort have occurred between 2013 and 2017. The increase in the ACLs for sablefish north and lingcod (north and south of 40° 10' N. lat.) as well as the proposed changes to the non-trawl RCAs, could result in additional fixed gear effort. However, as noted in NOAA Fisheries Entanglement Reports (see NOAA Fisheries 2019), the predominant identifiable source of entanglements originates from Dungeness crab gear (NOAA Fisheries 2019) and not groundfish gear. Since 2013, there have been four confirmed entanglements (of the 163 confirmed gear sources) of Humpback whale with sablefish pot gear (NOAA Fisheries 2019). While entanglement with fixed gear is possible, the data indicates a low possibility of humpbacks interacting with this gear type. Noting that due to population status, any take is considered a negative impact. As noted in Section 3.6.1, the current ITS is for injury or mortality from entanglement is a 5-year average of one whale/year and up to three whales/year in a single year; two documented takes have occurred in the fixed gear fishery since 2013. Therefore, even though additional pot gear effort may occur as a result of this action, impacts on humpback whales are expected to be low. Additionally, in 2020, the new biological opinion on humpback whales is expected and based on the ITS, any fishery management concerns will be addressed as necessary to reduce impact on this species.

As described under Section 3.6.5, NMFS recently implemented a requirement to use streamer lines or night set for longline vessels 26 ft or greater LOA in 2020 to minimize impacts to seabirds, specifically short tailed albatross. Although there may be increased effort due to the increased sablefish ACLs, the mitigation measures in place should reduce the risk of a take. Commercial fixed gear fisheries typically have little interaction with other protected or prohibited species, such as salmon, and therefore are not expected to result in significant impacts.

Increases in the ACLs for California cabezon, cowcod south of 40° 10' N. lat., and the Washington cabezon/kelp greenling stock complex in addition to the proposed changes to the recreational RCAs described above could result in additional recreational fishing effort. However, recreational fisheries typically have minimal interactions with prohibited or protected species compared to commercial fisheries and therefore, there are no significant impacts expected with these changes.

What about trawl and Salmon?? Midwater Whiting and Salmon? Chapter 5 says "Salmon bycatch is a primary concern in the trawl groundfish fishery. With increases to ACLs/allocations as well the adjustments to area restrictions, there is uncertainty of how these factors may impact salmon" This all needs to be addressed as direct/indirect effects of this action

4.1.1.6 RCAs, Trip Limits, Bag Limits, and Season Structures

The section describes the recommended trip limits, bag limits, and season structures for the West Coast groundfish fisheries in 2021-22. Trip limits, bag limits, and season structures area all

management measures the Council uses to keep catch from exceeding ACLs, and other harvest specifications. During the fishing year, the Council has the ability to make changes to these management measures, both increases and decreases, based on new information available. These changes are typically made to address either higher or lower than anticipated catch levels.

4.1.1.7 Commercial

Shorebased IFQ

Several species within the shortbased IFQ program are managed with trip limits. These limits are meant to limit the total catch of an IFQ species on a trip. The recommended 2021 trip limits for the IFQ fishery are listed in Figures 20 and 21. RCA boundary lines listed in these tables are the same as updated through Amendment 28 to the PCGFMP.

Figure 21. Limited entry trawl RCA and trip limits for north of 40° 10' N. lat. for 2021-2022.

Table 1 (North) to Part 660, Subpart D -- Limited Entry Trawl Rockfish Conservation Areas and Landing Allowances for non-IFQ Species and Pacific Whiting North of 40°10' N. Lat.

This table describes Rockfish Conservation Areas for vessels using groundfish trawl gear. This table describes incidental landing allowances for vessels registered to a Federal limited entry trawl permit and using groundfish trawl or groundfish non-trawl gears to harvest individual fishing quota (IFQ) species.

Other Limits and Requirements Apply -- Read § 660.10 - § 660.399 before using this table 09/01/2020

TABLE 1 (North)

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[1/]:						
1	North of 45°46' N. lat.	100 fm line[1/] - 150 fm line[1/]					
2	45°46' N. lat. - 40°10' N. lat.	Block Area Closures (BACs) may be implemented, and will be announced in the Federal Register.					

See provisions at § 660.130 for gear restrictions and requirements by area. Vessels fishing groundfish trawl quota pounds with groundfish non-trawl gears, under gear switching provisions at § 660.140, are subject to the limited entry groundfish trawl fishery landing allowances in this table, regardless of the type of fishing gear used. Vessels fishing groundfish trawl quota pounds with groundfish non-trawl gears, under gear switching provisions at § 660.140, are subject to the limited entry fixed gear non-trawl RCA, as described in Tables 2 (North) and 2 (South) to Part 660, Subpart E.

See § 660.60, § 660.130, and § 660.140 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.70-660.74 and §§ 660.76-660.79 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).

State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.

3	**Minor Nearshore Rockfish, Washington Black rockfish & Oregon Black/blue/deacon rockfish**	300 lb/ month
4	**Whiting[3/]**	
5	midwater trawl	Before the primary whiting season: CLOSED. -- During the primary season: mid-water trawl permitted in the RCA. See §660.131 for season and trip limit details. -- After the primary whiting season: CLOSED.
6	large & small footrope gear	Before the primary whiting season: 20,000 lb/trip. -- During the primary season: 10,000 lb/trip. -- After the primary whiting season: 10,000 lb/trip.
7	**Oregon Cabezon/Kelp Greenling complex**	50 lb/ month
8	**Cabezon in California**	50 lb/ month
9	**Spiny dogfish**	60,000 lb/ month
10	**Big skate**	Unlimited
11	**Longnose skate**	Unlimited
12	**Other Fish [4/]**	Unlimited

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

2/ The "modified" fathom lines are modified to exclude certain petrale sole areas from the RCA.

3/ As specified at §660.131(d), when fishing in the Eureka Area, no more than 10,000 lb of whiting may be taken and retained, possessed, or landed by a vessel that, at any time during the fishing trip, fished in the fishery management area shoreward of 100 fm contour.

4/ "Other Fish" are defined at § 660.11 and include kelp greenling off California and leopard shark.

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

Figure 22. Limited entry trawl RCA and trip limits for south of 40°10' N. lat. for 2021-2022.

Table 1 (South) to Part 660, Subpart D -- Limited Entry Trawl Rockfish Conservation Areas and Landing Allowances for non-IFQ Species and Pacific Whiting South of 40°10' N. Lat.

This table describes Rockfish Conservation Areas for vessels using groundfish trawl gear. This table describes incidental landing allowances for vessels registered to a Federal limited entry trawl permit and using groundfish trawl or groundfish non-trawl gears to harvest individual fishing quota (IFQ) species.

Other Limits and Requirements Apply -- Read § 660.10 - § 660.399 before using this table 09/01/2020

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[1/]:						
1	South of 40°10' N. lat.	Block Area Closures (BACs) may be implemented, and will be announced in the Federal Register.					
	See provisions at § 660.130 for gear restrictions and requirements by area. Vessels fishing groundfish trawl quota pounds with groundfish non-trawl gears, under gear switching provisions at § 660.140, are subject to the limited entry groundfish trawl fishery landing allowances in this table, regardless of the type of fishing gear used. Vessels fishing groundfish trawl quota pounds with groundfish non-trawl gears, under gear switching provisions at § 660.140, are subject to the limited entry fixed gear non-trawl RCA, as described in Tables 2 (North) and 2 (South) to Part 660, Subpart E.						
	See § 660.60, § 660.130, and § 660.140 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.70-660.74 and §§ 660.76-660.79 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).						
	State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
2	**Longspine thornyhead**						
3	South of 34°27' N. lat.	24,000 lb/ 2 months					
4	**Minor Nearshore Rockfish, California Black rockfish, & Oregon Black/Blue/Deacon rockfish**	300 lb/ month					
5	**Whiting**						
6	midwater trawl	During the Primary whiting season: allowed seaward of the trawl RCA. Prohibited within and shoreward of the trawl RCA.					
7	large & small footrope gear	Before the primary whiting season: 20,000 lb/trip. -- During the primary season: 10,000 lb/trip. -- After the primary whiting season: 10,000 lb/trip.					
8	**Cabezon**	50 lb/ month					
9	**Spiny dogfish**	60,000 lb/ month					
10	**Big skate**	Unlimited					
11	**Longnose skate**	Unlimited					
12	**California scorpionfish**	Unlimited					
13	**Blackgill rockfish**	Unlimited					
14	**Other Fish [3/]**	Unlimited					

TABLE 1 (South)

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

2/ South of 34°27' N. lat., the RCA is 100 fm line - 150 fm line along the mainland coast; shoreline - 150 fm line around islands.

3/ "Other Fish" are defined at § 660.11 and include kelp greenling off California and leopard shark.

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

Limited Entry and Open Access Fixed Gear

Figure 22 through Figure 25 below show the recommended trip limits and RCA boundaries for the 2021-22 limited entry and open access fixed gear fisheries north and south of 40° 10' N. lat. For the majority of these species, these limits represent an increase from the limits implemented

through the 2019-20 biennium (2019-20 EA). One recommended change that allowed for some flexibility in management of these fisheries was the combination of the nearshore and non-nearshore HGs for canary rockfish, bocaccio, and yelloweye rockfish (discussed above in Section 0). Trip limits that apply to the "nearshore" and "non-nearshore" vessels are the same, however, it is the presence of a federal limited entry fixed gear endorsed permit that distinguishes the limit permissible.

Figure 23. Limited entry fixed gear north of 40° 10' N. lat. RCA and trip trips for 2021-2022

Table 2 (North) to Part 660, Subpart E -- Non-Trawl Rockfish Conservation Areas and Trip Limits for Limited Entry Fixed Gear North of 40°10' N. lat.

Other limits and requirements apply -- Read §§660.10 through 660.399 before using this table — 9/1/2020

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[1/]:						
1	North of 46°16' N. lat.	shoreline - 100 fm line[1/]					
2	46°16' N. lat. - 40° 10' N. lat.	40 fm line[1/] - 100 fm line[1/]					
		30 fm line [1/]- 40 fm line [1/2/]					
	See §§660.60 and 660.230 for additional gear, trip limit and conservation area requirements and restrictions. See §§660.70-660.74 and §§660.76-						
	State trip limits and seasons may be more restrictive than Federal trip limits or seasons, particularly in waters off Oregon and California.						
4	**Minor Slope Rockfish[3/] & Darkblotched rockfish**	8,000 lb/ 2 month					
5	**Pacific ocean perch**	3,600 lb/ 2 months					
6	**Sablefish**	1,700 lb week, not to exceed 5,100 lbs / 2 months					
7	**Longspine thornyhead**	10,000 lb/ 2 months					
8	**Shortspine thornyhead**	2,000 lb/ 2 months			2,500 lb/ 2 months		
9	**Dover sole, arrowtooth flounder, petrale**	10,000 lbs/ month					
10	**sole, English sole, starry flounder, Other**						
11	**Flatfish[4/]**						
12	**Whiting**	10,000 lb/ trip					
13	**Minor Shelf Rockfish[3/]**	800 lbs / month					
14	**Shortbelly Rockfish**	200 lbs / month					
15	**Widow rockfish**	4,000 lb/ 2 month					
16	**Yellowtail rockfish**	3,000 lb/ month					
17	**Canary rockfish**	3,000 lb/ 2 months					
18	**Yelloweye rockfish**	CLOSED					
19	**Minor Nearshore Rockfish, Oregon black/blue/deacon rockfish & CA black rockfish [5/]**						
20	North of 42°00' N. lat.	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black rockfish or blue/deacon					
21	42°00' N. lat. - 40°10' N. lat.	7,000 lb/ 2 months, no more than 2,000 lb of which may be species other than black rockfish					
22	**Lingcod[6/]**						
23	North of 42°00' N. lat.	4,000 lb/ 2 months					
24	42°00' N. lat. - 40°10' N. lat.	2, 000 lb/2 months					
25	**Pacific cod**	1,000 lb/ 2 months					
26	**Spiny dogfish**	200,000 lb / 2months		150,000 lb /	100,000 lb / 2months		
27	**Longnose skate**	Unlimited					
28	**Other Fish[7/]& Cabezon in California**	Unlimited					
29	**Oregon Cabezon/Kelp Greenling**	Unlimited					
30	**Big skate**	Unlimited					

TABLE 2 (North)

1/ The Rockfish Conservation Area is an area closed to fishing by particular gear types, bounded by lines specifically defined by latitude and longitude coordinates set out at §§ 660.71-660.74. This RCA is not defined by depth contours (with the exception of the 20-fm depth contour boundary south of 42° N. lat.), and the boundary lines that define the RCA may close areas that are deeper or shallower than the depth contour. Vessels that are subject to RCA restrictions may not fish in the RCA, or operate in the RCA for any purpose other than transiting.

2/ Between 46°16' N. lat. and 40°10' N. lat. and the 30 fm and 40 fm lines, fishing is only allowed with hook-and-line gear except bottom longline and dinglebar gear, as defined in §660.11

3/ Bocaccio, chilipepper and cowcod are included in the trip limits for Minor Shelf Rockfish and splitnose rockfish is included in the trip limits for Minor Slope Rockfish.

4/ "Other flatfish" are defined at § 660.11 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.

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

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

7/ "Other Fish" are defined at § 660.11 and include kelp greenling off California and leopard shark.

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

Figure 24. Limited entry fixed gear south of 40° 10' N. lat. RCA and trip trips for 2021-2022

Table 2 (South) to Part 660, Subpart E -- Non-Trawl Rockfish Conservation Areas and Trip Limits for Limited Entry Fixed Gear South of 40°10' N. lat.							
	Other limits and requirements apply -- Read §§660.10 through 660.399 before using this table						9/1/2020
		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[1/]:						
1	40°10' N. lat. - 38°57.5' N. lat.	40 fm line[1/] - 125 fm line[1/]					
2	38°57.5' N. lat. -34°27' N. lat.	50 fm line[1/] - 125 fm line[1/]					
3	South of 34°27' N. lat.	100 fm line[1/] - 125 fm line[1/] (also applies around islands)					
	See §§660.60 and 660.230 for additional gear, trip limit and conservation area requirements and restrictions. See §§660.70-660.74 and §§660.76-						
	State trip limits and seasons may be more restrictive than Federal trip limits or seasons, particularly in waters off Oregon and California.						
3	**Minor Slope rockfish[2/] & Darkblotched**	40,000 lb/ 2 months, of which no more than 6,000 lb may be blackgill rockfish					
4	**Splitnose rockfish**	40,000 lb/ 2 months					
5	**Sablefish**						
6	40°10' N. lat. - 36°00' N. lat.	1,700 lb week, not to exceed 5,100 lbs / 2 months					
7	South of 36°00' N. lat.	2,000 lb/ week					
8	**Longspine thornyhead**	10,000 lb/ 2 months					
9	**Shortspine thornyhead**						
10	40°10' N. lat. - 34°27' N. lat.	2,000 lb/ 2 months			2,500 lb/ 2 months		
11	South of 34°27' N. lat.	3,000 lb/ 2 months					
12	**Dover sole, arrowtooth flounder, petrale**	10,000 lb/ month					
13	**sole, English sole, starry flounder, Other**						
14	**Flatfish[3/]**						
18	**Whiting**	10,000 lb/ trip					
	Minor Shelf Rockfish[2/]						
	40°10' N. lat. - 34°27' N. lat.	8,000 lbs. / 2 months, of which no more than 500 lbs. may be vermilion					
	South of 34°27' N. lat.	5,000 lbs. / 2 months, of which no more than 3,000lbs. may be vermilion					
	Widow						
	40°10' N. lat. - 34°27' N. lat.	10,000 lbs. / 2 months					
	South of 34°27' N. lat.	8,000 lbs. / 2 months					
21	**Chilipepper**						
	40°10' N. lat. - 34°27' N. lat.	10,000 lbs. / 2 months					
	South of 34°27' N. lat.	8,000 lbs. / 2 months					
	Shortbelly Rockfish						
	South of 40°10' N. lat.	200 lb/ month					
22	**Canary rockfish**	3,500 lbs/ 2 months					
23	**Yelloweye rockfish**	CLOSED					
24	**Cowcod**	CLOSED					
25	**Bronzespotted rockfish**	CLOSED					
26	**Bocaccio**	6,000 lbs/ 2 months					
27	**Minor Nearshore Rockfish**						
	Shallow nearshore[4/]	2,000 lbs/ 2 months					
	Deeper nearshore[5/]	2,000 lbs/ 2 months					
30	**California Scorpionfish**	3,500 lbs/ 2 months					
	Lingcod[6/]	1,200 lbs / 2 months					
32	**Pacific cod**	1,000 lb/ 2 months					
33	**Spiny dogfish**	200,000 lb/ 2 months		150,000 lb/ 2	100,000 lb/ 2 months		
34	**Longnose skate**	Unlimited					
35	**Other Fish[7/] & Cabezon in California**	Unlimited					
36	**Big Skate**	Unlimited					

TABLE 2 (South)

1/ The Rockfish Conservation Area is an area closed to fishing by particular gear types, bounded by lines specifically defined by latitude and longitude coordinates set out at §§ 660.71-660.74. This RCA is not defined by depth contours (with the exception of the 20-fm depth contour boundary south of 42° N. lat.), and the boundary lines that define the RCA may close areas that are deeper or shallower than the depth contour. Vessels that are subject to RCA restrictions may not fish in the RCA, or operate in the RCA for any purpose other than transiting.

2/ POP is included in the trip limits for Minor Slope Rockfish. Blackgill rockfish have a species specific trip sub-limit within the Minor Slope Rockfish cumulative limit. Yellowtail rockfish are included in the trip limits for Minor Shelf Rockfish. Bronzespotted rockfish have a species specific trip limit.

3/ "Other Flatfish" are defined at § 660.11 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.

4/ "Shallow Nearshore" are defined at § 660.11 under "Groundfish" (7)(i)(B)(1).

5/ "Deeper Nearshore" are defined at § 660.11 under "Groundfish" (7)(i)(B)(2).

6/ The commercial mimimum size limit for lingcod is 24 inches (61 cm) total length South of 42° N. lat.

7/ "Other Fish" are defined at § 660.11 and include kelp greenling off California and leopard shark.

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

Figure 25. Open access fixed gear north of 40°10' N. lat. RCA and trip limits for 2021-2022

Table 3 (North) to Part 660, Subpart F -- Non-Trawl Rockfish Conservation Areas and Trip Limits for Open Access Gears North of 40°10' N. lat.

Other limits and requirements apply -- Read §§660.10 through 660.399 before using this table — 9/1/2020

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[1/]:						
1	North of 46°16' N. lat.	shoreline - 100 fm line[1/]					
2	46°16' N. lat. - 40°10' N. lat.	40 fm line[1/] - 100 fm line[1/]					
		30 fm line [1/]- 40 fm line [1/2/]					
	See §§660.60, 660.330 and 660.333 for additional gear, trip limit and conservation area requirements and restrictions. See §§660.70-660.74 and §§660.76-660.79 for conservation area descriptions and coordinates (including RCAs, YRCAs, CCAs, Farallon Islands, Cordell Bank, and EFHCAs).						
	State trip limits and seasons may be more restrictive than Federal trip limits or seasons, particularly in waters off Oregon and California.						
4	**Minor Slope Rockfish[3/] & Darkblotched rockfish**	2,000 lbs / months					
5	**Pacific ocean perch**	100 lbs/ month					
6	**Sablefish**	300 lbs. daily, or 1 landing per week up to 1,400 lbs., not to exceed 2,800 lbs. bimonthly					
7	**Shortpine thornyheads**	50 lb/month					
8	**Longspine thornyheads**	50 lb/month					
9	**Dover sole, arrowtooth flounder, petrale**	5,000 lbs/ month					
10	**sole, English sole, starry flounder, Other**						
11	**Flatfish[4/]**						
12	**Whiting**	300 lbs/ month					
13	**Minor Shelf Rockfish[3/]**	800 lbs / month					
14	**Widow rockfish**	2,000 lb/ 2 months					
15	**Shortbelly Rockfish**	200 lbs / month					
16	**Yellowtail rockfish**	1,500 lbs/ month					
17	**Canary rockfish**	1,000 lbs/ 2 months					
18	**Yelloweye rockfish**	CLOSED					
19	**Minor Nearshore Rockfish, Oregon black/blue/deacon rockfish & CA black rockfish**						
20	North of 42°00' N. lat.	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black rockfish or blue/deacon rockfish[5/]					
21	42°00' N. lat. - 40°10' N. lat.	7,000 lb/ 2 months, no more than 2,000 lb of which may be species other than black rockfish					
22	**Lingcod[6/]**						
23	North of 42°00' N. lat.	2,000 lbs/ month					
24	42°00' N. lat. - 40°10' N. lat.	1,000 lbs / month					
25	**Pacific cod**	1,000 lbs/ 2 months					
26	**Spiny dogfish**	200,000 lbs/ 2 months		150,000 lbs/ 2 months	100,000 lbs/ 2 months		
27	**Longnose skate**	Unlimited					
28	**Big skate**	Unlimited					
29	**Other Fish[7/] & Cabezon in California**	Unlimited					
30	**Oregon Cabezon/Kelp Greenling**	Unlimited					

TABLE 3 (North)

1	**SALMON TROLL** *(subject to RCAs when retaining all species of groundfish, except for yellowtail rockfish and lingcod, as described below)*	
2	North	Salmon trollers may retain and land up to 500 lbs of yellowtail rockfish per month as long as salmon is on board, both within and outside of the RCA. Salmon trollers may retain and land up to 1 lingcod per 5 Chinook per trip, plus 1 lingcod per trip, up to a trip limit of 10 ligncod, on a trip where any fishing occurs within the RCA. The limit only applies during times when lingcod retention is allowed, and is not "CLOSED." The limit is within the per month limit for lingcod described in the table above, and not in addition to that limit. All groundfish species are subject to the open access limits, seasons, size limits and RCA restrictions listed in the table above, unless
3	**PINK SHRIMP NON-GROUNDFISH TRAWL** *(not subject to RCAs)*	
4	North	Effective April 1 - October 31: Groundfish: 500 lbs/day, multiplied by the number of days of the trip, not to exceed 1,500 lbs/trip. The following sublimits also apply and are counted toward the overall 500 lbs/day and 1,500 lbs/trip groundfish limits: lingcod 300 lbs/month (minimum 24 inch size limit); sablefish 2,000 lbs/month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lbs/day and 1,500 lbs/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.

TABLE 3 (North) cont'd

1/ The Rockfish Conservation Area is an area closed to fishing by particular gear types, bounded by lines specifically defined by latitude and longitude coordinates set out at §§ 660.71-660.74. This RCA is not defined by depth contours (with the exception of the 20-fm depth contour boundary south of 42° N. lat.), and the boundary lines that define the RCA may close areas that are deeper or shallower than the depth contour. Vessels that are subject to RCA restrictions may not fish in the RCA, or operate in the RCA for any purpose other than transiting.

2/ Between 46°16' N. lat. and 40°10' N. lat. and the 30 fm and 40 fm lines, fishing is only allowed with hook-and-line gear except bottom longline and dinglebar gear, as defined in §660.11

3/ Bocaccio, chilipepper and cowcod rockfishes are included in the trip limits for Minor Shelf Rockfish. Splitnose rockfish is included in the trip limits for Minor Slope Rockfish.

4/ "Other flatfish" are defined at § 660.11 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.

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

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

7/ "Other fish" are defined at § 660.11 and include kelp greenling off California and leopard shark.

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

Figure 26. Open access fixed gear south of 40° 10' N. lat. RCA and trip limits for 2021-2022

Table 3 (South) to Part 660, Subpart F -- Non-Trawl Rockfish Conservation Areas and Trip Limits for Open Access Gears South of 40°10' N. lat.

Other limits and requirements apply -- Read §§660.10 through 660.399 before using this table — 9/1/2020

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[1/]:						
1	40°10' N. lat. - 38°57.5' N. lat.	40 fm line[1/] - 125 fm line[1/]					
2	38°57.5' N. lat. -34°27' N. lat.	50 fm line[1/] - 125 fm line[1/]					
3	South of 34°27' N. lat.	100 fm line[1/] - 150 fm line[1/] (also applies around islands)					
	See §§660.60 and 660.230 for additional gear, trip limit and conservation area requirements and restrictions. See §§660.70-660.74 and §§660.76-660.79 for conservation						
	State trip limits and seasons may be more restrictive than Federal trip limits or seasons, particularly in waters off Oregon and California.						
4	**Minor Slope Rockfish[2/] & Darkblotched rockfish**	10,000 lbs/ 2 months, of which no more than 2,500 lbs may be blackgill rockfish					
5	**Splitnose rockfish**	200 lbs/ month					
6	**Sablefish**						
7	40°10' N. lat. - 36°00' N. lat.	300 lbs. daily, or 1 landing per week up to 1,400 lbs., not to exceed 2,800 lbs. bimonthly					
8	South of 36°00' N. lat.	1,600 lbs. per week, not to exceed 4,800 lbs bimonthly					
9	**Shortpine thornyheads**						
10	40°10' N. lat. - 34°27' N. lat.	50lb/ month					
11	**Longspine thornyheads**						
12	40°10' N. lat. - 34°27' N. lat.	50 lb/ month					
13	**Shortpine thornyheads and longspine**						
14	South of 34°27' N. lat.	50 lbs/ day, no more than 1,000 lbs/ 2 months					
15	**Dover sole, arrowtooth flounder, petrale**						
16	**sole, English sole, starry flounder, Other**	5,000 lbs/ month					
17	**Flatfish[3/]**						
18	**Whiting**	300 lbs/ month					
19	**Minor Shelf Rockfish[2/]**						
20	40°10' N. lat. - 34°27' N. lat.	4,000 lbs. / 2 months, of which no more than 400 lbs. may be vermilion					
21	South of 34°27' N. lat.	3,000 lbs. / 2 months, of which no more than 1,200lbs. may be vermilion					
22	**Widow**						
23	40°10' N. lat. - 34°27' N. lat.	6,000 lbs. / 2 months					
24	South of 34°27' N. lat.	4,000 lbs. / 2 months					
25	**Chilipepper**						
26	40°10' N. lat. - 34°27' N. lat.	6,000 lbs. / 2 months					
27	South of 34°27' N. lat.	4,000 lbs. / 2 months					
28	**Shortbelly Rockfish**						
29	South of 40°10' N. lat.	200 lb/ month					
22	**Canary rockfish**	1,500 lbs/ 2 months					
23	**Yelloweye rockfish**	CLOSED					
24	**Cowcod**	CLOSED					
25	**Bronzespotted rockfish**	CLOSED					
26	**Bocaccio**	4,000 lbs/ 2 months					
30	**Minor Nearshore Rockfish**						
31	Shallow nearshore[4/]	2,000 lbs/ 2 months					
32	Deeper nearshore[5/]	2,000 lbs/ 2 months					
33	**California Scorpionfish**	3,500 lbs/ 2 months					
34	**Lingcod[6/]**	500 lbs / months					
35	**Pacific cod**	1,000 lbs/ 2 months					
36	**Spiny dogfish**	200,000 lbs/ 2 months		150,000 lbs/ 2	100,000 lbs/ 2 months		
37	**Longnose skate**	Unlimited					
38	**Big skate**	Unlimited					
39	**Other Fish[7/] & Cabezon in California**	Unlimited					

TABLE 3 (South)

Table 3 (South) Continued

Other limits and requirements apply -- Read §§660.10 through 660.399 before using this table — 9/1/2020

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[1/]:						
1	40°10' N. lat. - 38°57.5' N. lat.	40 fm line[1/] - 125 fm line[1/]					
2	38°57.5' N. lat. -34°27' N. lat.	50 fm line[1/] - 125 fm line[1/]					
3	South of 34°27' N. lat.	100 fm line[1/] - 150 fm line[1/] (also applies around islands)					
	See §§660.60 and 660.230 for additional gear, trip limit and conservation area requirements and restrictions. See §§660.70-660.74 and §§660.76-660.79 for conservation						
40	**SALMON TROLL** *(subject to RCAs when retaining all species of groundfish, except for yellowtail rockfish and lingcod, as described below)*						
41	South of 40°10' N. lat.	Salmon trollers may retain and land up to 1 lbs of yellowtail rockfish for every 2 lbs of Chinook salmon landed, with a cumulative limit of 200 lbs/month, both within and outside of the RCA. This limit is within the 4,000 lbs per 2 month limit for minor shelf rockfish between 40°10' and 24°27' N lat., and not in addition to that limit. All groundfish species are subject to the open access limits, seasons, size limits and RCA restrictions listed in the table above, unless otherwise stated here.					
42	**RIDGEBACK PRAWN AND, SOUTH OF 38°57.50' N. LAT., CA HALIBUT AND SEA CUCUMBER NON-GROUNDFISH TRAWL**						
43	**NON-GROUNDFISH TRAWL Rockfish Conservation Area (RCA) for CA Halibut, Sea Cucumber & Ridgeback Prawn:**						
44	*40°10' N. lat. - 38°00' N. lat.*	*100 fm line[1/] - 200*	*100 fm line[1/] - 150 fm line[1/]*				*100 fm line[1/] - 200*
45	*38°00' N. lat. - 34°27' N. lat.*	*100 fm line[1/] - 150 fm line[1/]*					
46	*South of 34°27' N. lat.*	*100 fm line[1/] - 150 fm line[1/] along the mainland coast; shoreline - 150 fm line[1/] around islands*					
47		Groundfish: 300 lbs/trip. Species-specific limits described in the table above also apply and are counted toward the 300 lbs groundfish					
48	**PINK SHRIMP NON-GROUNDFISH TRAWL GEAR** *(not subject to RCAs)*						
49	South	Effective April 1 - October 31: Groundfish: 500 lbs/day, multiplied by the number of days of the trip, not to exceed 1,500 lbs/trip. The					

1/ The Rockfish Conservation Area is an area closed to fishing by particular gear types, bounded by lines specifically defined by latitude and longitude coordinates set out at §§ 660.71-660.74. This RCA is not defined by depth contours (with the exception of the 20-fm depth contour boundary south of 42° N. lat.), and the boundary lines that define the RCA may close areas that are deeper or shallower than the depth contour. Vessels that are subject to RCA restrictions may not fish in the RCA, or operate in the RCA for any purpose other than transiting.

2/ POP is included in the trip limits for minor slope rockfish. Blackgill rockfish have a species specific trip sub-limit within the minor slope rockfish cumulative limits. Yellowtail rockfish is included in the trip limits for minor shelf rockfish. Bronzespotted rockfish have a species specific trip limit.

3/ "Other flatfish" are defined at § 660.11 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.

4/ "Shallow Nearshore" are defined at § 660.11 under "Groundfish" (7)(i)(B)(*1*).

5/ "Deeper Nearshore" are defined at § 660.11 under "Groundfish" (7)(i)(B)(*2*).

6/ The commercial mimimum size limit for lingcod is 24 inches (61 cm) total length South of 42° N. lat.

7/ "Other fish" are defined at § 660.11 and includes kelp greenling off California and leopard shark.

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

4.1.1.8 Recreational Fisheries by State

The following sections show the recreational season structures, bag limits, and size limits for each of the three state recreational fisheries.

Washington

Season Structure

Marine Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3 and 4 (North Coast)	Closed		Open		Open<20 fm June 1-July 31 [a/ b/]			Open			Closed	
2 (South Coast)	Closed		Open [c/d/]			Open [d/]					Closed	
1 (Columbia River)	Closed		Open [e/ f/]								Closed	

Figure 27. Preferred season structure for Washington in the 2021-2022 biennium.

Groundfish Bag Limits and Size Limits

The aggregate daily groundfish limit would be nine fish per day which can include up to, 7 rockfish, 2 lingcod and one cabezon. Further, anglers would be allowed to retain five flatfish in addition to the 9 fish daily aggregate groundfish limit. There are no size limits for any species and the retention of yelloweye rockfish would continue to be prohibited in all areas (Marine Areas 1 – 4).

Area Restrictions

Fishing for, retention, or possession of groundfish and Pacific halibut will continue to be prohibited in the C-shaped YRCA (Figure 27 A.).

When lingcod is open (see Lingcod Seasons and Size Limits below), fishing for, retention, or possession of lingcod would be prohibited in deep-water areas seaward of a line extending from 47°31.70' N. lat., 124°45.00' W. long. to 46°38.17' N. lat., 124°30.00' W. long., except as allowed on days open to the Pacific halibut fishery (Figure 3-4 in Agenda item F.1., Attachment 8, June 2020) and from June 1 through 15 and September 1 through 30. This lingcod restriction would be in place two weeks less compared to 2019 by opening the restricted area for the entire month of September as opposed to it only being open the first two weeks of September.

As described in Section 4.1.1.1.1, the Westport Offshore and South Coast YRCAs are recommended to be removed.

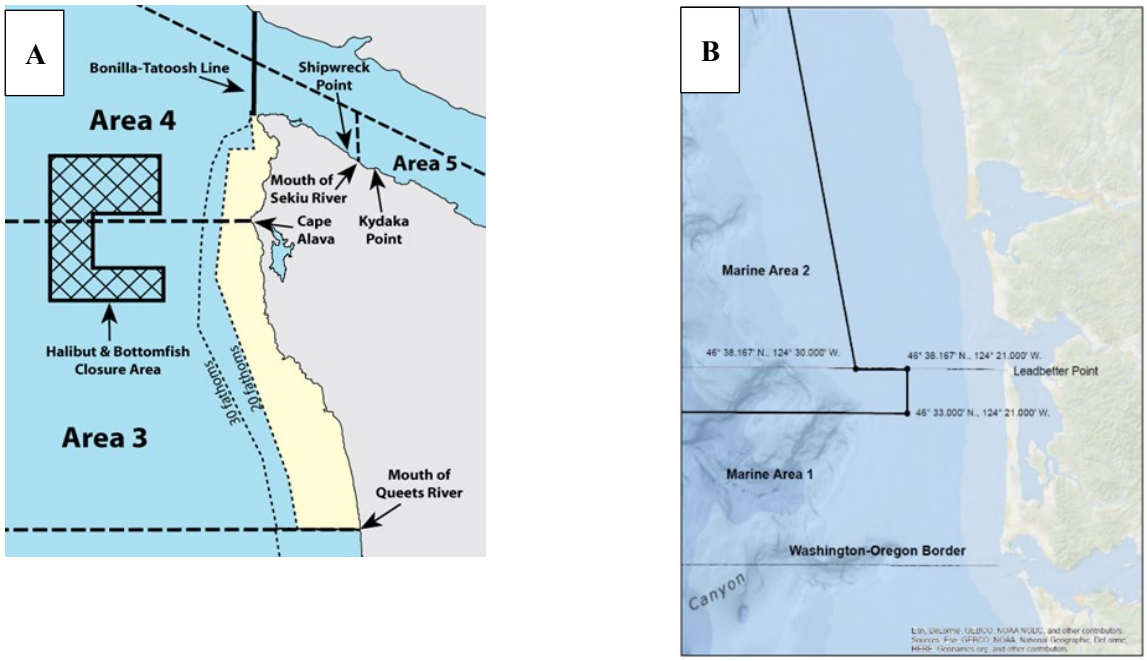


Figure 28. Washington recreational area restrictions. A. C-Shaped YRCA. B. Lingcod Restricted

Lingcod Seasons and Size Limits

In all Marine Areas, the lingcod season would be March 13 through October 16 in 2021 and March 12 through October 15 in 2022. There are no size limits in place for lingcod.

Pacific Halibut Seasons

It is expected that the Pacific halibut seasons in 2021-2022 will be similar to the halibut seasons in 2019-2020 given that the IPHC adopted a consistent quota for Area 2A (Washington, Oregon, and California) for 2019 through 2022 barring significant conservation concerns. The groundfish allowed to be retained during halibut days vary by marine area as described above in

Oregon

Season Structure, Bag limits, and Size limits

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bottomfish Season	Open all depths											
Marine Bag Limit [a/]	Ten (10)											
Lingcod Bag Limit	Three (3)											
Flatfish Bag Limit [b/]	Twenty Five (25)											

a/ Marine bag limit is 10 fish per day and includes all species other than lingcod, salmon, steelhead, Pacific halibut, flatfish, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine, and smelt; of which no more than one may be cabezon.
b/ Flounders, soles, sanddabs, turbots, and halibuts except Pacific halibut

Figure 29. Oregon recreational groundfish season structure and bag limits for 2021 and 2022.

There are no proposed changes to the size limits, which are 16 inches for cabezon and 22 inches for lingcod.

Area Restrictions

The 40 fm depth restriction for June-August in place for 2019-2020 is recommended to be removed through the proposed action. The Stonewall Bank YRCA (defined at 50 CFR 660.70 (g)- (i)) will remain in place.

Pacific Halibut Seasons

As described above in Section 0, the Pacific halibut seasons in 2021-2022 will be similar to the halibut seasons in 2019-2020. Additionally, Oregon will allow fishing for groundfish with longleader gear and all-depth Pacific halibut on the same trip. Groundfish species that will be allowed to be retained are the same as those allowed for longleader gear: yellowtail rockfish, widow rockfish, canary rockfish, redstriped rockfish, greenstriped rockfish, silvergrey rockfish, chilipepper, bocaccio, and blue/deacon rockfish.

California

Season Structure

Table 27. California recreational season structure and RCA depth boundaries by management area and month for 2021-2022.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 1 – Oct 31 <30fm						All Depth	
Mendocino	Closed				May 1 – Oct 31 <30fm						All Depth	
San Francisco	Closed			April 1 – Dec 31 <50fm								
Central	Closed			April 1 – Dec 31 <50fm								
Southern	Closed		Mar 1 – Dec 31 <100 fm									

Groundfish Bag Limits, Gear Limits, and Size Limits

There would be an aggregate Rockfish/Cabezon/Greenling (RCG) 10-fish daily bag 2021-2022. The Council recommended removing the sub-bag limits in place for 2019-2020 for black rockfish, canary rockfish, and cabezon. For vermillion rockfish, the Council recommended a sub-bag limit of 5 in order to control catch of the stock. Total catch (including the commercial landings) has exceeded the component OFL from 2015-2019, with recreational catch making up an average of 87 percent of that total (see Table 2 and Figure 2 from Agenda Item G.6.a, Supplemental CDFW Report 1, April 2020).

Table 28. Bag limits for black rockfish, canary rockfish, cabezon and sub-bag limit for vermilion rockfish for 2021 and 2022 compared to 2019.

Species	2019-2020 Bag Limit	2021-2022 Bag Limit a/
Black rockfish b/	4	Up to 10
Canary rockfish b/	3	Up to 10
Cabezon	3	Up to 10
Vermilion rockfish	10	5

a/ subject to aggregate RCG daily bag limit of 10 fish

b/ The sub-bag limits as listed in this table were as a result of an inseason adjustment effective June 1, 2019.

Retention of bronzespotted rockfish, cowcod, and yelloweye rockfish would continue to be prohibited. The following state-wide bag limits also apply in state regulations only and are outside of the 10-fish RCG bag limit:

- Leopard shark - 3 fish;
- Soupfin shark – 1 fish.

Unless otherwise specified, there is a general bag limit of 20 finfish, of which no more than 10 fish can be of any one species. Pacific sanddab, petrale sole, and starry flounder are exempt from the general finfish bag limit; retention of these species is unlimited.

The following minimum size limits apply to California recreational fisheries:

- Cabezon- 15 inches, total length;
- Kelp greenling and all greenlings of the genus *Hexagrammos*- 15 inches, total length;

- Leopard shark- 36 inches, total length (state regulations only)

Gear restrictions apply to all species within the RCG Complex. No more than one line and two hooks maybe used to take or possess species within the complex. Note that regulations specific to lingcod are described below.

Area Restrictions

There are no changes proposed to the CCAs or YRCAs through the proposed action. Figure 4-29 shows the Western CCA. Within the Western CCA, the shoreward boundary was moved from 20 fm to 40 fm in 2019 during the open season of March 1-December 31 (Figure 4-30) for species in the Nearshore Rockfish Complex, species in the Shelf Rockfish Complex, cabezon, greenlings, lingcod, ocean whitefish, and California sheephead. Recreational fishing for California scorpionfish in the CCAs is open year-round shoreward of 40 fm. Recreational fishing for Other Flatfish, petrale sole, and starry flounder is permitted year-round in all depths. Retention of yelloweye rockfish, bronzespotted rockfish, and cowcod is prohibited within the CCA.

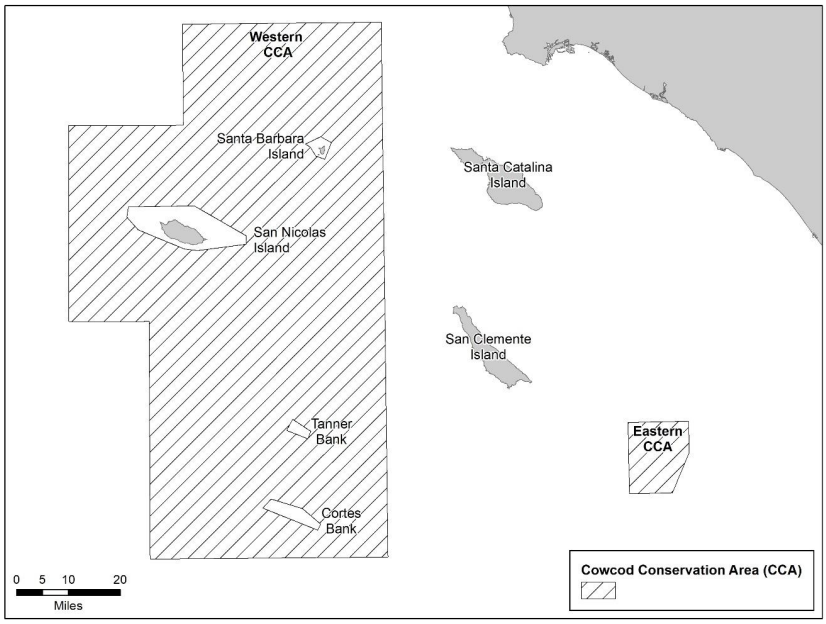


Figure 4-30. Overview of Western and Eastern Cowcod Conservations Areas located in the Southern Management Area.

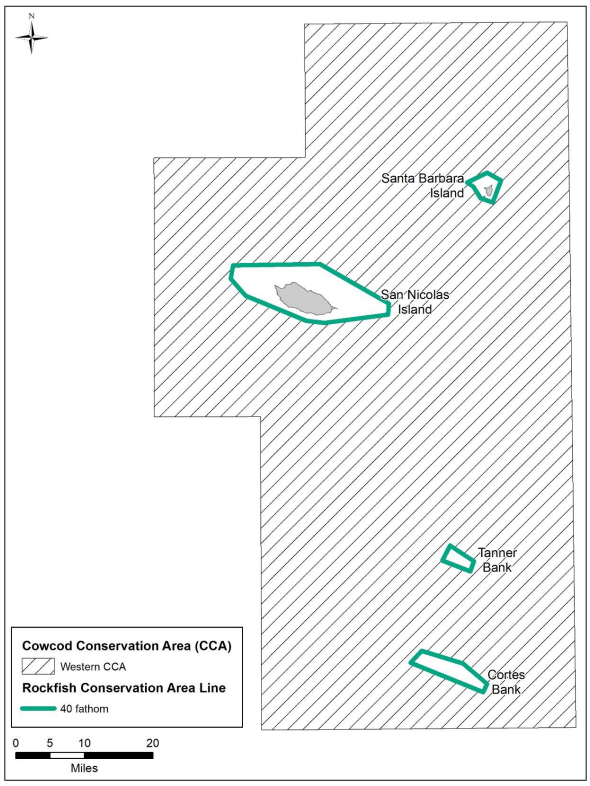


Figure 4-31. Overview of the 40-fathom depth contour inside the Western Cowcod Conservation Area.

There are four YRCAs in California (2009-2010 FEIS located in in the general areas of Point St. George, South Reef, Reading Rock, and Point Delgada and the waypoints are specified in federal

regulation at §660.70, subpart C. Federal regulations allow inseason implementation of YRCAs as needed. However, this management measure has never been implemented in California.

Lingcod Seasons, Bag Limits, Hook Limits, and Size Limits

The lingcod season structure is aligned with the RCG complex in each management area. In all areas, the lingcod bag limit is 2 fish with a minimum 22 inch total length size limit. The same RCG Complex gear restrictions apply for lingcod (i.e., no more than one line and two hooks).

California Scorpionfish Seasons, Bag Limits, and Size Limits

There are no proposed changes to the California scorpionfish regulations. The season length for California scorpionfish aligns with that of the RCG complex in all management areas except for the Southern Management Area, where it is open year-round. In all areas, the bag limit is 5 fish with a minimum size of 10 inches total length. The same RCG Complex gear restrictions apply for California scorpionfish (i.e., no more than one line and two hooks).

Pacific Halibut

As described above in Section 0, the Pacific halibut seasons in 2021-2022 will be similar to the halibut seasons in 2019-2020.

Integrated fishery – Synthesis of no action

There is an emphasis on a substantial increase in ACLs at the top of 4.1 ("The increase for cowcod south of 40°10' N lat. under the Council's preferred alternative is 740 percent"). The text and tables note that Lingcod is up 18% (N) and 27% (S); Big Skate is up 200%; Cabezon CA 43%, Cabezon WA 92%, Sablefish 20%, Petrale 45% and Widow 31.5%.

This would warrant a discussion about the overall change that this creates, what is catch or effort is anticipated as being less constrained by this change, how NMFS explains the combined effect of increased important ACLs with the OR and CA-wide non-trawl RCA openings? Is the combined effect of the integrated fishery significant on fish stocks, habitat and salmon, and marine mammals (listed and not listed)? Why? Summarize the built in mitigation for both IFQ and non-IFQ.

You can put this discussion here or better still can be at the end of the biological environment or anywhere under no-action. It can be its own standalone discussion with a header of 'integrated fishery' or something else. See the "synthesis" chapter example in the Am 28 FEIS which combined the effects of 2 different components of the Am 28 action (RCA and EFH CA). In this case, we have 2 very different components that together have synergistic effects – increases in ACLs and management measures/ catch controls such as changes in RCA. While the catch controls/management measures help keep catch at or below the ACLs, they don't mitigate habitat, protected, and prohibited species impacts. Rather they could exasperate them.

4.1.2 Alternative 1

Alternative 1 proposes new default harvest control rules for five stocks: cowcod south of 40° 10' N. lat., Petrale sole, shortbelly rockfish, sablefish, and Oregon black rockfish. The best scientific information available is then applied to the new default harvest control rules for these stocks to determine the OFLs, ABCs, and ACLs for the 2021-2022 biennium. Any new harvest control rules selected in this biennium then become the new default harvest control rules in subsequent biennial bienniums until changed by the Council.

4.1.2.1 Physical Impacts

The impacts to the physical environment (EFH, CCE, and RCAs) under Alternative 1 would likely be similar to those described under No Action because only minor changes exist between the No Action alternative and Alternative 1. Under Alternative 1, impacts to the physical environment as a result of harvest specifications for all stocks except for Oregon black rockfish, sablefish north of 36° N. lat., cowcod south of 40°10' N. lat., petrale sole, and shortbelly rockfish are likely to be the same as those disclosed under the No Action alternative. Impacts to the physical environment as a result of alternative harvest specifications are discussed for those stocks below.

Under Alternative 1, the ACL for Oregon black rockfish will increase from 479 mt to 512 mt in both 2021 and 2022. Therefore, there could be increased effort associated with Alternative 1 compared to No Action. As described in Section 0, rocky reef habitats are sensitive to hook and line gear- which is the main gear used to target black rockfish. However, there are no new areas proposed to be opened under Alternative 1 compared to No Action and therefore impacts are likely to be similar. The ACLs for both cowcod south of 40°10' N. lat. and petrale sole would decrease under Alternative 1. Therefore, any impacts to the physical environment as a result of the harvest specifications for these species is likely to be less than those discussed under the No Action alternative as we would expect a smaller increase in trawl effort is expected under No Action.

The increased ACL for shortbelly rockfish under Alternative 1 is likely to increase impacts to the physical environment by removing more shortbelly rockfish from the ecosystem. However, those impacts are not expected to be significant because they would be considerably less at 2,000 mt than the ABC for shortbelly rockfish (4,184 mt). The increased ACL for shortbelly rockfish under Alternative 1 is not expected to encourage targeting of shortbelly rockfish. Vessels are not expected to change their behavior as there are other incentives to avoid shortbelly rockfish, such as the little to no value of the fish and it can spoil otherwise valuable catch (Pacific whiting). Therefore, this increase would not be expected to have significant impacts on groundfish EFH, including prey availability, since the increased shortbelly bycatch is a result of an overall increase in abundance and range extension of shortbelly rockfish.

The ACL for sablefish north of 36° N. lat. would likely result in additional impacts to the environment. However, it is unlikely that these impacts would be significant as there are no new areas proposed to be open under Alternative 1 (same as No Action) which are not expected to provide additional access to sablefish grounds.

4.1.2.2 Biological Impacts

Oregon black rockfish

Alternative 1 would implement a new default harvest control rule of a "case-by-case" ABC for 2021-2022 in which the Oregon black rockfish ACL contribution to the complex would be set equal to 2020 ABC (512.2 mt) to provide fishery stability as they are the most economically important stock for the Oregon recreational and commercial nearshore fisheries. This would result in a complex ACL of 603 and 600 mt for 2021-2022, which is 33 and 38 mt above No Action, respectively. The biological impacts are nearly identical for both alternatives in both the short- and long-term. As shown in Figure 4-1 of Agenda Item F.1., Attachment 8, June 2020, the

depletion under Alternative 1 for 2021-2022 is only marginally less than under No Action, with each resulting in 54 percent depletion by 2030. Therefore, the impacts discussed under No Action would likely be similar to Alternative 1 as the higher Alternative 1 ACLs would likely only provide some relief from implementing more restrictive management measures inseason (see Section 4.5.8 of Agenda Item F.1, Attachment 8, June 2020).

Cowcod south of 40° 10 N. lat.

Cowcod would be managed with a P* of 0.4 under Alternative 1 with the ACL=ABC, which would result in ACLs of 84 and 82 mt for 2021-2022. These ACLs would be 14 mt lower than No Action but 74 and 72 mt higher than 2020. As noted in Section **Error! Reference source not found.**, the primary consideration for a more conservative harvest specifications compared to No Action is the relatively high scientific uncertainty in the estimated biomass and productivity in the cowcod assessment. Under Alternative 1, the Council's preferred alternative, cowcod is projected to be at 58.5 percent under the base case by 2030. However, under the low state of nature assuming full ABC removals, the stock would fall below B40 to 37.7 percent by 2030.

The same off-the-top deductions of 11.17 mt would apply under Alternative 1 as well as the trawl and non-trawl allocation percentages of 36 percent to trawl and 64 percent to non-trawl. Given the uncertainty and Council's decision to be precautionary as described under No Action, with the use of the ACT and other management measures (i.e. continuing to prohibit retention in the California recreational fishery), the impacts will likely be less than the full ABC and similar to those described under No Action.

Sablefish north of 36 N. lat.

Under Alternative 1, sablefish would be managed with ABC=ACL and a P* of 0.45. Overall, Alternative 1 is not expected to negatively impact the stock long-term. However, the impacts would likely be more under Alternative 1 than under the No Action alternative. Like the No Action alternative, Alternative 1 is projected to keep the stock above the 40 percent depletion management long-term (through 2030) under the base case model (**Error! Reference source not found.**). Additionally, both alternatives are expected to similarly impact the stock under long-term projections using the more pessimistic low state of nature (i.e., mid-to-high 30 percent depletion range for both). This means that the stock could eventually end up in the upper precautionary zone under both Alternatives if the assessment overestimated the population scale (size of biomass), which was the main source of scientific uncertainty in this and many previous assessments. These projections do however assume that the full ACLs would be taken each year, and if attainments remain low in the south (as described above under No Action), then the stock is projected to remain at or above the management target long-term even under the low state of nature for both alternatives. If southern attainments were to increase but less than the ACL was still caught, then the stock would be expected to remain at or slightly below (e.g., 38-41 percent range) long-term under the low state of nature for both alternatives.

Under Alternative 1, the same apportionment method described under No Action (i.e. based on recent trawl survey biomass) would apply to set the northern and southern ACLs. The northern ACLs would be 457 mt and 442 mt higher than No Action and 1,169 mt and 843 mt higher than 2020. The tribal allocation would remain at 10 percent, resulting in 689.2 mt and 656.6 mt for 2021 and 2022, with the remaining off-the-top deductions remaining the same as No Action.

Amendment 6 allocations would still apply as discussed under No Action, with 100 mt being set aside from the trawl allocation to account for expected mortality in the at-sea whiting fisheries. Attainment of the ACL is expected to remain at high levels within the limit across both trawl and non-trawl sectors (see Section 4.3.4 and 4.3.5 of Agenda Item F.1., Attachment 8, June 2020).

Shortbelly rockfish

Shortbelly rockfish would maintain the same P* of 0.45 under Alternative 1 as No Action, but would be managed to a constant ACL of 2,000 mt instead of 500 mt. The Council initially chose a 3,000 mt ACL in November 2019 (pg. 27 of November 2019 Council Meeting Record), which was the same ACL as the Council adopted for 2020 when they raised the ACL from 500 mt in part to reduce fishery constraints (EA/RIR/IRFA for Cowcod and Shortbelly Rockfish). However, in April 2020, the Council chose a 2,000 mt ACL for this Alternative as their PPA based on concerns that 3,000 mt was too high given the projections from the GMT (pg. 68 of April 2020 Council Meeting Transcripts). A 2,000 mt ACL is 2,184 mt less than the shortbelly rockfish ABC in both 2021 and 2022. As under No Action, there would be 29.9 mt deducted from the ACL resulting in a 1970.1 mt fishery HG, under which all groundfish fisheries would be managed together (i.e. no sector allocations). Based on the stock conditions described under No Action from the 2019 EA, the coastwide biomass of shortbelly rockfish has increased dramatically in recent years, which suggest removing up to 2,000 mt would be unlikely to significantly impact the population. Specifically, as discussed in the 2020 EA for Shortbelly/Cowcod, similar to the 3,000 mt ACL analyzed for 2020, a 2,000 mt ACL is below the MSY for shortbelly rockfish and therefore would allow for continued surplus production and would not decrease shortbelly rockfish biomass below target levels.

While the Council considered developing management measures to control catch of shortbelly under Alternative 1, none were adopted as the Council selected Alternative 2 (EC designation) as their final recommendation. Therefore, under this Alternative, there would continue to be no predetermined response for the Council to mitigate bycatch and prevent the exceedance of the ACL.

Petrale sole

Under Alternative 1, Petrale sole would be managed with a P* of 0.4 and an ABC= ACL. Alternative 1 was initially proposed (and selected as the PPA) due to initial concerns about the declining 2018 biomass estimate from the trawl survey which the assessment failed to fit, and therefore new fecundity data for petrale sole are likely to result in slightly more depleted estimates of stock size when incorporated into the next full assessment. However, 2019 survey data showed evidence that the biomass has increased from the lower 2018 value and more in line with 2014-2017 trends(Agenda Item G.4.a, Supplemental GMT Report 1, April 2020). The long term impacts of this harvest control rule is likely to reduce the relative biomass to 31 percent depletion in 10 years assuming full ACL removals which is still higher than the 25 percent depletion target for flatfish.

When applied to the 2019 stock assessment, the resulting ACLs are 3,843 mt and 3,455 mt in 2021 and 2022, respectively. These ACLs represent an increase of more than 20 percent from 2020, but approximately a six percent reduction from No Action. Therefore, it would be expected that any

impacts that result from Alternative 1 would be less than those that result from the No Action alternative. The same off-the-top deductions from No Action (387.5 mt) would apply to the Alternative 1 specifications resulting in a fishery HG of 3,455.5 mt for 2021 and 3,067.5 mt for 2022). The Council's recommended allocation of 30 mt to non-trawl and the remainder to trawl (3,425.5 mt in 2021, 3,037.5 mt in 2022) would apply under Alternative 1. Attainment trends described under No Action are expected to continue with Petrale sole being a consistently highly attained stock.

4.1.2.3 Prohibited and Protected Species

The impacts to prohibited and protected species under Alternative 1 are expected to be similar to those under No Action. The ACLs for petrale and cowcod decrease, which would like to decrease overall effort and potentially reduce the possibility for interactions with protected species. With the increases to ACLs for sablefish, there could be additional effort in both trawl and fixed gear fisheries; however, given the mitigation measures (i.e. trip limits and size limits) currently in place, the impacts are expected to be similar. For shortbelly rockfish, as it is not a targeted stock, the increase in ACL is not expected to result in increased effort or impacts to protected species. Finally, as discussed above, Oregon black rockfish are primary targeted by nearshore and recreational vessels which have limited interactions with protected species. The increase in ACLs is not expected to provide additional opportunity, but rather reduce the likelihood of implementing inseason closures.

4.1.3 Alternative 2

Under Alternative 2, the harvest specifications for all species would be the same as Alternative 1 except for shortbelly rockfish, Petrale sole, and cowcod.

4.1.3.1 Physical Impacts

The overall physical impacts under Alternative 2 are expected to be similar as Alternative 1 and No Action. Petrale sole and cowcod ACLs would decrease compare to No Action, and therefore the impacts here would be less than those described under No Action. With the exception of shortbelly rockfish all other stocks would be managed using the harvest specifications discussed under either the No Action alternative or Alternative 1.

With respect to shortbelly rockfish, under Alternative 2, the Council's preferred alternative, the stock would be moved out of the fishery and classified as an ecosystem component species. Therefore, under this Alternative, the Council did not recommend and NMFS would not implement any harvest specifications for shortbelly rockfish for the 2021-2022 biennium. Alternative 2 would neither decrease nor likely substantially increase the incidental catch of shortbelly rockfish in groundfish fisheries as shortbelly are not targeted in any way and incentives to not target shortbelly rockfish already exist It is likely that shortbelly rockfish catch would be similar under Alternative 1 and Alternative 2. Incidental catch of shortbelly rockfish has been substantially lower than the OFL or ABC. There is no directed fishery for shortbelly rockfish and there is a low probability of a market developing. Additionally, even if bycatch rates were to increase and the Council were to take no action inseason to slow the incidental , the groundfish fisheries would still likely take less than full ABC considered under No Action or Alternative 1. Therefore, there would be sufficient population of shortbelly rockfish within the ecosystem, in addition to the other forage species (e.g. anchovy) to support the CCE (2019 Shortbelly/Cowcod EA).

4.1.3.2 Biological Impacts

Cowcod south of 40° 10' N. lat.

Under Alternative 2, cowcod would be managed with a P* of 0.3 and ABC=ACL. This would result in 61 and 58 mt ACLs for 2021-2022 respectively. These ACLs are 51 and 48 mt higher than 2020, but 37 mt and 38 mt lower than No Action therefore the impacts to the stock under Alternative 2 would likely be less than under the No Action alternative. With the 11.17 mt deducted off-the-top for research activities, IOA fisheries, and EFPs, the resulting fishery HGs would be 49.83 mt and 46.83 mt for 2021 and 2022. These fishery HGs would not support the 50 mt ACT recommended by the Council as a precautionary approach.

Shortbelly rockfish

Shortbelly rockfish would be classified as an ecosystem component species under Alternative 2, the Council's preferred alternative. National Standard guidance allows Councils to choose to identify stocks within their FMPs as EC species[10] if a Council determines that the stocks do not require conservation and management based on the considerations and factors discussed in detail below. The PCGFMP currently identifies several EC species. The guidance explains, "Not every fishery requires Federal management. Any stocks that are predominately caught in Federal waters and are overfished or subject to overfishing, or likely to become overfished or subject to overfishing, are considered to require conservation and management". The shortbelly rockfish stock, while predominantly caught in Federal waters, is not overfished or subject to overfishing, nor likely to become so. Thus, the Magnuson Stevens Act (MSA) provides Councils with some leeway to "consider the following non-exhaustive list of factors when deciding whether additional stocks require conservation and management[11]:

[10] (see §§600.305(d)(13) and 600.310(d)(1))

[11] When considering removing a stock from, or continuing to include a stock in, an FMP, Councils should prepare a thorough analysis of factors in paragraphs (c)(1)(i) through (x) of this section, and any additional considerations that may be relevant to the particular stock…. Councils should consider weighting the factors as follows. Factors (i)-(iii)

(i) The stock is an important component of the marine environment:

As described in Field et al. 2007[12] , and Field et al. 2010[13] shortbelly rockfish is a key forage species of the CCE.

(ii) The stock is caught by the fishery:

Shortbelly rockfish is caught as bycatch, primarily by the Pacific whiting sectors in recent years, with total mortality estimated at 654 mt in 2019 (see Table 4-5 of Agenda Item F.1, Attachment 8, June 2020).

(iii)Whether an FMP can improve or maintain the condition of the stock:

Based on the work of Schroeder et al 2018, the shortbelly rockfish stock is expected to thrive for at least the next decade or so based on multiple strong incoming year-classes. Bycatch of shortbelly rockfish has typically been less than 20 percent of the acceptable biological catch (ABC) and therefore are not experiencing overfishing. The best available science suggests that management goals, as defined in the PCGFMP, could be accomplished even if the full ABC for shortbelly rockfish was taken in 2021-22 (Agenda Item H.4.a, Supplemental GMT Report 1, November 2020, Agenda Item H.6.a, GMT Report 2, November 2020, Agenda Item G.4.a, Supplemental GMT Report 1, April 2020). The amount and type of catch that occurs in Federal waters is therefore not expected to be a significant contributing factor to the stock's status. There is currently no targeting of shortbelly rockfish and there is no incentive to target shortbelly rockfish. Therefore, in the absence of a targeted fishery, shortbelly rockfish is very unlikely to become overfished and needing of additional management. Active management in the FMP is not necessary to improve or maintain the condition of the stock.

(iv)The stock is a target of a fishery:

Shortbelly rockfish is not a target stock and there is a low likelihood of a market developing (see discussion below). Additionally, we do not anticipate any change in industry behavior in response to an EC species designation, as shortbelly rockfish has been a low value species (~$0.02/lb. in 2019). Because shortbelly rockfish are small and have spines, they are easily caught in the mesh of trawl nets and codends, and are labor intensive to remove from fishing gear and to sort from the target stock in processing lines. The National Standards define non-target species and non-target stocks as fish caught incidentally during the pursuit of target stocks in a fishery6 . Non-target stocks may require conservation and management as determined using factors listed above, and if so, must be included in the FMP, and be identified at the stock or stock complex level. If non-

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should be considered first, as they address maintaining a fishery resource and the marine environment. These factors weigh in favor of continuing to include a stock in an FMP. Councils should next consider factors (iv)-(ix), which set forth key economic, social, and other reasons contained within the MSA for an FMP action. Finally, a Council should consider factor (x) before deciding to remove a stock from, or continue to include a stock in, an FMP. In many circumstances, adequate management of a fishery by states, state/Federal programs, or another Federal FMP would weigh in favor of removing a stock from an FMP. See e.g., 16 U.S.C. 1851(a)(7) and 1856(a)(3).

[12] Field, J.C., Dick, E.J., MacCall, A.D. 2007. Stock assessment model for the shortbelly rockfish, Sebastes jordani, in the California Current. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-405. U.S. Department of Commerce.

[13] Field, J.C., MacCall, A.D., Bradley, R.W., Sydeman, W.J. 2010. Estimating the impacts of fishing on dependent predators: a case study in the California Current. Ecological Applications. 20: 2223-2236.

target species are not in need of conservation and management, they may be identified in an FMP as an EC species.

(v) The stock is important to commercial, recreational, or subsistence users:

Shortbelly rockfish is not considered an important stock to commercial, recreational, or subsistence users at this time.

(vi) The fishery is important to the Nation or to the regional economy:

Shortbelly rockfish is not an important component of the regional or National economy and has limited economic value with ex-vessel landings totaling about $11,000 in 2019.

(vii) The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution:

There is no directed fishery for shortbelly rockfish, no allocations to user groups, and no competing interests among fishery groups.

(viii) The economic condition of a fishery and whether an FMP can produce more efficient utilization.

Shortbelly rockfish have limited economic value relative to other stocks caught by the trawl fishery. The trawl fishery is economically dependent on other stocks that co-occur with shortbelly rockfish, particularly Pacific whiting. The GMT has had substantial discussion and review of available management mechanisms and has not been able to identify any which would produce more efficient utilization of the incidentally caught shortbelly rockfish at this time.

(ix) The needs of a developing fishery, and whether an FMP can foster orderly growth:

There are no developing fisheries for shortbelly rockfish. New fisheries have and continue to develop under the groundfish FMP, such as big skate or the recently rebuilt midwater rockfish fishery. The GMT does not believe that it is feasible for a targeted fishery to develop for shortbelly rockfish, due to the lack of markets, low ex-vessel value, availability of higher value species like Pacific whiting and midwater rockfish, and high trip costs in the trawl fishery. As discussed in prior GMT reports, shortbelly rockfish are only encountered by trawl gear, as they are too small to be caught by hooks or pots. Economic Data Collection (EDC) data show that the average variable cost to fish with trawl gear in 2018 was $165 per mt. In 2019, participants in the shoreside trawl fishery landed 136 mt for which they received no revenue. Coastwide revenue for shortbelly rockfish of $11,381 was associated with landings summing to 117 mt. Most landings of shortbelly rockfish did not have associated ex vessel-revenue, on fish tickets that did, the average ex-vessel revenue in 2019 from shortbelly rockfish landings was $97 per mt, which would not allow the average trawl vessel to break even on a trip targeting shortbelly rockfish.

Shortbelly rockfish is currently primarily utilized in a fishmeal product when not discarded. On the production side, the EDC Whiting Purchase and Production Tool reports that the average product sale price for fishmeal for the at-sea whiting sectors was $1,675 per mt in 2018 (not enough sales were reported from the shoreside sector to be reported). Average production cost produced were $2,073 per mt in the mothership sector and $1,533 for catcher-processors (includes product types other than fishmeal), indicating that expanding fishmeal production is not likely to be profitable for processors at current market prices. Fishmeal is the lowest value Pacific whiting product type in the at-sea sector, relative to $2,800 per mt for fillets, $2,625 per mt for surimi, and

$1,800 per mt for minced. Council members, advisory bodies, and the public have indicated shortbelly rockfish is not suitable for other product forms at this time, and with Pacific whiting harvest levels expected to continue to remain high and not fully attained in the next biennium, it is unlikely that processors will shift from the higher value product forms to encourage vessel targeting of shortbelly rockfish in lieu of Pacific whiting.

The abundance of underutilized species in the trawl IFQ sector (114,391 mt of unutilized quota in 2019), length of time required to develop new seafood product markets (observed recently for rebuilt groundfish stocks), and cost/price constraints discussed above indicate that a targeted fishery for shortbelly rockfish is not likely to develop in the 2021- 22 biennium. Should markets evolve in that period, driving an increase in ex-vessel revenue sufficient to cover trawl trip and production costs, the Council may wish to revisit the likelihood of a targeted fishery developing.

(x) The extent to which the fishery is already adequately managed by states, by state/Federal programs, or by Federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the requirements of the Magnuson-Stevens Act and other applicable law:

Currently, there is no targeted fishery for shortbelly rockfish in state or Federal waters. Shortbelly is not subject to overfishing. Industry has provided public comment to the Council and GMT that they are making an effort to avoid shortbelly rockfish to the extent practicable, so the Council may wish to consider the extent to which the fishery is already adequately managed by financial and operational incentives to avoid incidental catch.

Petrale sole

Under Alternative 2, the Council would implement a new default harvest control rule which requires "stair-step" decreases to ACLs in subsequent biennial bienniums. As described in **Error! Reference source not found.**, this alternative would set a constant ACL for petrale sole in both years of a biennium. In each subsequent biennium, after the 2021-2022 biennium, the ACLs for both years would be reduced by a specific amount. The ACLs for 2021 and 2022 would each be set at 3,600 mt. This is most conservative ACL for 2021, but not for 2022. In the next ten years, this new default harvest control rule is likely to maintain the stock at or above 29% above the management target of 25% under the base state of nature. However, it is likely to reduce the relative stock biomass below the management target by 2022 under the low state of nature, which would result in the stock being overfished.

The off-the-top deductions would remain the same as No Action, resulting in fishery HGs of 3,212.5 mt for 2021 and 2022. Under the preferred allocation alternative of 30 mt to non-trawl and the remainder to trawl, the resulting trawl allocations would be 3,182.5 mt. Similar attainment would be expected under Alternative 2 as under Alternative 1 and No Action given that it is a consistently high attainment stock in the IFQ fishery. Overall, the impacts of Alternative 2 would be less than No Action.

4.1.3.3 Protected and Prohibited Species

The impacts to prohibited and protected species under Alternative 2 are expected to be similar to those under Alternative 1. For petrale sole, the ACLs for 2021 are less than Alternative 1 but greater in 2022 at 3,600 mt. This would likely result in a similar trawl effort over the biennium

given attainment is expected to remain high. Interactions with protected species are therefore likely neutral with respect to Alternative 1. The ACLs for cowcod decrease, which would likely decrease overall effort and potentially reduce the possibility for interactions with protected species. For shortbelly rockfish, the impacts are likely to be the same as under Alternative 1 given that the shift to managing as an ecosystem component species is not expected to result in increased effort or impacts to protected species

4.2 Socioeconomic Environment

4.2.1 Estimated Commercial Ex-Vessel Revenue and Recreational Effort Impacts

This section evaluates the effects of the Alternatives on fishery participants and fishing communities based on the regulations, totals and projections towards the end of 2019. The analysis assumes reapportionment of unused tribal fishery quota to the non-tribal commercial fishery occurs under all the Alternatives, including PPA[14]. In years when reapportionment has occurred, as it did in 2019, whiting quota and potential catch were shifted from the tribal sector to the non-tribal sector. Since such shifts generally have occurred late in the year, catch in the shorebased IFQ sector has been only mildly affected. In this analysis the shift in whiting quota is assumed to affect potential catch and revenue with respect to 2019 for the at-sea tribal sector and the non-tribal at-sea mothership and catcher-processor sectors. Since impacts to the tribal and at-sea whiting sectors are reported only in terms of potential sector ex-vessel revenues, and are not traced through to shorebased communities, the projected effects of whiting quota reapportionment under the Alternatives do not extend to estimated community income or employment impacts.

The Alternatives were constructed to illustrate how conditions may change from 2019, both by applying harvest specifications based on default HCRs and compliant management measures (i.e., the No Action Alternative), and varying ACLs and management measures for certain stocks [shortbelly rockfish, black rockfish (Oregon), cowcod (south of 40º10'), petrale sole and sablefish] under the action Alternatives (Alternative 1, Alternative 2, and the PPA). The ACLs for all remaining stocks are consistent across all Alternatives. Also, under No Action, Alternative 1 and Alternative 2, there are two scenarios corresponding to use of alternative methods to apportion sablefish between fisheries conducted in the relatively low-attainment Conception area vs relatively high-attainment fisheries conducted north of Conception. Method 1 is based on 2019 apportionment while Method 2 allots a larger portion of sablefish to fisheries north of the Conception area with correspondingly higher projected coastwide landings and associated community economic impacts.[15]

For simplicity, fishery and community economic impacts in the following sections are displayed for 2021, the first year of the two-year management biennium, only. Although the totals during the second year of the management biennium in 2022 may be somewhat different in some cases, the relative distribution of economic effects and inferences regarding rankings of the Alternatives would not change. The 2015 EIS included detailed descriptions of the models and data used to project socioeconomic impacts. Updated documentation of the models may be found in the Groundfish SAFE document. The projection models include:

- GMT catch and landings projection models for various sectors of the commercial groundfish fishery,

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[14] See Chapter 4

[15] Sablefish apportionment Method 1 uses the long-term (2002-2018) average bottom trawl survey biomass distributions while Method 2 uses the rolling 5-year (2014-2018) average survey biomass distributions. The reduction in sablefish apportioned to Conception area fisheries under Method 2 is not projected to affect catch, landings and ex-vessel revenue in that area because historical sablefish attainment rates there are so low (See Appendix A page 2-87).

- GMT fishing effort (angler trips) projections for the recreational groundfish fishery,
- The landings distribution model (LDM), which is used to assign where commercial landings are likely to occur, and resulting port-level ex-vessel revenues based on recent year ex-vessel prices,
- The IOPAC economic impact model used to evaluate the effects of the Alternatives on coastal communities (ports where commercial groundfish landings and recreational groundfish effort occur) in terms of personal income generated ("income impacts") and associated employment ("employment impacts"),
- Net revenue in commercial fishery operations based on projected landings, ex-vessel revenues and vessel cost earnings surveys.

The following sections assess socioeconomic impacts in terms of changes from 2019 in:

- landings and ex-vessel revenue by commercial fishery sector,
- recreational effort (angler trips) by originating community,
- net revenue by limited entry fishery sector,
- income and employment impacts by community resulting from changes in commercial landings revenue and recreational effort.

4.2.2 Commercial Fisheries

Revenue estimates are based on projected landings estimates from the GMT models referenced above. Table 28, Table 29, and Table 30 compare ex-vessel revenue estimates under the Alternatives to 2019. All projections assume average ex-vessel prices observed in 2019. Effects are presented by groundfish fishery "sectors," which are described in Section 3.8.

A number of caveats apply to modeling commercial fishery impacts. First, effort displaced by management measures is assumed not to switch readily into other fishery sectors or geographic regions. Second, landings projection models and economic impact models like IOPAC are calibrated to represent a baseline or "snapshot" of the economy at a particular point in time. Consequently, these models are best able to address impacts of scenarios that are not too far removed from what has occurred in the recent past. Third, catch projections in the IFQ fishery may not reflect the leveraging effect of increases in ACLs for certain "choke" species (those with low ACLs/allocations). A higher or lower allocation of a particularly constraining species may generate more or less actual revenue than is forecast using the current catch projection models. At the same time, market limitations may constrain the extent to which commercial fisheries are able to take advantage of increased allocations. Finally, stock recruitment variability and catch monitoring uncertainty will contribute to the divergence between the projections and actual catches. Although actual ACL attainment may differ from projections, inseason management measures are routinely applied to prevent ACLs from being exceeded.

As noted above, the Pacific whiting TAC is determined annually, consistent with the Agreement with Canada on Pacific Hake/Whiting where 73.88% of the TAC is allocated to U.S. fisheries, of which 17.5% is allocated to the Tribal sector. Since the TAC and resulting allocation is not determined during the harvest specifications process, a historical TAC (2019) is used to estimate socioeconomic impacts. The actual TACs for 2021 and 2022 could be higher or lower than the assumed value.

Key points regarding estimated ex-vessel revenue impacts by fishery sector are as follows:

- Under No Action and action Alternatives 1 and 2, annual average coastwide ex-vessel revenue, including the at-sea sectors, is projected to exceed 2019 by from $22.7 million to $25 million. Under the PPA annual average coastwide ex-vessel revenue, including the at-sea sectors, is projected to exceed Status Quo by $26.3 million. Approximately half of the projected increase from Status Quo ($13 million) under the Alternatives is due to the attainment assumptions affecting the at-sea whiting sectors. The relatively slight differences in projected overall ex-vessel revenue for the combined shoreside sectors between No Action, Alternative 1, Alternative 2 and the PPA, i.e., a range of $3.7 million, are likely within the margin of error for these estimates.
- The TAC for Pacific whiting is set annually outside of this harvest specifications process. In this analysis the 2021-2022 TAC,allocations (including tribal reapportionment), and revenue are assumed to be the same as 2019.
- Projected increases from Status Quo in shoreside IFQ non-whiting sector ex-vessel revenues range from $3.7 million to $5 million under No Action, Alternative 1 and Alternative 2, with higher revenues projected under sablefish apportionment Method 2 than under Method 1. Under the PPA annual average ex-vessel revenue in the shoreside IFQ non-whiting sector is projected to exceed Status Quo by $6.3 million.
- The non-nearshore limited entry fixed gear and open access sectors target sablefish and other species, with sablefish landings accounting for approximately 85% of Status Quo ex-vessel revenue (see Groundfish SAFE Table 8b). Compared with Status Quo ex-vessel revenue in the limited entry fixed gear sector is estimated to increase from $0.8 million to $2.2 million under No Action, Alternative 1 and Alternative 2, with greater revenues under sablefish apportionment Method 2 than Method 1. Under the PPA annual ex-vessel revenue in the sector is projected to exceed Status Quo by $2.2 million. Increases in revenues in the non-nearshore open access sector are projected to range from $1 million to $1.4 million under No Action, Alternative 1 and Alternative 2, with greater revenues under sablefish apportionment Method 2 than Method 1. Under the PPA annual average ex-vessel revenue in the non-nearshore open access sector is projected to exceed Status Quo by $1.4 million.
- The nearshore open access sector primarily targets rockfish, cabezon, and lingcod, with black rockfish accounting for the largest share of any single species (see Groundfish SAFE Table 9b). Compared with Status Quo the nearshore open access sector is projected to see an increase $1.4 million under No Action, Alternative 1 and Alternative 2. Under the PPA annual average ex-vessel revenue in the sector is also projected to exceed Status Quo by $1.4 million. There is no noticeable difference for this sector between the two sablefish apportionment methods. While the nearshore sector contributes a relatively small portion to coastwide shoreside revenue, it is important especially in Southern Oregon and Northern and Central California fishing communities.
- There is no difference in projected revenues compared with Status Quo for the incidental open access sector under any of the Alternatives, including PPA.
- Revenues in the Tribal groundfish sector (including shorebased whiting) are projected to increase over Status Quo by the same amount, under No Action, Alternative 1, Alternative 2 and the PPA (approximately $2.1 million).

Table 29. Estimated ex-vessel revenues by groundfish harvest sector under the Alternatives (2019 $million). M =sablefish allocation method

	Status Quo	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Shoreside Sectors:								
Whiting	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
Non-whiting Trawl+Non-trawl IFQ	34.3	38.6	39.2	38.6	39.2	37.9	38.5	40.6
LEFG	14.8	15.6	16.2	16.3	16.9	16.3	16.9	16.9
Nearshore OA	3.8	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Non-nearshore OA	3.1	4.2	4.3	4.3	4.5	4.3	4.5	4.5
IOA	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Tribal (incl. whiting)	3.8	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Shoreside Totals	**88.9**	**98.6**	**99.9**	**99.5**	**100.9**	**98.8**	**100.2**	**102.2**
At-sea Sectors:								
Non-Tribal Whiting	33.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8
Tribal Whiting	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
At-sea sectors' Totals	**37.8**	**50.8**	**50.8**	**50.8**	**50.8**	**50.8**	**50.8**	**50.8**
TOTAL Groundfish Revenue	**126.7**	**149.4**	**150.7**	**150.3**	**151.7**	**149.6**	**151.0**	**153.0**

Table 30. Change in groundfish ex-vessel revenues from Status Quo by groundfish harvest sector under the Alternatives (2019 $million). M =sablefish allocation method

	Status Quo	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Shoreside Sectors:								
Whiting	*28.9*	+0	+0	+0	+0	+0	+0	+0
Non-whiting Trawl+Non-trawl IFQ	*34.3*	+4.4	+4.9	+4.4	+5.0	+3.7	+4.3	+6.3
LEFG	*14.8*	+0.8	+1.4	+1.5	+2.2	+1.5	+2.2	+2.2
Nearshore OA	*3.8*	+1.4	+1.4	+1.4	+1.4	+1.4	+1.4	+1.4
Non-nearshore OA	*3.1*	+1.0	+1.2	+1.2	+1.4	+1.2	+1.4	+1.4
IOA	*0.3*	+0	+0	+0	+0	+0	+0	+0
Tribal (incl. whiting)	*3.8*	+2.1	+2.1	+2.1	+2.1	+2.1	+2.1	+2.1
Shoreside Totals	***88.9***	**+9.7**	**+11.0**	**+10.6**	**+12.0**	**+9.9**	**+11.3**	**+13.4**
At-sea Sectors:								

	Status Quo	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Non-Tribal Whiting	*33.8*	+13.0	+13.0	+13.0	+13.0	+13.0	+13.0	+13.0
Tribal Whiting	*4.0*	+0	+0	+0	+0	+0	+0	+0
At-sea sectors' Totals	***37.8***	**+13.0**	**+13.0**	**+13.0**	**+13.0**	**+13.0**	**+13.0**	**+13.0**
TOTAL Groundfish Revenue	***126.7***	**+22.7**	**+24.0**	**+23.5**	**+25.0**	**+22.9**	**+24.3**	**+26.3**

Table 31. Change in groundfish ex-vessel revenues from Status Quo by groundfish harvest sector under the Alternatives (percent). M =sablefish allocation method

	Status Quo ($mil)	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Shoreside Sectors:								
Whiting	*28.9*	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
Non-whiting Trawl+Non-trawl IFQ	*34.3*	+12.8%	+14.4%	+12.7%	+14.5%	+10.7%	+12.5%	+18.3%
Limited Entry Fixed Gear	*14.8*	+5.5%	+9.7%	+10.1%	+14.8%	+10.1%	+14.8%	+14.8%
Nearshore Open Access	*3.8*	+35.6%	+35.6%	+36.5%	+36.5%	+36.5%	+36.5%	+36.5%
Non-nearshore Open Access	*3.1*	+33.5%	+38.6%	+39.1%	+44.5%	+39.1%	+44.5%	+44.5%
Incidental Open Access	*0.3*	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
Tribal (incl. whiting)	*3.8*	+55.8%	+55.8%	+55.8%	+55.8%	+55.8%	+55.8%	+55.8%
Shoreside sectors' Totals	***88.9***	**+10.9 %**	**+12.4 %**	**+11.9 %**	**+13.5 %**	**+11.1 %**	**+12.8 %**	**+15.0 %**
At-sea Sectors:								
Non-Tribal Whiting	*33.8*	+38.4%	+38.4%	+38.4%	+38.4%	+38.4%	+38.4%	+38.4%
Tribal Whiting	*4.0*	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
At-sea sectors' Totals	***37.8***	**+34.3 %**	**+34.3 %**	**+34.3 %**	**+34.3 %**	**+34.3 %**	**+34.3 %**	**+34.3 %**
TOTAL Groundfish Revenue	***126.7***	**+17.9 %**	**+18.9 %**	**+18.6 %**	**+19.7 %**	**+18.0 %**	**+19.2 %**	**+20.8 %**

4.2.3 Recreational Fisheries

For recreational fisheries, projected marine area angler boat trips taken in groundfish plus Pacific halibut recreational fisheries are compared to Status Quo fishing effort under the proposed management alternatives. Table 31, Table 32, and Table 33 compare projected recreational angler trips under the No Action and Action Alternatives to 2019 angler effort. Results are shown by coastal regions that are aggregated from statistical reporting regions.[16]

Most of the recreational management options considered are projected to have modest or unquantifiable effects on projected angler fishing effort. To produce a tractable number economic impact projections that cover the range of possible outcomes, in addition to No Action two Action Alternatives plus the PPA were constructed from the range of management Alternatives or options proposed for each state: Under coastwide Alternative 1, Washington's and Oregon's Alternative 1 is paired with California recreational Options 1 and 2 (limited seasons and fishing depths), while under coastwide Alternative 2, Washington's and Oregon's Alternative 2 is paired with California recreational Option 3 (year-round all depth fishing). These associations are maintained in this and subsequent sections of the economic analysis.[17] Although management measures under the PPA may offer somewhat greater recreational fishing opportunity than No Action, the difference was not quantifiable for this analysis. Therefore, angler effort and associated economic impacts under the PPA are assumed to be equivalent to No Action

Key points regarding estimated recreational effort impacts by coastal region are as follows:

- Coastwide recreational effort is projected to increase marginally (3,500 trips, 0.4%) from Status Quo under No Action and Alternative 1. Under Alternative 2 overall recreational fishing effort is projected to increase by 184,700 trips (21.8%). Coastwide effort under the PPA is assumed to be same as No Action.
- Recreational fishing effort for the Washington Coast is projected to increase by 3,500 trips (7.2%) from Status Quo under all Alternatives[18]. Washington Coast effort under the PPA is projected to be the same as No Action. Washington accounts for 5.8% of coastwide Status Quo fishing effort.
- Recreational fishing effort in Oregon is not projected to change from Status Quo under the Alternatives, including PPA. This results from the observation that, although recreational management measures would change, a response in terms of change in effort dies not necessarily follow changes in bag limits or open fishing depths. The combined three coastal regions of Oregon account for 12.2% of coastwide Status Quo fishing effort.
- California recreational fishing effort is not projected to change under No Action, Alternative 1, or the PPA, but is projected to increase in all regions under Alternative 2. Note that under Alternative 2 (California recreational Option 3) fishing would be allowed at all depths throughout the year. The Santa Barbara to San Diego region accounts for

[16] The Puget Sound region is not shown in these tables because Council managed recreational fisheries do not occur in this region.

[17] For more information about the proposed recreational management options see Sections **Error! Reference source not found.** through **Error! Reference source not found.** descriptions .

[18] This is chiefly due to somewhat relaxed yelloweye rockfish avoidance measures.

more than half (57.8%) of coastwide Status Quo recreational angler trips, and this region also shows the largest absolute change in effort, an increase of 140,200 trips (28.8%). Increases projected for the other California regions under Alternative 2 areshown in Table X). The combined five California management areas account for 82% of coastwide 2019 fishing effort.

Table 32. Estimated Recreational Effort (halibut+bottomfish) under Status Quo and the Alternatives (thousands of angler trips).

Community Groups	Status Quo	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	49.2	52.8	52.8	52.8	52.8
Astoria-Tillamook	18.9	18.9	18.9	18.9	18.9
Newport	45.9	45.9	45.9	45.9	45.9
Coos Bay-Brookings	38.2	38.2	38.2	38.2	38.2
Crescent City-Eureka	25.3	25.3	25.3	30.3	25.3
Fort Bragg - Bodega Bay	16.5	16.5	16.5	17.2	16.5
San Francisco Area	69.2	69.2	69.2	84.6	69.2
SC – Mo – MB*	96.7	96.7	96.7	116.7	96.7
SB – LA – SD*	487.0	487.0	487.0	627.2	487.0
Coastwide Total	**846.9**	**850.4**	**850.4**	**1,031.7**	**850.4**

*SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 33. Estimated change from Status Quo Recreational Effort (halibut+bottomfish) under the Alternatives (thousands of angler trips).

Community Groups	Status Quo	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	*49.2*	+3.5	+3.5	+3.5	+3.5
Astoria-Tillamook	*18.9*	-	-	-	-
Newport	*45.9*	-	-	-	-
Coos Bay-Brookings	*38.2*	-	-	-	-
Crescent City-Eureka	*25.3*	-	-	+4.9	-
Fort Bragg - Bodega Bay	*16.5*	-	-	+0.7	-
San Francisco Area	*69.2*	-	-	+15.4	-
SC – Mo – MB*	*96.7*	-	-	+20.0	-
SB – LA – SD*	*487.0*	-	-	+140.2	-
Coastwide Total	***846.9***	+3.5	+3.5	+184.7	+3.5

*SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 34. Estimated change from Status Quo Recreational Effort (halibut+bottomfish) under the Alternatives (percent).

Community Groups	Status Quo	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	*49.2*	+7.2%	+7.2%	+7.2%	+7.2%
Astoria-Tillamook	*18.9*	-	-	-	-
Newport	*45.9*	-	-	-	-
Coos Bay-Brookings	*38.2*	-	-	-	-
Crescent City-Eureka	*25.3*	-	-	+19.4%	-
Fort Bragg - Bodega Bay	*16.5*	-	-	+4.2%	-
San Francisco Area	*69.2*	-	-	+22.3%	-
SC – Mo – MB*	*96.7*	-	-	+20.7%	-
SB – LA – SD*	*487.0*	-	-	+28.8%	-
Coastwide Total	***846.9***	+0.4%	+0.4%	+21.8%	+0.4%

*SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

4.2.4 Commercial Fishery Sectors Net Revenue

Table 34, Table 35, and Table 36 provides estimates of net revenues for the 1) Shoreside Whiting, 2) Non-whiting Trawl & Non-trawl IFQ, and 3) Limited Entry Fixed Gear sectors. These are based on the estimated revenues (from Table 4-1), and projected landings derived from the GMT and landings distribution models. Combined with cost-earnings data collected from surveys fielded by the Economics and Social Science Research program at the Northwest Fisheries Science Center, we use an economic model linking historical landings and costs to construct measures of projected costs and net revenues. These measures are constructed only for sectors with sufficient cost and earnings data coverage to perform the modeling described below.

In order to project how changes in future landings may affect costs, we form a model where the landings L for groundfish species s, as well as their respective interactions, are associated with the natural log of non-labor variable costs VC, for the ith vessel in year t as seen in equation (1). Key variable costs vary by sector, including, for example fuel, bait, ice, food, observer coverage, and electronic monitoring costs. Intuitively, we might expect costs to increase when a vessel catches a greater quantity of fish, and interactions allow for cost complementarities between species. The economic rationale behind examining the log of non-labor variable costs is that marginal costs increase with landings.[19]

$$\ln(VC_{it}) = \sum_{s=1} L_{its} + \sum_{s=1} \sum_{r=1, r \neq s} L_{its} L_{itr} + \epsilon_{it} \quad (1)$$

[19] Marginal costs might increase with landings if for example there exists a stock effect, such that it becomes harder and harder to find fish as catches increase.

Total costs net revenues (*TCNR*) are calculated as revenues (*R*), less projected non-labor variable costs (*VC*), wages, cost recovery fees (*CR*), buyback fees (*BB*), and fixed costs (*FC*) as shown in equation (2). First, projections of non-labor variable costs are obtained from forecasted catches, applied to our regression results, by species and vessel. Then, to obtain projected wages, we calculate the historical proportions of wages (*wp*) to variable costs net revenues, and apply them to projected variable costs net revenues. The intuition here is that wages are typically paid out as shares of variable costs net revenues. Cost recovery fees and buyback fees were calculated using 2020 rates of 3.0 percent and 3.5 percent, respectively. Finally, fixed costs, including vessel and on-board equipment, fishing gear, moorage, and insurance are aggregated from survey data by sector for all vessels that fished in 2019, although a sector-specific mean is applied in cases when a specific vessel is not included in the survey sample.

$$TCNR = R - VC - (R - VC) * wp - FC - CR - BB \quad (2)$$

Then, we examine potential differences between proposed Alternatives, where Methods 1 and 2 are the different sablefish allocation methods used in the GMT models. While additional model details can be obtained from the authors by request, key points regarding estimates of net revenue by fishery sector are as follows:

- Shoreside whiting sector net revenue is estimated between $8.5 and $8.6 million across the Alternatives. The relatively small differences in net revenue estimates are the result of slight variations in projections of catch of non-whiting groundfish species while targeting whiting.
- The largest absolute and percentage increases compared to Status Quo for groundfish harvesting sectors occur under the PPA, which incorporates Method 2 regarding projected sablefish harvest by vessels operating north of the Conception area.
- While estimates of net revenue appear similar across Alternatives, the 2021 specifications for the Non-whiting Trawl & Non-trawl IFQ and Limited Entry Fixed Gear sectors do appear to be an economic improvement compared with the 2019.
- The intervals in Figure 4-1 represent the 5th and 95th percentiles of our sampling distribution and suggest that increases in revenue from increases in landings could outpace corresponding increases in costs. Although not included in the figure, estimated sector net revenues under the PPA follow a pattern similar to the Alternatives shown..

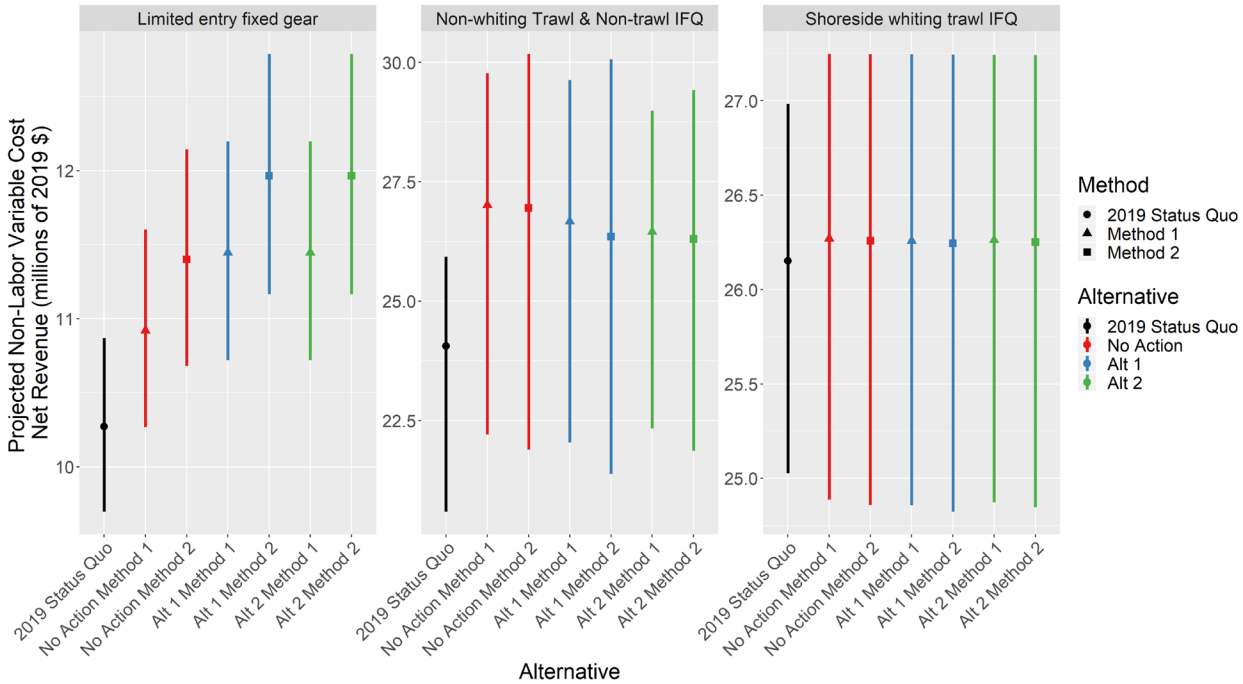

Figure 4-32. Estimated sector-wide total non-labor variable costs net revenues by groundfish harvesting sector under the alternatives, 5th and 95th percentile intervals (2019 $million).

Table 35. Estimated vessel net revenues for the whiting, shoreside IFQ, and limited entry fixed gear sectors under the alternatives in millions of dollars (2019 $million) compared to status quo. M =sablefish allocation method

	Status Quo ($mil)	**No Action**		**Alternative 1**		**Alternative 2**		**PPA**
		M- 1	**M-2**	**M- 1**	**M-2**	**M- 1**	**M-2**	
Shoreside Sectors:								
Whiting	8.5	8.6	8.6	8.5	8.5	8.6	8.5	8.6
Non-whiting Trawl+Non-trawl IFQ	6.7	8.6	8.7	8.5	8.7	8.2	8.4	9.2
Limited Entry Fixed Gear	1.7	2.0	2.3	2.4	2.7	2.4	2.7	2.7

Table 36. Change in groundfish net revenues from Status Quo for the whiting, shoreside IFQ, and limited entry fixed gear sectors under the alternatives in millions of dollars (2019 $million). M =sablefish allocation method

	Status Quo ($mil)	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M- 1	M-2	M- 1	M-2	
Shoreside Sectors:								
Whiting	8.5	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1
Non-whiting Trawl+Non-trawl IFQ	6.7	+1.8	+2.0	+1.8	+2.0	+1.5	+1.7	+2.5
Limited Entry Fixed Gear	1.7	+0.4	+0.7	+0.7	+1.0	+0.7	+1.0	+1.0

Table 37. Estimated percent change in groundfish net revenues from Status Quo for whiting, shoreside IFQ, and limited entry fixed gear sectors under the alternatives (2019 $million). M =sablefish allocation method

	Status Quo ($mil)	No Action		Alternative 1		Alternative 2		PPA
		M- 1	M-2	M- 1	M-2	M- 1	M-2	
Shoreside Sectors:								
Whiting	8.5	+ 1.0%	+ 1.0%	+ 1.0%	+ 0.9%	+ 1.0%	+ 0.9%	+1.2%
Non-whiting Trawl+Non-trawl IFQ	6.7	+27.4%	+30.2%	+26.5%	+29.3%	+22.2%	+25.0%	+37.3%
Limited Entry Fixed Gear	1.7	+23.4%	+40.6%	+42.3%	+60.9%	+42.3%	+60.9%	+58.8%

Table 4 26, Table 38, Table 39 represent projected payments made by vessels to both captain and crew. Owners of vessels who operate as the captain may be paid a wage and/or receive a share of the vessel's profits as compensation. Wage projections are based on actual recorded wages, as such compensation received by captains on vessels that do not pay a captain's wage is included in vessel net revenue. As in the case of vessel net revenue projections, wages are available only for sectors for which sufficient cost and earnings data are available.

Key points regarding estimates of crew and captain wages by fishery sector are as follows.

- Shoreside whiting sector net revenue is estimated between $8.5 and $8.6 million across the Alternatives. The relatively small differences in net revenue estimates are the result of slight variations in projections of catch of non-whiting groundfish species while targeting whiting.
- The largest absolute and percentage increases compared to Status Quo for groundfish harvesting sectors occur under the PPA, which incorporates Method 2 regarding projected sablefish harvest by vessels operating north of the Conception area.
- While estimates of net revenue appear similar across Alternatives, the 2021 specifications for the Non-whiting Trawl & Non-trawl IFQ and Limited Entry Fixed Gear sectors do appear to be an economic improvement compared with the 2019 Status Quo.

Table 38. Estimated vessel wages (crew and captain) for whiting, shoreside IFQ, and limited entry fixed gear sectors under the alternatives in millions of dollars (2019 $million) compared to status quo. M =sablefish allocation method

	Status Quo ($mil)	**No Action**		**Alternative 1**		**Alternative 2**		**PPA**
		M-1	**M-2**	**M- 1**	**M-2**	**M- 1**	**M-2**	
Shoreside Sectors:								
Whiting	10.2	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Non-whiting Trawl+Non-trawl IFQ	10.4	12.0	12.1	11.9	12.0	11.6	11.8	12.5
Limited Entry Fixed Gear	4.1	4.4	4.6	4.6	4.8	4.6	4.8	4.8

Table 39. Estimated change in vessel wages (crew and captain) whiting, shoreside IFQ, and limited entry fixed gear sectors under the alternatives in millions of dollars (2019 $million) compared to status quo. M =sablefish allocation method

	Status Quo ($mil)	**No Action**		**Alternative 1**		**Alternative 2**		**PPA**
		M- 1	**M-2**	**M- 1**	**M-2**	**M- 1**	**M-2**	
Shoreside Sectors:								
Whiting	10.2	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1
Non-whiting Trawl+Non-trawl IFQ	10.4	+1.5	+1.7	+1.5	+1.6	+1.2	+1.4	+2.1

	Status Quo ($mil)	**No Action**		**Alternative 1**		**Alternative 2**		**PPA**
		M- 1	**M-2**	**M- 1**	**M-2**	**M- 1**	**M-2**	
Limited Entry Fixed Gear	4.1	+0.3	+0.5	+0.5	+0.7	+0.5	+0.7	+0.7

Table 40. Estimated percent change in vessel wages (crew and captain) for whiting, shoreside IFQ, and limited entry fixed gear sectors under the alternatives compared to status quo wages. (2019 $million). M =sablefish allocation method

	Status Quo ($mil)	**No Action**		**Alternative 1**		**Alternative 2**		**PPA**
		M- 1	**M-2**	**M- 1**	**M-2**	**M- 1**	**M-2**	
Shoreside Sectors:								
Whiting	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%
Non-whiting Trawl+Non-trawl IFQ	+15.4%	+16.3%	+14.4%	+15.4%	+11.5%	+13.5%	+20.2%	+15.4%
Limited Entry Fixed Gear	+7.3%	+12.2%	+12.2%	+17.1%	+12.2%	+17.1%	+17.1%	+7.3%

4.2.5 Estimated Change in Income and Employment Impacts by Community

Socioeconomic impacts to fishing communities engaged in groundfish fisheries are evaluated based on the changes in personal income (dollar income impacts) and employment (number of jobs) under the Alternatives. These effects are functions of the projected changes in commercial landings, ex-vessel revenue, and recreational effort described above. Comparisons are with respect to Status Quo for the No Action, Alternative 1, Alternative 2, and the PPA.

For simplification and ease of comparing impacts from commercial and recreational fishing activities, coastal port groups are further aggregated regionally so as to be more consistent with the recreational reporting regions. For a description of the counties included in these regions see page 378 in the 2015 EIS.

Impacts were monetized and converted into income and employment effects using results from the National NMFS Northwest Fisheries Science Center (NWFSC) IOPAC input-output model. Impacts include combined direct, indirect, and induced economic effects resulting from projected changes in recreational angling, commercial fishing, fish processing, and related input supply and industry support activities.

Community impacts from commercial and recreational fishing are displayed separately. Impacts are calculated by applying income and employment multipliers generated using IOPAC regional

impact models to the projected levels of local expenditures by commercial harvesters, seafood processors, and recreational anglers under Status Quo and the Alternatives.

Income and employment impacts from Tribal fisheries and at-sea Pacific whiting catcher-processor and mothership sectors are not included in the community impact totals for the following reasons:

1. Tribal groundfish harvesting and shorebased processing are not included in any of the cost-revenue data collected by NWFSC.
2. While overall estimators of income and employment impacts derived from the at-sea whiting fishery (tribal and non-tribal catcher processors and motherships) have been developed, the detail required to attribute these impacts to particular port groups has not.

That being said, presumably most of the income and employment impacts associated with at-sea whiting fisheries would likely accrue in the Puget Sound region; while corresponding impacts of shorebased tribal groundfish fisheries most likely accrue in Washington Coast and Puget Sound communities.

Economic impact models like IOPAC are calibrated to represent a baseline or "snapshot" of the economy at a particular point in time. Consequently, these models are best able to address impacts of scenarios that are within the range of what may have occurred over the recent past. Analysis of scenarios that represent particularly large departures from the Status Quo may, therefore, result in biased impact estimates.

4.2.6 Commercial Fishery Community Income Impacts

Table 4-29 presents estimates of community personal income impacts by region due to projected commercial groundfish fishing activity under the range of Alternatives. Table 41 and Table 42 comparing those estimates relative to Status Quo.

Key points regarding estimated income impacts from commercial groundfish fisheries by coastal region are as follows:

- Coastwide estimated personal income impacts from commercial groundfish fishing are estimated to be $152.2 million under Status Quo and projected to increase by between $11.2 million (7.4%) under No Action Method 1 and Alternative 2 Method 1, and $16.9 million (11.1%) under the PPA. Coastwide income impacts are more than $2 million higher under sablefish apportionment Method 2 than Method 1. The highest coastwide total income impacts and also the highest levels for each community occur under the PPA.
- Puget Sound ports show increases over Status Quo ranging from $0.7 million (9.2%) under No Action Method 1 to $1.5 million (19.8%) under PPA. Puget Sound ports account for 5% of estimated coastwide Status Quo personal income impacts from commercial fishing.
- Washington Coast port areas show personal income increases over Status Quo ranging from $0.4 million (1.4%) under No Action Method 1 to $0.8 million (3.1%) under PPA.

Washington Coast ports account for 17.4% of estimated coastwide Status Quo personal income impacts from commercial fishing.

- Oregon port areas show personal income increases over Status Quo ranging from $0.9 million (Coos Bay-Brookings under No Action Method 1) to $4.8 million (Astoria-Tillamook under the PPA). The Coos Bay-Brookings area shows the largest percentage increase in income impacts among Oregon ports, ranging from $0.9 million (9.1%) under No Action Method 1 to $1.7 million (17%) under the PPA. Astoria-Tillamook is the port group with the largest estimated absolute increase in income impacts under each Alternative: No Action - $3.8 million (6.9%) under Method 2; Alternative 1 - $3.8 million (6.9%) under Method 2; Alternative 2 - $3.3 million (6.1%) under Method 2; and the PPA - an increase of $4.8 million (8.9%). Oregon ports combined account for 61.7% of estimated coastwide Status Quo personal income impacts from commercial fishing.
- All California port groups are projected to see increases from Status Quo under all Alternatives ranging from $0.3 million (San Francisco under several Alternatives) to $1.5 million (Santa Barbara to San Diego under all Alternatives, including PPA). The largest relative increases in personal income impacts compared to Status Quo among California port groups are projected for the Santa Cruz to Morro Bay region, ranging from $0.9 million (29.1%) under No Action Method 2 to $1 million (31%) under Alternative 1 Method 2, Alternative 2 Method 2, and the PPA. Projected landings by fixed gear fisheries account for much of the increased income impacts in California port groups. California ports combined account for 15.9% of coastwide Status Quo income impacts from commercial fishing.

Table 41. Commercial fishery income impacts under Status Quo and the Alternatives by community group (2019 $million). M =sablefish allocation method

Community Groups	Status Quo	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Puget Sound	7.6	8.3	8.7	8.6	9.0	8.5	8.9	9.1
Washington Coast	26.5	26.9	27.1	27.1	27.2	27.1	27.2	27.3
Astoria-Tillamook	54.6	57.9	58.3	57.9	58.3	57.4	57.8	59.4
Newport	29.5	31.3	31.8	31.6	32.1	31.4	31.9	32.7
Coos Bay-Brookings	9.8	10.7	11.1	11.0	11.3	10.8	11.2	11.5
Crescent City-Eureka	6.5	7.4	7.5	7.4	7.5	7.3	7.4	7.7
Fort Bragg – Bodega Bay	3.9	4.3	4.4	4.4	4.5	4.4	4.5	4.5
San Francisco Area	3.0	3.3	3.4	3.4	3.4	3.3	3.4	3.5

Community Groups	Status Quo	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
SC – Mo – MB*	3.2	4.1	4.1	4.1	4.1	4.1	4.1	4.1
SB – LA – SD*	7.6	9.1	9.1	9.1	9.1	9.1	9.1	9.1
Coastwide Total	152.2	163.4	165.4	164.6	166.7	163.4	165.6	169.1

* SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 42. Change in commercial fishery income impacts (from Status Quo) under the Alternatives by community group (2019 $ million). M =sablefish allocation method

Community Groups	*Status Quo*	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Puget Sound	*7.6*	+0.7	+1.1	+1.0	+1.4	+0.9	+1.3	+1.5
Washington Coast	*26.5*	+0.4	+0.5	+0.5	+0.7	+0.5	+0.7	+0.8
Astoria-Tillamook	*54.6*	+3.3	+3.8	+3.3	+3.8	+2.8	+3.3	+4.8
Newport	*29.5*	+1.9	+2.3	+2.2	+2.7	+2.0	+2.5	+3.2
Coos Bay-Brookings	*9.8*	+0.9	+1.2	+1.1	+1.5	+1.0	+1.4	+1.7
Crescent City-Eureka	*6.5*	+0.9	+1.1	+0.9	+1.1	+0.8	+0.9	+1.2
Fort Bragg – Bodega Bay	*3.9*	+0.4	+0.5	+0.5	+0.6	+0.5	+0.6	+0.6
San Francisco Area	*3.0*	+0.3	+0.4	+0.3	+0.4	+0.3	+0.3	+0.5
SC – Mo – MB*	*3.2*	+0.9	+0.9	+1.0	+1.0	+1.0	+1.0	+1.0
SB – LA – SD*	*7.6*	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5
Coastwide Total	*152.2*	+11.2	+13.2	+12.4	+14.6	+11.2	+13.4	+16.9

* SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 43. Change in commercial fishery income impacts (from Status Quo) under the Alternatives by community group (percent). M =sablefish allocation method

Community Groups	*Status Quo ($mil)*	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Puget Sound	*7.6*	+9.2%	+13.8%	+13.0%	+18.0%	+11.7%	+16.7%	+19.8%
Washington Coast	*26.5*	+1.4%	+2.0%	+2.0%	+2.6%	+2.0%	+2.6%	+3.1%
Astoria-Tillamook	*54.6*	+6.1%	+6.9%	+6.1%	+6.9%	+5.2%	+6.0%	+8.9%
Newport	*29.5*	+6.4%	+7.9%	+7.4%	+9.1%	+6.7%	+8.4%	+10.9%
Coos Bay-Brookings	*9.8*	+9.1%	+12.4%	+11.6%	+15.2%	+10.2%	+13.8%	+17.0%
Crescent City-Eureka	*6.5*	+14.5%	+16.4%	+14.6%	+16.6%	+12.4%	+14.5%	+19.4%
Fort Bragg – Bodega Bay	*3.9*	+9.4%	+12.9%	+12.6%	+16.3%	+11.8%	+15.6%	+16.5%
San Francisco Area	*3.0*	+9.7%	+12.0%	+10.3%	+12.7%	+8.5%	+11.0%	+15.3%
SC – Mo – MB*	*3.2*	+29.2%	+29.1%	+30.7%	+31.0%	+30.7%	+31.0%	+31.0%
SB – LA – SD*	*7.6*	+19.6%	+19.6%	+19.6%	+19.6%	+19.6%	+19.6%	+19.6%
Coastwide Total	*152.2*	+7.4%	+8.7%	+8.1%	+9.6%	+7.4%	+8.8%	+11.1%

* SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

4.2.7 Recreational Fishery Community Income Impacts

Table 43 shows recreational income impacts under the Alternatives; Table 44 shows the incremental change; Table 45 comparing those estimates relative to Status Quo.

For purposes of comparing economic impacts in this section, under Alternative 1 Washington's and Oregon's Alternative 1 is paired with California recreational Options 1 and 2 (limited seasons and fishing depths), while under alternative 2 Washington's and Oregon's Alternative 2 is paired with California recreational Option 3 (year-round all depth fishing). Economic impacts under the PPA are assumed to be equivalent to No Action.

Key points regarding estimated income impacts from recreational groundfish fisheries by coastal region are as follows:

- Coastwide Status Quo recreational fishing income impacts of $157.1 million are projected to increase by $0.5 million (0.3%) under No Action, Alternative 1 and the PPA, and by $38.7 million (24.6%) under Alternative 2.

- The Washington Coast shows relative increases under No Action, Alternative 1, Alternative 2 and PPA of $0.5 million (7.3%). The Washington Coast is the only region showing a change from Status Quo under No Action, Alternative 1 and the PPA.
- Recreational fishing income impacts are not projected to change from Status Quo in all regions in Oregon across all Alternatives, including PPA.
- Impacts in all California regions are most projected to change from Status Quo under No Action, Alternative 1 and the PPA.
- Impacts are projected to increase for all California regions under Alternative 2 (which assumes year-round fishing in all depths - California option 3). Under Alternative 2 the Santa Barbara to San Diego region shows the largest absolute change in income impacts, an increase of $32.2 million. This is also the largest relative increase in projected income impacts (29%) under the range of Alternatives.

Table 44. Recreational fishery income impacts under Status Quo and the Alternatives by community group ($ mil.).

Community Groups	***Status Quo ($ mil)***	**No Action**	**Alternative 1**	**Alternative 2**	**PPA**
Washington Coast	6.2	6.7	6.7	6.7	6.7
Astoria-Tillamook	1.3	1.3	1.3	1.3	1.3
Newport	5.8	5.8	5.8	5.8	5.8
Coos Bay-Brookings	2.5	2.5	2.5	2.5	2.5
Crescent City-Eureka	2.2	2.2	2.2	2.6	2.2
Fort Bragg - Bodega Bay	2.4	2.4	2.4	2.5	2.4
San Francisco Area	12.2	12.2	12.2	14.9	12.2
SC – Mo – MB*	13.4	13.4	13.4	16.1	13.4
SB – LA – SD*	111.2	111.2	111.2	143.4	111.2
Coastwide Total	**157.1**	**157.6**	**157.6**	**195.8**	**157.6**

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 45. Change in recreational fishery income impacts from Status Quo under the Alternatives by community group ($ mil.)

Community Groups	*Status Quo ($ mil)*	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	*6.2*	+0.5	+0.5	+0.5	+0.5
Astoria-Tillamook	*1.3*	-	-	-	-
Newport	*5.8*	-	-	-	-
Coos Bay-Brookings	*2.5*	-	-	-	-
Crescent City-Eureka	*2.2*	-	-	+0.4	-
Fort Bragg - Bodega Bay	*2.4*	-	-	+0.1	-
San Francisco Area	*12.2*	-	-	+2.7	-
SC – Mo – MB*	*13.4*	-	-	+2.7	-
SB – LA – SD*	*111.2*	-	-	+32.2	-
Coastwide Total	*157.1*	+0.5	+0.5	+38.7	+0.5

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 46. Change in recreational fishery income impacts from Status Quo under the Alternatives by community group (percent).

Community Groups	*Status Quo ($ mil)*	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	*6.2*	+7.3%	+7.3%	+7.3%	+7.3%
Astoria-Tillamook	*1.3*	-	-	-	-
Newport	*5.8*	-	-	-	-
Coos Bay-Brookings	*2.5*	-	-	-	-
Crescent City-Eureka	*2.2*	-	-	+19.4%	-
Fort Bragg - Bodega Bay	*2.4*	-	-	+5.7%	-
San Francisco Area	*12.2*	-	-	+22.4%	-
SC – Mo – MB*	*13.4*	-	-	+20.5%	-
SB – LA – SD*	*111.2*	-	-	+29.0%	-
Coastwide Total	*157.1*	+0.3%	+0.3%	+24.6%	+0.3%

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

4.2.8 Commercial Fishery Community Employment Impacts

Table 46 shows projected employment impacts due to the commercial groundfish fishery under the alternatives; Table 47 and Table 4-208 show the change in commercial fishery impacts relative to Status Quo in terms of dollars and percentage, respectively.

Key points regarding estimated employment impacts from commercial groundfish fisheries by coastal region are as follows:

- Coastwide estimated employment impacts from commercial groundfish fishing are estimated to be 2,344 jobs under Status Quo and projected to increase by between 224 jobs (9.6%) under No Action Method 1 and 307 jobs (13.1%) under the PPA. Employment impacts are at least 30 jobs greater under sablefish apportionment Method 2 than Method 1. The highest coastwide total increase in employment impacts and also the highest levels for each community occur under the PPA.
- Puget Sound ports show increases over Status Quo ranging from 8 jobs (9.0%) under No Action Method 1 to 17 jobs (19.6%) under PPA. Puget Sound ports account for 3.7% of estimated coastwide Status Quo employment impacts from commercial fishing.
- Washington Coast port areas show increases in employment impacts over Status Quo ranging from 5 jobs (1.4%) under No Action Method 1 to 12 jobs (3.4%) under PPA. Washington Coast ports account for 15.5% of estimated coastwide Status Quo employment impacts from commercial fishing.
- Oregon port areas show employment increases over Status Quo ranging from 14 jobs (Coos Bay-Brookings under No Action Method 1) to 65 jobs (Astoria-Tillamook under the PPA). The Coos Bay-Brookings area shows the largest percentage increase in employment impacts among Oregon ports, ranging from 14 jobs (7%) under No Action Method 1 to 26 jobs (13.5%) under the PPA. Oregon ports combined account for 56.1% of estimated coastwide Status Quo employment impacts from commercial fishing.
- All California port groups are projected to see increases from Status Quo under all Alternatives ranging from 8 jobs (San Francisco under No Action Method 1 and Alternative 2 Method 1) to 50 jobs (Santa Cruz to Morro Bay under Alternative 1 Method 2, Alternative 2 Method 2, and the PPA). The largest relative increases in employment impacts compared to Status Quo are projected for the Santa Cruz to Morro Bay region, ranging from 49 jobs (43.2%) under No Action to 50 jobs (44%) under Alternative 1 Method 2, Alternative 2 Method 2, and the PPA. Projected landings by fixed gear fisheries account for much of the increased employment impacts in California port groups. California ports account for 24.7% of coastwide Status Quo employment impacts from commercial fishing.

Table 47. Commercial fishery employment impacts under Status Quo and the Alternatives by community group (number of jobs). M =sablefish allocation method

Community Groups	Status Quo (*$mil*)	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Puget Sound	86	93	97	97	101	96	100	102
Washington Coast	364	370	372	372	375	372	375	377
Astoria-Tillamook	712	758	762	757	762	750	755	777

Community Groups	Status Quo (*$mil*)	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Newport	408	432	438	437	443	434	441	450
Coos Bay-Brookings	196	209	214	214	220	213	218	222
Crescent City-Eureka	107	131	133	131	133	130	132	135
Fort Bragg – Bodega Bay	109	129	133	134	138	133	138	138
San Francisco Area	64	72	74	73	74	72	74	75
SC – Mo – MB*	113	161	161	162	162	162	162	162
SB – LA – SD*	186	213	213	213	213	213	213	213
Coastwide Total	2,344	2,569	2,598	2,590	2,622	2,575	2,607	2,652

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 48. Change in commercial fishery employment impacts from Status Quo under the Alternatives by community group (number of jobs). M =sablefish allocation method

Community Groups	*Status Quo* (*$mil*)	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Puget Sound	*86*	+8	+12	+11	+15	+10	+14	+17
Washington Coast	*364*	+5	+8	+8	+11	+8	+11	+12
Astoria-Tillamook	*712*	+46	+50	+45	+50	+38	+43	+65
Newport	*408*	+24	+30	+29	+35	+26	+33	+42
Coos Bay-Brookings	*196*	+14	+19	+19	+24	+17	+22	+26
Crescent City-Eureka	*107*	+24	+26	+24	+26	+23	+25	+28
Fort Bragg – Bodega Bay	*109*	+21	+25	+25	+29	+25	+29	+29
San Francisco Area	*64*	+8	+9	+9	+10	+8	+9	+11
SC – Mo – MB*	*113*	+49	+49	+49	+50	+49	+50	+50
SB – LA – SD*	*186*	+27	+27	+27	+27	+27	+27	+27
Coastwide Total	*2,344*	+224	+254	+246	+278	+231	+263	+307

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 49. Change in commercial fishery employment impacts from Status Quo under the Alternatives by community group (percent). M =sablefish allocation method

Community Groups	*Status Quo (# of jobs)*	No Action		Alternative 1		Alternative 2		PPA
		M-1	M-2	M-1	M-2	M-1	M-2	
Puget Sound	*86*	+9.0%	+13.7 %	+12.9 %	+17.9 %	+11.7 %	+16.7 %	+19.6 %
Washington Coast	*364*	+1.4%	+2.1%	+2.2%	+3.0%	+2.2%	+2.9%	+3.4%
Astoria-Tillamook	*712*	+6.4%	+7.1%	+6.3%	+7.0%	+5.3%	+6.1%	+9.1%
Newport	*408*	+5.9%	+7.4%	+7.0%	+8.7%	+6.4%	+8.1%	+10.2 %
Coos Bay-Brookings	*196*	+7.0%	+9.6%	+9.6%	+12.3 %	+8.7%	+11.4 %	+13.5 %
Crescent City-Eureka	*107*	+22.3 %	+24.0 %	+22.8 %	+24.7 %	+21.4 %	+23.3 %	+26.6 %
Fort Bragg – Bodega Bay	*109*	+19.0 %	+22.8 %	+22.8 %	+26.9 %	+22.6 %	+26.6 %	+26.9 %
San Francisco Area	*64*	+12.5 %	+14.6 %	+13.6 %	+15.8 %	+12.4 %	+14.7 %	+17.4 %
SC – Mo – MB*	*113*	+43.2 %	+43.2 %	+43.8 %	+44.0 %	+43.8 %	+44.0 %	+44.0 %
SB – LA – SD*	*186*	+14.5 %	+14.5 %	+14.5 %	+14.5 %	+14.5 %	+14.5 %	+14.5 %
Coastwide Total	*2,344*	+9.6%	+10.8 %	+10.5 %	+11.9 %	+9.8%	+11.2 %	+13.1 %

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

4.2.9 Recreational Fishery Community Employment Impacts

Table 4 38 shows projected employment impacts due to the recreational groundfish fishery under the alternatives; Table 50 and Table 51 show the change in recreational fishery impacts relative to Status Quo in terms of dollars and percentage, respectively.

For purposes of comparing economic impacts in this section, under Alternative 1 Washington's and Oregon's Alternative 1 is paired with California recreational Options 1 and 2 (limited seasons and fishing depths), while under Alternative 2 Washington's and Oregon's Alternative 2 is paired with California recreational Option 3 (year-round all depth fishing). Economic impacts under the PPA are assumed to be equivalent to No Action.

Key points regarding estimated employment impacts from recreational groundfish fisheries by coastal region are as follows:

- Coastwide Status Quo recreational fishing employment impacts of 2,734 jobs are projected to increase by 14 jobs (0.5%) under No Action, Alternative 1 and the PPA, and by 618 jobs (22.6%) under Alternative 2.
- The Washington Coast shows relative increases under No Action, Alternative 1, Alternative 2 and PPA of 14 jobs (7.4%). The Washington Coast is the only region showing a change from Status Quo under No Action, Alternative 1 and the PPA.
- Recreational fishing employment impacts are not projected to change from Status Quo in all regions in Oregon across all Alternatives, including PPA.
- Impacts in all California regions are not projected to change from Status Quo under No Action, Alternative 1 and the PPA.
- Impacts for all California regions are projected to increase under Alternative 2 (which assumes year-round fishing in all depths - California option 3). Under Alternative 2 the Santa Barbara to San Diego region shows the largest absolute increase in employment impacts, 504 jobs. This is also the largest relative increase in projected employment impacts (29%) for any port group under the range of Alternatives..

Table 50. Recreational fishery employment impacts under Status Quo and the Alternatives by community group (number of jobs).

Community Groups	*Status Quo*	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	189	202	202	202	202
Astoria-Tillamook	52	52	52	52	52
Newport	175	175	175	175	175
Coos Bay-Brookings	79	79	79	79	79
Crescent City-Eureka	37	37	37	44	37
Fort Bragg - Bodega Bay	41	41	41	44	41

Community Groups	*Status Quo*	No Action	Alternative 1	Alternative 2	PPA
San Francisco Area	188	188	188	231	188
SC – Mo – MB*	236	236	236	285	236
SB – LA – SD*	1,738	1,738	1,738	2,242	1,738
Coastwide Total	2,734	2,748	2,748	3,352	2,748

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 51. Change in recreational fishery employment impacts from Status Quo under the Alternatives by community group (number of jobs).

Community Groups	*Status Quo*	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	*189*	+14	+14	+14	+14
Astoria-Tillamook	*52*	-	-	-	-
Newport	*175*	-	-	-	-
Coos Bay-Brookings	*79*	-	-	-	-
Crescent City-Eureka	*37*	-	-	+7	-
Fort Bragg - Bodega Bay	*41*	-	-	+2	-
San Francisco Area	*188*	-	-	+42	-
SC – Mo – MB*	*236*	-	-	+48	-
SB – LA – SD*	*1,738*	-	-	+504	-
Coastwide Total	*2,734*	+14	+14	+618	+14

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 52. Change in recreational fishery employment impacts from Status Quo under the Alternatives by community group (percent).

Community Groups	*Status Quo*	No Action	Alternative 1	Alternative 2	PPA
Washington Coast	*189*	+7.4%	+7.4%	+7.4%	+7.4%
Astoria-Tillamook	*52*	-	-	-	-
Newport	*175*	-	-	-	-
Coos Bay-Brookings	*79*	-	-	-	-
Crescent City-Eureka	*37*	-	-	+19.4%	-
Fort Bragg - Bodega Bay	*41*	-	-	+6.0%	-
San Francisco Area	*188*	-	-	+22.4%	-
SC – Mo – MB*	*236*	-	-	+20.4%	-
SB – LA – SD*	*1,738*	-	-	+29.0%	-
Coastwide Total	*2,734*	+0.5%	+0.5%	+22.6%	+0.5%

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Chapter 5 Cumulative Effects

5.1 Scope of Analysis

The 2015 EIS (PFMC and NMFS 2015) includes an analysis of the cumulative effects of biennial management under the Groundfish FMP framework. That EIS addresses the significance of the expected cumulative impacts as they relate to the federally managed groundfish fishery. The 2016 EA (NMFS 2016) and the 2018 EA (NMFS 2018) updates that analysis by evaluating subsequent actions. These analyses, as well as new information indicating potential changes for the 2021-2022 biennium, are disclosed below and summarized here. This chapter focuses on the cumulative effects analysis of the proposed action combined with potential effects of past, present, and reasonably foreseeable future actions.

Actions are understood to be human actions (e.g., a designation of critical habitat for species), as distinguished from natural events (e.g., an ecological regime shift). CEQ regulations require consideration of actions, whether taken by a government or by private persons, which are reasonably foreseeable. This requirement is interpreted to indicate actions that are more than merely possible or speculative. Actions are considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or NMFS's publication of a proposed rule. Actions only "under consideration" have not generally been included, because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen. Identification of actions likely to impact a resource component within this action's area and time frame will allow the public and Council to make a reasoned choice among alternatives.

5.1.1 Affected Resources

Chapter 3 identifies the resources affected by the proposed action. Chapter 4 evaluates the direct and indirect impacts of the proposed action on these resources. The cumulative effects analysis carries forward this information. Those resources are as follows:

- Essential fish habitat (EFH)
- The California Current Ecosystem (CCE)
- Groundfish
- Protected Resources
- Non-groundfish species, other than protected resources, caught in groundfish fisheries

5.1.2 Geographic Boundaries

The analysis of impacts focuses on actions related to the management unit of species in the Groundfish FMP. The geographic scope for groundfish, habitat, and protected species is the West Coast EEZ. For the socioeconomic environment, the geographic scope is defined as those U.S. fishing communities directly involved in the harvest or processing of Council-managed resources, particularly those of the states of Washington, Oregon, and California.

5.1.3 Temporal Boundaries

The temporal scope of past and present actions for the affected resources encompasses actions that occurred after FMP implementation (1982). This EA incorporates that long-term time scale but focuses specifically on actions that have occurred since the implementation of the previous cumulative effects analysis in the 2018 EA (NMFS 2018). For protected species, the scope of past and present actions is determined by analysis pursuant to ESA and the Marine Mammal Protection Act (MMPA), including Biological Opinions for the groundfish fishery and marine mammal stock assessment reports. The temporal scope of future actions for all affected resources takes into account the fact that this tiered action is undertaken every two years and evaluation of this periodic action includes a consideration of cumulative effects. Thus, in this instance, the cumulative effects of establishing harvest specifications, adjusting routine management measures, and adopting new management measures will again be evaluated in 2022 for the 2023–24 biennial period. That analysis will take advantage of the most current information on which to base the assessment of future effects beyond the 2021–22 biennial period subject to this evaluation. Therefore, the temporal scope of the cumulative effects analysis in this EA is the same as that for the evaluation of direct indirect effects, through the 2021–22 biennial period.

5.2 Effects of Past, Present, and Reasonably Foreseeable Future Actions other than the Proposed Action

The cumulative effects analysis (CEA) does not specifically identify past actions no longer affecting resources as those effects have contributed to current status quo conditions described in Chapter 3. Chapter 1 above describes that this EA is tiered from the 2015 EIS, as updated by the 2016 EA and 2018 EA. The effects of both past and present fishing and non-fishing actions were described in both of those documents (see Section 4.15.4 of the 2015 EIS, Section 5.2 of the 2016 EA, and Section 5.2 of the 2018 EA).

5.2.1 Reasonably Foreseeable Future Actions

Reasonably Foreseeable Future Actions (RFFA) included in this CEA are based on following four criteria

1) Actions in the West Coast EEZ that affect the same resources affected by the proposed action. Administrative fishery management actions that have no discernible effect are not included.
2) Actions that are not speculative in that the action is defined to an extent that it can be analyzed, including actions for which the Council has adopted a Preliminary Preferred Alternative (PPA) or a Final Preferred Alternative (FPA).
3) Actions that are not identified in the 2018 EA
4) Actions in which additional information or analysis has been completed since the 2018 EA.

Based on these criteria, the following RFFA are considered in this EA.

Table 5-1. Reasonably Foreseeable Future Actions and the estimated effective dates considered in the cumulative effects analysis.

Reasonable Foreseeable Future Action	Estimated Effective Dates
Salmon Bycatch Mitigation Measures	January 2021
Electronic Monitoring	2020

Salmon Bycatch Mitigation Measures

The Council recommended the following salmon bycatch mitigation measures for the groundfish fishery to NMFS at their November 2019 meeting.

- Block Area Closures (BAC) for midwater trawl fisheries to be activated as needed
- Addition of 700 fm boundary line as a Western boundary for bottom trawl BACs developed in Amendment 28
- Selective Flatfish Trawl Net Gear Requirement
- Pacific Whiting Cooperative Agreements
- Automatic Authority for NMFS to close Trawl Sectors and Preserve 500 Chinook Salmon for Fixed Gear and Select Recreational Fisheries at 19,500 Chinook and non-whiting trawl fisheries at 8,500 Chinook.
- Development of Reserve Access Rule Provision.

For detail on these measures, please see Agenda Item H.9, Attachment 1 (Revised) Initial Review Draft, Preliminary Preferred Alternatives Regulatory Impact Review for Proposed Endangered Species Act Salmon Bycatch Mitigation Measures under the Pacific Coast Groundfish Fishery Management Plan, November 2019..

The mitigation measures are expected to have a positive effect on salmon and industry, if activated, by curtailing groundfish trawl activity, which is the primary source of salmon bycatch in the groundfish fishery, could reduce incidental catch of salmon and allow the industry to remain in operation. However, the measure(s) if and when activated could have a negative economic impact on the trawl fishery as they would restrict fishing in specific areas/times, require specific gear, etc. and may result in a shift of effort away from preferred fishing grounds and into areas where high valued target species may not be present in densities similar to the preferred areas.

Electronic Monitoring

Electronic monitoring as a whole is meant to create efficiencies in catch monitoring aboard whiting and fixed gear vessels. The impacts of this type of catch monitoring are expected to beneficial in the sense of accurate assessment of fishing activities and catch accounting; however, there is a cost impact associated with this method that will be borne by the industry. Cost of the technology and associated review will have direct impacts on revenue of vessels; however, it is difficult to ascertain if these costs can be mitigated by current and future catch limits of target species. Additionally, the initial concept of this technology was to reduce/remove the cost for a human observer as industry must pay for coverage. The action is expected to have neutral effects on EFH and ecosystems. It is expected to have a positive effect on prohibited and protected species as EM could aide in detection of these species and could increase accuracy of these estimates. There are little to no direct effects of the action on the biological resources, thereby it will have neutral impacts. Notably, maximized retention fisheries and fixed gear operations would be allowed to only discard identifiable species. The action may produce low negative socioeconomic effects as the cost of operation will be borne by the industry, thus reducing overall profit. However, these costs may be mitigated through increased attainments or other avenues.

EM would produce no adverse effect on the physical or biological environment because they are not expected to change fishing location, amount of catch, or types of gear used. The action may provide operational flexibility, and reduce costs of catch monitoring required by the Catch Share Program. These actions are not expected to: 1) change incentives and fishing behavior in such a way as to cause impacts; 2) alter the allocation structures or annual catch limits (ACLs) analyzed in this EA or previous NEPA

documents; 3) change the risks and controls for exceeding ACLs; and 4) change the rate of endangered species or marine mammal encounters; and 5) change the effects on physical habitat.

5.2.2 Actions Commencing in the Past with Ongoing Effects

Three actions identified as RFFA in the 2018 were completed. The Pacific Coast Trawl Gear Change rule was implemented in 2019 and the PCGFMP Amendment 28 Groundfish EFH/RCA rule in 2020. The third, PCGFMP Amendment 26, which was to adopt revised allocations of harvest opportunity between sectors of blackgill rockfish and other species managed in the slope rockfish complex south of 40°10′ N latitude, was rescinded in April 2019. Additional non-administrative actions relevant to the 2021-2022 biennium implemented (or expected to be implemented) in 2019 or 2020 are shown in Table 5-2.

Table 5-2. Schedule for groundfish fishery-related actions implementation dates and final rule links

Action	Final Rule	Implementation Date
Groundfish Harvest Specifications and Management Measures	85 FR 250, *correcting amendments at* 85 FR 8200	January 1, 2019
Pacific Coast Groundfish Trawl Gear Changes	83 FR 62269	January 1, 2019
Amendment 28 to the PCGFMP	84 FR 41818	January 1, 2020
Seabird Bycatch Avoidance Measures	84 FR 67674	January 10, 2020
Amendment 21-4 to the PCGFMP	84 FR 68799	January 16, 2020
Cowcod & Shortbelly Harvest Specifications	85 FR 21372	June 18, 2020

The actions shown above in Table 5-2 are summarized below.

2019-2020 Groundfish Harvest Specifications and Management Measures

Past harvest specifications and management measures allow controlled fishing harvest while managing stocks within science-based catch limits. This action was expected to have low negative to neutral effects on all groundfish stocks and complexes. The effects on ecosystem, EFH and biological resources were considered to have neutral to low negative impacts due to increased effort, increased ACLs, and adjustments to RCA boundaries. The effects of the action on protected species, however, were expected to be neutral to low positive and largely positive for socioeconomics.

Pacific Coast Groundfish Trawl Gear Changes

This rule revised regulations that specified the use and configuration of bottom and midwater trawl gear in the Pacific coast groundfish trawl rationalization program. This action improved participant's flexibility of configuring trawl gear types to improve efficiency, increase catch of target stocks, reduce bycatch to meet the conservation objectives of IFQ program. Though detailed in the Trawl Gear Changes EA, the effects of these changes are summarized here. Overall, the gear changes are expected to result in neutral impacts to groundfish. Fishing would not occur outside of areas typically fished. EFH protections would continue to prohibit bottom contact gear, including bottom trawl, from specific areas designated as EFHCA. Footrope restrictions for some fishing operations would continue and therefore provide additional protection to rock habitats that

may not be closed to bottom contact gear. Impacts to the ecosystem are expected to be low negative; whereas to EFH they were expected to be neutral. Biological impacts were neutral, however they were considered to have a low negative impact on salmon and eulachon. The gear change rule is expected to increase operational flexibility and have positive socioeconomic impacts.

Amendment 28 to the PCGFMP

The measures adopted new and revised area closures to bottom trawling as well as reopens areas previously closed to fishing to protect overfished groundfish species. In all, Amendment 28 (A-28) reopened approximately 3,000 square miles and closed approximately 13,000 square miles (including almost all of the Southern California Bight) to groundfish bottom trawling. Additionally, it closed approximately 123,000 square miles to all bottom contact groundfish gear, in waters deeper than 3,500 meters Overall, this action improves protections to groundfish EFH and increases flexibility for participants fishing in the groundfish trawl. Detailed analyses of the impacts are found in Agenda Item F.3.a, Project Team Report 1: Preliminary Draft Environmental Impact Statement. The magnitude of the overall effects of A-28 on habitat, are expected to be positive in the long-term. Trawl effort may shift to the newly reopened areas. As such, biological impacts are expected to be low negative to neutral as ACL attainments may increase. Ecosystem and EFH are expected to somewhat benefit from A-28, as there will be less access to sensitive EFH areas than were fished historically because of net increases in the protection of priority habitats such as high relief areas, areas with relatively high densities of habitat forming invertebrates, etc. This habitat protection would benefit groundfish and non-groundfish. Flexibility for operations and access to more fishing area with the potential for increased attainment in those areas would provide positive economic benefits to the fleet, supply chains, and associated coastal communities.

Seabird Bycatch Avoidance Measures:

The action responds to a 2017 BiOp published by the United States Fish and Wildlife Service (USFWS) that includes the proposed action as a term and condition to address takes of endangered short-tailed albatross. The measure requires groundfish longline vessels fishing in the EEZ to use either streamer lines or set gear at night when fishing north of 36° N. lat. This measure is expected to reduce incidental take of seabirds by longline vessels that target groundfish. Detailed analysis of impacts are described under Agenda Item I.5, Attachment 1, June 2019. The measures do not change fishing gear but require the aforementioned mitigation measures for seabird bycatch avoidance; therefore, it is expected they effects of this action on groundfish will be negligible. Effects on the ecosystem and EFH are expected to be neutral as there is relatively no interaction between the measures and the ecosystem or EFH. This action is expected to have positive effects on seabirds, notably short-tailed albatross, as it is designed to prevent incidental take of these animals. The action may affect such things as gear performance or vessel efficiency in setting gear but the extent of these impacts is unclear. The streamer lines could add increased cost to vessel operations; however, as noted in Agenda Item I.5, Attachment 1, it appears as if the purchase of streamer lines may be covered though grants from the USFWS. Overall, these measures may have a positive effect on socioeconomics as they are designed to reduce seabird bycatch which would, therefore, reduce the risk of a fishery closure.

Amendment 21-4 of the PCGFMP

This measure implemented changes to four areas of the Catch Share Program as a result of the Catch Share Program Five-Year review. Those changes were:

1. At-Sea Sector Bycatch Management: 1. Change the management of widow and canary rockfish in the at-sea sector to management and 2. remove the Amendment 21 formulas for widow rockfish,

darkblotched rockfish, and POP for setting the set aside amounts and determine values within the biennial process

2. IFQ quota utilization improvements: 1. Allow for post-season trading of previous year QPs and 2. Eliminate September 1 deadline to transfer quota from QS accounts to vessel accounts.
3. Catcher Processor Accumulation Limits: Establishes a permit accumulation limit of five at-sea Pacific whiting C/P endorsed permits that any one person or entity may own or control. Includes regulations that define "own and control" as it relates to C/P endorsed trawl permits. This limit only takes effect if the C/P cooperative fails.
4. Data Collections: 1. C/P Ownership survey- Establishes the requirement for C/P endorsed permit owners to submit the Trawl Identification of Ownership Interest form annually during permit renewal and 2. QS Ownership survey- Requires all QS permit owners to submit information to the EDC program annually.

This action also implemented regulatory language related to cost recovery program clarifications and provided technical corrections to catch share program regulations.

Overall, this action was determined to have no significant impact on the resources as it promoted operational flexibility, allowed for maximization of quota pound utilization, and provided technical corrections to the regulations- none of which would result in changes to fishing behavior or effort. Therefore, this action will not be discussed further in this Section.

Cowcod and Shortbelly Rockfish Catch Limits

The Council recommended eliminating the 2020 ACT and reducing the research set-aside for cowcod south of 40° 10' N. lat. to cover unanticipated mortality in the trawl fishery and increased the 2020 ACL shortbelly rockfish in the 2019 from 500 mt to 3,000 mt (Agenda Item H.4, Supplemental REVISED Attachment 1: Draft Regulatory Impact Review/Initial Regulatory Flexibility Analysis for a Proposed Regulatory Amendment under the Pacific Coast Groundfish Fishery Management Plan).

to avoid premature closure of groundfish fisheries that incidentally take shortbelly rockfish. The analysis showed there was little danger to the status of the shortbelly stock through this short-term action. The socioeconomic impacts are largely positive, noting that the actions for both species will allow participants to conduct their fishing operations more efficiently in 2020. The impacts are fully described in the EA for this action.

5.3 Effects of the Proposed Action

This section, therefore, identifies those non-negligible differences in effects that may exist between alternatives.

Adjustments to management measures are undertaken to both end and prevent overfishing of groundfish stocks and to attain but not exceed ACLs. Mortality of some stocks may increase relative to No Action. Modifications to 2021-2022 management measures are expected to continue to maintain current conservation efforts for groundfish stocks into the future. Overall, the proposed action is expected to have neutral to low negative impacts on groundfish.

Increases in recommended harvest specifications, particularly for sablefish north of 36° N. lat and lingcod, could result in increased fishing pressure on other species that coexist in the same habitat, geography, and depth range. Of the management measures, changes to allocations, set-asides, trip limits, and area restrictions (e.g., RCA boundary changes) could directly and indirectly result in higher attainment of target and non-target species. Additionally, these changes could increase

effort, which may increase habitat impacts. Notably, the modification of the non-trawl RCA off California and Oregon (see Section **Error! Reference source not found.**) and removal of the YRCAs in Washington could expose these areas to increased fishing effort, although the majority of these areas are fished by both trawl and non-groundfish fisheries (e.g. sea cucumber, spot prawn, etc.). The GMT noted these impacts in Agenda Item F.1.a, Supplemental GMT Report 4, June 2020.

In light of RCA depth increases, cowcod and yelloweye rockfish could be incidentally caught more often. However, impacts to these species are both managed in a precautionary manner that allows the Council to respond inseason should catch levels close in on catch limits. Additionally, retention of yelloweye and cowcod is to remain prohibited in the non-trawl fishery, which is the primary source of mortality for both species. These species specific prohibition are likely to reduce the incentive to fish in depths and habitats where densities of these species are known to be high. Therefore, risk to exceeding their ACLs should be considered low. In summary, the impacts of fixed gear on bottom substrate are not well known, however, based on available research, fixed gear is expected to have a low to moderately negative impact. Yet, substrate is key to the impacts. As noted above in Chap 4, hardbottom with bottom dwelling invertebrate communities are most susceptible to fixed gear impacts; however, these communities appear to be very resilient to disturbance and repair themselves rather quickly. Therefore, this action is expected to have low negative impacts on groundfish habitat and EFH, though these impacts could be localized rather than region-wide depending on effort locations.

This Preferred Alternative designates shortbelly rockfish as an ecosystem component (EC) species, which is a departure from active management of this stock. Concern from stakeholders was voiced regarding potential harm to the forage base from too high an incidental catch of shortbelly rockfish. As noted in Agenda Item H.4.a, Supplemental GMT Report 1, November 2019, that even if the full ABC (4,184 mt) were attained, the forage base would not be negatively impacted, stating: "*all indications are that the shortbelly rockfish stock is thriving as are abundances of other important prey species (e.g., anchovy), and even full ABC removals (4,184 mt) would not be expected to negatively impact forage bases*.". All indications are that the shortbelly rockfish stock is thriving with unprecedented recent recruitment and abundance in the California Current Ecosystem. The current high abundance of shortbelly and other forage species (e.g., anchovy) suggest there is a strong forage base in the ecosystem. The high abundance of shortbelly is predicted to persist in the next decade due to the exceptionally high recruitment observed in recent years.

There is no market currently for shortbelly rockfish, they are not a commercially valuable stock, and neither the Council nor the industry anticipate a surge in demand for fishmeal or other fishmeal product types resulting from any incidental shortbelly catch that would drive prices high enough to encourage targeting of shortbelly by the trawl fishery in the 2021-2022 biennium. As discussed above in Section **Error! Reference source not found.**, noting the importance of shortbelly as a forage base in the California Current Ecosystem, the Council adopted a precautionary policy measure under which the Council would closely monitor the species as part of the routine inseason agenda item. Under this policy guidance, should catch exceed 2,000 mt in a calendar year, it would trigger the Council initiate investigation into the cause(s) of such amounts and could, at that time, reconsider its EC designation or other management actions necessary to reduce the catch of the species. To accomplish this goal, the Council requested that shortbelly rockfish catches continue to be monitored inseason by the GMT in the groundfish species scorecard. The fisheries primarily

responsible for shortbelly catch are observed at a 100 percent rate and catch estimates are provided inseason to the Council. The Council would also have the opportunity to recommend management measures to curtail catch of this species including, but not limited to, area closures, gear prohibitions, etc. Further, noting the If at any time a conservation concerns arises, the Regional Administrator for NMFS's West Coast Region has the ability to restrict fishing through spatial closures, close a sector, or close a fishery. This action can be taken during routine inseason management or through automatic action authority.

Under this action, fishing effort in both trawl and non-trawl fisheries could increase. Increases in effort could change the amount and extent of fishery interactions with prohibited and protected species. Protected species take under the management measures could occur, however, it is difficult to project where/when these events would happen.

Increased ACLs and allocations for trawl dominant species, such as petrale sole, could affect eulachon; however, as reported in the 2019 Groundfish Endangered Species Workgroup Report (GESW), bycatch of this species is well under both precautionary and reinitiation thresholds. The whiting fleet is actively monitored for eulachon bycatch. Green sturgeon is a protected species that may be taken in groundfish fisheries; however, as detailed in the GESW report, green sturgeon are primarily taken in California state managed species. Based on the GESW report, take in federally managed trawl fisheries is expected to remain at negligible levels regardless of increases to ACLs and/or allocations.

Salmon bycatch is a primary concern in the trawl groundfish fishery. With increases to ACLs/allocations as well the adjustments to area restrictions, there is uncertainty of how these factors may impact salmon. However, with the mitigation measures adopted in the 2019-20 harvest specifications, Amendment 28, and the salmon mitigation measure action, the Council is well positioned to mitigate incidental salmon bycatch in a timely manner, in necessary. Thus the overall risk of exceeding salmon bycatch guideline limits (as described in the salmon mitigation action) is low. This action is not expected to increase salmon bycatch and the mitigation measures the Council will be able to employ will have a positive impact on salmon.

In the fixed gear fishery, short-tailed albatross take has been documented. Short-tailed albatross are known to be attracted to and feed on bait from longline gear being deployed. Increased ACLs, allocations, and trip limits could increase seabird take; however, the new measures implemented under the seabird action in 2019 are expected to reduce take (as described above and in Section 4.2.9 of the above EA). The seabird mitigation is expected to provide positive impacts on incidental take for short-tailed albatross and may afford other seabird species similar benefits.

Marine mammals are known to be impacted by fishing activity. While impacts are low in the groundfish fishery, take for some species (e.g., humpback whale) in other fisheries -i.e. Dungeness crab has increased in recent years (NOAA Fisheries 2019). Crab gear and sablefish pot gear both use long lines to attach the pot to a surface buoy. Whales are susceptible to becoming entangled in these lines. As described above at Section 4.2.9, Humpback whale interactions are known to occur in the fixed gear fishery, where they may become entangled in gear; however, as noted in the GESW report, it appears fishery interactions are low; however, precision related to estimates of take is low. Based on past history, interactions with the groundfish fishery and humpback whale are expected to remain low under the proposed action. A new biological opinion is expected in fall of 2020 that could describe mitigation measures for the fishery. Overall, the action is not expected to appreciably change, either positive or negatively, interactions with protected species. The net

effect of this action is expected to be neutral on marine mammals as impacts outside what was described in the 2015 EIS are not expected.

Increases in harvest specifications amounts for 2021-2022 under the Preferred Alternative would result in increased commercial and recreational fishing opportunities and revenues compared to No Action. Preliminary economic analysis indicates the average estimated ex-vessel revenue for shoreside sectors (trawl and non-trawl) is over $100 million and for at-sea sectors, the estimated average ex-vessel revenue is $151 million. The shoreside sector ex-vessel revenue increases by an average of 14 percent and at-sea sector ex-vessel revenue increases by approximately 20 percent. In all states, the recreational seasons are proposed to be adjusted and as such, projections indicate effort in all states could increase. Coastwide, income impacts are expected to result in a positive socioeconomic benefit. Overall coastwide employment may increase as a result of the increased ACLs associated with the preferred alternative.

5.4 Summary of the Cumulative Effects of the Proposed Action and Past, Present, and Reasonably Foreseeable Future Actions.

The differences between the No Action, Alternative 1, and Alternative 2 are relatively small within the context of the entire EEZ and the scope of past, present and RFFAs. Therefore, the effects of the cumulative differences between the alternatives are largely negligible. This tiered cumulative effects analysis therefore presents the cumulative effects with the preferred alternative.

Overall, when the proposed action or alternatives are considered in conjunction with all the other pressures placed on fisheries by past, present, and reasonably foreseeable future actions, the incremental effect of the proposed action or alternatives is not expected to result in any significant cumulative impacts, positive or negative, for any affected resource.

5.4.1 Groundfish

Amendment 28 is designed to protect groundfish habitat and may shift the distribution of fishing effort through the removal of the trawl RCA and changes to the EFHCA areas. When combined with the expected increase in catch limits under the proposed action, Amendment 28 would further serve to increase flexibility and efficiency so fishermen may increase catch of rebuilt groundfish species and attain more of the ACL. Notably, A-28 reopens some 3,000 square miles to trawling. This change is significant in terms of areas available to fishermen; however, the catch limits under the proposed action would be set consistent with the PCGFMP based on the best available science, and would be intended to prevent overfishing while achieving optimum yield as required by the MSA. There is 100 percent monitoring and accountability for groundfish IFQ species caught. Amendment 28 would establish another management tool in Block Area Closure (BAC) boundaries that could be closed to reduce harvest of target or non-target stocks (e.g., prohibited species, protected species, etc.).

The trawl gear action may have an impact on stock productivity if changing the trawl mesh size causes smaller fish to be harvested; however, in general, smaller fish are not marketable. It is unlikely fishermen will target smaller fish or reduce the net size so as to catch more small fish. The incremental change of the trawl gear action on the fishery is it may increase attainments of target species over time and, potentially, incentivize development of net-types that reduce prohibited and protected species (e.g., salmon and eulachon). This, along with improved used and experimentation with selective devices, may also change size or species selectivity slightly. If at

any time a conservation concerns arises such as the exceedance of an annual catch limit in the 2020-2021 harvest specifications, the Regional Administrator for NMFS's West Coast Region has the ability to restrict fishing through spatial closures, close a sector, or close a fishery. This action can be taken during routine inseason management or through automatic action authority.

Salmon mitigation measures may impact fishery operations. In the course of normal trawl fishing, vessels may catch salmon incidentally. There is a cap to the amount of salmon the fishery, by sector, and if reached will close the fishery, either by sector or in totality. To reduce take of listed salmon, these measures may be implemented. In general, these measures will restrict fishing to certain areas, depths, etc., however, they will still allow the groundfish fishery to continue operation in open areas. Further, the Whiting Cooperative Salmon Mitigation Plans incentivize industry lead actions to actively avoid salmon bycatch though a host of measures. These measure are designed to reduce the risk of a total fishery shutdown, which would have significant effects on groundfish attainments. The measures, however, improve Council flexibility to attend to specific sectors in case of unexpected incidental salmon take, and may not result in complete closures to the fishery as they are meant to be temporary. EM is unlikely to directly affect groundfish; however, EM could improve the ability of NMFS to receive timely data to the Council for the fleet(s) equipped with EM devices. These data could, therefore, improve the ability of the Council to monitor inseason activity of catch and thereby ensure catch limits are not exceeded.

The cowcod and shortbelly rockfish actions are specific to the 2020 fishery. The action for cowcod south of 40°10' N lat. eliminated the 2020 ACT and reduced the research set-aside to increase the annual vessel limit in the limited entry trawl fishery. The shortbelly rockfish action increased the 2020 ACL. Based on the analyses informing these actions, catch of these species will potentially increase; however, the status of these species is not expected to be negatively impacted. In this action, the cowcod south of 40°10 N. lat ACL is the highest in over 20 yrs. This ACL is representative of the stock being declared rebuilt. Noting the concerns of accuracy relating to uncertainty of certain aspects in the stock assessment, the Council recommended an ACT of 50 mt be placed on this species. As the fishery begins to expand into cowcod depth ranges, it is expected catch will increase incrementally, but still remain low due to other mitigating factors (i.e. no retention in the non-trawl fishery, avoidance practices by fishermen, etc.).

Shortbelly rockfish are not a target species and industry actively attempts to avoid this species and this action is not anticipated to negatively impact these species. Given the recent recruitment events of shortbelly rockfish (described in Section 5.4.2 below and in Chapter 2 above), the overall stock is likely to remain highly abundant. Incremental increases in shortbelly catch may occur over the biennium due to the abundance of the stock and the apparent range expansion to the north; however, as they are not targeted and disrupt normal fishing operations, industry will continue to avoid them.

When the EM action and this action are examined together, there is very little impact that can be described. EM has no direct impact on groundfish. No changes to groundfish populations are expected from implementation of this rule. Similarly, the seabird action does not directly affect groundfish populations as it is a mitigation measure to reduce take of seabirds above water. Therefore, the impacts from these two actions on groundfish are neutral.

When all items are taken into account, the measure cumulatively increase the likelihood that ACLs will not be exceeded. The action in concert with A-28, gear changes, salmon mitigation measures and EM act to mitigate overages. Overall, the Council and NMFS have a multitude of mitigation

measures available to modify fishing behavior. If at any time a conservation concern arises, the Regional Administrator for the NMFS West Coast Region has the ability to restrict fishing via a variety of measures. This action can be taken during routine inseason management.

In a cumulative sense, when the past, present, and reasonably foreseeable future actions and the action are taken into account, they are likely to have neutral or low negative impacts on groundfish. When combined with the medium positive effects of past, present, and reasonably foreseeable future actions, the incremental effect of the proposed action or alternatives would not result in significant cumulative impacts on the groundfish.

5.4.2 Habitat including Groundfish Essential Fish Habitat.

The action increases ACLs for nine species. Under Amendment 28, the trawl RCA was removed off Oregon and California; however, as described above, there is a net increase in the amount of area closed to bottom trawl and bottom contact gear. A-28 opens some 3,000 sq. miles to trawl, it closes approximately 13,000 square miles (including almost all of the Southern California Bight), and closes approximately 123,000 square miles to all bottom contact groundfish gear, in waters deeper than 3,500 meters. This change could allow for bottom trawlers to target a more diffuse area and could, therefore, lessen the impact on areas repeatedly fished in the past. Additionally, bottom trawl fishermen generally avoid high-relief substrate as it has the high potential of damaging gear and target soft bottom. Soft substrates are the most resilient and the fastest to recover, with full recovery possible in as little as one year after bottom trawling. While hard substrate (including high rocky, relief areas) is more vulnerable to the negative impacts associated with trawl gear fishing, only a small portion of the former RCA area consists of hard substrate. In fact, A-28 is expected to provide a net-gain in protection of high relief as EFH Conservation Areas remain in place and provide protection to this type of bottom.

Overall impacts from the proposed action were found to be low negative on the physical environment due primarily to the increased fishing effort associated with the catch limits. When combined with the low positive effects of past, present, and reasonably foreseeable future actions, the incremental effect of the proposed action or alternatives would not result in significant cumulative impacts on the physical environment.

5.4.3 Protected Resources

This action coupled with the newly opened areas under A-28 could increase protected species interactions due to potential fishing effort changes. Commonly encountered protected species in the groundfish fishery are seabirds and salmon. Seabirds and salmon are incidentally taken in the course of normal fishing operations; however, the Seabird Bycatch Avoidance Measures (84 FR 67674) action and the salmon mitigation measures are designed to mitigate incidental take. Additionally, the groundfish fishery operates in areas where eulachon, and humpback whale are known to exist.

Seabird bycatch avoidance mitigation measures are expected to reduce take of seabirds, in particular short-tailed albatross. These measures, as described in the Seabird Bycatch Avoidance Measure action, are expected to have positive effects on seabirds as they are known to actively discourage interactions with gear, and therefore reduce incidental mortality. Although fixed gear effort via longline may increase with ACL increases for sablefish north of 36° N. lat. under the proposed action, the overall impact to seabirds is expected to be neutral given mitigation measures.

ESA-listed salmon are incidentally caught in all sectors of the groundfish; however, they are encountered at a higher rate in trawl fisheries. With increased fishing area available under A-28 and increased ACLs for target species under this action, this could increase fishing effort, including in newly opened areas. This could relate to a change, either positive (if vessels are able to avoid salmon within the new areas) or negative (if effort increases lead to a corresponding increase in interactions), in salmon bycatch. The trawl gear rule allows for innovation in gear design (e.g., selective flatfish trawl gear) that are expected to reduce incidental salmon take. The salmon mitigation measures described above can be implemented pre-season or inseason as the Council reviews salmon bycatch estimates on a regular basis and is well positioned to take action prior to bycatch limits being achieved. The salmon action allows the Council or NMFS to require the groundfish fishery sectors to cease fishing should mitigation measures fail and the fishery specific bycatch amounts are attained. This grants further protection to salmon. Overall, these measures are expected to have positive effects on salmon even if effort were to increase.

Eulachon are incidentally caught primarily in the midwater trawl fishery. With the increased ACLs, allocations, etc., bycatch of this species could increase if effort, notably in midwater, increases. However, as noted in the GESW report, eulachon catch is not expected to exceed the thresholds set in the biological opinion. Coupling this action with A-28, increase in trawlable area may disperse effort sufficiently to reduce frequency of interactions. When trawl effort is confined, it is likely localized impacts of eulchon could arise as multiple vessels are fishing the same area. It is important to note that the trawl fishery is observed at 100 percent and catch estimates are available in a timely manner that is sufficient for inseason. Any negative impacts to this species thought are expected to be incremental as effort will develop overtime and as market forces allow. Additionally, the trawl gear rule specifically notes the potential impacts to this species by gear design. As such, this rule allowed for modification of net gear that may have incrementally positive effects on this species and reduce incidental take.

Several distinct population segments of humpback whale are present in the action area. As noted above, this species is subject to current Section 7 ESA reconsultation, with an expected completion in fall 2020. Humpback whales can be entangled in pot gear. Due to the increased ACLs for sablefish, there could likely be a concomitant increase of pot gear. Additional effort is, however, expected to be incremental and will naturally occur as a response to increased trip limits, but is highly dependent on the market conditions. As noted in the GESW report, increased entanglements of humpback are not expected in the groundfish fishery. Therefore, these actions in a cumulative sense likely result in in neutral effects to this species; however, it is important to note that independent of effort, any take of humpback is a negative impact.

It is important to note, measures implemented to reduce take of protected species could also affect fishing opportunity and catch. Reduced fishing effort would likely have a low positive impact on target species, on non-target species, and on protected species.

Overall impacts from the proposed action or alternatives were found to be neutral to low positive as the mitigation measures for seabirds present a positive benefit to short-tailed albatross, net design changes may allow for reduction of eulachon bycatch, etc.. When considered in the context of the fishery management process, the effects of the proposed action or alternatives are incrementally positive, but controlled, and not expected to be significant.

5.4.4 Socioeconomic

A-28 and the trawl gear rule increase operational flexibility and are expected to provide positive socioeconomic impacts. Further, these items may increase operational efficiencies that allow vessels to increase catch and ACL attainment of non-whiting groundfish species.

The salmon mitigation measures are designed to address incidental salmon bycatch in such a way that would keep the fishery, as a whole or by sector, operational. Some of the measures, e.g. BACs and aspects of Salmon Mitigation Plans, may result in time/area closures; however, these closures are meant to be temporary and would allow fishing in areas outside of the closure. Vessels could therefore continue to fish, though to what benefit is unknown as it is uncertain if target species would be present in areas outside the closures. These measures and associated impacts are further described in Agenda Item H.9, Attachment 1 (Revised), November 2019. Overall, the salmon mitigation measures afford the Council a tool set to attempt to reduce salmon bycatch rates and thereby keep the fishery or fishery sector open. While the mitigation measures may affect a subset of the fishery, overall, it creates positive impacts as the mitigation measures would be used to keep the majority of the fishery open. It is important to note, the mitigation measures could be incrementally implemented to control incidental salmon bycatch; thereby, operations could adjust to compensate for losses. However, if bycatch were to suddenly spike, the Council could act to curtail bycatch in a fishery with any measures available to them at that point.

EM directly effects revenue, specifically vessel owner/operators as they will likely be required to fund these technologies. These costs may be mitigated, however, by operational flexibility created by past actions and, if adopted, changes to catch limits in this action. time, this action may incrementally increase in cost to operate the technology.

This action combined with recent past, present, and reasonably foreseeable future actions offer improved flexibility to the fishery. Further, efficiency gains created from these combined actions may improve the ability of fishermen to prosecute the fishery as well as increase catch of rebuilt groundfish stocks and, therefore, achieve optimum yield from the fishery. While catch limits under the proposed action have increased based on the PCGFMP and available science, the proposed alternatives control catch in some cases (e.g., cowcod, petrale etc.) to ensure that the efficiency gains of past, present, and reasonably foreseeable future actions (e.g., gear change or RCA removal) continue to prevent the risk of overfishing while helping fishermen and the fishery achieving optimal yield. When considered in the context of the fishery management process, the effects of the proposed action or alternatives are incrementally positive, but controlled, and not expected to be significant.

Environmental Component	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Groundfish Stocks	**Mixed (Low Positive and Low Negative)** Most stocks above or near target biomass; one stock, yelloweye rockfish status is overfished	**Low to Moderate Positive** The current management framework is effective in rebuilding stocks to the target biomass and achieving optimum yield.	**Low Positive** No actions are identified that would reduce the effectiveness of the management framework	**Low Positive** No actions are identified that would reduce the effectiveness of the management framework; however, misspecification of catch limits and management error could occur
Essential Fish Habitat	**Low to Moderate Positive** Trawl RCA eliminated (A-28). Large areas of EFH are protected. Past actions have mitigated adverse effects of fishing on EFH. Fisheries have impact on EFH at varying levels depending on gear type	**Mixed (Low Positive and Low Negative)** Trawl fishing effort stable; Ongoing actions continue to mitigate adverse effects of fishing on EFH; Boundary changes to RCA may impact habitat, though at what level is unknown.	**Low Positive** Part/present actions likely to enhance the mitigation of adverse effects of fishing on EFH. Stability in fishery may reduce risk of increased trawl footprint.	**Low to Moderate Positive** Trawl fishery is stable, Trawl RCA reopened with large areas protected from fishing to protect EFH. future actions likely to enhance the mitigation of adverse effects of fishing on EFH.
Socioeconomic (Human Communities)	**Mixed (Low Positive and Low Negative)** Fishery resources have supported profitable industry. Trawl opportunities and flexibility increased due to gear rule and A-28. Trip limit changes allow for increased attainment of target species.	**Mixed (Low Positive and Low Negative)** Stock status and yield may allow fishery revenues to increase; Increased trip limits may allow increased operational flexibility. Increases to participation/ employment are marginal, may not expand significantly over biennium	**Low Positive** Fishery closure due to incidental salmon bycatch would be unexpected. Mitigation measures reduce risk of attaining bycatch guideline. EM participants may incur costs to fund EM program. EM may offer operational flexibility.	**Low to Moderate Positive** Stock status and yield have allowed fishery revenues to increase; A-28 will allow access to trawl fishery to target shelf/slope stocks that are under-utilized.

Environmental Component	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Protected Resources	**Low Positive** Mitigation measures may reduce adverse effects on seabird populations. Net design may allow for reduced incidental take of protected & prohibited species (salmon)	**Neutral** Ongoing prosecution of fisheries at current levels not expected to change ecosystem attributes from the baseline; other actions likely have negligible impacts	**Low Positive** Fishery effort may impact protected species. Mitigation plans for salmon to reduce adverse effects of fishing on protected/prohibited species.	**Low Positive.** Mitigation measures reduce risk of negative impact to protected resources. Current action is expected to have negligible impact.

The President of the United States signed E.O. 12866, "Regulatory Planning and Review," on September 30, 1993. This order established guidelines for promulgating new regulations and reviewing existing regulations. The E.O. covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. The E.O. stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits of available regulatory alternatives. Based on this analysis, they should choose those approaches that maximize net benefits to the Nation, unless a statute requires another regulatory approach.

NMFS satisfies the requirements of E.O. 12866 through the preparation of an RIR. The RIR provides a review of the potential economic effects of a proposed regulatory action in order to gauge the net benefits to the Nation associated with the proposed action. The analysis also provides a review of the problem and policy objectives prompting the regulatory proposal and an evaluation of the available alternatives that could be used to solve the problem.

The RIR provides an assessment that can be used by the Office of Management and Budget to determine whether the proposed action could be considered a significant regulatory action under E.O. 12866. E.O. 12866 defines what qualifies as a "significant regulatory action" and requires agencies to provide analyses of the costs and benefits of such action and of potentially effective and reasonably feasible alternatives. An action may be considered significant if it is expected to:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in E.O. 12866.

6.1 Statement of Problem

New scientific data and information about the needs of fishing communities are available that will provide additional tools to ensure that annual catch limits (ACL) and other federal harvest guidelines (HGs) are not exceeded, and will afford additional fishing opportunities where warranted.

6.2 Description of Management Goals and Objectives

The proposed action is needed to conserve and manage Pacific Coast groundfish fishery resources. This proposed action would set catch limit specifications for 2021-2022 consistent with existing or revised harvest control rules for all stocks, and established management measures designed to keep catch within the appropriate limits.

The harvest specifications are set consistent with the optimum yield (OY) harvest management framework described in Chapter 4 of the PCGFMP. The management objectives of this action are: to prevent overfishing, to rebuild overfished stocks, to ensure conservation, to facilitate long-term protection of essential fish habitat (EFH), and to realize the full potential of the nation's fishery resources (MSA §2(a)(6)). This rule is authorized by 16 U.S.C. § 1854–55 and by the PCGFMP.

6.3 Description of Fisheries and Other Affected Entities

Federally managed Pacific groundfish fisheries occurring within the Exclusive Economic Zone off the coasts of Washington, Oregon, and California establish the geographic context for the proposed action. West Coast communities engaged in these fisheries are also part of the context. Although this is the federal fishery management area, the states manage the fisheries within 3 miles of their coastlines to meet the goals and objectives of the Pacific Groundfish FMP. The number of vessels permitted in the fishery are shown in Table 6-1.

A detailed description of the fishery and affected entities is available in the SAFE document. The SAFE includes a summary of historic harvests, description of management, and economic characteristics of the commercial fishery, tribal fisheries, and recreational fishery, along with commercial port communities.

Table 6-1.. Number of participating vessels, by sector and fishery in 2019. Source PacFIN, February 2020

Sector	Vessels
Whiting -total	58
• Catcher Processor	9
• Mothership	6
• MS Catcher Vessel	19
• Shoreside	27
IFQ Non-whiting - total	131
• Mid-water trawl	28
• Bottom trawl	66
• Fixed Gear	16
LEFG - total	134
• Sablefish	130
• Nearshore	25
• Other non-nearshore	34
OA - total	592
• Sablefish	171
• Nearshore	280
• Other non-nearshore	259

6.4 Methods Used for Impact Analysis

The analysis (Section 4.3.1) of the economic impacts effects illustrate how conditions may change, both by applying harvest specifications based on default HCRs and compliant management measures (i.e., the No Action Alternative), and varying ACLs and management measures for certain stocks [shortbelly rockfish, black rockfish (Oregon), cowcod (south of 40º10' N. lat.), petrale sole, and sablefish] under the action Alternatives (Alternative 1, Alternative 2, and the PPA). The ACLs for all remaining stocks are consistent across all Alternatives.

For simplicity, fishery and community economic impacts in the following sections are displayed for 2021, the first year of the two-year management cycle, only. Although the totals during the second year of the management cycle in 2022 may be somewhat different in some cases, the relative distribution of economic effects and inferences regarding rankings of the Alternatives would not change. The 2015 EIS included detailed descriptions of the models and data used to project socioeconomic impacts. Updated documentation of the models may be found in the Groundfish SAFE document.

6.5 Description of the Alternatives

A complete description of the Alternatives is available above in Chapter 2 of the EA (see Table 2-1), however a summary is provided below. A detailed analysis of the economic effects expected to result from the action is provided in Section 4.3.

Under No Action, the default harvest control rules (DHCR) for all species would remain the same as in the 2019-2020 biennium. Under Alternative 1, the DHCR would change for Oregon black rockfish, sablefish, petrale sole, cowcod, and shortbelly rockfish. Under Alternative 2, the DHCR would change for cowcod, sablefish, petrale sole, and shortbelly rockfish. Under the preferred alternative, the Council adopted Alternative 1 DHCR for Oregon black rockfish, cowcod, shortbelly rockfish, and sablefish; and for petrale sole, the Council adopted the No Action Alternative. The annual catch limits based on these harvest control rules are show in T for comparison. Further detail is found in chapter 2 of the EA.

Table 6-2. Comparison of annual catch limit values by species for each alternative (after Table 2-1)

Species	No Action	Alternative 1	Alternative 2	Preferred
Oregon Black Rockfish	ACL are 479 mt in 2021, 472 mt in 2022.	512 mt ACL for 2021 & 2022.	Not applicable (NA)	Alternative 1
Cowcod	ACL of 98 mt in 2021 and 96 mt in 2022.	ACLs of 84 mt in 2021 and 82 mt in 2022.	ACL of 61mt for 2021 and an ACL of 58 mt for 2022.	Alternative 1
Petrale Sole	ACLs of 4,115 mt for 2021 and 3,660 mt for 2022.	ACLs of 3,843 mt for 2021 and 3,045 mt for 2022	ACL of 3,600 mt for 2021 and 2022.	No Action
Shortbelly Rockfish	ACL specified at 500 mt for both 2021 and 2022.	ACL would be set as a constant 3,000 mt for 2021-2022	Ecosystem Component species designation No ACLs specified	Alternative 2
Sablefish a/	Coastwide ABC of 8,208 mt for 2021 and 7,811 mt for 2022.	Coastwide ABC is 627 mt (2021) and 564 mt (2022) higher than under No Action	NA	Alternative 1

Additionally, under No Action, Alternative 1 and Alternative 2, there are two scenarios corresponding to use of alternative methods to apportion sablefish between fisheries conducted in the relatively low-attainment Conception area vs relatively high-attainment fisheries conducted north of Conception. Method 1 is based on "status quo" apportionment while Method 2 allots a larger portion of sablefish to fisheries north of the Conception area with correspondingly higher projected coastwide landings and associated community economic impacts. The Council adopted Method 2 as their preferred apportionment method for sablefish. As such, the following summarizes the economic effects of Method 2 only. Method 1 economic impacts are detailed in the No Action Alternative section of Agenda Item F.1, Attachment 8, June 2020.

6.6 Commercial Fishery

6.1 Analysis of Expected Effects

A detailed analysis of the expected effects of the Alternatives, relative to the No Action alternative, is available above in Section 4.3. The following sections summarizes that discussion

The following discussion summarizes and compares expected economic effects for each of the Alternatives. All monetary values are in 2019 dollars. Detailed tables and analyses are available in Section 4.3; however, Table 6-2 provides a quick reference guide to those tables.

Table 6-3. Quick reference guide to tables in Section 4.3 that provide detail pertaining to the summarization below.

Subject	Tables
Commercial Fishery	

Subject	Tables
Ex-vessel Revenue	4-17 to 4-19
Vessel Net Revenue	4-23 to 4-25
Captain/Crew Wages	4-26 to 4-28
Community Income Impact	4-29 to 4-31
Employment Impact	4-35 to 4-37
Recreational Fishery	
Effort Impact	4-20 to 4-22
Community Income Impact	4-32 to 4-35
Employment Impact	4-38 to 4-40

6.1.1 Commercial Fishery

A detailed discussion of the expected effects of the alternatives is found in Section 4.3 above. The following information is summarized from that information.

6.1.1.1 Ex-vessel Revenue Impacts

Under No Action and action Alternatives 1 and 2, annual average coastwide ex-vessel revenue, including the at-sea sectors, ranges from $150.7 million to $151.0 million. Under the Preferred Alternative annual average coastwide ex-vessel revenue, including the at-sea sectors, is projected to exceed No Action by $2.3 million, Alternative 1 by $1.3 million, and Alternative 2 by $2.0 million Projected ex-vessel shoreside sector (including shoreside whiting revenues under the three Alternatives from a low (No Action) of $99.9 million to a high (Alternative 1) of $100.9 million. The Preferred Alternative annual average coastwide shoreside ex-vessel revenue is projected to be $102.2 million. The at-sea sector ex-vessel revenue remains static across all alternatives and the Preferred Alternative at $50.8 million. Revenues in the Tribal groundfish sector (including shorebased whiting) are projected to increase over Status Quo by the same amount, under No Action, Alternative 1, Alternative 2 and the Preferred Alternative (approximately $2.1 million). Table 4-17 above displays a sector specific breakdown of the ex-vessel revenue. Overall, the Preferred Alternative provides the highest ex-vessel revenue. Table 6-3 displays the estimated combined ex-vessel revenue.

6.1.1.2 Estimated Net Revenue Of Crew and Captain Wages.

Combined net revenue for crew and captain per year range from a low under No Action at $19.6 million to a high of $20.5 million under the Preferred Alternative (Table 6-3). Table 4-26 above_displays the breakdown of wages by sector. Shoreside whiting sector net revenue is estimated between $8.5 and $8.6 million across the Alternatives, with the Preferred Alternative an estimated $8.6 million. The relatively small differences in net revenue estimates are the result of slight variations in projections of catch of non-whiting groundfish species while targeting whiting. The non-whiting trawl/IFQ sector net revenue range from $8.4 million to $8.7 million across the three Alternatives, with the Preferred Alternative estimated at $9.2 million. LEFG sector net revenue is estimated to range from a low of $2.3 million under No Action to a high of $2.7 million under both Alternative 1 and Alternative 2. The Preferred Alternative estimate is the same as Alternatives 1 and 2 at $2.7 million. Overall, the highest wages occur under the Preferred Alternative.

6.1.1.3 Estimated Coastal Region Income Impacts

As displayed in Table 6-3, (detailed in Table 4-29), coastwide estimated personal income impacts from commercial groundfish fishing are estimated to be $165.4 million under No Action and projected to increase by between $2.3 million under Alternative 1 and by $1.2 million under Alternative 2. Under the Preferred Alternative, Washington ports are estimated to see personal income impacts totaling $36.4 million; Oregon ports an estimated $103.6 million; and California ports an estimated $28.9 million. Detail by region is provided above in Section 4.3. The highest coastwide total income impacts and also the highest levels for each community occur under the Preferred Alternative, which is an estimated coastwide total of $169.1 million.

6.1.1.4 Estimated Coastal Region Employment Impacts

Coastwide estimated employment impacts from commercial groundfish fishing range from an estimated 2,598 jobs under No Action to 2,622 jobs under Alternative 1 (Table 6-3) Under the Preferred Alternative, the estimate is 2,652 jobs. The highest coastwide total increase in employment impacts and also the highest levels for each community occur under the Preferred Alternative. Under the Preferred Alternative, Washington jobs are estimated at 479, Oregon at 1,449 jobs, and California at 723 jobs.

Table 6-4. Comparison table of sector-combined coastwide estimated economic effects in the commercial fishery of the Alternatives ($2019 dollars) and estimated number of jobs (employment impact) by Alternative

	No Action	Alternative 1	Alternative 2	Preferred Alternative
Ex-Vessel Revenue	$150.7	$151.7	$151.0	$153.0
Net Revenue	$19.6	$19.9	$19.6	$20.5
Income Impacts	$165.4	$166.7	$165.6	$169.1
Employment Impact	2,598	2,622	2,607	2,652

6.6.1 Recreational Fisheries

6.6.1.1 Estimated Recreational Effort Impacts

As shown below Table 6-4 (detail in Table 4-20 above), in Coastwide recreational effort is projected to be the same as 850.4 thousand angler trips under No Action, Alternative 1, and the Preferred Alternative. Under Alternative 2, effort increases by 181.3 thousand angler trips to 1,031.7 thousand angler trips. The highest effort impact is generated under Alternative 2.

6.1.1.5 Estimated Recreational Groundfish Fisheries Income Impacts

Coastwide recreational fishing income impacts range from an estimated $157.6 million under No Action and Alternative 1 to $195.8 million under Alternative 2 (Table 6-6).Table 6-4). The Preferred Alternative estimate is $157.6 million. Overall, Alternative 2 produces the highest estimate recreational groundfish income impacts. However, these impacts appear limited to California. Oregon and Washington income impacts to not changed across all Alternatives, including the Preferred Alternative.

6.1.1.6 Estimated Recreational Groundfish Fisheries Employment

Coastwide recreational fishing employment impacts range from an estimated 2,748 jobs under No Action and Alternative 1 to 3,352 jobs under Alternative 2 (Table 6-7).Table 6-4). The Preferred Alternative estimate is $157.6 million. Overall, Alternative 2 produces the highest number of jobs, though the increase is limited to California. Under Alternative 2, the estimated total of jobs is approximately +600 jobs (~ +22 percent) more than the other Alternatives Oregon and Washington estimated number of jobs do not change across all Alternatives, including the Preferred Alternative.

Table 6-5. Comparison of coastwide estimated recreational angler trips, income impact (2019 $), and employment impact (number of jobs) under the Alternatives, state data combined (in thousands)

	No Action	Alternative 1	Alternative 2	Preferred Alternative
Effort Impact	850.4	850.4	1,031.7	850.4
Income Impact	$157.6	$157.6	$195.8	$157.6
Employment Impact	2,748	2,748	3,352	2,748

6.2 Summation of the Alternatives with Respect to Net Benefit to the Nation

Potential costs from the proposed rule would be unlikely, and only in the event of unexpected closures or management restrictions on groundfish sectors. Closures and restrictions are not anticipated by either managers or participants, who monitor their own catch inseason, and in many cases use coop structures and information sharing to limit bycatch.

The harvest specifications, routine management measures, and other new management measures of this rule are not expected to result in additional regulatory costs for any directly regulated entity. Specifically, there are no impact direct compliance, reporting, or recordkeeping costs; changes in market competition between entity types/sizes; taxes or fees required, or other administrative costs associated with this rulemaking. Estimated benefits may vary by entity type and size as defined and described in the Regulatory Flexibility Act Considerations in Chapter 7.

Preliminary analysis indicates the preferred alternative is expected to provide an estimated total of $326.7 million in income impacts and nearly 5,400 jobs coastwide.

Table 6-6. Summarized estimated income impacts (2019 $) and employment impacts (number of jobs) for commercial and recreational fisheries combined.

	No Action	Alternative 1	Alternative 2	Preferred Alternative
Income Impact	$323.0	$324.3	$361.4	$326.7
Employment Impact	5,346	5,370	5,959	5,400

Chapter 7 Regulatory Flexibility Act Considerations

For any rule subject to notice and comment rulemaking, the Regulatory Flexibility Act (RFA) requires Federal agencies to prepare, and make available for public comment, both an initial and final regulatory flexibility analysis, unless the agency can certify that the proposed and/or final rule would not have a "significant economic impact on a substantial number of small entities". These analyses describe the impact on small businesses, non-profit enterprises, local governments, and other small entities as defined by the RFA (5 U.S.C. § 603). This analysis is to inform the agency and the public of the expected economic effects of the alternatives, and aid the agency in considering any significant regulatory alternatives that would accomplish the applicable objectives and minimize the economic impact on affected small entities. The RFA does not require the alternative with the least cost or with the least adverse effect on small entities be chosen as the preferred alternative.

The RFA considerations only address the effects of a proposed rule on entities subject to the regulation (i.e., entities to which the rule will directly apply) rather than all entities affected by the regulation, which would include entities to which the rule will indirectly apply.

Part 121 of Title 13, Code of Federal Regulations (CFR), sets forth, by North American Industry Classification System (NAICS) categories, the maximum number of employees or average annual gross receipts a business may have to be considered a small entity for RFAA purposes. See 13 C.F.R. § 121.201. Under this provision, the U.S. Small Business Administration established criteria for businesses in the fishery sector to qualify as small entities. Standards are expressed either in number of employees, or annual receipts in millions of dollars. The number of employees or annual receipts indicates the maximum allowed for a concern and its affiliates to be considered small (13 C.F.R. § 121.201).

- A fish and seafood merchant wholesaler (NAICS 424460) primarily engaged in servicing the fishing industry is a small business if it employs 100 or fewer persons on a full time, part time, temporary, or other basis, at all its affiliated operations worldwide.
- A business primarily engaged in Seafood Product Preparation and Packaging (NAICS 311710) is a small business if it employs 750 or fewer persons on a full time, part time, temporary, or other basis (13 CFR § 121.106), at all its affiliated operations.

In addition to small businesses, the RFA recognizes and defines two other kinds of small entities: small governmental jurisdictions and small organizations. A small governmental jurisdiction is any government or district with a population of less than 50,000 persons. A small organization is any not-for-profit enterprise that is independently owned and operated and not dominant in its field, while. (5 U.S.C. § 601). There is no available guidance beyond this statutory language regarding how to determine if non-profit organizations are "small" for RFA purposes. The Small Business Administration (SBA) does have provisions for determining whether a business is "small" for RFA purposes and whether it is "dominant in its field," and those provisions can inform how NMFS classifies non-profit organizations for the purposes of RFA analyses in rulemaking. After consultation with the SBA, NOAA Fisheries has decided to use SBA's size standards for non-profit organizations to determine whether a non-profit organization is "small" and, in turn, whether it is "dominant in its field," to apply the statutory definition of a "small organization" in practice:

A nonprofit organization is determined to be "not dominant in its field" if it is considered "small" under SBA size standards:

- Environmental, conservation, or professional organizations (NAICS 813312, 813920): Combined annual receipts of $15 million or less.
- Other organizations (NAICS 813319, 813410, 813910, 813930, 813940, 813990): Combined annual receipts of $7.5 million or less.

Provision is made under SBA's regulations for an agency to develop its own industry-specific size standards after consultation with Advocacy and an opportunity for public comment (see 13 CFR 121.903(c)). NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (80 FR 81194, December 29, 2015). This standard is only for use by NMFS and only for the purpose of conducting an analysis of economic effects in fulfillment of the agency's obligations under the RFA.

NMFS' small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing is $11 million in annual gross receipts. This standard applies to all businesses classified under North American Industry Classification System (NAICS) code 11411 for commercial fishing, including all businesses classified as commercial finfish fishing (NAICS 114111), commercial shellfish fishing (NAICS 114112), and other marine fishing (NAICS 114119) businesses. (50 C.F.R. § 200.2; 13 C.F.R. § 121.201).

7.1 Description of why action by agency is being considered

The reasons why this agency action is being considered are explained in the "Statement of the Problem" Section of the RIR and in Chapter 1, Section 1.1 titled "Purpose and Need" of the EA above.

7.2 Statement of the objectives of, and the legal basis for, the proposed rule.

The reasons why agency action is being considered and legal basis for the proposed rule are explained in the "Description of the Management Goals and Objectives" section in the RIR above.

7.3 A description and, where feasible, estimate of the number of small entities to which the proposed rule will apply; and a description and estimate of economic effects on entities, by entity size and industry.

Part 121 of Title 13, Code of Federal Regulations (CFR), sets forth, by North American Industry Classification System (NAICS) categories, the maximum number of employees or average annual gross receipts a business may have to be considered a small entity for RFAA purposes. *See* 13 CFR 121.201. Under this provision, the U.S. Small Business Administration established criteria for businesses in the fishery sector to qualify as small entities. Standards are expressed either in number of employees, or annual receipts in millions of dollars. The number of employees or annual receipts indicates the maximum allowed for a concern and its affiliates to be considered small (13 CFR 121.201).

A business primarily engaged in seafood product preparation and packaging (NAICS 311710) is a small business if it employs 750 or fewer persons on a full time, part time, temporary, or other basis (13 CFR 121.106), at all its affiliated operations.[20]

As the harvest specifications process determines the amount of quota pounds available in the catch share (limited entry trawl permit Individual Fishing Quota) sector, this proposed rule will impact quota share owners. Thirty-one non-whiting quota share permits owned by ten entities are estimated, based on holdings of first receiver permit affiliation in the non-public West Coast Region permits database, to be primarily engaged in seafood "product preparation and packaging." According to the size standard defined above, six of the entities that own ten of these permits are considered small. These small processing entities were issued 4.6 percent of the non-whiting quota pounds issued in 2020. Some of these small processing entities also own groundfish permits, required on both catcher vessels and catcher processors, which would be regulated by the proposed rule; four small entities primarily engaged in seafood processing own nine groundfish permits.

Thirty groundfish vessel permits are owned by four entities who are considered large both estimated independently using the definition above, as well as through ownership affiliation to self-reported size on groundfish permit and first receiver site license permits (self-reported using the definition above). Four of these five large processing entities were issued 7.6 percent of the non-whiting quota pounds issued in 2020 across 21 quota share permits. In addition to increasing benefits from recently rebuilt overfished species, participants are expected to benefit from recent changes to EFH designations as specified in Amendment 28 (PFMC and NMFS, 2019).

A business primarily engaged in charter fishing boat operation (NAICS 487210) is a small business if it has annual receipts of less than $7.5 million.

All three states have an active charter for-hire/Commercial Passenger Fishing Vessels (aka 'party boats') fishery engaged in recreational groundfish fishing. The most recent estimated numbers of active vessels that took at least one groundfish trip are shown in Table 7-1.

Table 7-1.. Number of Charter/Commercial Passenger Fishing Vessels (CPFV) with at least one groundfish trip by state as of 2019.

State	Number CPFV/Charter Boats
Washington	43
Oregon	45
California	287

Regarding Oregon, there is not an Oregon license or tracking of "six pack" or party fishing vessel businesses. These business are likely to be impacted by the Action. All of these vessels are likely to be impacted by changes in recreational catch guidelines for groundfish in their respective states.

[20] For purposes of rulemaking, NMFS West Coast Region is applying the seafood processor standard to catcher processors (C/Ps) and mothership processor ships, which earn the majority of their revenue from selling processed seafood product.

Additionally, these operations are expected to benefit from changes to season structure, removal of the Washington YRCAs, and modification to the recreational RCA boundaries in California

NMFS's small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing is $11 million in annual gross receipts.[21] *This standard applies to all businesses classified under North American Industry Classification System (NAICS) code 11411 for commercial fishing, including all businesses classified as commercial finfish fishing (NAICS 114111), commercial shellfish fishing (NAICS 114112), and other commercial marine fishing (NAICS 114119) businesses. (50 C.F.R. § 200.2; 13 C.F.R. § 121.201).*

Entities that are not registered as trusts, estates, governments, or non-profits are assumed to earn the majority of their revenue from commercial fishing. The definition above is thus used for 141 quota share permit owners, who collectively received 93.1 percent of the quota pounds (86.7 percent of non-whiting quota pounds) issued in 2020. Note that 17 QS accounts received zero non-whiting QPs in 2020. Benefits are expected to increase for quota share owners proportional with the increase in ACLs for most IFQ species. Limited entry groundfish vessels are required to self-report size across all affiliated entities; of the business who earn the majority of their revenue from commercial fishing, none self-reported as large. 209 entities owning 360 permits self-reported as small. The average small entity owns 1.7 permits, with 42 small entities owning between three and twelve permits each. Open access groundfish vessel owners are assumed to earn the majority of their revenue from fishing and would thus fall into this SBA definition. 191 non-limited entry vessels harvested at least $10,000 worth of groundfish in 2019; these are likely to be impacted by the proposed rule. This number is likely an upper bound as some entities may own more than one vessel, however, these generally small operations are assumed to be independent entities; with the top three vessels having coastwide (including non-groundfish) revenues averaging $529,567 in 2019. Median revenues were $36,279 per vessel.

In addition to benefits from increasing ACLs in the harvest specifications, several of the new management measures contained in the proposed rule are likely to benefit vessels. Trawl vessels, notably in California South of 40°10' N. lat are expected to benefit from the increased AVL for cowcod. This change should reduce the regulatory burden on vessels and improve operational flexibility. Non-trawl vessels are expected to benefit from modification to the non-trawl Rockfish Conservation Area boundaries as well as the recommended changes to specific RCA coordinates that better reflect isobath contours.

<u>Salmon trollers</u>

This action primarily impacts entities in the groundfish fishery; however, two management measures will likely benefit vessels primarily involved in the salmon troll fishery through a modification in the incidental yellowtail rockfish retention ratio in that fishery. The first measure would increase the trip limit amount of yellowtail rockfish relative to the amount of salmon onboard for trollers north of 40°10' N. lat. The second measure would establish a trip limit of

[21] Provision is made under SBA's regulations for an agency to develop its own industry-specific size standards after consultation with Advocacy and an opportunity for public comment (see 13 CFR 121.903(c)). NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (80 FR 81194, December 29, 2015). This standard is only for use by NMFS and only for the purpose of conducting an analysis of economic effects in fulfillment of the agency's obligations under the RFA.

yellowtail rockfish relative to the number of Chinook salmon on-board south of 40°10' N. lat. The subsector of the fleet expected to benefit from the proposed rule is much smaller however, as historically a small proportion has elected to land yellowtail within the previously allowed limits. In order to land yellowtail, the vessel would have VMS installed in order to retain groundfish in federal waters, which likely deters some salmon trollers, among other factors.

Vessels fishing north of 40°10' N. lat could fish off of all three states. Based on the analysis in Agenda Item G.6.a Attachment 6, April 2020, the 2015-2019 average participation in salmon trolling has been 18.4 boats in Washington, 60.2 in Oregon, and 6.4 in California. In 2019, there were 1,053 vessels permitted to land salmon in California, of which 570 vessels participated in the commercial salmon fishery (all gears) and 89 of vessels had 50 percent of the landings. Approximately, 920 vessels have a home port south of 40°10' N. lat., of which 527 vessels participated in the salmon troll fishery and landed south of 40°10' N. lat., and 82 of those vessels had 50 percent of the landings from the salmon troll fishery. Given that only 53 salmon permitted vessels landed yellowtail rockfish in 2019 and the requirement for VMS, the overall number of vessels that will participate in this fishery will likely be less than that.

This small positive benefit is not expected to be a substantial impact, nor are the entities likely to be impacted a substantial number of the overall salmon troll fishery. Notably, north of 40°10' N. lat, the 2015-2019 average was landings of yellowtail rockfish by salmon trollers was $4,709. South of 40° 10' N. lat, the price per pound of hook and line caught yellowtail rockfish is higher ($3.13/lb south vs. $1.69/lb north; Figure). Under the industry scenario described in Section Agenda Item F.1., Attachment 8, June 2020, where 80 vessels encounter yellowtail for three months and take the 200 lb maximum trip limit, this would average out to approximately $1,901 per vessel. This compares to an average of $6.6 million in revenue earned from salmon north of 40°10' N. lat.

As detailed in Review of 2019 Ocean Salmon Fisheries (PFMC 2020), the average price per pound in 2019 of West Coast ocean harvest Chinook salmon was $6.58, coho salmon was $2.85 per pound, and pink salmon was $ 2.11. Total coastwide ex-vessel revenue of the Council managed non-Indian commercial salmon troll was $21.2 million dollars, with more than 99 percent derived from Chinook salmon.

In addition to small businesses, the RFA recognizes and defines other kinds of small entities. *A small governmental jurisdiction is any government or district with a population of less than 50,000 persons*.

According to the public IFQ Account database as of 07/08/2020, the City of Monterey owns quota shares of ten species. The U.S. Census estimates the population to be 28,454 as of July 1, 2017, so would be considered a small governmental jurisdiction by the RFA standard above. The City of Monterey received 0.1 percent of the non-whiting quota pounds issued for 2020 according to the public IFQ Account database.

A small organization is any not-for-profit enterprise that is independently owned and operated and not dominant in its field (5 U.S.C. § 601). A nonprofit organization is determined to be "not dominant in its field" if it is considered "small" under SBA size standards.[25] *Environmental, conservation, or professional organizations (NAICS 813312, 813920) are considered not dominant in its field (small for the purposes of NMFS rulemaking) if they have combined annual receipts of $15 million or less. Other organizations (NAICS 813319, 813410, 813910, 813930,*

813940, 813990) are considered not dominant in their fields with combined annual receipts of $7.5 million or less.

According to the public IFQ Account database, six not-for-profit organizations own quota share in the catch share program and would thus be impacted by the trawl sector allocation under this proposed rule. All six would be considered small by the definition above (2017 annual receipts as reported on IRS form 990 of $52-53 thousand dollars). Collectively, the six small not-for-profit organizations received 7.9 percent of the non-whiting quota pounds issued in 2020. Four of the six non-profit entities owned 11 limited entry trawl permits which would be impacted by the management measures of the rule.

A small trust, estate, and agency account (NAICS 525920) is defined at 13 C.F.R. § 121.201 as having annual receipts of less than $32.5 million (including affiliates).

Seven personal or family trusts/estates owned quota share permits and would thus potentially be impacted by the trawl sector allocation under this proposed rule. All of these are assumed to be smaller than the size standard above. Collectively, these seven small entities owned eight quota share permits and received 3.7 percent of the non-whiting quota pounds issued for 2020.

7.4 An explanation of the criteria used to evaluate whether the rule would impose "significant" economic effects.

NMFS considers two criteria to consider in determining the significance of adverse regulatory effects, disproportionality, and profitability.

Disproportionality compares the effect of the regulatory action between small and large entities. These regulations related to harvest specifications, with inter and intra-sector allocations largely fixed within the PCGFMP framework and not impacted by biennial determination of ACLs. Management measures are created for each commercial and state recreational fishery independently; with all but the trawl sector made up of exclusively small entities. Regulations in the trawl sector are anticipated to benefit all entities, and are not expected to place any of the small entities described above at a significant competitive disadvantage to large entities.

Profitability: There are no compliance costs to entities associated with this rule anticipated for the 2021-2022 biennium. It is assumed, based on available analyses in the supporting EA document that there will not be any explicit costs associated with this rule, with the exception of unlikely implementation of ACTs for cowcod and accountability measures for shortbelly rockfish in the trawl fishery.

7.5 A description of, and an explanation of the basis for, assumptions used.

Data used to inform this analysis come primarily from PacFIN, and RecFIN, which includes data provided by the states of Oregon, California, and Washington on commercial and recreational fishing trips and landings. Other data sources include the California Passenger Fishing Vessel survey, the West Coast Region permit database, and the West Coast Region Individual Fishing Quota Account public database. The number of entities predicted to be impacted is generally based on the level of participation in the previous year (2019), and as noted above is in some cases likely to be an overestimate of the true number of entities likely to be impacted if current trends continue. However, it is possible that environmental or management conditions change in other fisheries that would impact the level of participation in the groundfish fishery beyond what is predicted here.

7.6 Reporting and recordkeeping requirements

There are no reporting or recordkeeping requirements associated with this action.

7.7 Relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule:

There are no Federal rules that duplicate, overlap, or conflict with the proposed rule.

7.8 A description of any significant alternatives to the proposed rule that accomplish the stated objectives of applicable statutes and that minimize any significant economic impact of the proposed rule on small entities

The Alternatives are specified and analyzed above in Chapter 2 and Chapter 4. The economic impact of these measures are detailed at Chapter 4.3 and in Chapter 6 above.

This rule is not expected to result in adverse impacts to small entities. The Council did consider alternatives to the proposed rule which would have had a lower level of benefits to small entities, the Council did not consider alternatives that would have had greater benefits to small entities as these would not have met several primary objectives of the rule (prevent overfishing, rebuild overfished stocks, ensure conservation). Under No Action, the default harvest specifications and associated routine management measures would be implemented using best scientific information available to establish default harvest control rules for all groundfish stocks. The Council considered alternative specifications for Oregon black rockfish, cowcod, petrale sole, shortbelly rockfish, and sablefish. In each case, the Council selected the harvest control rule that resulted in the maximum benefits to both large and small directly regulated entities. Routine management measures are adjusted according to harvest specifications, which also impact the new management measures available for implementation.

7.9 Certification statement by the head of the agency

The Chief Counsel for Regulation of the Department of Commerce certified to the Chief Counsel for Advocacy of the Small Business Administration that the preferred alternative, if adopted, would not have a significant economic impact on a substantial number of small entities.

8.1 Magnuson-Stevens Act National Standards

Below are the 10 National Standards as contained in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), and a brief discussion of how each action alternative is consistent with the National Standards, where applicable. The No Action alternative, including the aspects of the No Action alternative that are preferred, are consistent with the 10 National Standards as described in detail in 2019-2020 EA (NMFS 2018). In recommending a preferred alternative, the Council must consider how to balance the national standards.

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

MSA section 303(a)(3) requires that each FMP include an estimate of MSY and OY for the fishery. OY is the amount of fish that will provide the greatest overall benefit to the U.S., particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems. OY is set based on the MSY, with potential further reductions based on relevant economic, social, or ecological factors; and in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the MSY in such fishery. The harvest specification action alternatives are consistent with the OY harvest management framework described in Chapter 4 of the Groundfish FMP. The application of the OY harvest management framework in the PCGFMP to the specifications described in this document should result in harvest specifications that reduce the likelihood of overfishing.

The preferred HCRs for the 2021-2022 management cycle balance the stock conservation mandate in the MSA and the socioeconomic mandate to provide the greatest overall benefit to the U.S. with respect to managing marine resources consistent with the NS1 guidelines. In the case of sablefish and Oregon black rockfish, the preferred HCRs depart from more conservative limits considered under the No Action alternative. The preferred HCRs for these stocks have slightly negative conservation impacts relative to the No Action HCRs, yet are still predicted to maintain a healthy stock biomass in the next ten years. Both stocks are important target stocks for key sectors in the west coast groundfish fishery and realize high ACL attainment. Higher limits for both stocks are predicted to result in positive socioeconomic benefits. In the case of sablefish, the preferred HCR decision results from the new stock assessment indicating the stock is now healthy with a spawning biomass above B_{MSY} and a prediction that status will be maintained over the next ten years under a more aggressive harvest rate. In the case of Oregon black rockfish, the larger sigma values and ABC buffers to be implemented beginning in 2021 are predicted to reduce fishing access and opportunity in Oregon nearshore recreational and commercial fisheries. Departing from the No Action HCRs and specifying the 2020 ABC/ACL for the next two years will mitigate those predicted negative impacts and provide time for ODFW to improve surveys for nearshore rockfish. The scale of the Oregon black rockfish population estimated in the 2015 assessment has been disputed, compelling the ODFW initiative to improve the science informing black rockfish abundance. The prediction that the population will not be negatively affected in the next ten years by this departure of default HCRs was the rationale for this action.

A new feature in harvest specifications for west coast groundfish fisheries proposed to be implemented in 2021 are larger sigma values endorsed by the SSC and adopted by the Council, which resulted in larger ABC buffers for all stocks and stock complexes. The SSC's motivation for larger sigmas and ABC buffers was to better characterize the uncertainty in estimating OFLs. Further, the time-varying sigmas where sigma values and ABC buffers progressively increase with the increasing age of the assessment. This

methodology better recognizes the inherent interannual variation in recruitment of stocks in the California Current ecosystem, which are not taken into account until changes in stock productivity are considered in a new assessment. Time-varying simgas recommended by the SSC are anticipated to better account for scientific uncertainty as a stock assessment ages, and is therefore anticipated to reduce the likelihood of overfishing.

Amendment 29 and the associated changes to allocations and designation of shortbelly rockfish as an EC species are consistent with NS1 guidelines because there are no associated negative stock impacts predicted by these actions and they are designed to improve utilization of target species. The removal of the formal allocations from the FMP for the Slope Rockfish complex south of 40°10' N lat., lingcod south of 40°10' N lat., and widow rockfish are intended to provide better utilization of these target stocks. There are no risks to overfishing since the ACLs are still being managed under default HCRs and the AMs, including the Council's inseason fishery management process, have been effective at preventing overfishing. The sector inequities associated with the allocation of the mix of trawl-dominant (i.e., stocks predominantly caught by trawl gear) and stocks readily caught by both trawl and non-trawl gears (e.g., blackgill rockfish) was thoroughly explored in consideration of Amendment 26, when restructuring the complex and reallocation of the stocks therein was contemplated. While the Amendment 26 action was not adopted, the Council did approve removing the formal sector allocations from the FMP and considering these allocations on a biennial basis. The Council intends to better explore the sharing of southern Slope Rockfish species and adapt their allocation decisions through time as the fishery continues to evolve under trawl rationalization and other changes to the west coast groundfish management system. Likewise, the sharing of lingcod south of 40°10' N lat. was judged to be inequitable in the five-year review of the trawl catch share program and Amendment 21 allocations, with the California recreational fishery in greater need for lingcod. The five-year review also demonstrated a greater need and better utilization of the petrale sole and widow rockfish allocations by the trawl fishery prompting that stock's allocation to be managed biennially to better explore sector needs. The Amendment 29 action to designate shortbelly rockfish as an EC species is also predicted to cause no harm to the shortbelly stock nor compromise its role in the California Current ecosystem. There is evidence the shortbelly stock has experienced an unprecedented increase in recruitment and abundance with biomass estimated to be three orders of magnitude higher than the recent average. Shortbelly meets all the criteria in the NS1 guidelines for an EC designation (see section 4.1.1.5). Their extremely low ex-vessel value, which does not cover operating costs if they were to be targeted, and the physical damage done to co-occurring target stocks when shortbelly are incidentally caught provide a strong incentive to continue avoiding shortbelly with or without an EC designation. The EC designation is intended to reduce the chance of an early closure of midwater trawl fisheries targeting healthy stocks of Pacific whiting and pelagic rockfish north of 40°10' N lat. and thereby promote greater efficiencies and utilization of marine resources in the fishery. The Council specified a cumulative annual catch of 2,000 mt of shortbelly rockfish will trigger Council discussion on an alternative management strategy or different management measures to reduce the incidental bycatch of shortbelly.

National Standard 2 — Conservation and management measures shall be based upon the best scientific information available.

The best available science standard applies to the following areas relative to this proposed action: stock assessments, rebuilding analyses, and methods for determining management reference points (OFL, ABC, ACL, etc.); these areas form the basis for determining harvest levels and the evaluation of socioeconomic impacts. The alternative harvest specifications for 2021 and 2022 were updated and based on default or, for four actively managed stocks, alternative HCRs analyzed in this EA. These values in the alternatives reflect the application of the best scientific information available (BSIA) to current harvest management policies.

The harvest specifications considered under the proposed action (the action alternatives, including the Preferred Alternative) are based on the most recent stock assessments and developed through the peer-review STAR process. All these assessments were judged by NMFS to be based on BSIA before results were used to decide harvest specifications and management measures. The 2020 Groundfish SAFE document reviews the basis for alternative harvest specifications and references the stock assessments that were used. It also describes the methods that were used to determine reference points for harvest specifications (OFL, ABC, ACL, etc.) for stocks and stock complexes.

The process to decide stock assessment priorities utilizes a matrix of factors designed by the NMFS Northwest Fisheries Science Center following national NMFS guidance on best practices for making such decisions. This process has been judged by NMFS to be BSIA.

Socioeconomics are a critical component to fishery management. The NWFSC has developed a model application, called the Input-Output Model for Pacific Coast Fisheries (IOPAC), for estimating personal income impacts of commercial fishing on the West Coast. Outputs from this model are used by the Council to develop the alternatives and are considered BSIA.

National Standard 3— 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 Council develops and designates management units for groundfish, which include stocks, stock complexes, or geographic subdivisions thereof within its jurisdiction in the west coast EEZ. Groundfish ACLs are set for these management units. Many west coast groundfish stocks have a broader distribution than the west coast EEZ and are therefore managed by multiple countries and management entities. There are few international agreements for managing west coast groundfish, with the exception of Pacific whiting, which is managed under an international treaty agreement with Canada. Sablefish are distributed as one stock from waters off NE Asia (Sea of Okhotsk), the Bering Sea, Gulf of Alaska, off Canada, and south through the west coast EEZ to the southern tip of Baja California. Multiple agencies including the NMFS Alaska and Northwest Fisheries Science Centers and the Department of Fisheries and Oceans Canada are collaborating on a management strategy evaluation of sablefish management. This effort could inform future Council decisions on sablefish management. The Groundfish SAFE document details the process by which ACLs for each management unit are developed.

The alternatives consider designating shortbelly rockfish as an EC species throughout its range within the west coast EEZ, and no stocks are interrelated to such an extent that they should be managed in close coordination. The alternatives consider updating the ABC apportionment of the coastwide sablefish stock, as is necessary due to the long-standing allocation structure, north and south of 36° N. lat. Sablefish is managed as a coastwide stock with similar management measures in both areas, and the management and apportionment are both based on BSIA.

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

As described above under the National Standard 1 guidelines section, the removal of the formal allocations from the FMP for the Slope Rockfish complex south of 40°10' N lat., lingcod south of 40°10' N lat., petrale sole, and widow rockfish under the proposed Amendment 29 actions are intended to provide better utilization of these target stocks by reducing the stranding of available yield in a sector's allocation and

thus addressing sector sharing inequities. These allocations will be made every two years, rather than formal, more enduring allocations specified in the FMP, to adapt to the needs of participants in the evolving west coast groundfish fishery.

Chapter 4 of this EA describes allocation decisions made during this biennial harvest specification process. The proposed measures will not discriminate between residents of different states. Decision-making on allocations occurs through the Council process, which facilitates substantial participation by state representatives and the public. Generally, state proposals are brought forward when alternatives are crafted and integrated to the degree practicable. Emphasis is placed on equitable division, while achieving conservation goals. Allocation decisions are also made as part of the Council's biennial harvest specifications process for those stocks that do not, at present, have established formal allocations under the PCGFMP

Amendment 29 to the PCGFMP changes the allocations of four stocks with long-term allocations to biennial allocations. The new allocation structure for these species better reflects the sector needs. The Amendment 21 allocations for these species were inefficient and lead to under-attainment of stocks. The new allocation structure should also reduce regulatory discards as allocations better reflect sectors that target and land these species, thus improving conservation management of the stocks while achieving fishery management goals. Fishery participants who belong to the IFQ sector will receive the same percentage of a higher sector allocation, and thus increased poundage, but no particular entity will receive different percentages than they have at present. The fixed gear sector operates under trip limits and no one entity is granted a percentage; therefore, the distribution of the allocation is under a common pool and all participants have equal opportunity.

National Standard 5 — Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.

Management measures were designed to offer increased opportunity to the resource as well as increase overall attainments of stocks that allow participants to attain OY through efficient distribution of the resource among the user groups. This design should allow for efficient access to the resource as well as potentially allow for increased utilization by the various sectors as well as allow for ecosystem needs to be met.

Under the proposed PCGFMP 29, utilization of widow rockfish, petrale sole, lingcod south of 40°10' N. lat., and the Slope Rockfish Complex South of 40°10' N. lat. should improve as the allocation structure between trawl and non-trawl sectors better reflects user needs. These allocation changes should improve efficiency of utilization through reduced regulatory discards. For example, Under No Action, and subsequently the Preferred Alternative, a holistic examination of sector allocations revealed inefficiency in the distribution to the fishery for widow rockfish, petrale sole, lingcod south of 40°10' N. lat., and the Slope Rockfish Complex South of 40°10' N. lat. Modification to these allocations from Amendment 21 formulas to biennial allocations addressed the lack of inefficient utilization by sectors prior to this biennial cycle. In that, under existing Amendment 21 allocations, fish were allocated in such a manner whereby full attainment by sectors was unlikely. The allocations of these species were set in such a manner that was no longer representative of the needs of the fishery. The Preferred Alternative recognizes the current distribution of fishery needs in such a manner that should allow for the fishery, as a whole, to achieve OY via an efficient assignment of these species to the sector that is best positioned to harvest the allocation. Additionally, noting the fishery may change, the designation of these species as biennial allows the Council to revisit the allocations in a manner that can adapt to changing needs of the fishery. Additionally, minor adjustments to the non-trawl RCA may allow for increased utilization of under-attained stocks and more

efficient use of fishery resources by allowing fishermen to maximize harvests with less time on the water. The biennial allocations, both those for stocks subject to Amendment 29 and those that are not, and the EC designation for shortbelly rockfish under Amendment 29, are proposed to increase efficiency and utilization of the target stocks in the fishery. These allocations and the shortbelly action are predicted to increase attainment of the primary targets in the affected fishery sectors.

National Standard 6— Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The harvest specifications and management measures proposed in this EA reflect differences in catch and, in particular, bycatch of overfished species. Management measures include adjustments to spatial and temporal closures, catch controls, and trip limits by area. For example, spatial adjustments to the RCA boundaries in California and Oregon were modified to better reflect both the status of the fishery and user needs while meeting conservation goals. The modification of the RCA shoreward boundaries increases access to the fishery resources in these states but also maintains a large area where non-trawl groundfish fishing is not allowed. The new boundaries may result in increased catch of cowcod and yelloweye rockfish; however, as cowcod is now rebuilt and yelloweye is rebuilding ahead of schedule their respective annual catch limits are at such a level that these minor adjustments are not likely to affect the status of these stocks. Opening these areas could increase access of underutilized groundfish species while minimizing the incidental take of cowcod and yelloweye rockfish. Removing the two YRCAs off of Washington takes into account the desire of fishermen in that state to improve access the fishery resource while continuing to respect the conservation measures for yelloweye rockfish by maintaining the zero retention bag limit.

The measures in this EA reflect the flexibility of the Council to address the improving status of the fishery yet still meet conservation goals. The Council is able to monitor the fishery for indications of overages and apply measures to ensure ACLs are achieved, but not exceeded, through routine inseason action. The management measures in this EA do not appreciably change this framework, but rather reflect the status of stocks in the PCGFMP. Inseason actions taken by the Council can include temporal adjustments, spatial adjustments, as well as catch control mechanisms (i.e. trip limits) that are specific to area and/or fishery.

National Standard 7 — Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Development of these alternatives was achieved through coordinated effort of West Coast fishery managers, enforcement, and stakeholders over the course of a calendar year at six Council meetings. The alternatives in this EA were developed to reduce the overall burden on participants and to achieve management objectives and priorities among the three West Coast states. In general, coordination between managers, enforcement, and stakeholders reduces duplication in action or effort and, therefore, reduces costs. The implications of the alternatives are evaluated in Chapter 4 of this EA.

National Standard 8 — 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 by utilizing economic and social data that meet the requirements of National Standard 2, 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 2015 EIS evaluating the 2015-2016 harvest specifications and management measures and Amendment 24 to the PCGFMP (PFMC and NMFS 2015) evaluates the long-term impacts of alternatives harvest management policies of fishing communities. The short-term impacts of the current proposed actions do not differ substantially in context or intensity from the impacts disclosed in the 2015 EIS (see Chapter 4).

These effects were taken into account by adopting the preferred alternative. Target species catch estimates for each alternative is projected based on the management measures. The catch estimates provide the base information for estimating ex-vessel revenue and personal income impacts at the community level (with the port group area the unit of analysis for community impacts).

West Coast fishing communities depend on a diverse portfolio of commercial and recreational fisheries to support year-round operations. The proposed changes to the default harvest control rules for cowcod, shortbelly rockfish, Oregon black rockfish, sablefish, and petrale sole were selected to appropriately account for the needs of fishing communities. The management measures selected as preferred maximize positive economic impacts on the communities and could improve participation over time. These changes may provide increased opportunity for both commercial and recreational sectors and may, concomitantly, improve stability of many fishing communities.

Commercial fisheries, overall, should see increased opportunity and flexibility under the proposed actions. For example, in the commercial trawl communities, this proposed action to restructure certain Amendment 21 allocated species (e.g., widow rockfish, petrale sole, etc.) may provide improved economic conditions as they were designed to maximize benefits to the community without constraining non-trawl fisheries. In commercial fixed gear, changes to the Rockfish Conservation areas to target underutilized species. Additionally, trip limit increases should provide positive economic benefits to the fixed gear community. Recreational fisheries proposed changes to the RCA off of California, season structure/depth changes off of Oregon, and removal of two YRCAs off of Washington allow for anglers to target a broader suite of species (e.g., yellowtail rockfish, lingcod, etc.) while reducing pressure on nearshore stocks. Proposed changes in ACL research deductions for cowcod would allow for additional research opportunities to collect much-needed data to better inform stock assessments and management decisions. Which, in turn, could provide for sustained participation and positive economic impacts for groundfish fishing communities.

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

Minimizing bycatch, of overfished species and other sensitive species such as shortbelly rockfish, is an important component of the alternatives. Bycatch of several species is mitigated through non-retention of incidental catch, and with annual vessel limits, and depth based area closures.

The newly rebuilt status of cowcod south of 40°10' N lat. is based on a relatively data-poor assessment, which has always been the case for cowcod assessments, with relatively uncertain estimates of abundance and status. All of the alternatives @true?@ maintained non-retention of cowcod and did not include management measures designed or anticipated @true?@ to take significant amounts of cowcod. Some measures were considered but rejected @true?@ in order to minimize bycatch of this formerly overfished stock. Likewise, the preferred alternative maintains non-retention of bronzespotted rockfish, an unassessed species of concern that may be in a more depleted status, and of yelloweye rockfish, a species still managed under a rebuilding plan.

Under No Action, the Council proposed, and adopted as there Preferred Alternative, modifications to the non-trawl RCA boundaries as well as elimination of two yelloweye rockfish conservation areas (YRCA) off of Washington State. Changes to the RCA non-trawl boundaries are expected to increase encounters with cowcod, bronzespotted rockfish, and yelloweye rockfish, but not to the extent that harvest specifications would be exceed. Changes to the non-trawl RCA boundaries are necessary to access co-occurring healthy stocks and to reduce pressure on nearshore rockfish which have been harvested at high rates in the last 18 years under RCA management.

The RCA adjustment south of Pt Conception (34°27' N. lat) to the Mexico border re-opened some area by moving the shoreward boundary deeper, from 75 fm to 100 fm. This depth adjustment may increase incidental catch of cowcod and bronzespotted as these species are typically found in deeper water in this region (PFMC, 2020). However, as retention of these species are prohibited, direct targeting should not occur. Additionally, cowcod is managed within an ACT of 50 mt, which is 34 mt lower than the ACL. The catch levels of cowcod are closely monitored and the Council is poised to take routine inseason action should catch levels approach the ACT. Thus even if incidental catch were to increase, it is unlikely the ACL would be reached, much less exceeded.

The RCA boundary adjustments north of Point Conception also re-opens some area by moving the shoreward depth boundary deeper. This, as well as removal of two YRCAs off of Washington may increase the incidental catch of this species. Yelloweye rockfish, which becomes more prevalent in northern latitudes, cannot legally be retained and this species has both a fishery HG as well as non-trawl HG and ACT, so that management targets are below the ACL. The Council monitors this species closely and considers at each meeting whether routine inseason management changes are needed to keep harvest within the HGs.

Shortbelly rockfish are a noted bycatch species in the midwater trawl fishery (particularly in the Pacific whiting sector). As detailed in this EA, there is low probability that this designation will negatively impact this species. It is neither targeted and nor does a market exist for it (nor is their consideration for developing such a market). Industry, especially the at-sea sectors, actively avoid this species and minimize mortality to the extent practicable. There is a strong incentive to avoid shortbelly rockfish by midwater trawlers given the low value and deterioration of valuable whiting and rockfish targets caught together with shortbelly rockfish as they are damaged by this very spinous species in the codends of trawls. The at-sea trawl sectors utilize cooperative agreements to share catch data in a timely manner to the fleet, agencies, and the Council. Further, the observer program also provides at-sea bycatch data in a timely manner to NOAA Fisheries. These factors allow the Council to address shortbelly bycatch through inseason action, as necessary.

Noting the importance of this species as forage in the CCE, the Council recommended that, should bycatch exceed 2,000 mt in a calendar year, the Council will investigate the reason(s) and, if necessary, issue additional management measures, including reconsideration of the EC designation, for shortbelly rockfish. Additionally, the Council will monitor this species as part of the routine inseason management agenda item via the groundfish scorecard and the GMT. The Council could take precautionary action prior to the 2,000 mt trigger, if necessary, to curtail bycatch of shortbelly rockfish. This guidance is consistent with National Standard 9, §303(b)(12) and other applicable MSA sections, whereby management measures can be adopted to collect data on EC species, minimize bycatch or bycatch mortality of EC species, protect the role of EC species in the ecosystem, and/or to address other ecosystem issues.

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

The increases to ACLs and trip limits may encourage additional effort for target species. Adjustments to the seaward boundaries of the RCA may result in more vessels venturing further offshore to target deeper water species. However, these changes may induce fishermen to increase investment in vessels and vessel equipment to harvest the resource more efficiently. Upgrades to the operational ability of the vessel could likely result in enhanced safety.

8.2 Consistency of the Proposed Actions with Other Applicable MSA Provision

Section 303(a)(9) of the Magnuson-Stevens Act requires that a fishery impact statement be prepared for each FMP or FMP amendment. A fishery impact statement is required to assess, specify, and analyze the

likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for (a) participants in the fisheries and fishing communities affected by the plan amendment; (b) participants in the fisheries conducted in adjacent areas under the authority of another Council; and (c) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery.

The EA/RIR prepared for this plan amendment constitutes the fishery impact statement. The likely effects of the proposed action are analyzed and described throughout the EA/RIR. The effects on participants in the fisheries and fishing communities are analyzed in the RIR chapter of the analysis (Chapters 6). The effects of the proposed action on safety of human life at sea are evaluated below in Chapter 8 under National Standard 10, Based on the information reported in this section, there is no need to update the Fishery Impact Statement included in the FMP.

The proposed action affects the groundfish fisheries in the EEZ off the West Coast, which are under the jurisdiction of the Pacific Fishery Management Council. Impacts on participants in fisheries conducted in adjacent areas under the jurisdiction of other Councils are not anticipated as a result of this action.

Harvest specifications are set based on targets established in overfished species rebuilding plans, which conform to Section 304(e) Rebuild Overfished Fisheries. Rebuilding plans contain the elements required by Section 304(e)(4) and discussed in the NS1 Guidelines (50 CFR 600.310).

NMFS prepared EISs evaluating measures designed to identify and describe West Coast groundfish EFH in 2005 (NMFS 2005) and in 2019 (NMFS and PFMC 2019) under Amendments 15 and 28, respectively to minimize potential fishing impacts on West Coast groundfish EFH.

The effects of the proposed actions on groundfish EFH are within the scope of effects evaluated in the programmatic groundfish EFH EIS. The Council commenced a 5-year review of its groundfish EFH designation in December 2010 and the Council chose a preferred alternative in April 2018 (Amendment 28). In this action, the Council modified multiple shoreward RCA boundaries. The boundary from 40°10 N. lat to 46°16' N. lat adds additional habitat protection through allowing only hook and line gear, excluding bottom contact longline and dinglebar gear, between the 30 fm and 40 fm management lines. This measure is expected to decrease potential EFH damage from non-trawl fishing practices.

The current proposed actions are unlikely to result in adverse impacts to EFH outside those disclosed in Section 4.1.4 in the 2019 EIS. The 2019 EIS, which analyzed Amendment 28 impacts, describes impacts of the groundfish management program on EFH, consistent with the EFH assessment requirements of 50 CFR 600.920 (e)(3).

MSA Section 600.305

Section 600.305 of the MSA is the precursor section to the National Standards. While this section is not, in and of itself, a National Standard, it is applicable to this action in that shortbelly rockfish is recommended to be designated an ecosystem component species. While discussed in the above EA, it is important to note how the Council recommended this designation. The GMT provided a detailed discussion on the merits of classifying shortbelly rockfish as an EC species in their Agenda F.1.a, Supplemental GMT Report 3, June 2020 (GMT Report 3) that provided a basis from which the Council initiated their decision making process on this species. This report is incorporated by reference, but is summarized below.

Under §§600.305(d)(13) and 600.310(d)(1)), National Standard guidance allows Council to identify stocks to manage within their FMPs as EC species. As expressed §600.305(c)(4), Councils should give due

consideration to the ten factors listed at §600.305(c)(1) and any additional considerations that maybe relevant to the stock. As detailed in the above EA (see Sections 2.2.2, 4.1, and 4.2.4 in particular), in GMT Report 3, and in the NS1, NS3 and NS9 discussion above, shortbelly rockfish are an abundant and healthy stock that is neither targeted nor considered an important stock to commercial, recreational, and subsistence users. The amount and type of catch that occurs in Federal waters is not expected to significantly affect this stock's status. As noted by industry, there is little to no incentive to target this species as it provides negative economic return and industry actively attempts to avoid this species. Based on input from industry, there is a low likelihood that a market will develop within the biennium and it is not anticipated that industry behavior will change in response to the stock being designated as an EC species. The Council concluded that shortbelly rockfish are not in need of conservation and management in the 2021-2022 biennium and is a species that could be designated as an ecosystem component. Further, the Council adopted a precautionary policy on the stock that world trigger a review process of the EC designation based on catch amounts. Should catches exceed 2,000 mt, the Council will investigate the factors relevant to why it occurred and consider management measures, including reconsidering EC designation, to recommend.

8.3 Amendment 29 PCGFMP

Under this action, the PCGFMP would be amended to reflect changes to the shortbelly rockfish management designation of an ecosystem component species and the changes to the trawl/non-trawl allocations for widow rockfish, petrale sole, lingcod south of 40°10 N. lat., and the Slope Rockfish complex south of 40°10' N. lat. from Amendment 21 percentages to biennial allocations. In summary, three tables would be updated to show these changes.

1) Shortbelly rockfish would be removed from Section 3.1, Table 3-1, which displays the list of species actively managed under the PCGFMP

2) Shortbelly rockfish would be added to Section 3.1, Table 3-2, which displays the groundfish species designated as ecosystem component species.

3) Section 6.3.2.3, Table 6-1, which displays the allocations percentages for limited entry trawl and non-trawl sectors specified for FMP groundfish stocks and stock complexes under Amendment 21, would have widow rockfish, petrale sole, lingcod south of 40°10 N. lat., and the Slope Rockfish complex south of 40°10' N. lat removed. Note that for lingcod, the Amendment 21 allocations were for stocks north and south of 40° 10' N. lat. so the table is updated to reflect that the northern allocations remain in place.

These changes are reflected in the following excerpted sections of the PCGFMP below. Red strikeout text is used for removals and red bold text is used for additions. The complete PCGFMP with these changes is attached to this EA as Appendix A.

3.1 Species Managed by this Fishery Management Plan

Table 3-1 is the listing of species actively managed under this FMP.

Table 3-8-1. Common and scientific names of species actively managed in this FMP.

Common Name	Scientific Name
ELASMOBRANCHS	
Big skate	*Raja binoculata*
Leopard shark	*Triakis semifasciata*

Common Name	Scientific Name
Longnose skate	*Raja rhina*
Spiny dogfish	*Squalus suckleyi*
ROUNDFISH	
Cabezon	*Scorpaenichthys marmoratus*
Kelp greenling	*Hexagrammos decagrammus*
Lingcod	*Ophiodon elongatus*
Pacific cod	*Gadus macrocephalus*
Pacific whiting (hake)	*Merluccius productus*
Sablefish	*Anoplopoma fimbria*
ROCKFISH[a/]	
Aurora rockfish	*Sebastes aurora*
Bank rockfish	*S. rufus*
Black rockfish	*S. melanops*
Black and yellow rockfish	*S. chrysomelas*
Blackgill rockfish	*S. melanostomus*
Blackspotted rockfish	*S. melanostictus*
Blue rockfish	*S. mystinus*
Bocaccio	*S. paucispinis*
Bronzespotted rockfish	*S. gilli*
Brown rockfish	*S. auriculatus*
Calico rockfish	*S. dallii*
California scorpionfish	*Scorpaena gutatta*
Canary rockfish	*Sebastes pinniger*
Chameleon rockfish	*S. phillipsi*
Chilipepper rockfish	*S. goodei*
China rockfish	*S. nebulosus*
Copper rockfish	*S. caurinus*
Cowcod	*S. levis*
Darkblotched rockfish	*S. crameri*
Deacon rockfish	*S. diaconus*
Dusky rockfish	*S. ciliatus*
Dwarf-red rockfish	*S. rufinanus*
Flag rockfish	*S. rubrivinctus*
Freckled rockfish	*S lentiginosus*
Gopher rockfish	*S. carnatus*
Grass rockfish	*S. rastrelliger*
Greenblotched rockfish	*S. rosenblatti*
Greenspotted rockfish	*S. chlorostictus*
Greenstriped rockfish	*S. elongatus*
Halfbanded rockfish	*S. semicinctus*
Harlequin rockfish	*S. variegatus*
Honeycomb rockfish	*S. umbrosus*
Kelp rockfish	*S. atrovirens*
Longspine thornyhead	*Sebastolobus altivelis*
Mexican rockfish	*Sebastes macdonaldi*
Olive rockfish	*S. serranoides*
Pink rockfish	*S. eos*
Pinkrose rockfish	*S. simulator*
Pygmy rockfish	*S. wilsoni*
Pacific ocean perch	*S. alutus*
Quillback rockfish	*S. maliger*
Redbanded rockfish	*S. babcocki*
Redstripe rockfish	*S. proriger*
Rosethorn rockfish	*S. helvomaculatus*
Rosy rockfish	*S. rosaceus*
Rougheye rockfish	*S. aleutianus*
Sharpchin rockfish	*S. zacentrus*
~~Shortbelly rockfish~~	~~*S. jordani*~~
Shortraker rockfish	*S. borealis*
Shortspine thornyhead	*Sebastolobus alascanus*

Common Name	Scientific Name
Silvergray rockfish	*Sebastes brevispinis*
Speckled rockfish	*S. ovalis*
Splitnose rockfish	*S. diploproa*
Squarespot rockfish	*S. hopkinsi*
Sunset rockfish	*S. crocotulus*
Starry rockfish	*S. constellatus*
Stripetail rockfish	*S. saxicola*
Swordspine rockfish	*S. ensifer*
Tiger rockfish	*S. nigrocinctus*
Treefish	*S. serriceps*
Vermilion rockfish	*S. miniatus*
Widow rockfish	*S. entomelas*
Yelloweye rockfish	*S. ruberrimus*
Yellowmouth rockfish	*S. reedi*
Yellowtail rockfish	*S. flavidus*
FLATFISH	
Arrowtooth flounder (turbot)	*Atheresthes stomias*
Butter sole	*Isopsetta isolepis*
Curlfin sole	*Pleuronichthys decurrens*
Dover sole	*Microstomus pacificus*
English sole	*Parophrys vetulus*
Flathead sole	*Hippoglossoides elassodon*
Pacific sanddab	*Citharichthys sordidus*
Petrale sole	*Eopsetta jordani*
Rex sole	*Glyptocephalus zachirus*
Rock sole	*Lepidopsetta bilineata*
Sand sole	*Psettichthys melanostictus*
Starry flounder	*Platichthys stellatus*

[a/] The category "rockfish" includes all genera and species of the family Scorpaenidae, even if not listed, that occur in the Washington, Oregon, and California area. The Scorpaenidae genera are *Sebastes, Scorpaena, Sebastolobus, and Scorpaenodes*.

The species in Table 3-2 are designated Ecosystem Component Species (see section 4.4.4 for more details). The inclusion of all endemic skates, except longnose and big skate, and all endemic grenadiers will allow more precise catch monitoring without the need for a sorting requirement for these species since skates and grenadiers are generally landed in unidentified species market categories (e.g., Unidentified Skates).

Table 3-8-2. Groundfish species designated as Ecosystem Component Species.

Common Name	Scientific Name
Shortbelly rockfish	***Sebastes jordani***
Aleutian skate	*Bathyraja aleutica*
Bering/sandpaper skate	*B. interrupta*
California skate	*R. inornata*
Roughtail/black skate	*Bathyraja trachura*
All other skates	Endemic species in the family *Arhynchobatidae*
Pacific grenadier	*Coryphaenoides acrolepis*
Giant grenadier	*Albatrossia pectoralis*
All other grenadiers	Endemic species in the family *Macrouridae*
Finescale codling (aka Pacific flatnose)	*Antimora microlepis*
Ratfish	*Hydrolagus colliei*
Soupfin shark	*Galeorhinus zyopterus*

6.3.2.3 Limited Entry Trawl Allocations for Amendment 21 Stocks and Stock Complexes

Formal allocations of stocks and stock complexes covered under Amendment 21 support Amendment 20 trawl rationalization measures. Annual OYs/ACLs are established for these stocks and stock complexes the same as for other groundfish stocks and stock complexes. The OYs/ACLs are then reduced by deducting the estimated total mortality of these stocks and stock complexes in research, tribal, and non-groundfish fisheries, and the estimated exempted fishing permits set-asides. The remainder of the OYs/ACLs are then allocated according to the percentages in Table 6-1. The trawl percentage is for the non-treaty trawl fishery managed under Amendment 21. The non-treaty, non-trawl percentage is for the LE fixed gear fishery, the open access fishery, and the recreational fishery. Amendment 6 limited entry and open access allocations are superseded by these allocation percentages. Allocations to the directed non-trawl sectors (i.e., LE fixed gear, directed open access, and recreational) for the species allocated in Table 6-1 are decided, if needed, in the biennial harvest specifications and management measures process.

Trawl/Non-trawl Allocations

Table 6-1. Allocation percentages for limited entry trawl and non-trawl sectors specified for FMP groundfish stocks and stock complexes under Amendment 21 (most percentages based on 2003-2005).

Stock or Complex	All Non-Treaty LE Trawl Sectors	All Non-Treaty Non-Trawl Sectors
Lingcod **N. of 40°10' N latitude**	45.0%	55.0%
Pacific Cod	95.0%	5.0%
Sablefish S. of 36° N latitude	42.0%	58.0%
Pacific Ocean Perch	95.0%	5.0%
~~Widow~~	~~91.0%~~	~~9.0%~~
Chilipepper S. of 40°10' N latitude	75.0%	25.0%
Splitnose S. of 40°10' N latitude	95.0%	5.0%
Yellowtail N. of 40°10' N latitude	88.0%	12.0%
Shortspine N. of 34°27' N latitude	95.0%	5.0%
Shortspine S. of 34°27' N latitude	50 mt	Remaining Yield
Longspine N. of 34°27' N latitude	95.0%	5.0%
Darkblotched Rockfish	95.0%	5.0%
Minor Slope RF North of 40°10' N latitude	81.0%	19.0%
~~Minor Slope RF South of 40°10' N latitude~~	~~63.0%~~	~~37.0%~~
Dover Sole	95.0%	5.0%
English Sole	95.0%	5.0%
~~Petrale Sole~~	~~95.0%~~	~~5.0%~~
Arrowtooth Flounder	95.0%	5.0%
Starry Flounder	50.0%	50.0%
Other Flatfish	90.0%	10.0%

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