Allocation of Harvest Opportunity Between Sectors of the Pacific Coast Groundfish Fishery of Blackgill Rockfish and Other Species Managed in the Slope Rockfish Complex South of 40° 10' N. Latitude

Draft Environmental Assessment

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Allocation of Harvest Opportunity Between Sectors of the Pacific Coast Groundfish Fishery of Blackgill Rockfish and Other Species Managed in the Slope Rockfish Complex South of 40°10' N Latitude

Proposed Action:

1. Remove blackgill rockfish (*Sebastes melanostomus*) from the Slope Rockfish complex south of 40°10' N lat. to allow more refined and conservative management of this stock.

2. If blackgill rockfish are removed from the Slope Rockfish complex, make sector allocations of southern blackgill rockfish and potentially reallocate the remaining Slope Rockfish complex south of 40°10' N lat. between sectors.

Type of Statement: Preliminary Draft Environmental Assessment

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Executive Summary

To be completed once the Council decides a final preferred alternative for this action.

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ACRONYMS AND GLOSSARY

Acronym	Definition
ACL	annual catch limit
CFR	Code of Federal Regulations
Council	Pacific Fishery Management Council
CPS	coastal pelagic species
CZMA	Federal Coastal Zone Management Act
DEIS	draft environmental impact statement
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EFP	exempted fishing permit
EIS	environmental impact statement
EO	Executive Order
ESU	evolutionarily significant units
fm	fathom or fathoms
FMP	fishery management plan
F_{MSY}	the fishing mortality rate that maximizes catch biomass in the long term
GAP	Groundfish Advisory Subpanel
GMT	Groundfish Management Team
HAPC	habitat areas of particular concern
IFQ	individual fishing quota

Acronym	Definition
IRFA	initial regulatory flexibility analysis
LE	limited entry
m	meter or meters
MRFSS	Marine Recreational Fisheries Statistical Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
mt	metric ton
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration – the parent agency of National Marine Fisheries Service
NS1	National Standard 1
OA	open access
OFL	overfishing level
OMZ	oxygen minimum zone
OY	optimum yield
PacFIN	Pacific Coast Fisheries Information Network. Provides commercial fishery information for Washington, Oregon, and California. Maintained by the Pacific States Marine Fisheries Commission.
POP	Pacific ocean perch – a rockfish species that was declared overfished in 1999
QP	quota pound
QS	quota share
RCA	Rockfish Conservation Area

Acronym	Definition
RecFIN	Recreational Fishery Information Network. Provides recreational fishery information for Washington, Oregon, and California. Maintained by the Pacific States Marine Fisheries Commission.
RFA	Regulatory Flexibility Analysis, or Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	stock assessment and fishery evaluation
SSC	Science and Statistical Committee
USFWS	U.S. Fish and Wildlife Service – a representative of USFWS is a nonvoting member of the Council

1 Purpose and Need for the Proposed Action

1.1 Introduction

This document provides background information about, and analyses informing the impacts associated with removing blackgill rockfish (*Sebastes melanostomus*) from the Slope Rockfish complex south of 40°10' N lat. and for exploring alternative sector allocations of blackgill and other rockfish species (*Sebastes* spp.) currently managed in the Slope Rockfish complex south of 40°10' N lat. to West Coast fishing sectors that target federally-managed groundfish species. These actions would require an amendment to the Pacific Coast Groundfish Fishery Management Plan (FMP), which contains the policies and framework for allocating the harvestable surplus of groundfish. This action must conform to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore.

1.2 Description of the Proposed Actions

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

1. Remove blackgill rockfish (*Sebastes melanostomus*) from the Slope Rockfish complex south of 40°10' N lat. to allow more refined and conservative management of this stock.

2. If blackgill rockfish are removed from the Slope Rockfish complex, make sector allocations of southern blackgill rockfish and potentially reallocate the remaining Slope Rockfish complex south of 40°10' N lat. between sectors.

1.3 Purpose and Need for the Proposed Actions

The most recent assessment of blackgill rockfish was conducted in 2011 (Field and Pearson 2011). The 2011 assessment indicated the spawning stock biomass south of 40°10' N lat. was at a depletion of 30% of unfished biomass at the start of 2011, or in the precautionary zone below the target biomass of 40% of unfished biomass. The Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) implemented conservative cumulative landing limits of blackgill rockfish for the non-trawl sectors of the West Coast groundfish fishery in 2013 to reduce the risk of exceeding annual catch limits (ACLs) projected using the precautionary 40-10 ACL harvest control rule (these 40-10 ACLs are projected in the 2011 blackgill rockfish assessment).

A reduction in the cumulative landing limits of blackgill rockfish for non-trawl sectors was designed to remove any incentive to target blackgill rockfish and, based on 2013 total catch of blackgill by these sectors, appears to have been successful. However, a similar strategy designed to restrict trawl catches of blackgill cannot work efficiently under status quo management measures. Annual trawl catches of southern slope rockfish species are controlled by the formal trawl allocation of the harvestable surplus of the Slope Rockfish complex south of 40°10' N lat. Under trawl rationalization, any stock managed in the non-whiting trawl fishery with individual fishing quotas (IFQs) are effectively managed at the management unit which is the level at which harvest limits are specified, whether the management unit is a single stock or an aggregate of stocks managed within a complex. Given that blackgill are currently managed within the southern Slope Rockfish complex and quota is allocated for the entire complex in aggregate, there are few management measures that would effectively reduce trawl targeting in the IFQ fishery without a significant disruption in the ability to prosecute other target strategies. For example, with status quo management at the complex level, non-voluntary measures such as significant area/depth or season closures may be needed to reduce trawl impacts on blackgill. And since blackgill rockfish have

one of the deepest distributions of West Coast groundfish (they occur out to the edge of the oxygen minimum zone (OMZ) (Field and Pearson 2011) and have a reported distribution out to 768 m (Love, *et al.* 2002)), area/depth closures could be extreme and could affect the efficiency of important deep-water trawl target strategies, such as the DTS (Dover sole-thornyheads-sablefish) harvesting strategy. Removing blackgill rockfish from the southern Slope Rockfish complex and managing the stock with stock-specific ACLs and quotas would allow for more refined and less disruptive management measures to control trawl impacts.

While blackgill is caught using trawl and non-trawl gear, the other species in the Slope Rockfish complex south of 40°10' N lat. are primarily caught using trawl gear. Should blackgill be removed from the complex, the complex will become dominated by trawl-dominant species. Because of this shift, the Council may want to reconsider the current sector allocation of the harvestable surplus of Slope Rockfish South in light of the Allocation Framework and the equity standards specified in the FMP and the MSA. The Council will also need to consider allocation of the harvestable surplus of blackgill rockfish south of 40°10' N lat. The groundfish FMP specifies the need for an FMP amendment to change a formal, long term allocation under rules implemented under FMP Amendment 21.

The specific purposes of the actions are:

1. To reduce the risk of exceeding the blackgill rockfish OFL contribution and harvest guideline south of 40°10' N lat. projected in the 2011 assessment and established consistent with the default 40-10 ACL harvest control rule described in section 4.6 of the Groundfish FMP (available at http://www.pcouncil.org/wp-content/uploads/GF_FMP_FINAL_May2014.pdf). The need for the action is to provide greater resource protection for blackgill rockfish south of 40°10' N lat. while minimizing disruption of current fisheries.

2. To ensure an equitable allocation of the harvestable surplus of blackgill rockfish and the Slope Rockfish South complex in the event blackgill rockfish is removed from the complex and managed with stock-specific harvest specifications.

1.4 Action Area

The action area for the proposed action comprises the fishing grounds used by federally-managed U.S. West Coast groundfish fisheries and associated coastal communities south of Cape Mendocino at 40°10' N lat. In general, the fishing grounds are within the West Coast EEZ, which stretches from 3 to 200 nautical miles off the coast of California south of Cape Mendocino (Figure 1-1), although groundfish fishing is largely confined to depths of 300 fathoms or less, or roughly within 30 miles of the coast. Groundfish fisheries are an important part of the local economy and social fabric in coastal communities in California.

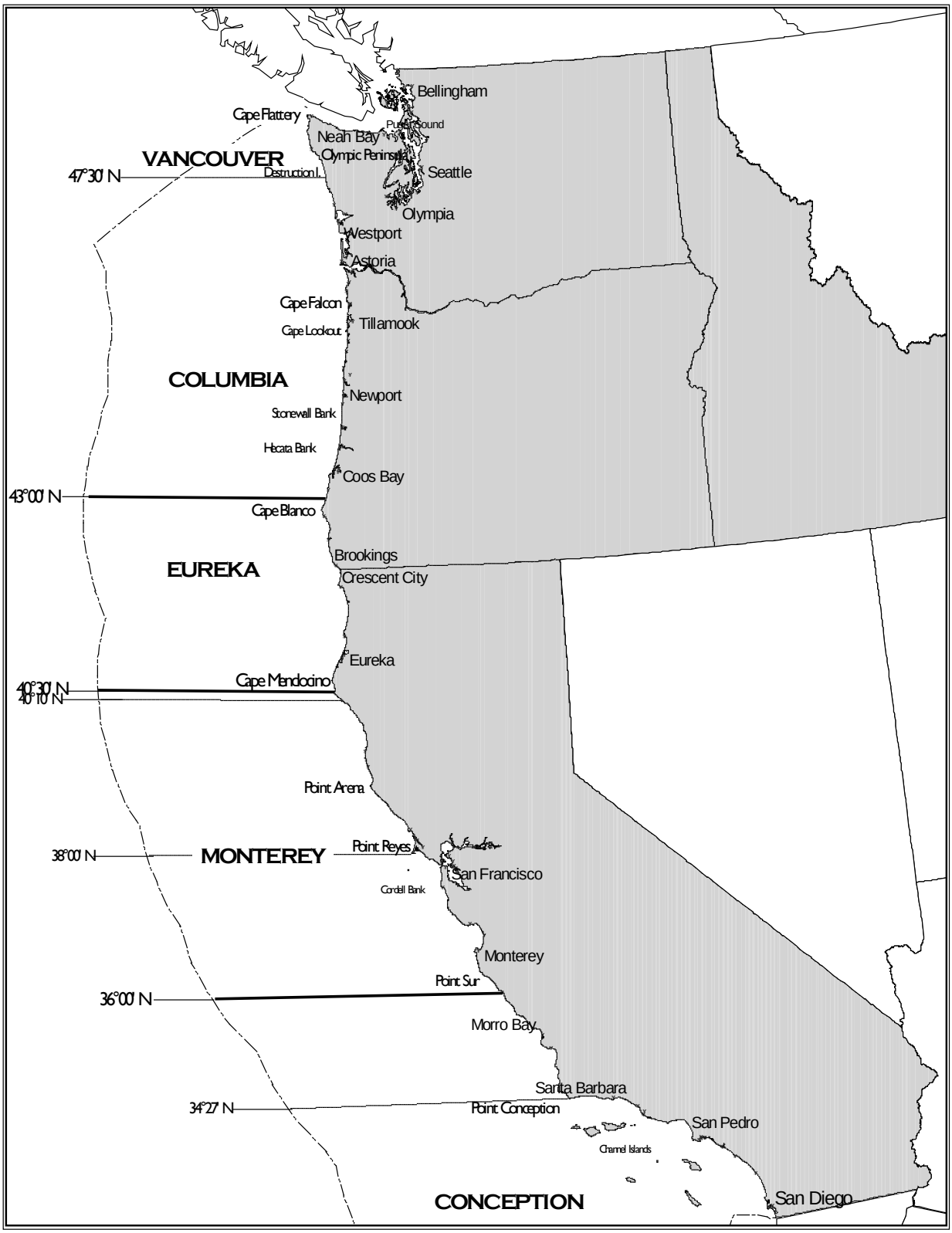

Figure 1-1. The West Coast Exclusive Economic Zone and some of the latitudinal management lines used in groundfish management.

1.5 Scoping Process

1.5.1 Background to Scoping

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

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

1.5.2 Council and Agency NEPA Scoping

The Council process, which is based on stakeholder involvement and allows for public participation and public comment on fishery management proposals during Council, subcommittee, and advisory body meetings, is the principal mechanism to scope this proposed action. The advisory bodies involved in groundfish management include the Groundfish Management Team (GMT), with representation from state, federal, and tribal fishery scientists; and the Groundfish Advisory Subpanel (GAP), whose members are drawn from the commercial, tribal, and recreational fisheries, fish processors, and environmental advocacy organizations. Meetings of the Council and its advisory bodies constitute the Council scoping process, involving the development of alternatives and consideration of the impacts of the alternatives.

The Council first determined the need to consider this action at their September meeting in Spokane, Washington and prioritized this initiative at their November 2014 meeting in Costa Mesa, California. Further scoping on this proposed action occurred at the April 2015 Council meeting in Rohnert Park, California and the June 2015 meeting in Spokane, Washington.

1.5.3 Summary of Comments Received

1.5.3.1 Comments from Non-Governmental Organizations

The GAP recommended this initiative as a priority item as advice to the Council in November 2014 (see Agenda Item J.3.b, Supplemental GAP Report, November 2014).

Mr. Gerry Richter, a representative of the Point Conception Groundfishermen's Association, recommended this initiative be prioritized and completed expeditiously as a public comment to the Council at their November 2014 meeting.

Mr. Pete Leipzig, executive director of the Fishermen's Marketing Association, recommended at the June 2015 Council meeting against the proposed action of removing blackgill rockfish from the Slope Rockfish South complex since there is no immediate conservation issue. He recommended an alternative action of reallocating the harvestable surplus of the current Slope Rockfish South complex to better reflect current sector needs and fishing practices.

1.5.3.2 Other Scoping Comments

The GMT recommended this initiative as a priority item as advice to the Council in November 2014 (see Agenda Item J.3.b, Supplemental GMT Report, November 2014).

1.5.4 Criteria Used to Evaluate Impacts of the Proposed Action

The proposed action to remove blackgill rockfish from the Slope Rockfish South complex, make formal allocations of blackgill rockfish, and to reallocate the harvestable surplus of the other slope rockfish species currently managed in the Slope Rockfish complex south of 40°10' N lat. to LE trawl and all non-trawl sectors of the West Coast groundfish fishery does not affect overall harvest levels of any species other than blackgill, nor does it directly affect management measures for any sector of the fishery other than management measures designed to stay within future blackgill rockfish ACLs. The proposed action is not expected to change the magnitude or distribution of trawl efforts. Such actions and effects are analyzed and decided separately in a biennial Council process. Therefore, the proposed action is expected to have no direct impacts (except for impacts to the blackgill rockfish resource) and potentially low indirect impacts to the West Coast biological environment (i.e., affected species) or the physical environment (i.e., West Coast marine ecosystems and essential fish habitat).

The anticipated impacts of the proposed action are largely socioeconomic. Therefore, most of the environmental consequences of the proposed action are discussed in section 4.4.

One overall objective of an intersector allocation process is to optimally use the available harvest of target groundfish species. This objective is guided by two of the three management goals in the Groundfish FMP: 1) goal 2 – Economics – maximize the value of the groundfish resource as a whole; and 2) goal 3 – Utilization – achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities (see section 6.1). The proposed action is to determine long term formal allocations of blackgill rockfish and the remaining species in the Slope Rockfish complex south of 40°10' N lat. after blackgill rockfish is removed from the complex, a decision aided by understanding the needs of the directed LE trawl and non-trawl sectors. The sectors' needs are best addressed by limiting the constraints to healthy target species for these sectors without risking the conservation objectives of rebuilding the blackgill rockfish stock using the Council's default 40-10 harvest control rule.

The utilization goal is first addressed in these analyses by comparing alternative 2015 sector allocations of blackgill rockfish and the remaining species in the Slope Rockfish complex south of 40°10' N lat. to the 2003-2013 total catches in each sector. This analysis is also done at the permit level for the LE trawl sector under different equal sharing options for the buyback portion of quota shares of these species.

The economics goal is addressed by first estimating revenue impacts by sector under each of the alternatives and then analyzing the importance of each of the species to each non-tribal directed groundfish sector. The analyses herein apply the sector catch percentages in the alternatives to the ACLs specified in 2015 to determine sector total catch amounts (landings plus discards). Landed catches by sector in 2015 are projected assuming 2013-2014 landings using sector-specific bycatch and discard rates updated from the West Coast Groundfish Observer Program (WCGOP) for the commercial sectors and state sampling programs for the recreational sector. The predicted landed catch is then modeled to determine revenue impacts by sector. Revenue impacts by sector are then compared to status quo 2013 revenue impacts. Revenue impacts are evaluated at the port group level to determine effects to West Coast fishing communities.

2 Description of the Alternatives

2.1 Description of the Alternatives

The proposed strawman alternatives provided here (Table 2-1) may not be the final ones decided for detailed analysis in this EA. A range of alternatives for detailed analysis will be decided at the April 2015 Council meeting.

Table 2-1. Summary of allocation alternatives analyzed in this Environmental Assessment.

Alternative	Blackgill Removed from Complex?	Allocation Basis	Slope Rockfish S		Blackgill Rockfish	
			LE Trawl Alloc. %	Non-Trawl Alloc. %	LE Trawl Alloc. %	Non-Trawl Alloc. %
No Action	N	A21 - 2003-2005 Total Catch	63.0%	37.0%	NA	NA
Alt. 1	Y	2003-2013 Total Catch	91.0%	9.0%	41.0%	59.0%
Alt. 2	Y	2011-2013 Total Catch	86.5%	13.5%	35.6%	64.4%

2.1.1 The No Action Alternative

Under the No Action Alternative, blackgill rockfish south of 40°10' N lat. are not removed from the southern Slope Rockfish complex and the Amendment 21 formal sector allocation of **63% of the annual harvestable surplus (as defined by the fishery HG) of southern Slope Rockfish to LE trawl sectors and 37% of the annual harvestable surplus to non-trawl sectors is maintained**. The current allocation of southern Slope Rockfish QS to permittees in the LE trawl fishery remain unchanged under the No Action Alternative. Table 2-2 lists the species currently managed in the Slope Rockfish complex south of 40°10' N lat.

Table 2-2. Species currently managed in the Slope Rockfish complex south of 40°10' N lat.

Common Name	Scientific Name
Aurora Rockfish	*Sebastes aurora*
Bank Rockfish	*S. rufus*
Blackgill Rockfish	*S. melanostomus*
Blackspotted Rockfish	*S. melanostictus*
Pacific Ocean Perch	*S. alutus*
Redbanded Rockfish	*S. babcocki*
Rougheye Rockfish	*S. aleutianus*
Sharpchin Rockfish	*S. zacentrus*
Shortraker Rockfish	*S. borealis*
Yellowmouth Rockfish	*S. reedi*

Individual quota share (QS) allocations of blackgill rockfish and the remainder of the southern Slope Rockfish complex to LE trawl permits are based on the default Amendment 20 mechanism where the

current permit's QS of the southern Slope Rockfish complex applies to the allocation of blackgill rockfish and the remaining species in the complex.

2.1.2 Alternative 1 Sector Allocations: Remove Blackgill Rockfish from the Southern Slope Rockfish Complex and Reallocate to Groundfish Sectors Using 2003-2013 Total Catch Shares

Under Alternative 1 sector allocations, blackgill rockfish south of 40°10' N lat. are removed from the southern Slope Rockfish complex and the southern Slope Rockfish complex harvestable surplus minus blackgill rockfish, as well as the harvestable surplus of blackgill rockfish, are allocated to groundfish sectors based on 2003-2013 total catch shares to sectors. The reason for basing sector allocations on catch histories during this period are 1) Rockfish Conservation Areas (RCAs) were fully implemented in 2003, thus causing effort shifts to the continental slope seaward of the RCAs; 2) better estimates of total catch by sector are available after full implementation of the WCGOP in 2003; and 3) 2013 is the final year of fully reconciled total catches available for this analysis[1]. **The allocations under this alternative would be 91% of the annual harvestable surplus (as defined by the fishery HG) of southern Slope Rockfish minus blackgill to LE trawl sectors and 9% of the annual harvestable surplus to non-trawl sectors. The annual harvestable surplus of blackgill rockfish would be allocated 41% to LE trawl sectors and 59% to non-trawl sectors.**

Individual QS allocations of blackgill rockfish and the remainder of the southern Slope Rockfish complex to LE trawl permits are based on the default Amendment 20 mechanism where the current permit's QS of the southern Slope Rockfish complex applies to the allocation of blackgill rockfish and the remaining species in the complex.

2.1.3 Alternative 2 Sector Allocations – Post-Trawl Rationalization: Remove Blackgill Rockfish from the Southern Slope Rockfish Complex and Reallocate to Groundfish Sectors Using 2011-2013 Total Catch Shares

Under Alternative 2 sector allocations, blackgill rockfish south of 40°10' N lat. are removed from the southern Slope Rockfish complex and the southern Slope Rockfish complex harvestable surplus minus blackgill rockfish, as well as the harvestable surplus of blackgill rockfish, are allocated to groundfish sectors based on 2011-2013 total catch shares to sectors. The basis for using sector total catch shares during this period is to explore the effect of trawl rationalization, which was implemented in 2011. **The allocations under this alternative would be 86.5% of the annual harvestable surplus (as defined by the fishery HG) of southern Slope Rockfish minus blackgill to LE trawl sectors and 13.5% of the annual harvestable surplus to non-trawl sectors. The annual harvestable surplus of blackgill rockfish would be allocated 35.6% to LE trawl sectors and 64.4% to non-trawl sectors.**

Individual QS allocations of blackgill rockfish and the remainder of the southern Slope Rockfish complex to LE trawl permits are based on the default Amendment 20 mechanism where the current permit's QS of the southern Slope Rockfish complex applies to the allocation of blackgill rockfish and the remaining species in the complex.

[1] Analysts from the NMFS Northwest Fisheries Science Center West Coast Groundfish Observer Program reconcile annual landed catch and dead discards by sector and publish these estimates in total mortality reports available at http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/data_library.cfm.

2.2 Alternatives Considered but Eliminated from Further Detailed Analysis

The Council originally considered alternative sector allocations of blackgill rockfish and the remaining species in the southern Slope Rockfish complex based on differential sector catch histories. Sector allocation alternatives based on the same years used to determine Amendment 21 allocations (2003-2005), years prior to implementation of the trawl rationalization program (2003-2010), and all years with reliable total catch estimates (2003-2012) were eliminated from detailed analysis since there was little contrast between these alternatives and Alternatives 1 and 2.

Alternative QS allocations to LE trawl permits based on more recent catch histories with suboptions regarding equal sharing of any portion of the QS determined for retired permits from the buyback program were eliminated from further detailed analysis. The Council rejected these alternatives since there has been no sorting requirement for blackgill rockfish until recently and the catch history at the permit level is uncertain and LE permit history is no longer relevant with respect to the history of current QS owners, because LE permits have been traded since the time QS was issued (as of April 15, 2015, 13 permits have changed ownership since the start of the trawl rationalization program). The GAP agreed to withdraw their original recommendation from the April 2015 meeting to consider alternative QS allocations given these considerations.

In September 2015 the Council evaluated two alternatives that were in the preliminary draft EA (Agenda Item H.7, Attachment 1, September 2015) and removed Alternatives 1 and 4 since these alternatives did not comport with the Allocation Framework in the FMP. That is the intersector allocations of southern Slope Rockfish did not meet the economics and utilization objectives in the FMP (see section 5.1). Alternative 1 also did not fit the purpose and need of the proposed action of addressing any future conservation concerns for blackgill rockfish since status quo management of blackgill within the southern Slope Rockfish complex was contemplated under that alternative. Since the original Alternatives 1 and 4 were removed from the analysis, action alternatives 2 and 3 from the preliminary draft EA were renumbered Alternatives 1 and 2 in this version of the draft EA.

3 Description of the Affected Environment

3.1 Introduction

This chapter describes the Pacific Coast groundfish fishery and the resources that would be affected by the alternative action. Physical resources are discussed in Section 3.~~1~~2, biological resources are described in Section 3.~~2~~3, and socioeconomic resources are described in Section 3.~~3~~4. The 2014 Status of the Pacific Groundfish Fishery, Stock Assessment and Fishery Evaluation (SAFE) document (PFMC 2014); available at http://www.pcouncil.org/wp-content/uploads/SAFE_Dec2014_v12.pdf) provide detailed information pertaining to the physical, biological, and socioeconomic environment. This document is incorporated by reference.

3.2 Physical Environment

The area affected by the proposed alternatives is the groundfish fishing grounds within the West Coast EEZ, which stretches from 3 to 200 nautical miles off the coasts of Washington, Oregon, and California (Figure 1-1). Groundfish fishing is largely confined to depths of 300 fathoms or less, or roughly within 30 miles of the coast. Federally managed groundfish fishing that could be directly affected by the proposed action occurs in Federal waters on the continental slope south of 40°10' N lat., or roughly from 150-300 fm and primarily south of 36° N lat. where most of the targeting of blackgill rockfish has historically occurred.

3.2.1 West Coast Marine Ecosystems

The proposed alternatives would be contained within the California Current ecosystem. The California Current is essentially the eastern limb of the Central Pacific Gyre. It begins where the west wind drift (or the North Pacific Current) reaches the North American Continent. This occurs near the northern end of Vancouver Island (Ware and McFarlane 1989). A divergence in the prevailing wind patterns causes the west wind drift to split into two broad coastal currents, the California Current to the south and the Alaska Current to the north. There are several dominant currents in the region, which vary in geographical location, intensity, and seasonal direction (Hickey 1979).

The California Current ecosystem, like other eastern boundary current ecosystems, are especially difficult to define, as they are characterized by tremendous fluctuations in physical conditions and productivity over multiple timescales (Mann and Lazier 1996; Parrish et al. 1981). Food webs tend to be structured around coastal pelagic species (CPS) that exhibit boom-bust cycles over decadal time scales (Bakun 1996; Schwartzlose, *et al.* 1999). Similarly, the top trophic levels of such ecosystems are often dominated by highly migratory species such as salmon, albacore tuna, sooty shearwaters, fur seals and baleen whales, whose dynamics may be partially or wholly driven by processes in entirely different ecosystems, even different hemispheres. For the purposes of this analysis, the ecosystem is considered in terms of physical and biological oceanography, climate, biogeography, EFH, and the marine protected areas. A more detailed description of the California current ecosystem, and the effects of fishing on this ecosystem, can be found in the 2014 SAFE document (PFMC 2014).

3.2.2 Essential Fish Habitat

The MSA defines EFH to mean "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. 1802 sec. 3(10)). Regulatory guidelines elaborate that the words "essential" and "necessary" mean EFH should be sufficient to "support a population adequate to maintain a sustainable fishery and the managed species' contributions to a healthy ecosystem." The regulatory guidelines also establish authority for Councils to designate Habitat Areas of Particular Concern (HAPC) based on the vulnerability and ecological value of specific habitats. Councils are required to minimize, to

the extent practicable, the adverse effects of fishing on EFH. NMFS works through a consultation process to minimize adverse effects (50 CFR 600 subpart J).

Amendment 19 revised the groundfish EFH definitions, specified HAPCs, and delineated area closures to mitigate the adverse impacts of fishing on habitat (NMFS 2005). There are 43 areas closed to bottom trawling off the West Coast and 17 areas off Oregon and California that are closed to all bottom-contact gear. Furthermore, all waters deeper than 700 fm is closed to bottom trawling. A comprehensive description of groundfish EFH can be found in the Final Groundfish Essential Fish Habitat EIS (NMFS 2005). Federal regulations (50 CFR 600.815(a)(10)) require that EFH provisions in FMPs to be periodically reviewed and revised, as warranted, at least every 5 years. Section 6.2.4 of the FMP describes the habitat conservation framework.

3.3 Biological Environment

3.3.1 Groundfish Species

There are over 100 species of groundfish managed under the groundfish FMP. These species include over 60 species of rockfish in the family Scorpaenidae, 7 roundfish species, 12 flatfish species, assorted shark species, all endemic skate species, all endemic grenadier species, and a few miscellaneous bottom-dwelling marine fish species. Groundfish species occur throughout the EEZ and occupy diverse habitats at all stages in their life history.

Under the Pacific coast groundfish FMP, stocks are defined as healthy, precautionary, or overfished. Healthy stocks are those non-flatfish stocks with current biomass levels greater than 40 percent of their unfished biomass level (depletion is the term used to define the ratio of current spawning biomass relative to unfished spawning biomass); precautionary zone non-flatfish stocks are those with a depletion between 25 and 40 percent, and overfished non-flatfish stocks are those stocks whose abundance has fallen below the depletion threshold of 25 percent. Healthy, precautionary zone, and overfished flatfish stocks are defined as ≥25%, ≥12.5% but <25%, and <12.5%, respectively. To prevent a precautionary zone stock from becoming overfished, an ACL adjustment is made reducing the allowable catch to a level below the ABC. The more the stock biomass is below the precautionary threshold of 40% depletion for non-flatfish stocks or 25% depletion for flatfish stocks, the greater the precautionary adjustment. The 2014 SAFE document provides detailed information on species distributions, life histories and management areas for the groundfish species and species complexes (PFMC 2014).

3.3.2 Non-Groundfish Species

Non-groundfish species that are harvested commercially, such as California halibut, Pacific halibut, coastal pelagic species, highly migratory species, Dungeness crab, shrimp, prawns, and sea cucumber, occur in the area. Other important non-groundfish species that occur in the action area include Pacific salmon, marine mammals, turtles, and seabirds.

3.3.3 Protected Species

3.3.3.1 Salmon

Salmon caught in West Coast fisheries have life cycle ranges that include coastal streams and river systems from Central California to Alaska and marine waters along the U.S. and Canada seaward into the north central Pacific Ocean, including Canadian territorial waters and the high seas. Chinook, or king salmon (*Oncorhynchus tshawytscha*), and coho, or silver salmon (*O. kisutch*), are the main species caught in

Council-managed ocean salmon fisheries. In odd-numbered years, catches of pink salmon (*O. gorbuscha*) can also be significant, primarily off Washington and Oregon.

Section 7 of the ESA requires Federal agencies, in consultation with and with the assistance of the U.S. Secretary of Commerce, to ensure that their actions are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat that has been designated for those species. NMFS issued biological opinions (BOs) under the ESA pertaining to the effects of the Pacific Coast groundfish FMP fisheries on Chinook salmon on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999. The August 1992 BO included an analysis of the effects of the Pacific whiting fishery on listed Chinook salmon. The BOs indicate that Chinook is the salmon species most likely to be affected by the groundfish fishery, while other salmon species are rarely encountered in the Pacific whiting and other groundfish fisheries. The following "evolutionarily significant units" (ESUs) of ESA-listed Chinook are most likely to be affected by the groundfish fisheries: Snake River fall Chinook (threatened), Upper Willamette River Chinook (threatened), Lower Columbia River Chinook (threatened), Puget Sound Chinook (threatened), Sacramento River winter-run Chinook (endangered), California coastal Chinook (threatened), and Central Valley spring-run Chinook (threatened). Further information on the distribution and life history of these salmon species can be found in the most recent SAFE document (PFMC 2014).

3.3.3.2 Marine Mammals

Approximately thirty species of marine mammals, including seals and sea lions, sea otters, and whales, dolphins, and porpoise, occur within the EEZ. Many marine mammal species seasonally migrate through Pacific Coast waters, while others are year-round residents. Federal legislation in the form of the Marine Mammal Protection Act (MMPA) and the ESA guide marine mammal species protection and conservation policy. Under the MMPA, NMFS is responsible for the management of cetaceans and pinnipeds, while the U.S. Fish and Wildlife Service (USFWS) manages sea otters. Stock assessments review new information every year for strategic stocks (those whose human-caused mortality and injury exceeds the potential biological removal [PBR]) and every three years for non-strategic stocks. Marine mammals whose abundance falls below the optimum sustainable population are listed as "depleted" according to the MMPA.

Fisheries that interact with species listed as depleted, threatened, or endangered may be subject to management restrictions under the MMPA and ESA. Species listed as endangered under the ESA include sperm whale (*Physeter macrocephalus*), humpback whale (*Megaptera novaeangliae*), blue whale (*Balaenoptera musculus*) and fin whale (*Balaenoptera physalus*). Species listed as threatened under the ESA include Steller sea lion (*Eumetopias juba*tus) eastern stock Guadalupe fur seal (*Arctocephalus townsendi*), southern sea otter (*Enhydra lutris*) California Stock. Species listed as depleted under the MMPA include northern fur seal (*Callorhinus ursinus*), eastern Pacific stock killer whale (*Orcinus orca*) eastern north Pacific, southern resident Stock.

NMFS publishes an annual list of fisheries based on the level of serious injury and mortality of marine mammals occurring incidentally in that fishery. The categorization of a fishery in the list of fisheries determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. The Pacific Coast groundfish fisheries (with the exception of sablefish pot gear) are in Category III, indicating a remote likelihood of, or no known, serious injuries or mortalities, to marine mammals.

3.3.3.3 Seabirds

The California Current System supports more than two million breeding seabirds and at least twice that number of migrant visitors. Tyler et al. (1993) reviewed seabird distribution and abundance in relation to

oceanographic processes in the California Current System and found that over 100 species have been recorded within the EEZ. These species include albatross, shearwaters, petrels, storm-petrels, cormorants, pelicans, gulls, terns and alcids (murres, murrelets, guillemots, auklets and puffins). In addition, millions of other birds are seasonally abundant in the EEZ, including waterfowl, waterbirds (loons and grebes), and shorebirds (phalaropes). There is considerable overlap of fishing areas and areas of high bird density in this highly productive upwelling system. The species composition and abundance of birds vary spatially and temporally. The highest seabird biomass is found over the continental shelf, and bird density is highest during the spring and fall when local breeding species and migrants predominate. Seabird species listed as endangered under the ESA include short-tail albatross (*Phoebastria albatrus*), California brown pelican (*Pelecanus occidentalis*), and California least tern (*Sterna antillarum browni*). The only species listed as threatened under the ESA is the marbled murrelet (*Brachyramphs marmoratus*).

3.3.3.4 Sea Turtles

Four sea turtle species have been sighted off the U.S. West Coast: loggerhead (*Caretta care*tta), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and olive ridley (*Lepidochelys olivacea*). Under the ESA, green, leatherback, and olive ridley sea turtles are listed as endangered; loggerheads are listed as threatened. Although sea turtles have been sighted off the West Coast, no takes of these species have been documented in the groundfish fishery.

3.3.3.5 Green Sturgeon

The Southern Distinct Population Segment (DPS) of green sturgeon (*Acipenser medirostris*) (71 FR 17757, April 7, 2006) were recently listed as threatened under the ESA. Green sturgeon are found from Ensenada, Mexico, to Southeast Alaska. Green sturgeon are not abundant in any estuaries along the Pacific coast, although they are caught incidentally in the estuaries by the white sturgeon fishery.

3.4 Socioeconomic Environment

3.4.1 Groundfish Fishery

NMFS approved FMP Amendment 6 for a groundfish license limitation (limited entry) program on September 4, 1992. The groundfish fishery was operating under a LE system beginning in 1994. Under the groundfish LE program, vessels were issued limited entry permits (LEPs) based on catch history. Each LEP is endorsed for used with trawl and/or fixed gears. Most of the Pacific coast commercial groundfish harvest is taken by the LE fleet. The smaller portion of the commercial groundfish fishery that is not permitted, and which targets groundfish or catches and retains groundfish caught incidentally to a non-groundfish fishery, is the open access fishery. The gears used by participants in open access fisheries include longline, vertical hook-and-line, troll, pot, setnet, trammel net, shrimp and prawn trawl, California halibut trawl, and sea cucumber trawl gears. Open access trawl gear may not be used to target groundfish, but may land incidental groundfish caught while targeting other state managed species. Open access trap/pot and longline vessels may target groundfish under certain restrictions.

The Makah, Quileute, Hoh, and Quinault Tribes off the Washington coast participate in tribal commercial, ceremonial and subsistence fisheries for groundfish according to their treaty rights; however, they do not fish in the area affected by the proposed action.

In addition to commercial and tribal participants, there are state-managed recreational fisheries that harvest groundfish. Marine recreational fisheries consist of charter vessels, private vessels, and shore anglers. Charter vessels are larger vessels for hire, which typically can fish farther offshore than most vessels in the

private recreational fleet. Shore-based anglers often fish in intertidal areas, within the surf, or off jetties. Recreational fisheries are managed by a series of seasons, area closures, and bag limits.

3.4.1.1 Limited Entry Trawl

Non-whiting trawl vessels use midwater trawl gear and small and large footrope bottom trawl gear (defined at 50 CFR660.302 and 660.322(b)). The LE non-whiting trawl vessels catch a wide range of species. By weight, the following species account for the bulk of non-whiting landings: Dover sole, arrowtooth flounder, petrale sole, sablefish, longspine thornyhead and shortspine thornyhead, and yellowtail rockfish. Larger non-whiting LE trawl vessels focus more heavily on the DTS complex in deep water, while smaller trawl vessels focus more heavily on the shelf. Large trawl vessels also tend to participate in the trawl fishery for more months of the year than small trawl vessels.

Management measures intended to reduce the directed and incidental catch of overfished rockfish and other depleted species have significantly reduced rockfish catches in recent years. The primary management measures used to control effort in the non-whiting trawl fisheries are an individual fishing quota (IFQ) system combined with closed area management, gear restrictions, and cumulative landing limits for non-quota species. Non-whiting trawl vessels are subject to area closures including trawl Rockfish Conservation Areas (RCA) and EFH closures. RCA closures are designed to reduce catch of overfished species by prohibiting fishing in areas where overfished rockfish species are relatively abundant. RCAs are adjusted inseason.

3.4.1.2 Limited Entry Fixed Gear

LE fixed gear vessels use longline and fish pots (traps) to target groundfish. LE fixed gear vessels principally target sablefish, a species that tends to reside in relatively deep water, although blackgill rockfish has been an important target species south of 34°27' N lat. Like trawl, closed areas are used to control catch of overfished species. The LE fixed gear sector cannot fish within the boundaries of the non-trawl RCAs (the boundaries are different than the trawl RCAs). Some overfished rockfish species, such as yelloweye rockfish, are more vulnerable to being caught with fixed gear; therefore, the use of fixed gear is more restricted on the continental shelf than trawl.

LE fixed gear vessels may also participate in open access fisheries or in the LE trawl fishery. Like the LE trawl fleet, LE fixed gear vessels deliver their catch to ports along the Washington, Oregon, and California coast.

3.4.1.3 Directed Open Access

Directed open access vessels use various non-trawl gears to target particular groundfish species or species groups. Longline and hook-and-line gear are the most common open access gear types used by vessels directly targeting groundfish and are generally used to target sablefish, rockfish, and lingcod. Pot gear is used for targeting sablefish, thornyheads, and rockfish. Though largely prohibited from use under current regulations, setnet gear was used in the past to target rockfish, including chilipepper rockfish, widow rockfish, bocaccio, yellowtail rockfish, and olive rockfish, and, to a lesser extent, vermilion rockfish off southern and central California. Groundfish retention and landings by open access vessels are regulated under the Groundfish FMP. Open access vessels must comply with non-trawl RCA restrictions and with cumulative trip limits established for the open access sector, as well as other operational restrictions imposed in the regulations.

Though fishery managers divide the open access sector into directed and incidental categories, such segregation is difficult, as the choice depends on the intention of the fishermen. Over the course of a year

or during a single trip, fishermen may engage in different strategies, and they may switch between directed and incidental fishing categories. Such changes in strategy are likely the result of a variety of factors, including the potential economic return from landing a particular mix of species.

Rockfish, thornyheads, and sablefish account for most of the open access landings and revenue, and hook-and-line is the major gear type used for open access landings. Fixed gears are used to catch most open access groundfish, although non-shrimp trawl gear and net gear also make substantial landings. Open access landings in the state of California and in ports in southern Oregon have a large live fish component (as does the limited entry fixed gear sector).

3.4.2 Groundfish Management

Since 2000, groundfish management has been heavily centered on the need to rebuild overfished stocks. West coast groundfish stocks are highly inter-mixed, meaning that overfished species co-occur and are caught in common with more abundant groundfish stocks (stocks with healthy or precautionary status). This intermixed nature of groundfish stocks means that eliminating the directed targeting of overfished species usually does not achieve the catch reductions needed to meet rebuilding goals. To adequately constrain total catch of overfished species, management measures have constrained target-fishing opportunity on the more abundant stocks that co-occur with overfished species to reduce the catch of overfished species. The need to constrain harvest of healthy stocks has economic implications for the harvesters, processors, and communities due to the loss of landings and revenue that could have been derived from both overfished species and many target species that co-occur with those overfished species.

3.4.2.1 Groundfish Allocations

The Pacific coast groundfish fishery is managed on a biennial calendar with harvest specifications and management measures being announced every other year. During each cycle, the harvest specifications for each species or species complex is set for two sequential years. Fishery specifications include ABCs, designation of OYs (which may be represented by harvest guidelines [HGs] or quotas for species that need individual management,) and allocation of commercial ACLs between the open access and LE segments of the fishery. The specifications include fish caught in state ocean waters (0 to 3 nm offshore) as well as fish caught in the EEZ (3 to 200 nm offshore).

An allocation is the apportionment of a harvest specification for a specific purpose, to a particular person or group of persons. Allocation of groundfish resources is generally a direct allocation stated as a numerical quota or HG for a specific gear or fishery sector, but indirect allocation also occurs as a result from management measures. Direct allocation occurs when numerical quotas, HGs, or other management measures are established with the specific intent of affecting a particular group's access to the fishery resource. Most fishery management measures allocate fishery resources to some degree, because they invariably affect access to the resource by the different participants.

The FMP allows groundfish resources to be allocated to accomplish a single biological, social, or economic objective, or a combination of such objectives. The entire resource, or a portion thereof, may be allocated to a particular group, although the MSA requires that allocation among user groups be fair and equitable, reasonably calculated to promote conservation, and determined in such a way that no group, person, or entity receives an undue excessive share of the resource. Allocative impacts of all proposed management measures should be analyzed and discussed during the decision-making process. In addition to the requirements described in Section 6.2.3 of the FMP, the FMP requires the Council to consider the following actions when intending to recommend direct allocation of the resource:

1. Present participation in and dependence on the fishery, including alternative fisheries

2. Historical fishing practices in and historical dependence on the fishery
3. The economics of the fishery
4. Any consensus harvest sharing agreement or negotiated settlement between the affected participants in the fishery
5. Potential biological yield of any species or species complex affected by the allocation
6. Consistency with the MSA national standards
7. Consistency with the goals and objectives of the FMP

The modification of a formal allocation cannot be designated as routine and, under the policy adopted under FMP Amendment 21, requires an FMP amendment.

FMP Amendment 6 established the commercial non-treaty LE program and established procedures for allocating species and species complexes between the LE and open access fisheries. Chapter 11.2.2 for the FMP addresses the allocation of groundfish between the limited and open access fisheries. Allocations for the open access fishery are based on historical catch levels for the period from July 11, 1984, to August 1, 1988, by exempted, longline, and fishpot gears used by vessels that did not receive an endorsement for the gear. Based on the record of landings over this period, an open access percentage of catch was determined. LE and open access allocations are derived by applying the percentage to the commercial harvest guideline or quota. The commercial harvest guideline or quota is the ACL after subtracting any recreational fishery estimates or tribal allocations harvest guidelines or set-asides, projected bycatch in non-groundfish fisheries, and estimated research catch.

4 Environmental Consequences

4.1 Introduction

The proposed action to remove blackgill rockfish from the southern Slope Rockfish complex and to make a formal intersector allocation of blackgill and to modify the formal allocation of the harvestable surplus of southern Slope Rockfish to LE trawl and non-trawl (both LE and OA) sectors of the West Coast groundfish fishery doesn't affect projected overall harvest levels of any species, nor does it affect management measures for any sector of the fishery. The proposed actions are not expected to change the magnitude or distribution of trawl effort compared to the No Action Alternative. Therefore, the proposed action is expected to have no differential direct impacts and potentially low indirect impacts to the West Coast biological environment (i.e., affected species) or the physical environment (i.e., West Coast marine ecosystems and EFH).

Related actions to this proposed action include the biennial harvest specifications, with decision-making for the 2017 and beyond fishing seasons scheduled to begin later this year (the first harvest specifications decisions for fisheries in 2017 and beyond were scheduled for Council consideration in September 2015). While the proposed actions for intersector allocations of blackgill rockfish and the Slope Rockfish complex south of 40°10' N lat. may not have direct impacts on the physical or biological environment, corresponding actions in the biennial specifications process may change the way the trawl fishery is managed and may result in changes in the timing, location, and intensity of harvest patterns, as will be described in any analyses informing those decisions.

The anticipated impacts of the proposed allocation actions are largely socioeconomic, although there are biological impacts anticipated for blackgill rockfish. Therefore, most of the environmental consequences of the proposed actions are discussed in Section 4.4.

4.2 Impacts of the Alternatives on the Physical Environment

NMFS completed an EIS to comprehensively evaluate groundfish habitat and the effects of groundfish fishing on that habitat in response to litigation (American Oceans Campaign v. Daley et al., Civil Action No 99-982(GK)). The action analyzed in the EFH EIS, authorizing harvest of groundfish within EFH, is incorporated by reference. A Record of Decision for Pacific Coast Groundfish EFH was issued on March 8, 2006, and it concluded that partial approval of Amendment 19 to the FMP would minimize to the extent practicable adverse impacts to EFH from fishing. Amendment 19, approved on March 8, 2006, provides for a comprehensive strategy to conserve EFH, including its identification, designation of HAPC, and the implementation of measures to minimize, to the extent practicable, adverse impacts to EFH from fishing. The final rule implementing Amendment 19 provided measures necessary to conserve EFH.

There is currently insufficient information to predict the effects of fishing on the marine ecosystem in any precise way. NEPA regulations address this issue. When an agency is evaluating reasonably foreseeable significant adverse effects, there is incomplete or unavailable information, and the costs of obtaining it are exorbitant or the means unknown, the agency must (1) so state, (2) describe the importance of the unavailable information to the assessment, (3) summarize any existing scientific information, and (4) evaluate impacts based on generally accepted scientific principles (40 CFR Part 1502.22), which may accord with the best professional judgment of agency staff.

NMFS acknowledges that the information necessary to fully evaluate impacts on the marine ecosystems cannot be reasonably obtained at this time, and impacts are generally unknown. While it is not possible to fully evaluate the impacts to the physical environment, the level of potential significant impact to EFH and

the marine ecosystem from the proposed actions is anticipated to be low or have no expected differential impact from the No Action Alternative.

The action alternatives are not expected to significantly change the magnitude or distribution of bottom trawl or non-trawl effort compared to the No Action Alternative. No change in fishing activity would occur in areas that are currently closed to fishing with specific gears, because no changes are anticipated to RCAs or other EFH conservation measures. Because all of the alternatives are similar to indirect allocations that have occurred through the biennial specifications and management measures, and because the alternatives do not affect overall harvest levels or fishing practices, the effects of these alternative allocations are not significant on EFH or the marine ecosystem.

4.3 Impacts of the Alternatives on the Biological Environment

4.3.1 Protected Species

When compared to the No Action Alternative, no differential impacts from any of the alternatives for are anticipated to salmonids (ESA-listed and non-listed). This action would not affect overall harvest levels of groundfish other than the affected slope rockfish species, including blackgill rockfish, nor would fishing practices change as a result of this action. Under any of the alternatives, West Coast groundfish fishing would remain under guidance contained in the BO for listed salmonids taken incidentally in this fishery.

4.3.2 Overfished Groundfish Species

Blackgill rockfish are primarily caught on the continental slope off southern California with 65% of the historical catch occurring south of Pt. Conception at 34°27' N lat. (Field and Pearson 2011). Given that the two overfished slope rockfish species (i.e., darkblotched rockfish and POP) on the West Coast are species occurring primarily in waters north of Pt. Conception (darkblotched are rare south of 38° N lat. and POP are rare south of 40°10' N lat.), to the extent that implementation of any of the action alternatives effectively reduces trawl targeting of blackgill rockfish and that effort shifts north to areas where darkblotched rockfish or POP are incidentally caught or, if effort shifts onto the shelf where overfished shelf rockfish are found, there could be an increased bycatch of those species. However, IFQ management has effectively kept trawl impacts on overfished species within prescribed allocations. The 100% monitoring requirement for LE trawl efforts and implementation of IFQ for all overfished species has created a precise and effective management strategy to reduce impacts on overfished species and other species of concern.

4.3.3 Blackgill Rockfish and Other Species Currently Managed in the Slope Rockfish Complex South of 40°10' N lat.

Total catches of the species currently managed in the Slope Rockfish complex south of 40°10' N lat., including blackgill rockfish, by sector and year are provided for the 2003-2013 period in Table 4-1. These years are used in this analysis since these are the years of available total catches reconciled by the WCGOP (full implementation of WCGOP occurred in 2003) and 2003 was the first year of full implementation of the trawl and non-trawl RCAs. Full implementation of the WCGOP allows more precise estimates of discard mortalities of affected slope rockfish stocks, which better informs considerations of new intersector allocations since future sector limits will be based on total catch. Full implementation of RCAs is also an important consideration in this analysis since the affected LE trawl and non-trawl fleets began shifting effort to the slope in 2003 as RCA implementation closed shelf areas where these fleets directed much of their effort previously.

Table 4-1. Total catches of blackgill rockfish and other species currently managed in the Slope Rockfish complex south of 40°10' N lat., 2003-2013.

Sectors	Sub-sectors	Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Grand Total
LE Trawl	LE Trawl Species Total		45.6	51.5	41.0	45.7	29.4	10.8	9.0	4.0	6.1	24.6	9.2	277.0
	LE Trawl - Fixed Gear	Aurora Rockfish									0.1	0.2	0.3	0.5
	LE Trawl - Trawl Gear		45.6	51.5	41.0	45.7	29.4	10.8	9.0	4.0	6.0	24.4	8.9	276.4
	LE Trawl Species Total		85.5	109.8	24.6	22.1	27.9	95.3	57.5	13.4	27.8	16.6	45.7	526.1
	LE Trawl - Fixed Gear	Bank Rockfish											0.0	0.0
	LE Trawl - Trawl Gear		85.5	109.8	24.2	22.1	27.9	95.3	57.5	13.4	27.8	16.6	45.7	525.7
	LE Trawl Species Total		54.8	80.4	52.1	36.2	25.7	37.7	54.0	61.3	16.0	79.2	53.5	550.9
	LE Trawl - Fixed Gear	Blackgill Rockfish									1.7	6.1	15.1	22.9
	LE Trawl - Trawl Gear		54.8	80.4	52.1	36.2	25.7	37.7	54.0	61.3	14.3	73.1	38.4	528.0
	LE Trawl Species Total											0.1		0.1
	LE Trawl - Fixed Gear	Blackspotted Rockfish												0.0
	LE Trawl - Trawl Gear											0.1		0.1
	LE Trawl Species Total		0.0	1.0		0.0	0.2	0.2			0.0	0.1	0.0	1.6
	LE Trawl - Fixed Gear	Pacific Ocean Perch												0.0
	LE Trawl - Trawl Gear		0.0	1.0		0.0	0.2	0.2			0.0	0.1	0.0	1.6
	LE Trawl Species Total		2.8	0.7	0.6	0.8	1.4	3.0	2.3	1.3	0.2	0.7	0.5	14.3
	LE Trawl - Fixed Gear	Redbanded Rockfish											0.0	0.0
	LE Trawl - Trawl Gear		2.8	0.7	0.6	0.8	1.4	3.0	2.3	1.3	0.2	0.7	0.5	14.3
	LE Trawl Species Total		0.0	0.1				0.0	0.0		0.0	0.2	0.1	0.5
	LE Trawl - Fixed Gear	Rougheye Rockfish												0.0
	LE Trawl - Trawl Gear		0.0	0.1				0.0	0.0		0.0	0.2	0.1	0.5
	LE Trawl Species Total			0.8	5.6	0.2	0.2		4.7	0.6	0.0	0.3	0.9	13.1
	LE Trawl - Fixed Gear	Sharpchin Rockfish												0.0
	LE Trawl - Trawl Gear			0.8	5.6	0.2	0.2		4.7	0.6	0.0	0.3	0.9	13.1
	LE Trawl Species Total			0.0			0.7	0.7	3.3	0.6		0.0		5.5
	LE Trawl - Fixed Gear	Shortraker Rockfish												0.0
	LE Trawl - Trawl Gear			0.0			0.7	0.7	3.3	0.6		0.0		5.5
	LE Trawl Species Total													0.0

Sectors	Sub-sectors	Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Grand Total
	LE Trawl - Fixed Gear	Shortraker/Rougheye Rockfish												0.0
	LE Trawl - Trawl Gear													0.0
	LE Trawl Species Total		2.2	2.5	0.6	58.7	7.0	0.3	6.8	0.8	1.9	1.0	7.5	89.2
	LE Trawl - Fixed Gear	Slope Rockfish Unid									0.3	0.0		0.3
	LE Trawl - Trawl Gear		2.2	2.5	0.6	58.7	7.0	0.3	6.8	0.8	1.7	1.0	7.5	88.9
	LE Trawl Species Total											0.0		0.0
	LE Trawl - Fixed Gear	Yellowmouth Rockfish												0.0
	LE Trawl - Trawl Gear											0.0		0.0
	LE Trawl Complex Total	Slope Rockfish South Complex	191.0	246.8	124.2	163.5	92.4	148.1	137.6	82.0	52.1	122.7	117.3	1477.7
	LE Trawl - Fixed Gear		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	6.3	15.3	23.7
	LE Trawl - Trawl Gear		191.0	246.8	124.2	163.5	92.4	148.1	137.6	82.0	50.0	116.4	102.0	1454.0
Non-Trawl	Non-Trawl Species Total		3.0	1.5	0.5	0.3	0.3	1.0	7.1	0.8	0.6	0.3	0.1	15.5
	Nearshore Fixed Gear	Aurora Rockfish	0.0	0.0		0.0		0.0	0.0	0.0			0.0	0.0
	Non-Nearshore Fixed Gear		3.0	1.5	0.5	0.3	0.3	1.0	7.1	0.8	0.6	0.3	0.1	15.5
	Non-Trawl Species Total		1.1	1.1	2.0	3.9	1.2	0.3	0.3	0.1	1.1	0.4	0.2	11.7
	Nearshore Fixed Gear	Bank Rockfish	0.0	0.1	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.8
	Non-Nearshore Fixed Gear		1.1	1.0	1.8	3.7	1.2	0.3	0.2	0.1	1.1	0.4	0.0	10.9
	Non-Trawl Species Total		127.6	70.5	35.9	57.7	22.4	33.6	81.5	85.2	135.1	116.3	18.1	783.8
	Nearshore Fixed Gear	Blackgill Rockfish	4.1	3.2	2.0	3.8	0.3	0.4	2.4	0.5	0.4	2.3	1.0	20.6
	Non-Nearshore Fixed Gear		123.4	67.3	33.9	53.8	22.0	33.3	79.0	84.7	134.7	114.0	17.0	763.2
	Non-Trawl Species Total											8.8		8.8
	Nearshore Fixed Gear	Blackspotted Rockfish										0.0		0.0
	Non-Nearshore Fixed Gear											8.8		8.8
	Non-Trawl Species Total			0.1	0.0	0.1		0.0	0.1	0.0			0.0	0.3
	Nearshore Fixed Gear	Pacific Ocean Perch		0.1		0.0			0.0					0.1
	Non-Nearshore Fixed Gear				0.0	0.0		0.0	0.1	0.0			0.0	0.2
	Non-Trawl Species Total		0.5	2.4	0.6	2.1	0.4	1.9	1.2	0.3	0.3	0.9	0.2	10.7
	Nearshore Fixed Gear	Redbanded Rockfish		0.2		0.0	0.0		0.0		0.0	0.0		0.2
	Non-Nearshore Fixed Gear		0.5	2.2	0.6	2.1	0.4	1.9	1.2	0.3	0.3	0.9	0.2	10.6

Sectors	Sub-sectors	Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Grand Total
	Non-Trawl Species Total	Rougheye Rockfish	0.1		1.7	0.2	3.0	0.2	3.1	0.0	0.3	0.2		9.0
	Nearshore Fixed Gear		0.0			0.0			0.0					0.0
	Non-Nearshore Fixed Gear		0.1		1.7	0.2	3.0	0.2	3.1	0.0	0.3	0.2		9.0
	Non-Trawl Species Total	Sharpchin Rockfish							0.1			0.0		0.1
	Non-Nearshore Fixed Gear								0.1			0.0		0.1
	Non-Trawl Species Total	Shortraker Rockfish							0.2					0.2
	Non-Nearshore Fixed Gear								0.2					0.2
	Non-Trawl Species Total	Shortraker/Rougheye Rockfish	0.0											0.0
	Non-Nearshore Fixed Gear		0.0											0.0
	Non-Trawl Species Total	Slope Rockfish Unid	7.6	7.2	5.1	2.3	1.4	0.7	0.7	2.1	1.7	3.6	3.6	36.0
	Nearshore Fixed Gear		0.1	0.2	0.3	0.4	0.1	0.1	0.0	0.0	0.0	0.1	0.0	1.3
	Non-Nearshore Fixed Gear		7.5	6.9	4.8	2.0	1.3	0.5	0.7	2.1	1.7	3.5	3.6	34.7
	Non-Trawl Species Total	Yellowmouth Rockfish				0.0			0.0					0.1
	Nearshore Fixed Gear					0.0			0.0					0.0
	Non-Nearshore Fixed Gear					0.0			0.0					0.0
	Non-Trawl Species Total	Slope Rockfish South Complex	139.8	82.7	45.9	66.6	28.7	37.7	94.3	88.5	139.1	130.6	22.2	876.1
	Nearshore Fixed Gear		4.2	3.7	2.6	4.4	0.5	0.5	2.5	0.6	0.4	2.4	1.2	22.9
	Non-Nearshore Fixed Gear		135.6	79.0	43.3	62.2	28.2	37.2	91.8	87.9	138.7	128.2	21.0	853.2
Set-Aside	Set-Aside Species Total	Aurora Rockfish		0.1	0.1	0.0		0.0	0.1	0.1				0.4
	California Halibut													0.0
	Incidental			0.1	0.1	0.0		0.0	0.1	0.1				0.4
	Pink Shrimp			0.0										0.0
	Set-Aside Species Total	Bank Rockfish	14.8	19.4	10.4	11.3	7.5	1.1	0.1			1.0	8.1	73.9
	California Halibut													0.0
	Incidental		14.8	19.4	10.4	11.3	7.5	1.1	0.1			1.0	8.1	73.9
	Pink Shrimp													0.0
	Set-Aside Species Total	Blackgill Rockfish	9.9	1.9	0.3	1.2	0.2	3.1	0.5	5.6		0.0	0.1	22.8
	California Halibut													0.0
	Incidental		9.9	1.9	0.3	1.2	0.2	3.1	0.5	5.6		0.0	0.1	22.8
	Pink Shrimp													0.0

Sectors	Sub-sectors	Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Grand Total
	Set-Aside Species Total	Blackspotted Rockfish												0.0
	California Halibut													0.0
	Set-Aside Species Total	Pacific Ocean Perch		0.0	0.0					0.0				0.1
	California Halibut													0.0
	Incidental				0.0									0.0
	Pink Shrimp			0.0						0.0				0.1
	Set-Aside Species Total	Redbanded Rockfish	0.0	0.1	0.0			0.0			0.0		0.0	0.2
	California Halibut													0.0
	Incidental		0.0	0.1	0.0			0.0			0.0		0.0	0.2
	Pink Shrimp			0.0										0.0
	Set-Aside Species Total	Rougheye Rockfish												0.0
	California Halibut													0.0
	Set-Aside Species Total	Sharpchin Rockfish		0.0										0.0
	California Halibut													0.0
	Pink Shrimp			0.0										0.0
	Set-Aside Species Total	Shortraker Rockfish												0.0
	California Halibut													0.0
	Set-Aside Species Total	Shortraker/Rougheye Rockfish												0.0
	California Halibut													0.0
	Set-Aside Species Total	Slope Rockfish Unid	1.3	0.3	0.3	4.8	0.0	0.0	0.1	0.1	0.1	0.0	0.0	7.0
	California Halibut								0.0					0.0
	Incidental		1.2	0.3	0.3	4.8	0.0	0.0	0.0	0.1	0.1	0.0	0.0	6.8
	Pink Shrimp		0.1	0.0	0.0				0.0	0.0			0.0	0.2
	Set-Aside Species Total	Yellowmouth Rockfish												0.0
	California Halibut													0.0
Grand Total			356.9	351.3	181.6	247.5	128.8	190.0	232.8	176.2	191.3	254.5	147.8	2,458.6

Blackgill rockfish south of 40°10' N lat. have never been subject to potential overfishing even when comparing the total catch against the ABC/OFL contribution of the stock to the southern Slope Rockfish complex (Table 4-2). In fact, the total catch since 2003 never exceeded the annual OY/ACL contribution of the stock to the complex. However, the annual total catch prior to 2013 did exceed the more conservative harvest specifications implemented in 2013, which were based on the results of the more pessimistic 2011 assessment. The large reduction in total catch from 2012 to 2013 (63.4%) is the result of implementing very low cumulative landing limits for the non-trawl sectors to discourage targeting. There are limited management measures to discourage trawl targeting under the status quo management of blackgill in the southern Slope Rockfish complex, where LE trawl quota is allocated based on the annual allocation of the harvestable surplus of southern Slope Rockfish species in aggregate at the complex level. Clearly, if that quota is largely taken in efforts to target blackgill, the most marketable rockfish of those readily caught in the southern Slope Rockfish complex, then there are few selective management strategies that will effectively reduce trawl impacts on the stock.

The default harvest control rule for blackgill rockfish south of 40°10' N lat. is implementing the Council 40-10 ACL control rule to inform the stock's ACL contribution. If annual total catch is maintained at the ACLs projected using the 40-10 rule, the stock is predicted to rebuild slowly from approximately a 30% depletion ratio in 2013 to a 36% depletion ratio in 2022 (Table 4-3). The consideration to remove blackgill from the southern Slope Rockfish complex will allow more precise management of blackgill to achieve the predicted results under the Council's default harvest control rule.

The slow growth, late maturation and low depletion ratio of blackgill rockfish drive the conservation concern for the stock. While annual total catches since 2013 have been less than the ACL contribution of blackgill to the southern Slope Rockfish complex, IFQ management at the complex level does not provide stock-specific benefits. That is, there are few measures that can be taken to control future trawl impacts if trawl catches increase to the point the ACL contribution is exceeded; non-trawl impacts appear to be effectively controlled by reducing the cumulative landing limit of blackgill. The measures that could be taken to control trawl impacts of blackgill under status quo management in the complex include extending the RCA out to 250 fm or 275 fm or implementing seasonal closures to the fishery. Both measures would severely impact trawl fishing opportunities for sablefish, petrale sole, shortspine thornyheads and other primary targets of the trawl fishery south of 40°10' N latitude.

Table 4-2. Total catch (in mt) of blackgill rockfish south of 40°10' N lat. relative to the ACL/OY (annual total catch limit in mt; OY prior to 2011 and ACL thereafter) and ABC/OFL (annual overfishing limit in mt; ABC prior to 2011 and OFL thereafter) contributions of blackgill to the Slope Rockfish South complex, 2003-2013.

	Total Catch	ACL/OY (Annual Total Catch Limit)	ABC/OFL (Overfishing Limit)	% of ACL/OY	% of ABC/OFL
2003	192.3	306	343	62.8%	56.0%
2004	152.8	306	343	49.9%	44.5%
2005	88.4	306	343	28.9%	25.8%
2006	95.1	306	343	31.1%	27.7%
2007	48.3	292	292	16.5%	16.5%
2008	74.4	292	292	25.5%	25.5%
2009	136.0	282	282	48.2%	48.2%
2010	152.1	282	282	53.9%	53.9%
2011	151.1	267	279	56.6%	54.2%
2012	195.5	263	275	74.3%	71.1%
2013	71.6	106	119	67.6%	60.2%

Table 4-3. Projected spawning output, depletion, and annual catch limits for blackgill rockfish south of 40°10' N lat. based on implementation of the Council's default 40-10 harvest control rule.

Year	Projections Assuming ACL Removals using the 40-10 Harvest Control Rule		
	Spawning output (larvae x 10^6)	Depletion	Annual Catch Limit (mt)
2013	357,200	30.1%	106
2014	367,126	30.9%	110
2015	376,517	31.7%	114
2016	385,375	32.4%	117
2017	393,708	33.1%	120
2018	401,527	33.8%	123
2019	408,850	34.4%	125
2020	415,697	35.0%	128
2021	422,091	35.5%	130
2022	428,060	36.0%	132

4.4 Impacts of the Alternatives on the Socioeconomic Environment

4.4.1 Summary of the Socioeconomic Impacts Associated with Intersector Allocations of Blackgill Rockfish and the Slope Rockfish complex South of 40°10' N lat.

Two criteria are used to evaluate impacts of the trawl and non-trawl allocation alternatives: 1) the utilization of blackgill rockfish and the southern Slope Rockfish complex by each sector, and 2) a comparison of historical catches of these species by trawl and non-trawl sectors to the amount available to these sectors in 2015 under the alternatives.

4.4.1.1 Utilization of Yields by Limited Entry Trawl and Non-Trawl Sectors

One objective of this re-allocation process beyond minimizing risk of overfishing blackgill rockfish, is optimal use of the available harvest of target groundfish species. This objective is guided by two of the three management goals in the Groundfish FMP: 1) goal 2 – Economics – maximize the value of the groundfish resource as a whole; and 2) goal 3 – Utilization – achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities (see Section 5.1). While the proposed action is to determine long-term equitable allocations of blackgill rockfish and the southern Slope Rockfish complex to the LE trawl sector, this decision cannot be made without understanding the needs of the directed non-trawl sectors. This is the intent of this analysis of the alternatives and understanding how target opportunities may be constrained by the bycatch of some of the species under consideration in the proposed action, not the least of which is blackgill rockfish. These analyses attempt to tease out these constraints to all the groundfish sectors, so that trawl allocations will not unnecessarily constrain other groundfish sectors by allocating enough yield for their historic needs.

The utilization goal is first addressed in these analyses by understanding the available yields or ACLs of the groundfish species under consideration during 2003 to 2013 and the harvests in each sector relative to these ACLs and relative to the annual catch in all non-treaty directed sectors combined. Significant utilization of a groundfish species by a sector is defined in this analysis as catching an average of at least 10% of the total annual catch during the 2003 to 2013 period. Dominant utilization of a groundfish species by a sector is defined in this analysis as catching an average of at least 90% of the total annual non-treaty catch during the 2003 to 2013 period. Species thus categorized are "sector-dominant." This evaluation is done for the LE trawl sector (note the at-sea whiting trawl sectors are not affected by the proposed action since those fisheries are prosecuted north of 40°10' N lat. and therefore outside the action area), and the combined non-trawl sectors (i.e., the LE longline and pot/trap sectors combined referred to as the LE fixed gear sector, the directed open access sector, and the recreational sector[2]). Catches of slope rockfish and all other species managed in the groundfish FMP in the incidental open access sector are considered as set-asides in the West Coast groundfish management framework.

Blackgill rockfish is the dominant species in the current Slope Rockfish complex south of 40°10' N lat. that was caught in directed groundfish fisheries during 2003-2013, with 59.9% of all identified species in the catch comprised of blackgill (Table 4-4). Of all the species caught in any significant amount during 2003-2013 among those currently managed in the Slope Rockfish complex south of 40°10' N lat., blackgill rockfish is the one species caught significantly by both LE trawl and non-trawl sectors (Table 4-5 and Figure 4-1)[3]. The presence of blackgill rockfish in the southern Slope Rockfish complex led to the current Amendment 21 sector allocations of 63% LE trawl and 37% non-trawl (allocations under the No Action alternative), arguably giving the non-trawl sectors a higher percentage of the harvestable surplus of the complex than would likely occur if blackgill were not managed in the complex. A comparison of sector total catches in 2003-2013 for the entire complex (Figure 4-2) shows the significant take of slope rockfish by the non-trawl sectors, largely from targeting blackgill. However, under a scenario where blackgill is removed from the complex, the remaining slope rockfish species are trawl-dominant in aggregate (Figure 4-3 and Table 4-5).

[2] The recreational groundfish fishery rarely impacts slope rockfish species since that fishery is typically prosecuted inshore on the shelf and in nearshore waters where slope rockfish do not occur.

[3] Note that the 2015 ACL contribution of blackgill rockfish is projected from the 2011 assessment, which informed southern Slope Rockfish harvest specifications implemented beginning in 2013. Blackgill catches in previous years that exceeded the 2015 blackgill rockfish ACL contribution do not constitute past overfishing.

Table 4-4. Percent of total catch in directed groundfish fisheries during 2003-2013 of all identified species in the Slope Rockfish complex south of 40°10' N lat., ranked from highest to lowest.

Species	Percent of Total Catch of All Identified Species
Blackgill Rockfish	59.9%
Bank Rockfish	24.1%
Aurora Rockfish	13.1%
Redbanded Rockfish	1.1%
Sharpchin Rockfish	0.6%
Rougheye Rockfish	0.4%
Blackspotted Rockfish	0.4%
Shortraker Rockfish	0.3%
Pacific Ocean Perch	0.1%
Yellowmouth Rockfish	0.0%
Shortraker/Rougheye Rockfish	0.0%
All Identified Species	100.0%

Table 4-5. Sector total catch average percent of species currently managed in the Slope Rockfish complex south of 40°10' N lat., 2003-2013.

Species	Sectors	Ave. Percent (2003-2013)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Aurora Rockfish	LE Trawl	94.7%	93.9%	97.2%	98.8%	99.2%	99.0%	91.5%	56.1%	84.0%	91.2%	98.7%	98.5%
	Non-Trawl	5.3%	6.1%	2.8%	1.2%	0.8%	1.0%	8.5%	43.9%	16.0%	8.8%	1.3%	1.5%
Bank Rockfish	LE Trawl	97.8%	98.8%	99.0%	92.3%	85.1%	95.8%	99.7%	99.6%	99.2%	96.2%	97.4%	99.6%
	Non-Trawl	2.2%	1.2%	1.0%	7.7%	14.9%	4.2%	0.3%	0.4%	0.8%	3.8%	2.6%	0.4%
Blackgill Rockfish	LE Trawl	41.3%	30.0%	53.3%	59.2%	38.5%	53.5%	52.8%	39.9%	41.8%	10.6%	40.5%	74.7%
	Non-Trawl	58.7%	70.0%	46.7%	40.8%	61.5%	46.5%	47.2%	60.1%	58.2%	89.4%	59.5%	25.3%
Blackspotted Rockfish	LE Trawl	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%
	Non-Trawl	99.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	99.4%	0.0%
Pacific Ocean Perch	LE Trawl	85.5%	100.0%	95.1%	0.0%	6.8%	100.0%	97.8%	0.0%	0.0%	100.0%	100.0%	94.3%
	Non-Trawl	14.5%	0.0%	4.9%	100.0%	93.2%	0.0%	2.2%	100.0%	100.0%	0.0%	0.0%	5.7%
Redbanded Rockfish	LE Trawl	57.2%	85.2%	22.9%	53.4%	27.2%	77.6%	61.0%	65.9%	82.4%	38.9%	42.7%	77.4%
	Non-Trawl	42.8%	14.8%	77.1%	46.6%	72.8%	22.4%	39.0%	34.1%	17.6%	61.1%	57.3%	22.6%
Rougheye Rockfish	LE Trawl	5.3%	26.2%	100.0%	0.0%	0.0%	0.0%	0.7%	0.1%	0.0%	6.3%	54.2%	100.0%
	Non-Trawl	94.7%	73.8%	0.0%	100.0%	100.0%	100.0%	99.3%	99.9%	100.0%	93.7%	45.8%	0.0%
Sharpchin Rockfish	LE Trawl	99.4%	0.0%	100.0%	100.0%	100.0%	100.0%	0.0%	98.6%	100.0%	100.0%	93.6%	100.0%
	Non-Trawl	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	6.4%	0.0%
Shortraker Rockfish	LE Trawl	96.2%	0.0%	100.0%	0.0%	0.0%	100.0%	100.0%	94.0%	100.0%	0.0%	100.0%	0.0%
	Non-Trawl	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	0.0%	0.0%	0.0%	0.0%
Shortraker/Rougheye Rockfish	LE Trawl	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Non-Trawl	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Slope Rockfish Unid	LE Trawl	71.3%	22.6%	25.7%	10.2%	96.2%	83.1%	29.4%	90.3%	27.1%	53.0%	22.6%	67.3%
	Non-Trawl	28.7%	77.4%	74.3%	89.8%	3.8%	16.9%	70.6%	9.7%	72.9%	47.0%	77.4%	32.7%

Species	Sectors	Ave. Percent (2003-2013)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Yellowmouth Rockfish	LE Trawl	47.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
	Non-Trawl	52.1%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Grand Total - All Slope RF	LE Trawl	62.8%	57.7%	74.9%	73.1%	71.1%	76.3%	79.7%	59.3%	48.1%	27.2%	48.5%	84.1%
	Non-Trawl	37.2%	42.3%	25.1%	26.9%	28.9%	23.7%	20.3%	40.7%	51.9%	72.8%	51.5%	15.9%
Grand Total Based on Average 2003-13 Total Catch - All Slope RF Except Blackgill	LE Trawl	90.9%	91.7%	93.2%	87.9%	93.4%	91.3%	96.4%	86.7%	86.4%	89.9%	75.3%	93.9%
	Non-Trawl	9.1%	8.3%	6.8%	12.1%	6.6%	8.7%	3.6%	13.3%	13.6%	10.1%	24.7%	6.1%

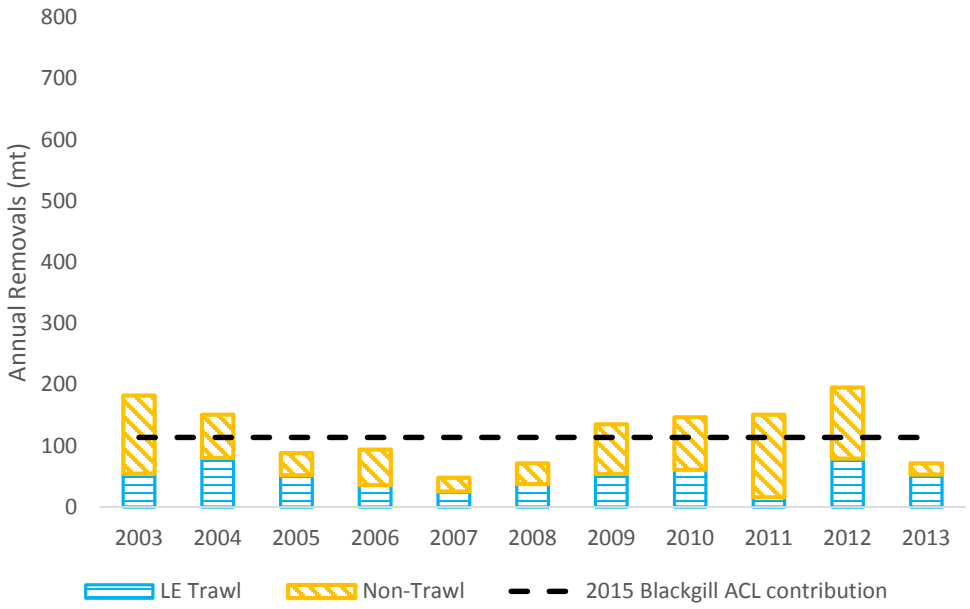

Figure 4-1. Annual removals of blackgill rockfish south of 40°10' N lat. by directed groundfish sectors relative to the 2015 ACL contribution of blackgill to the southern Slope Rockfish complex ACL.

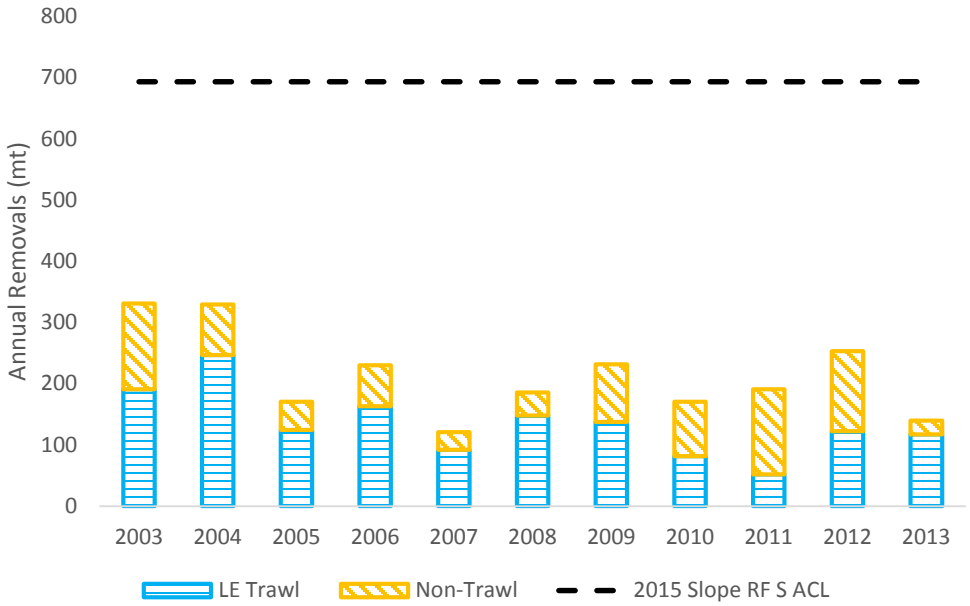

Figure 4-2. Annual removals of species in the Slope Rockfish complex south of 40°10' N lat. by directed groundfish sectors relative to the 2015 southern Slope Rockfish complex ACL.

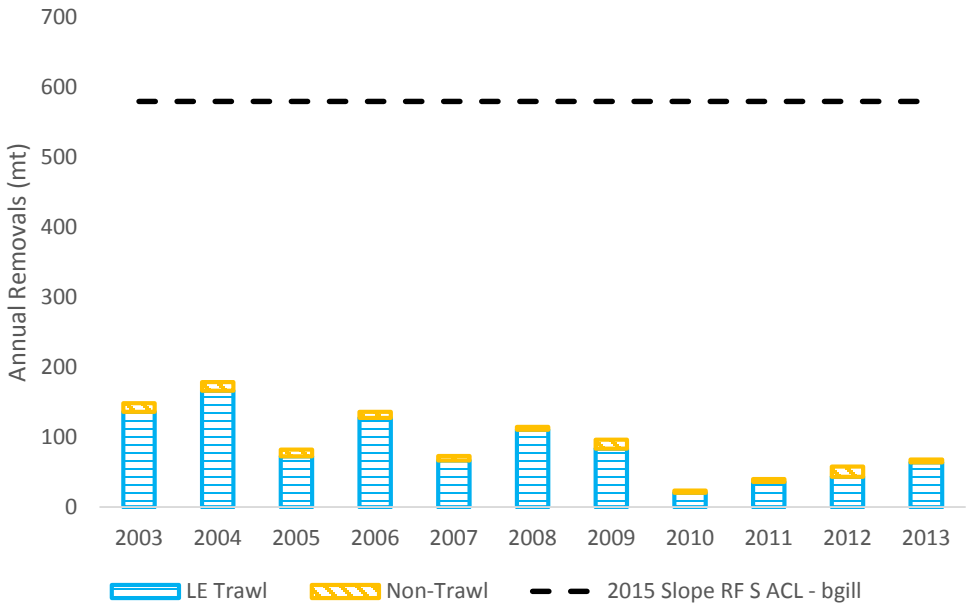

Figure 4-3. Annual removals of all other species in the Slope Rockfish complex south of 40°10' N lat. except blackgill rockfish by directed groundfish sectors relative to the 2015 southern Slope Rockfish complex ACL minus the blackgill rockfish ACL contribution.

There is little contrast in sector allocation percentages between the action alternatives with a range of LE trawl allocations for blackgill rockfish of 35.6% to 41.0% and a range of LE trawl allocation percentages for the remaining southern Slope Rockfish species of 86.5% to 91.0% (Table 2-1). However, the difference in sector allocation percentages between the No Action alternative where blackgill remains in the southern Slope Rockfish complex and the action alternatives is significant with 63% of the harvestable surplus of the complex apportioned to the LE trawl sector under the No Action alternative.

Both action alternatives would result in a lower allocation of blackgill to the LE trawl sector than the sector caught in most years in the analysis (Figure 4-4). Alternative 2 provides the lowest LE trawl allocation percentage of blackgill and is a lower level of harvest when applied to the 2015 blackgill ACL contribution than observed in 9 of the 11 years in the analysis, while the Alternative 1 provides a level of harvest for the LE trawl sector lower than observed in 7 of the 11 years in the analysis (Figure 4-4). However, given the objective of reducing LE trawl impacts on blackgill while it recovers from its precautionary status, an allocation lower than recent observed catches is needed.

The action alternatives also provide a lower allocation of blackgill to the non-trawl sectors than the annual catches observed in most years of the analysis (Figure 4-5). Both alternatives provide a blackgill non-trawl allocation higher than the observed harvest in 2013 when non-trawl targeting was effectively reduced with lower cumulative landing limits. Both Alternative 1 and Alternative 2 provide lower non-trawl allocations than the combined catches of the non-trawl sectors observed in 6 of the 11 years in the analysis (Figure 4-5).

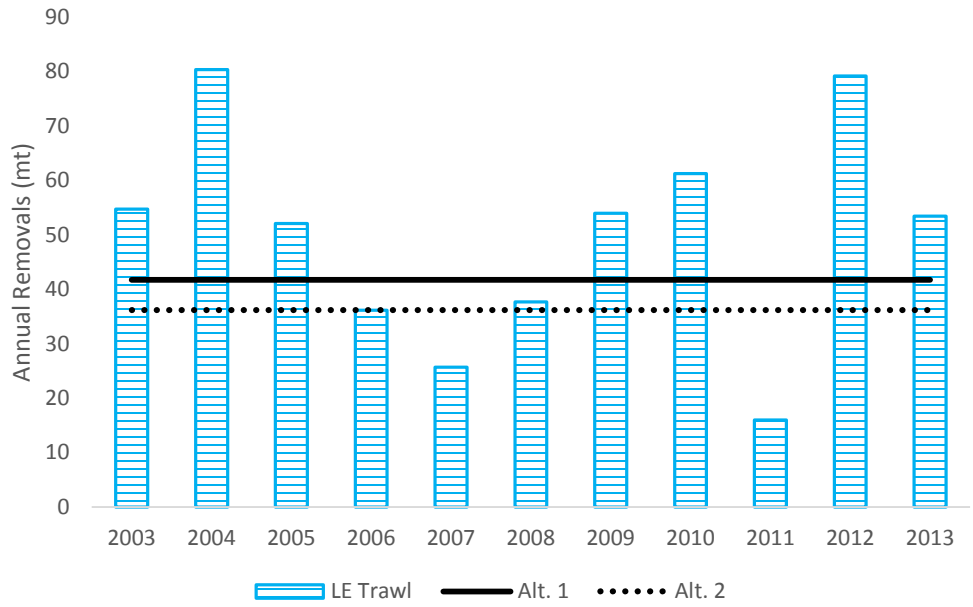

Figure 4-4. Total annual catches of blackgill rockfish south of 40°10' N lat. during 2003-2013 by the LE trawl groundfish sector relative to alternative LE trawl allocations assuming the 2015 fishery harvest guideline.

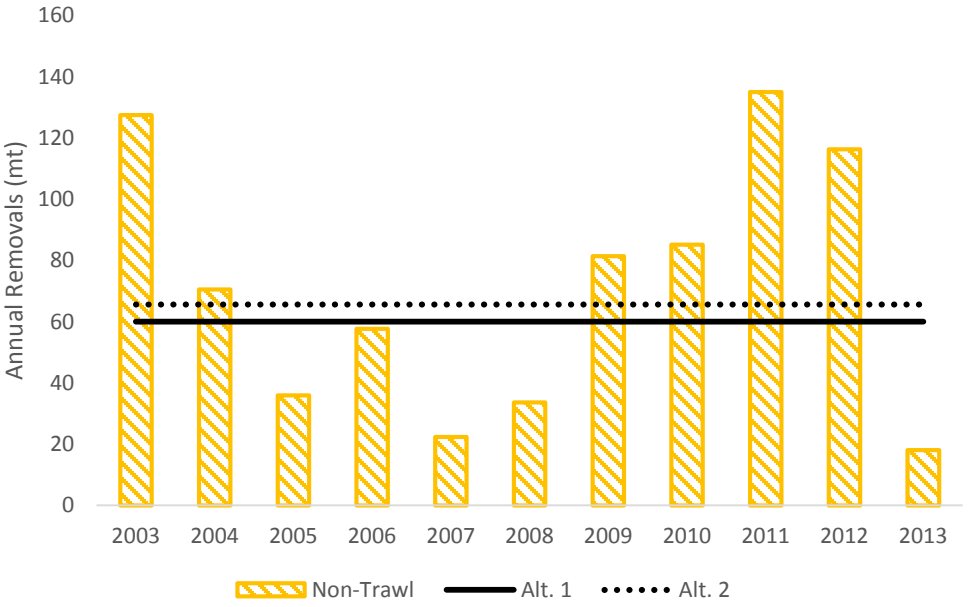

Figure 4-5. Total annual catches of blackgill rockfish south of 40°10' N lat. during 2003-2013 by the non-trawl groundfish sectors relative to alternative non-trawl allocations assuming the 2015 fishery harvest guideline.

None of the directed sectors are adversely affected by the alternative allocations of the remaining species in the southern Slope Rockfish complex since allocations are significantly higher than the observed sector catches since 2003 (Figure 4-6 and Figure 4-7). Neither of these alternatives are predicted to constrain access to target species on the slope south of 40°10' N lat. other than blackgill rockfish where one purpose of the proposed action is to eliminate targeting on the stock.

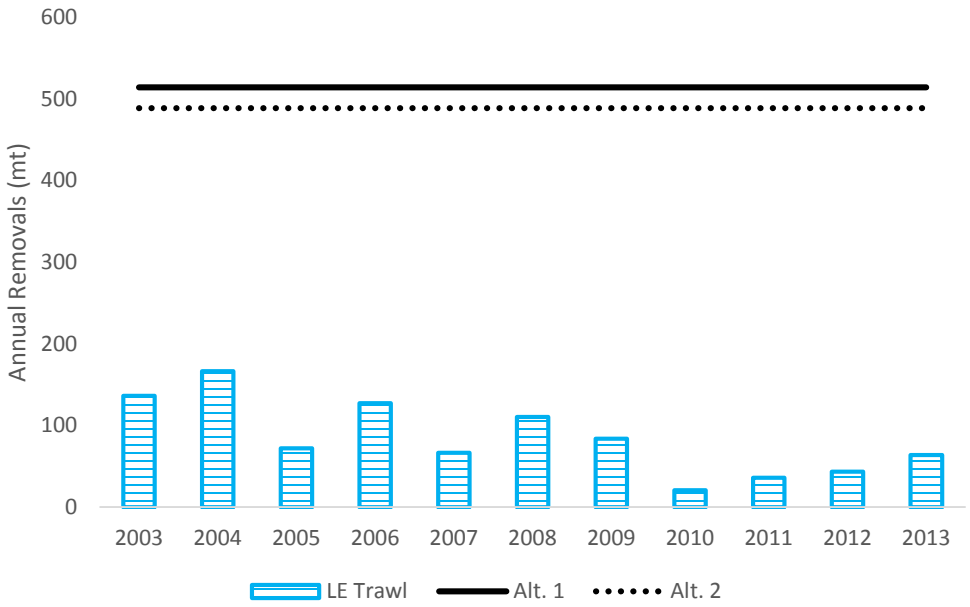

Figure 4-6. Total annual catches of the remaining species in the Slope Rockfish South complex minus blackgill rockfish during 2003-2013 by the LE trawl groundfish sector relative to alternative LE trawl allocations assuming the 2015 fishery harvest guideline.

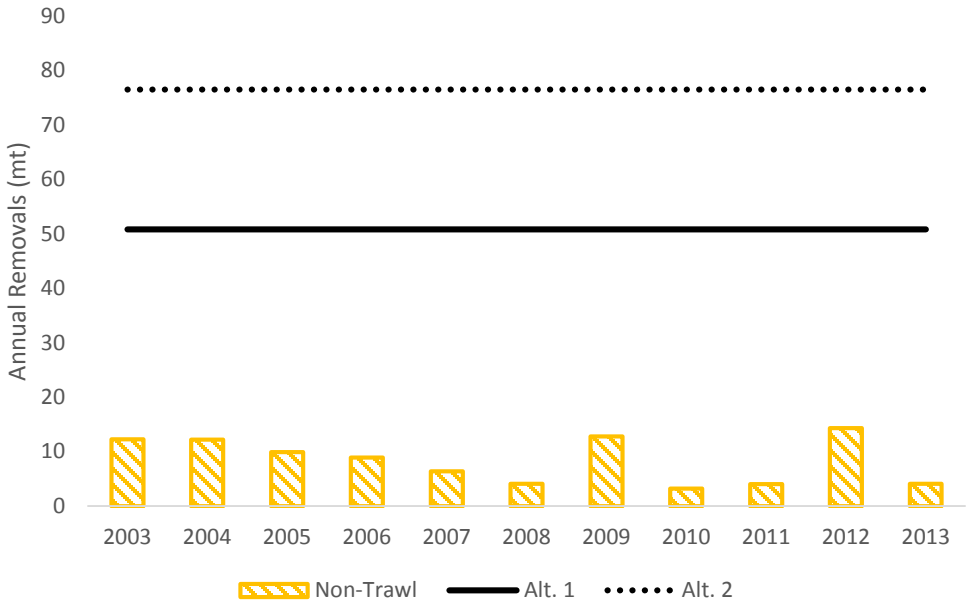

Figure 4-7. Total annual catches of the remaining species in the Slope Rockfish South complex minus blackgill rockfish during 2003-2013 by the non-trawl groundfish sectors relative to alternative non-trawl allocations assuming the 2015 fishery harvest guideline.

4.4.1.2 Economic Impacts of Sector Reallocation Alternatives for the Southern Slope Rockfish Fishery Complex and the Underlying Blackgill Rockfish and Other Remaining Southern Slope Rockfish Species Components.

Blackgill rockfish and the other slope rockfish species in the southern Slope Rockfish (SSRF) complex are harvested using trawl and non-trawl gear and landed in port areas south of 40°10' N lat., namely Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay, Santa Barbara, Los Angeles and San Diego. Table 4-6 reports landings of total SSRF complex species by sector (trawl and non-trawl) and port area during 2003-2013[4]. The table shows that the port areas with the largest total landings of SSRF species during 2003-2013 were Morro Bay and Fort Bragg, followed by Monterey, San Francisco, San Diego, Santa Barbara, Los Angeles and Bodega Bay. SSRF landings by the trawl sector (including non-trawl IFQ landings) are concentrated north of Santa Barbara, with Fort Bragg and Morro Bay in the lead. SSRF landings by non-trawl sectors are spread more evenly among port areas, but tend to be greater toward the south, with Morro Bay, San Diego and Santa Barbara the three leading port areas.

Table 4-7 and Table 4-8 split out landings during the 2003-2013 period by sector and port area for blackgill rockfish and all other SSRF complex species, respectively. The two tables show that in each year since 2008, coastwide landings of blackgill rockfish exceeded coastwide landings of all other SSRF species combined. These tables also show that other SSRF complex species were predominantly landed by the trawl sector each year, whereas blackgill rockfish landings were more evenly split, with non-trawl landings exceeding trawl sector landings in only six out of the 11 years shown, but in four out of five years since 2008. Table 4-9 reports 2013 average exvessel values per pound received for SSRF landed by port area and gear sector[5]. Note although the overall average price was essentially the same for both blackgill rockfish and combined other SSRF species at $0.91 per pound, there were considerable variations in the species average prices by port area and between the two gear sectors. In general, higher prices per pound of both species types were received for non-trawl landings than for trawl landings. The highest average prices were recorded for landings in San Diego, Los Angeles and Santa Barbara. These price differentials by region and gear sector drive the differences in projected total exvessel revenue and income impacts under the sector reallocation alternatives reported below.

[4] Commercial, non-Tribal landings of SSRF species were summarized from the Pacific Fisheries Information Network (PacFIN) vdrfd data table extracted on January 13, 2015). Landings were grouped by port area (Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay, Santa Barbara, Los Angeles and San Diego) and by sector (Non-Tribal IFQ Trawl, Non-Tribal IFQ Fixed Gear, Non-nearshore Fixed Gear, Nearshore Fixed Gear, and Incidental Fisheries). For purposes of this analysis, Non-Tribal IFQ Trawl and Non-Tribal IFQ Fixed Gear were classified as the "Trawl" sector, and the remaining three sectors (Non-nearshore Fixed Gear, Nearshore Fixed Gear, and Incidental Fisheries) were grouped as "Non-trawl".

[5] Average exvessel revenues per pound were calculated as total exvessel revenues divided by total landings recorded in each port area and gear sector during 2013, the most recent of the 11 years in the data series used.

Table 4-10 summarizes the data and assumptions used to project landings of blackgill rockfish and other SSRF species under the sector reallocation alternatives. In general, for alternatives that specified sector allocations for either or both blackgill rockfish and combined other SSRF species (Alternatives 1 and 2), landings were distributed to sectors and port areas in proportion to the average 2003-2013 distribution of trawl and non-trawl landings by port for each species group. In the case of the No Action alternative, where overall sector allocations were specified only for the total SSRF complex and not for the component parts, landings for the SSRF complex as a whole were distributed based on the average 2003-2013 distribution of trawl and non-trawl SSRF complex landings by port.

Projected total landings were controlled so as not to exceed the ACLs and to maintain the sector allocations specified under each alternative. Average attainment ratios, or estimates of the portion of the sector allocations that would be harvested and landed, were also applied equally under each alternative. Consequently projected total landings for each of the two component species groups are identical under each alternative. Therefore, differences between impacts projected under the alternatives are solely due to projected redistributions of blackgill rockfish or other SSRF catch between fisheries sectors, which in turn affects the distribution of landings of the two species groups by port area. For purposes of this analysis it was assumed there were no differential impacts between the alternatives on landings of any non-SSRF species, such as sablefish, thornyheads or petrale sole[6].

Table 4-11 shows the resulting projections of SSRF landings by species group, port area and gear sector under the sector reallocation alternatives.

Average 2013 exvessel prices were applied to the projected landings weights by port area and sector in Table 4-11 to generate estimated exvessel revenues under the alternatives[7]. These results are summarized in Table 4-12.

Finally, personal income impacts by port area under the sector reallocation alternatives were estimated using average income coefficients for trawl and non-trawl groundfish landings and associated shorebased processing activity by port area[8]. These results are summarized in Table 4-13 as the difference in estimated income impacts under each action alternative compared with No Action[9]. Under No Action an estimated total of $1.4 million in total personal income impacts is projected from landings of SSRF species. Both action alternatives project some redistribution of activity generally from southern port areas to northern port areas in the region and have overall net negative income impacts compared with No Action. Alternative 1 has a slightly larger overall net negative impact (-$121 thousand), resulting from a redistribution of landings revenue from southern port areas to the northern port areas. Alternative 2 shows a somewhat smaller overall net negative impact (-$99 thousand) due to a more mixed pattern of shifting landings revenue between northern and southern port areas. Again, for this analysis it was assumed there were no differential impacts on landings or revenues for any non-SSRF species between the alternatives.

[6] An analysis of possible effects of alternative blackgill sector allocations on target fisheries for sablefish, petrale sole and shortspine thornyheads is included below.

[7] In cases where the projection methodology, which used averages calculated over 2003-2013, assigned landings to a port area/sector combination that did not record landings history during 2013, average exvessel revenue per pound values were "borrowed" from the nearest port area geographically.

[8] Income impact coefficients were estimated by the IOPAC fisheries economic impact model and are expressed as dollars of personal income generated in each port area by commercial harvesting and processing activities per dollar of exvessel value received for landings by fisheries sector. These coefficients are the same as were used to analyze economic impacts of the 2015-16 Groundfish Harvest Specifications and Management Measures.

[9] Note that the differences in impacts reported for these alternatives are very small in terms of overall groundfish fishery activities in each port area and so may lie within the margin of error of the impact estimation methodology.

Table 4-6. Total commercial landings of all Southern Slope Rockfish (SSRF) complex species by port area and gear sector, 2003-2013 (mt).

Port Area	Sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fort Bragg	Trawl	13.0	96.4	38.8	33.1	56.7	53.1	54.1	57.0	35.0	80.7	64.4
	Non-trawl	0.1	0.1	3.3	0.3	3.1	1.8	4.1	3.5	7.7	10.0	4.3
Fort Bragg Total		13.1	96.5	42.1	33.4	59.8	54.8	58.2	60.5	42.7	90.7	68.6
Bodega Bay	Trawl	0.1	0.5		2.2	0.6	1.0	4.6	0.9			
	Non-trawl	0.1	0.0		0.0	0.1	0.3	0.2	0.5	0.6	0.7	2.4
Bodega Bay Total		0.2	0.5		2.2	0.7	1.3	4.8	1.4	0.6	0.7	2.4
San	Trawl	37.7	62.3	24.3	16.0	15.8	24.0	5.8	5.1	0.1	0.1	2.0
	Non-trawl	6.7	6.1	0.9	7.1	4.3	1.9	0.8	0.4	1.0	0.4	0.1
San Francisco Total		44.4	68.5	25.1	23.2	20.1	25.9	6.6	5.4	1.1	0.5	2.1
Monterey	Trawl	33.1	14.7	10.8	33.6	7.7	30.5	38.8	15.3	5.6	4.1	2.7
	Non-trawl	39.4	15.5	13.8	9.8	3.7	3.0	1.1	0.3	2.8	7.1	3.1
Monterey Total		72.5	30.3	24.7	43.5	11.4	33.5	40.0	15.7	8.4	11.1	5.8
Morro Bay	Trawl	95.7	62.4	35.9	0.4	4.2	40.5	18.9		6.5	26.1	23.4
	Non-trawl	45.1	20.1	8.0	21.7	7.5	8.3	54.5	40.2	78.9	40.9	26.9
Morro Bay Total		140.	82.6	43.9	22.2	11.8	48.8	73.5	40.2	85.4	66.9	50.4
Santa	Trawl											
	Non-trawl	25.8	16.6	14.7	17.3	5.6	0.5	16.6	13.1	5.4	8.7	4.4
Santa Barbara Total		25.8	16.6	14.7	17.3	5.6	0.5	16.6	13.1	5.4	8.7	4.4
Los Angeles	Trawl											
	Non-trawl	17.3	15.7	5.1	7.7	6.2	5.5	2.2	1.7	6.9	6.1	2.5
Los Angeles Total		17.3	15.7	5.1	7.7	6.2	5.5	2.2	1.7	6.9	6.1	2.5
San Diego	Trawl											
	Non-trawl	18.9	17.9	5.6	10.2	4.0	14.9	11.1	25.9	29.8	43.7	0.7
San Diego Total		18.9	17.9	5.6	10.2	4.0	14.9	11.1	25.9	29.8	43.7	0.7
Total Trawl		179.	236.4	109.9	85.4	85.1	149.1	122.2	78.4	47.2	111.0	92.5
Total Non-trawl		153.	92.1	51.2	74.2	34.4	36.1	90.7	85.6	133.0	117.5	44.4
Total Trawl + Non-trawl		333.	328.5	161.1	159.7	119.5	185.2	213.0	164.0	180.2	228.5	136.9

Source: PacFIN vdrfd table.

Table 4-7. Total commercial landings of Blackgill Rockfish by port area and gear sector, 2003-2013 (mt).

Port Area	Sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fort Bragg	Trawl	2.3	23.8	17.6	12.8	19.4	29.6	41.4	50.0	11.2	70.0	37.9
	Non-trawl	0.0	0.0	1.5	0.0	0.0	1.5	0.5	3.5	7.4	6.4	2.0
Fort Bragg Total		2.3	23.8	19.1	12.8	19.4	31.2	41.9	53.4	18.6	76.4	39.8
Bodega Bay	Trawl	0.1	0.0	0.0	2.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
	Non-trawl	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.5	0.7	2.4
Bodega Bay Total		0.2	0.0	0.0	2.2	0.2	0.3	0.2	0.5	0.5	0.7	2.4
San	Trawl	3.4	20.8	5.9	7.8	3.2	3.6	5.1	4.0	0.1	0.0	0.0
	Non-trawl	5.4	4.7	0.9	6.2	0.4	0.8	0.7	0.4	1.0	0.4	0.1
San Francisco Total		8.8	25.5	6.8	14.1	3.6	4.5	5.8	4.4	1.0	0.4	0.2
Monterey	Trawl	11.0	6.9	6.4	12.9	2.6	3.6	5.5	7.6	0.6	2.2	1.2
	Non-trawl	38.3	6.3	5.4	6.9	3.4	2.9	0.8	0.3	2.8	7.1	3.0
Monterey Total		49.3	13.2	11.8	19.8	6.0	6.5	6.3	7.9	3.3	9.3	4.2
Morro Bay	Trawl	37.9	27.9	21.1	0.0	0.2	0.6	2.0	0.0	2.4	1.2	0.6
	Non-trawl	30.2	9.6	4.6	12.5	3.3	8.3	53.3	39.7	77.8	39.6	18.5
Morro Bay Total		68.1	37.6	25.7	12.5	3.5	8.9	55.3	39.7	80.2	40.8	19.1
Santa Barbara	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	25.2	16.4	14.3	16.9	5.5	0.5	16.5	13.0	5.2	8.3	4.2
Santa Barbara Total		25.2	16.4	14.3	16.9	5.5	0.5	16.5	13.0	5.2	8.3	4.2
Los Angeles	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	16.6	15.4	4.7	7.4	6.0	5.0	1.0	1.7	6.8	6.0	2.5
Los Angeles Total		16.6	15.4	4.7	7.4	6.0	5.0	1.0	1.7	6.8	6.0	2.5
San Diego	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	18.1	17.9	5.2	7.5	3.5	14.8	6.7	25.6	29.8	43.7	0.7
San Diego Total		18.1	17.9	5.2	7.5	3.5	14.8	6.7	25.6	29.8	43.7	0.7
Total Trawl		54.7	79.4	51.0	35.7	25.5	37.7	54.0	61.5	14.2	73.4	39.7
Total Non-trawl		133.	70.4	36.6	57.4	22.2	33.8	79.7	84.6	131.	112.	33.3
Total Trawl + Non-trawl		188.	149.	87.6	93.1	47.7	71.5	133.	146.	145.	185.	73.0

Source: PacFIN vdrfd table.

Table 4-8. Total commercial landings of "Other" (Non-Blackgill Rockfish) SSRF complex species by port area and gear sector, 2003-2013 (mt).

Port Area	Sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fort Bragg	Trawl	10.7	72.7	21.2	20.4	37.3	23.5	12.7	7.1	23.8	10.7	26.5
	Non-trawl	0.1	0.1	1.8	0.3	3.1	0.2	3.6	0.0	0.4	3.6	2.3
Fort Bragg Total		10.8	72.8	23.0	20.6	40.4	23.7	16.3	7.1	24.2	14.3	28.8
Bodega Bay	Trawl	0.0	0.5	0.0	0.0	0.4	0.8	4.5	0.9	0.0	0.0	0.0
	Non-trawl	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.0	0.0
Bodega Bay Total		0.0	0.5	0.0	0.0	0.5	1.0	4.6	0.9	0.1	0.0	0.0
San Francisco	Trawl	34.3	41.6	18.4	8.2	12.6	20.4	0.7	1.1	0.1	0.1	2.0
	Non-trawl	1.3	1.4	0.0	0.9	3.9	1.0	0.1	0.0	0.0	0.0	0.0
San Francisco Total		35.6	43.0	18.4	9.1	16.5	21.4	0.8	1.1	0.1	0.1	2.0
Monterey	Trawl	22.1	7.8	4.5	20.7	5.1	26.9	33.3	7.8	5.0	1.9	1.5
	Non-trawl	1.1	9.2	8.4	2.9	0.3	0.1	0.4	0.0	0.0	0.0	0.0
Monterey Total		23.2	17.1	12.9	23.7	5.4	27.0	33.7	7.8	5.1	1.9	1.6
Morro Bay	Trawl	57.8	34.5	14.9	0.4	4.0	39.9	17.0	0.0	4.1	24.8	22.8
	Non-trawl	15.0	10.5	3.4	9.3	4.2	0.1	1.2	0.5	1.1	1.3	8.5
Morro Bay Total		72.8	45.0	18.3	9.7	8.2	39.9	18.2	0.5	5.2	26.1	31.3
Santa Barbara	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	0.6	0.1	0.3	0.4	0.1	0.0	0.1	0.1	0.1	0.4	0.2
Santa Barbara Total		0.6	0.1	0.3	0.4	0.1	0.0	0.1	0.1	0.1	0.4	0.2
Los Angeles	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	0.7	0.3	0.4	0.3	0.2	0.5	1.2	0.0	0.0	0.1	0.0
Los Angeles Total		0.7	0.3	0.4	0.3	0.2	0.5	1.2	0.0	0.0	0.1	0.0
San Diego	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	0.8	0.0	0.3	2.6	0.5	0.1	4.4	0.2	0.0	0.0	0.0
San Diego Total		0.8	0.0	0.3	2.6	0.5	0.1	4.4	0.2	0.0	0.0	0.0
Total Trawl		125.0	157.0	58.9	49.8	59.5	111.4	68.2	16.8	33.0	37.5	52.8
Total Non-trawl		19.6	21.7	14.7	16.8	12.3	2.3	11.0	1.0	1.7	5.5	11.1
Total Trawl + Non-trawl		144.6	178.7	73.6	66.5	71.8	113.7	79.2	17.8	34.8	43.0	63.9

Source: PacFIN vdrfd table.

Table 4-9. Average exvessel revenue per pound for Blackgill Rockfish and combined Other SSRF species by port area and gear sector for landings recorded in 2013 ($ per pound).

Port Area	Sector	Blackgill RF	Other SSRF
Fort Bragg	Trawl	0.70	0.67
	Non-trawl	1.10	0.95
Fort Bragg Total		0.72	0.69
Bodega Bay	Trawl	-	-
	Non-trawl	1.66	-
Bodega Bay Total		1.66	-
San Francisco	Trawl	0.69	0.68
	Non-trawl	1.24	1.36
San Francisco Total		1.14	0.68
Monterey	Trawl	1.08	0.75
	Non-trawl	1.22	1.00
Monterey Total		1.18	0.75
Morro Bay	Trawl	1.11	1.05
	Non-trawl	0.92	1.37
Morro Bay Total		0.93	1.14
Santa Barbara	Trawl	-	-
	Non-trawl	1.49	1.07
Santa Barbara Total		1.49	1.07
Los Angeles	Trawl	-	-
	Non-trawl	1.41	1.96
Los Angeles Total		1.41	1.96
San Diego	Trawl	-	-
	Non-trawl	2.26	2.00
San Diego Total		2.26	2.00
Total Trawl		0.72	0.84
Total Non-trawl		1.15	1.28
Total Trawl + Non-trawl		0.91	0.91

Source: PacFIN vdrfd table.

Table 4-10. Data and assumptions used to project landings of Blackgill Rockfish, all Other Southern Slope Rockfish ("Other SSRF") and Total Southern Slope Rockfish ("Total SSRF") by port area and gear sector under the SSRF sector reallocation alternatives.

Item	Species	No Action	Alternative 1	Alternative 2
1	Total SSRF	Total SSRF sector allocations were distributed assuming 2003-2013 average SSRF landings as % of SSRF ACL or OY, and 2003-2013 average distribution of Total SSRF sector landings by port.	Total SSRF landings in each sector/port calculated as sum of Blackgill and Other SSRF landings in each sector/port (2 + 3).	Total SSRF landings in each sector/port calculated as sum of Blackgill and Other SSRF landings in each sector/port (2 + 3).
2	Blackgill RF	Blackgill ACL was distributed to each sector/port in proportion to average 2003-2013 share of total SSRF landings that were Blackgill.	Blackgill sector allocations were distributed assuming historical 2003-2013 average distributions of Blackgill landings by sector and port.	Blackgill sector allocations were distributed assuming historical 2003-2013 average distributions of Blackgill landings by sector and port.
3	Other SSRF	Other SSRF landings were calculated as the residual (1 - 2).	Other SSRF sector allocations were distributed assuming historical 2003-2013 average distributions of Other SSRF landings by sector and port.	Other SSRF sector allocations were distributed assuming historical 2003-2013 average distributions of Other SSRF landings by sector and port.

Table 4-11. Projected landings of Blackgill Rockfish, all Other Southern Slope Rockfish ("Other SSRF") and Total Southern Slope Rockfish ("Total SSRF") by port area and gear sector under the SSRF sector reallocation alternatives (mt).

Port Area	Sector	No Action			Alternative 1			Alternative 2		
		Black-gill	Other SSRF	Total SSRF	Black-gill	Other SSRF	Total SSRF	Black-gill	Other SSRF	Total SSRF
Fort Bragg	Trawl	23.7	114.9	138.6	24.4	122.4	146.8	21.2	115.0	136.2
	Non-trawl	1.7	5.9	7.6	1.7	4.6	6.3	1.8	7.4	9.2
Fort Bragg Total		25.4	120.8	146.2	26.0	127.0	153.0	23.0	122.4	145.4
Bodega	Trawl	0.2	2.1	2.3	0.2	3.3	3.5	0.2	3.1	3.3
	Non-trawl	0.3	0.7	1.0	0.3	0.2	0.5	0.4	0.2	0.6
Bodega Bay Total		0.5	2.8	3.3	0.5	3.4	4.0	0.5	3.3	3.9
San	Trawl	4.0	41.9	46.0	4.2	64.0	68.1	3.6	60.1	63.7
	Non-trawl	1.6	4.3	5.9	1.5	2.6	4.1	1.7	4.1	5.8
San Francisco Total		5.6	46.3	51.9	5.7	66.5	72.2	5.3	64.2	69.5
Monterey	Trawl	4.5	42.4	46.9	4.7	62.8	67.5	4.0	59.0	63.1
	Non-trawl	5.8	14.0	19.8	5.7	6.7	12.4	6.2	10.8	17.0
Monterey Total		10.3	56.4	66.7	10.3	69.5	79.9	10.2	69.8	80.1
Morro	Trawl	7.0	67.7	74.8	7.2	101.2	108.4	6.3	95.0	101.3
	Non-trawl	22.3	47.7	70.0	21.9	16.3	38.2	23.9	26.3	50.2
Morro Bay Total		29.3	115.4	144.8	29.1	117.5	146.6	30.2	121.4	151.5
Santa	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	9.5	16.1	25.5	9.3	0.8	10.0	10.1	1.2	11.3
Santa Barbara Total		9.5	16.1	25.5	9.3	0.8	10.0	10.1	1.2	11.3
Los	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	5.5	9.8	15.3	5.4	1.2	6.5	5.9	1.9	7.7
Los Angeles Total		5.5	9.8	15.3	5.4	1.2	6.5	5.9	1.9	7.7
San Diego	Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Non-trawl	13.0	23.2	36.2	12.8	2.7	15.5	13.9	4.4	18.3
San Diego Total		13.0	23.2	36.2	12.8	2.7	15.5	13.9	4.4	18.3
Total Trawl		39.5	269.2	308.7	40.7	353.6	394.3	35.3	332.2	367.5
Total Non-trawl		59.6	121.7	181.3	58.5	35.0	93.5	63.9	56.3	120.2
Total		99.1	390.8	490.0	99.1	388.6	487.7	99.1	388.6	487.7
Percent Trawl		39.9	68.9	**63.0**	**41.0**	**91.0**	80.8	**35.6**	**85.5**	75.4
Percent Non-trawl		60.1	31.1	**37.0**	**59.0**	**9.0**	19.2	**64.4**	**14.5**	24.6

Table 4-12. Estimated exvessel revenue by port area associated with projected Total SSRF landings under the SSRF sector reallocation alternatives ($,000).

Port Area	No Action	Alternative 1	Alternative 2
Fort Bragg	224	234	222
San Francisco (incl. Bodega Bay)	90	65	79
Monterey	121	142	143
Morro Bay	350	355	367
Santa Barbara	69	32	36
Los Angeles	59	22	26
San Diego	167	75	89
Total	1,080	926	962

Table 4-13. Estimated change from No Action in local area personal income impacts associated with harvesting and processing Total SSRF landings by port area under the SSRF sector reallocation alternatives ($,000).

Port Area	*No Action*	Alternative 1	Alternative 2
Fort Bragg	*339*	*+15*	*-1*
San Francisco (incl. Bodega Bay)	*173*	*+56*	*+52*
Monterey	*147*	*+26*	*+27*
Morro Bay	*366*	*-7*	*+8*
Santa Barbara	*80*	*-42*	*-38*
Los Angeles	*101*	*-64*	*-56*
San Diego	*191*	*-105*	*-90*
Total	*1,397*	*-121*	*-99*

4.4.1.3 IFQ Gear Switching

The Trawl Rationalization program began in 2011, and with its implementation participants in the Shorebased IFQ Program have had the option to "gear switch." To exercise this option participants are required to submit a declaration for a given trip, allowing the vessel to use any legal groundfish non-trawl gear to take IFQ species instead of trawl gear. The intent of the gear switching option is to provide shorebased IFQ trawl vessels more flexibility, to improve their efficiency at attaining species allotted to them, and to reduce bycatch.

4.4.1.3.1 Annual Landings – All Ports Combined South of 40°10' N latitude

Total landings (mt) for the shorebased IFQ vessels are summarized from 2011 through 2014 for the southern Slope Rockfish (SSRF) complex (excluding blackgill rockfish) and for blackgill rockfish for all ports combined south of 40°10' N latitude (Table 4-14 and Table 4-15). Two categories are provided: shorebased IFQ trawl gear landings and shorebased IFQ non-trawl gear landings (gear switched). These two fishery sectors were derived from PacFIN's vdrfd table using Dahl Sector 4 (Shorebased IFQ Nonwhiting Trawl) and Dahl sector 20 (Shorebased IFQ Non-trawl). Analysis revealed that vessels taking SSRF complex species, other than blackgill, tended to do so mainly with trawl gear (Table 4-14). When taking blackgill, however, vessels tended more to capitalize on the gear switching option more so than when taking other SSRF complex rockfishes (Table 4-15). This supports the fact blackgill rockfish are taken by both trawl and non-trawl gears, whereas the remainder of the SSRF complex are taken mostly by vessels using trawl gear. During this four-year period, the take of the SSRF complex rockfishes by trawlers increased from 33.0 mt in 2011 to 55.3 mt in 2014 (Table 4-14). Vessels exercising the gear switching option averaged less than 0.2 mt annually over the four-year period. For blackgill rockfish, shorebased IFQ trawlers had a peak year in 2012 when 73.4 mt were taken, with an annual decrease since then. Those vessels utilizing the gear switching option experienced a steady increase from 2011 to 2013 with a peak in 2013 when 15.0 mt were taken (Table 4-15). A 43 percent decrease took place in 2014 (8.6 mt) compared to the four-year high of 15.0 mt taken in the previous year.

Table 4-14. Shorebased IFQ vessel annual landings (mt) of the SSRF complex (excluding blackgill rockfish) for all ports south of 40°10' N. latitude, 2011-2014.

SSRF	Year and Landings (mt)			
Sector	2011	2012	2013	2014
Shorebased IFQ Trawl	33.0	37.5	52.8	55.3
Shorebased IFQ Non-trawl	0.1	0.2	0.3	0.1

Table 4-15. Shorebased IFQ vessel annual landings (mt) of blackgill rockfish for all ports south of 40°10' N latitude, 2011-2014.

Blackgill Rockfish	Year and Landings (mt)			
Sector	2011	2012	2013	2014
Shorebased IFQ Trawl	14.2	73.4	39.7	25.3
Shorebased IFQ Non-trawl	2.2	5.9	15.0	8.6

Note: All landings, vessel count summaries, and trip counts in this section are from PacFIN's table vdrfd. As such, these landings totals do not include discard mortality estimates.

4.4.1.3.2 Annual Landings – By Port Complex South of 40°10' N latitude

Table 4-16 and Table 4-17 summarize the annual landings (mt) for the shorebased IFQ trawl and shorebased IFQ non-trawl sectors by port complex for the SSRF complex (excluding blackgill rockfish) and for

blackgill rockfish. The analysis revealed that the Bodega Bay port complex and the three port complexes south of Morro Bay (Santa Barbara, Los Angeles, and San Diego) did not have any recorded shorebased IFQ vessel landings for any SSRF species since the inception of the shorebased IFQ Program.

4.4.1.3.3 SSRF Shorebased IFQ Trawl and Non-trawl Sectors

Fort Bragg and Morro Bay dominated the port complexes for the take of the SSRF complex rockfishes by shorebased IFQ trawlers with annual averages of 22.97 mt and 18.76 mt, respectively (Table 4-16). With the exception of 2012, Fort Bragg's annual total exceeded 23 mt, with the greatest amount (30.86 mt) taken in 2014. Morro Bay, on the other hand, had its four-year low in 2011 (4.11 mt), and then leveled off between at approximately between 23 and 25 mt. In the Monterey port complex, its best year was in 2011 (5.04 mt), with steady decreases for the remaining three years. San Francisco has relatively sparse landings totals in three of the four years, with its best year occurring in 2013 when approximately 2 mt were landed.

Vessel activity, for the four port complexes, was very light regarding the take of the SSRF complex rockfishes (excluding blackgill rockfish) by vessels that opted to gear switch (Table 4-16). Of the four port complexes, Morro Bay had the highest four-year average, and at that, it amounted to only about 330 pounds (0.15 mt).

Table 4-16. Shorebased IFQ vessel SSRF complex (excluding blackgill rockfish) annual landings (mt) comparing the trawl and non-trawl sectors by port complex south of 40°10' N. latitude, 2011-2014.

SSRF	Year and Landings (mt)				Four-year	
Port Complex and Sector	**2011**	**2012**	**2013**	**2014**	**Total**	**Average**
Fort Bragg						
IFQ Trawl	23.79	10.75	26.49	30.86	91.88	22.97
IFQ Non-trawl	0	0	0	0.04	0.04	0.01
San Francisco						
IFQ Trawl	0.07	0.08	1.95	0.32	2.43	0.61
IFQ Non-trawl	0	tr	tr	tr	tr	tr
Monterey						
IFQ Trawl	5.04	1.85	1.54	0.86	9.30	2.32
IFQ Non-trawl	0	tr	0	0	tr	tr
Morro Bay						
IFQ Trawl	4.11	24.84	22.80	23.28	75.03	18.76
IFQ Non-trawl	0.06	0.17	0.34	0.03	0.60	0.15

Note: tr = trace amount

4.4.1.3.4 Blackgill Rockfish Shorebased IFQ Trawl and Non-trawl Sectors

Of the four port complexes, Fort Bragg shorebased IFQ trawlers easily dominated blackgill rockfish landings, averaging 35.5 mt (Table 4-17). The next highest was for the Morro Bay port complex with an average of 1.47 mt. However, the Morro Bay port complex averaged the most landings of blackgill rockfish by those vessels that opted to gear switch (6.45 mt). Note that in 2014 there was a substantial amount of blackgill rockfish taken in the Fort Bragg complex by vessels that gear switched, making this port complex the most productive in 2014 (5.24 mt), followed next by the Morro Bay port complex (3.17 mt). Previous to 2014, no blackgill rockfish had been taken by the Fort Bragg shorebased IFQ non-trawl sector whereas in the Morro Bay complex 2013 was the most productive year of any of the ports and years when 14.92 mt were landed.

Table 4-17. Shorebased IFQ vessel blackgill rockfish annual landings (mt) comparing the trawl and non-trawl sectors by port complex south of 40°10' N latitude, 2011-2014.

Blackgill Rockfish	Year and Landings (mt)				Four-year	
Port Complex and Sector	**2011**	**2012**	**2013**	**2014**	**Total**	**Average**
Fort Bragg						
IFQ Trawl	11.21	70.00	37.87	22.92	141.99	35.50
IFQ Non-trawl	0	0	0	5.24	5.24	1.31
San Francisco						
IFQ Trawl	0.05	0.01	0.03	0.39	0.47	0.12
IFQ Non-trawl	0.19	0.11	0.11	0.15	0.56	0.14
Monterey						
IFQ Trawl	0.56	2.20	1.17	0.37	4.30	1.08
IFQ Non-trawl	0	0.02	0	0	0.02	0.01
Morro Bay						
IFQ Trawl	2.40	1.23	0.62	1.63	5.88	1.47
IFQ Non-trawl	1.97	5.74	14.92	3.17	25.79	6.45

4.4.1.3.5 Number of Vessels Making Landings

For the SSRF complex fishery, shorebased IFQ vessels utilized the gear switching option in four port complexes from 2011 through 2014: Fort Bragg, San Francisco, Monterey, and Morro Bay. For the other four port complexes, there were no recorded landings of either the other SSRF complex species or blackgill rockfish. Table 4-18 provides a summary count of the number of shorebased IFQ vessels (both trawl and non-trawl) that landed SSRF complex species (excluding blackgill rockfish) for each of those four port complexes during this time period. Table 4-19 provides a summary count for vessels that landed blackgill rockfish in these same port complexes. Confidentiality rules apply; therefore, there are some year/sectors where the number of vessels cannot be given.

4.4.1.3.6 SSRF Shorebased IFQ Trawl and Non-trawl Vessel Counts

For the four port complexes, the number of shorebased IFQ trawlers remained relatively steady per port complex throughout the four-year period, with Fort Bragg recording the greatest numbers of vessels per year when taking the SSRF complex (excluding blackgill rockfish) (Table 4-18). San Francisco had than three vessels per year taking SSRF complex rockfish with the exception of 2012 when three vessels made landings. Monterey's high year was in 2013 with three vessels with the other three years totaling less than three vessels per year. In the Morro Bay port complex, less than three vessels per year made landings during the four-year period.

For the shorebased IFQ non-trawl vessels taking SSRF complex rockfishes, the count pattern was much different compared to the shorebased IFQ trawlers. In the Fort Bragg port complex, until 2014, there were no non-trawl vessels with recorded landings of the SSRF complex. In 2014, however, there was some activity, albeit a minimal amount. The San Francisco port complex had some activity with vessels making landings in the last three years. In the Monterey port complex, there was activity only during 2012. Morro Bay was the one port complex that deviated most markedly from the other three port complexes. It showed a decrease in shorebased IFQ non-trawl vessel activity in the SSRF complex fishery, starting with a high of five vessels in 2011 and decreasing to three vessels in 2014 (Table 4-18).

Table 4-18. The number of shorebased IFQ vessels landing SSRF complex rockfishes (excluding blackgill rockfish) for the four port complexes south of 40°10' N latitude, 2011-2014.

SSRF Port Complex and Sector	Year and Number of Vessels Making Landings			
Ft. Bragg	2011	2012	2013	2014
IFQ Trawl	6	5	6	6
IFQ Non-trawl				x
San Francisco	2011	2012	2013	2014
IFQ Trawl	x	3	x	x
IFQ Non-trawl		x	x	x
Monterey	2011	2012	2013	2014
IFQ Trawl	x	x	3	x
IFQ Non-trawl		x		
Morro Bay	2011	2012	2013	2014
IFQ Trawl	x	x	x	x
IFQ Non-trawl	5	4	4	3

Notes: Cells with an "x" denote years where there were less than three vessels; because of confidentiality rules the actual amount cannot be given. A null cell value indicates that no vessels made any recorded landings for that port complex, sector, and year.

4.4.1.3.7 Blackgill Rockfish Shorebased IFQ Trawl and Non-trawl Vessel Counts

For vessels that landed blackgill rockfish (both shorebased IFQ trawl and shorebased IFQ non-trawl), the annual count pattern for Fort Bragg was the same as that for the SSRF complex vessel count (Table 4-18 and Table 4-19). For San Francisco, shorebased IFQ trawlers had high years in 2011 and 2014. In both the Monterey and Morro Bay port complexes, the vessel count pattern was the same as for the SSRF complex counts.

In the Fort Bragg complex, 2014 was the only year where blackgill rockfish was taken by shorebased IFQ non-trawl vessels, with two vessels making landings in that year (Table 4-19). San Francisco had its peak year in 2012 with three vessels landing blackgill, with less than three vessels per year thereafter. Monterey, again, had activity in only one year (2012) where blackgill rockfish was landed. Similar to the relative vessel count pattern for the SSRF complex, Morro Bay had its highest year in 2011 with nine vessels landing blackgill rockfish, then a decrease to five vessels in 2012 and then a continued decrease to three vessels per year for 2013 and 2014.

Table 4-19. The number of shorebased IFQ trawl vessels and shorebased IFQ non-trawl vessels landing blackgill rockfish for the four port complexes south of 40°10' N latitude, 2011-2014.

Blackgill Rockfish	Year and Number of Vessels Making Landings			
Port Complex and Sector				
Ft. Bragg	2011	2012	2013	2014
IFQ Trawl	6	5	6	6
IFQ Non-trawl				x
San Francisco	2011	2012	2013	2014
IFQ Trawl	x	x	x	x
IFQ Non-trawl	x	3	x	x
Monterey	2011	2012	2013	2014
IFQ Trawl	x	x	3	x
IFQ Non-trawl		x		
Morro Bay	2011	2012	2013	2014
IFQ Trawl	x	x	x	x
IFQ Non-trawl	9	5	3	3

Notes: Cells with an "x" denote years where there were less than three vessels making landings; because of confidentiality rules the actual amount cannot be given. A null cell value indicates that no vessels made any recorded landings for that port complex, sector, and year.

4.4.1.3.8 Number of Trips

As another indicator of sector activity and effort for the SSRF complex fishery for the four port complexes, Table 4-20 and Table 4-21 provide the number of annual trips made by shorebased IFQ trawl and shorebased IFQ non-trawl vessels. A trip was defined as one where any amount of SSRF complex rockfish were included in a vessel's landing on a given date. Trips were determined whereby "split tickets" were accounted for since vessels frequently make landings that are recorded on more than one dealer receipt.

Table 4-20. The number of trips made by shorebased IFQ vessels landing SSRF complex rockfishes (excluding blackgill rockfish) for the four port complexes south of 40°10' N latitude, 2011-2014.

SSRF	Year and Number of Trips			
Port Complex and Sector	2011	2012	2013	2014
Fort Bragg				
IFQ Trawl	74	64	75	66
IFQ Non-trawl				x
San Francisco				
IFQ Trawl	5	10	19	13
IFQ Non-trawl		x	x	x
Monterey				
IFQ Trawl	27	38	38	31
IFQ Non-trawl		x		
Morro Bay				
IFQ Trawl	14	46	35	31
IFQ Non-trawl	36	50	25	13

Notes: Cells with an "x" denote years where there were less than three trips made; because of confidentiality rules the actual amount cannot be given. A null cell value indicates that no trips were made for that port complex, sector, and year.

Table 4-21. The number of trips made by shorebased IFQ vessels landing blackgill rockfish for the four port complexes south of 40°10' N latitude, 2011-2014.

Blackgill Rockfish	Year and Number of Trips			
Port Complex and Sector	**2011**	**2012**	**2013**	**2014**
Fort Bragg				
IFQ Trawl	71	63	77	56
IFQ Non-trawl				6
San Francisco				
IFQ Trawl	9	4	7	15
IFQ Non-trawl	5	5	5	x
Monterey				
IFQ Trawl	21	36	32	19
IFQ Non-trawl		3		
Morro Bay				
IFQ Trawl	12	42	33	30
IFQ Non-trawl	74	64	25	17

Notes: Cells with an "x" denote a year where there were less than three trips made; because of confidentiality rules the actual amount cannot be given. A null cell value indicates that no trips were made for that port complex, sector, and year.

4.4.1.4 Analysis of Blackgill Rockfish Incidental Catch Rates and Implications for Management of Groundfish Target Fisheries

In order to understand the impacts of potentially pulling blackgill rockfish out of the Slope Rockfish complex (South of 40°10' N latitude) or changing the relative trawl:non-trawl allocations, an analysis was done to determine the co-occurrence of blackgill with sablefish, shortspine thornyhead, and Petrale sole. It was thought that blackgill rockfish could become a constraining species on targeted trips for those three selected species. The West Coast Groundfish Observer Program (WCGOP) database was used to analyze catch on a haul-by-haul basis for the years 2003-2013 (using the RYEAR field) for catch south of 40°10' N latitude (using the AREA field; AREA= SOUTH).

For each haul, the observer notes the targeted species from either the logbook or the captain. Using the TARGET field, those individual hauls (each with a separate HAUL_ID) that targeted either sablefish (SABL), shortspine thornyhead (SSPN), petrale sole (PTRL), and blackgill rockfish (BLGL) were selected. The following sections describe the occurrence of blackgill rockfish on the other targeted trips and the occurrence of the three species on blackgill rockfish targeted trips. For each combination, two primary analyses were done: 1. Evaluating the proportion of individual hauls on targeted trips that also caught (retained or discarded) the other species, and 2. Determining the amount (in pounds) and proportions of non-target to target species caught.

4.4.1.4.1 Sablefish Targeted Hauls

Over the 11 year period, there were 4,140 unique haul IDs that listed sablefish as the targeted species. Of those 4,140 unique hauls, only 4,123 actually caught (retained or discarded) sablefish. Those 17 hauls without any observed sablefish catch were removed from the analysis.

Table 4-22 below shows the number of unique hauls that caught sablefish and blackgill rockfish on targeted sablefish trips, and the proportion of hauls that caught blackgill rockfish to hauls that caught sablefish for non-IFQ sectors. Due to confidentiality, all non-IFQ sectors are displayed together, i.e., Limited Entry (Primary and DTL) and Open Access Fixed Gear.

Table 4-22. Non-IFQ Sablefish Targeted Hauls.

Year	Number of Hauls That Caught Sablefish	Number of Hauls That Caught Blackgill Rockfish	Proportion of Sablefish Hauls that Caught Blackgill Rockfish
2003	151	50	0.33
2004	283	104	0.37
2005	97	49	0.51
2006	110	43	0.39
2007	184	53	0.29
2008	90	30	0.33
2009	146	53	0.36
2010	165	50	0.30
2011	212	45	0.21
2012	171	54	0.32
2013	168	39	0.23

Table 4-23 shows the same information as Table 4-22, except for the IFQ sector (which was implemented beginning 2011).

Table 4-23. IFQ Sablefish Targeted Hauls.

Year	Number of Hauls That Caught Sablefish	Number of Hauls That Caught Blackgill Rockfish	Proportion of Sablefish Hauls that Caught Blackgill Rockfish
2011	1,008	207	0.21
2012	850	193	0.23
2013	488	254	0.52

Table 4-24 and Table 4-25 describe the average amount of sablefish and blackgill rockfish caught (retained and discarded; lbs.) and the average and maximum ratio of blackgill rockfish catch to sablefish catch on a single haul for the non-IFQ and IFQ sectors, respectively.

Table 4-24. Catch Statistics (in pounds) on Non-IFQ Sablefish Targeted Hauls.

Year	Average Amount of Sablefish Caught (lbs.)	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Ratio of Blackgill Rockfish /Sablefish Caught on Single Haul	Maximum Ratio of Blackgill Rockfish /Sablefish Caught on Single Haul
2003	741	68	0.13	6.78
2004	857	11	0.04	3.04
2005	1,058	19	0.06	1.50
2006	1,788	15	0.07	2.32
2007	1,101	7	0.01	0.29
2008	590	3	0.01	0.44
2009	1,139	16	0.04	2.36
2010	1,002	16	0.04	1.92
2011	948	17	0.02	2.00
2012	963	52	0.12	4.37
2013	1,437	12	0.01	0.46

Table 4-25. Catch Statistics (in pounds) on IFQ Sablefish Targeted Hauls.

Year	Average Amount of Sablefish Caught (lbs.)	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Ratio of Blackgill Rockfish /Sablefish Caught on Single Haul	Maximum Ratio of Blackgill Rockfish /Sablefish Caught on Single Haul
2011	1,311	13	0.01	2.15
2012	753	36	0.09	11.35
2013	620	70	0.30	13.59

Table 4-26 shows the minimum, maximum, and 25th, 50th (median), 75th percentiles of the amounts of sablefish and blackgill rockfish caught on sablefish targeted trips (in lbs) from 2003-2013.

Table 4-26. Catch Quantiles on Sablefish Targeted Trips (lbs).

Quantile	Minimum	25th	50th	75th	Maximum
Sablefish	1.81	265.02	643.69	1,288.21	20,691.11
Blackgill Rockfish	0	0	0	2.17	6,837.76

Based on the data, those trips targeting sablefish primarily are not also targeting blackgill rockfish. Only 2 years (2005 for non-IFQ and 2013 for IFQ) had more than 40% of the individual observed hauls catch both sablefish and blackgill rockfish. On average, sablefish targeted hauls caught less than 70 lbs. of blackgill rockfish in all years in both non-IFQ and IFQ. However, there were some hauls where significant amounts of blackgill were caught, even in excess of the sablefish catch.

4.4.1.4.2 Shortspine Thornyhead Targeted Hauls

Over the period, there were 1,251 unique haul IDs that listed shortspine thornyhead as the targeted species. Of those 1,251 unique hauls, only 1,250 actually caught (retained or discarded) shortspine thornyhead. That one haul without any observed shortspine thornyhead catch was removed from the analysis. The tables below are the same as presented for sablefish above, although all sectors (both IFQ and non-IFQ) have been combined for confidentiality.

Table 4-27. Shortspine Thornyhead Targeted Hauls (All Sectors).

Year	Number of Hauls That Caught Shortspine thornyhead	Number of Hauls That Caught Blackgill Rockfish	Proportion of Shortspine thornyhead Hauls that Caught Blackgill Rockfish
2003	59	9	0.15
2004	117	53	0.45
2005	59	27	0.46
2006	106	34	0.32
2007	183	67	0.37
2008	80	9	0.11
2009	103	12	0.12
2010	154	8	0.05
2011	158	8	0.05
2012	115	1	0.01
2013	116	10	0.09

Table 4-28. Catch Statistics (in pounds) on Shortspine Thornyhead Targeted Hauls.

Year	Average Amount of Shortspine thornyhead Caught (lbs.)	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Ratio of Blackgill Rockfish /Shortspine thornyhead Caught on Single Haul	Maximum Ratio of Blackgill Rockfish /Shortspine thornyhead Caught on Single Haul
2003	194.69	0.58	0.03	1.34
2004	199.98	2.56	0.02	0.22
2005	243.01	9.38	0.23	12.54
2006	199.50	3.52	0.05	3.97
2007	158.47	2.90	0.18	27.95
2008	171.68	0.60	0.00	0.07
2009	139.70	0.34	0.00	0.05
2010	89.82	3.22	0.03	2.46
2011	110.34	0.11	0.00	0.02
2012	98.38	0.02	0.00	0.01
2013	154.94	0.31	0.00	0.01

Table 4-29. Catch Quantiles on Shortspine Thornyhead Targeted Hauls (lbs).

Quantile	Minimum	25th	50th	75th	Maximum
Shortspine thornyhead	1.00	73.80	121.14	188.8	1,255.88
Blackgill Rockfish	0	0	0	0	25.60

As seen in the tables above, those hauls that are targeting shortspine thornyhead are not encountering blackgill rockfish at any significant levels. In recent years, there has been less than one pound on average caught per haul (Table 4-28); with a maximum haul of 25.6 lbs. of blackgill rockfish caught over the entire period (Table 4-29). Therefore, blackgill rockfish are most likely not a constraining species for those fishermen targeting shortspine thornyhead.

4.4.1.4.3 Petrale Sole Targeted Hauls

Over the period, there were 1,558 unique haul IDs that listed petrale sole as the targeted species. Of those 1,588 unique hauls, only 1,522 actually caught (retained or discarded) petrale sole. Those 36 hauls without any observed petrale sole catch were removed from the analysis. As opposed to the two previous species, there is a seasonality that occurs with the petrale sole fishery. Petrale sole "cut-outs" within the Rockfish Conservation Area (RCA) are in place during periods 1 and 6 (January-February, November-December). These allow greater access to spawning aggregations of petrale sole that occur over winter within the RCA. Therefore, the analysis below looks at the relationship of petrale sole targeted trips during "winter" (November-February) and "summer" (March-October) periods. As with shortspine thornyhead, the tables below are the same as presented in the sablefish targeted haul description. Note that for both seasons, all 2003-2010 catch was in the limited entry trawl sector while 2011-2013 catch was all in IFQ fisheries. For the winter season, all 2003-2010 data have been combined for confidentiality purposes.

Table 4-30. Petrale Sole Targeted Hauls During Summer Months.

Year	Number of Hauls That Caught Petrale sole	Number of Hauls That Caught Blackgill Rockfish	Proportion of Petrale sole Hauls that Caught Blackgill Rockfish
2003	47	0	0.00
2004	28	5	0.18
2005	130	6	0.05
2006	167	0	0.00
2007	88	1	0.01
2008	179	29	0.16
2009	43	3	0.07
2010	43	14	0.33
2011	153	28	0.18
2012	173	30	0.17
2013	128	75	0.59

Table 4-31. Petrale Sole Targeted Hauls During Winter Months.

Year	Number of Hauls That Caught Petrale sole	Number of Hauls That Caught Blackgill Rockfish	Proportion of Petrale sole Hauls that Caught Blackgill Rockfish
2003-2010	151	47	0.31
2011	53	36	0.68
2012	91	74	0.81
2013	48	32	0.67

Note: 2003-2010 data combined for confidentiality purposes.

Table 4-32. Catch Statistics (in pounds) for Petrale Sole Targeted Hauls during Summer Months.

Year	Average Amount of Petrale sole Caught (lbs.)	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Ratio of Blackgill Rockfish /Petrale sole Caught on Single Haul	Maximum Ratio of Blackgill Rockfish /Petrale sole Caught on Single Haul
2003	684.18	0.00	0.00	0.00
2004	922.29	2.88	0.01	0.12
2005	810.31	0.04	0.00	0.00
2006	598.31	0.00	0.00	0.00
2007	1,221.36	0.02	0.00	0.00
2008	779.47	0.96	0.00	0.05
2009	901.08	7.07	0.00	0.14
2010	587.03	1.16	0.00	0.03
2011	435.22	0.90	0.01	0.42
2012	436.50	1.67	0.02	2.42
2013	1,099.06	26.91	0.06	2.64

Table 4-33. Catch Statistics (in pounds) on Petrale Sole Targeted Hauls during Winter Months.

Year	Average Amount of Petrale sole Caught (lbs.)	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Ratio of Blackgill Rockfish /Petrale sole Caught on Single Haul	Maximum Ratio of Blackgill Rockfish /Petrale sole Caught on Single Haul
2003-2010	1,320.39	33.75	0.12	5.56
2011	1,367.47	34.74	0.03	0.08
2012	1,620.21	232.76	0.19	5.16
2013	2,871.56	60.97	0.14	5.98

Table 4-34. Catch Quantiles on Petrale Sole Targeted Hauls (lbs).

Quantile	Minimum	25th	50th	75th	Maximum
Summer					
Petrale Sole	0.4	211.35	492.28	966.71	22,816.15
Blackgill Rockfish	0	0	0	0	1,227.492
Winter					
Petrale Sole	4.66	648.80	1,214.22	2,292.89	8,900
Blackgill rockfish	0	0	1.41	25.30	11,093.58

There is a seasonal effect on Petrale sole trips that encounter blackgill rockfish. In winter months, petrale sole targeted hauls tend to encounter blackgill rockfish at a higher rate than in summer months (Table 4-31 and Table 4-30, respectively); although, summer 2013 did see relatively high levels of blackgill encounters. Furthermore, with the increased access to petrale sole grounds during the winter months resulting in higher catch of petrale sole, there are higher average amounts of blackgill rockfish as well as increased ratios of blackgill to petrale sole catch (Table 4-33). In fact, some hauls in 2012 and 2013 caught five times the amount of blackgill as they did petrale sole. The maximum amount of blackgill caught on a haul exceeded the maximum amount of petrale sole during the winter period. This suggests that blackgill rockfish could become a constraining species to petrale sole targeted trips, especially during periods 1 and 6.

4.4.1.4.4 Trips Targeting Blackgill Rockfish

Over the period, there were 62 unique haul IDs that listed blackgill rockfish as the targeted species. Of those 62 unique hauls, only 59 actually caught (retained or discarded) blackgill rockfish. Those 3 hauls without any blackgill rockfish observed were removed from the analysis. Note that no trips were recorded targeting blackgill rockfish prior to 2009. As with previous sections, the same tables below are presented for blackgill rockfish targeted trips. Due to confidentiality, all sectors have been combined and no data is shown for 2010 because the rule of three was not met.

4.4.1.4.4.1 Sablefish Co-Occurrence

Table 4-35. Blackgill Rockfish Targeted Hauls.

Year	Number of Hauls That Caught Blackgill Rockfish	Number of Hauls That Caught Sablefish	Proportion of Blackgill Rockfish Hauls that Caught Sablefish
2009	15	6	0.40
2010			
2011	14	11	0.79
2012	10	8	0.80
2013	13	13	1.00

Note: 2010 data omitted for confidentiality.

Table 4-36. Catch Statistics (in pounds) on Blackgill Rockfish Targeted Hauls.

Year	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Amount of Sablefish Caught (lbs.)	Average Ratio of Sablefish Caught /Blackgill Rockfish Caught on Single Haul	Maximum Ratio of Sablefish Caught /Blackgill Rockfish Caught on Single Haul
2009	492	9	4.70	68.50
2010				
2011	1,326	144	0.31	1.46
2012	820	125	0.56	4.27
2013	1,602	393	0.14	0.79

Note: 2010 data omitted for confidentiality.

Table 4-37. Catch Quantiles on Blackgill Rockfish Targeted Hauls (lbs).

Quantile	Minimum	25th	50th	75th	Maximum
Blackgill Rockfish	1.00	195.60	721.19	1,475.26	4,286.40
Sablefish	0	0	20.02	81.31	2,554.00

4.4.1.4.4.2 Shortspine Thornyhead Co-Occurrence

Table 4-38. Blackgill Rockfish Targeted Hauls.

Year	Number of Hauls That Caught Blackgill Rockfish	Number of Hauls That Caught Shortspine thornyhead	Proportion of Blackgill Rockfish Hauls that Caught Shortspine thornyhead
2009	15	6	0.40
2010			
2011	14	10	0.71
2012	10	7	0.70
2013	13	11	0.85

Note: 2010 data omitted for confidentiality.

Table 4-39. Catch Statistics on Blackgill Rockfish Targeted Hauls.

Year	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Amount of Shortspine thornyhead Caught (lbs.)	Average Ratio of Shortspine thornyhead Caught /Blackgill Rockfish Caught on Single Haul	Maximum Ratio of Shortspine thornyhead Caught /Blackgill Rockfish Caught on Single Haul
2009	491.52	0.50	0.13	1.82
2010				
2011	1,325.77	21.03	0.05	0.34
2012	819.53	11.84	0.05	0.27
2013	1,602.15	25.48	0.02	0.05

Note: 2010 data omitted for confidentiality.

Table 4-40. Catch Quantiles on Blackgill Rockfish Targeted Hauls (lbs).

Quantile	Minimum	25th	50th	75th	Maximum
Blackgill Rockfish	1.00	195.60	721.19	1,475.26	4,286.40
Shortspine Thornyhead	0	0	1.82	14.91	136.92

4.4.1.4.4.3 Petrale Sole Co-Occurrence

Table 4-41. Blackgill Rockfish Targeted Hauls- Summer.

Year	Number of Hauls That Caught Blackgill Rockfish	Number of Hauls That Caught Petrale sole	Proportion of Blackgill Rockfish Hauls that Caught Petrale sole
2009	15	0	0
2010			
2011	7	4	0.57
2012	9	1	0.11
2013			

Note: 2010 and 2013 data omitted for confidentiality.

Table 4-42. Blackgill Rockfish Targeted Hauls-Winter.

Year	Number of Hauls That Caught Blackgill Rockfish	Number of Hauls That Caught Petrale sole	Proportion of Blackgill Rockfish Hauls that Caught Petrale sole
2011-2013	12	4	0.33

Note: 2011-2013 data combined for confidentiality.

Table 4-43. Catch Statistics on Blackgill Targeted Hauls-Summer.

Year	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Amount of Petrale sole Caught (lbs.)	Average Ratio of Petrale sole /Blackgill Rockfish Caught on Single Haul	Maximum Ratio of Petrale sole /Blackgill Rockfish Caught on Single Haul
2009	491.52	0.00	0.00	0.00
2010				
2011	1,393.91	17.30	0.03	0.39
2012	773.03	16.11	0.75	6.76
2013				

Note: 2010 and 2013 data omitted for confidentiality.

Table 4-44. Catch Statistics on Blackgill Targeted Hauls-Winter.

Year	Average Amount of Blackgill Rockfish Caught (lbs.)	Average Amount of Petrale sole Caught (lbs.)	Average Ratio of Petrale sole /Blackgill Rockfish Caught on Single Haul	Maximum Ratio of Petrale sole /Blackgill Rockfish Caught on Single Haul
2011-2013	1282.85	14.08	0.01	0.04

Table 4-45. Quantiles of Catch on Blackgill Rockfish Targeted Hauls.

Quantile	Minimum	25th	50th	75th	Maximum
Summer					
Blackgill rockfish	1.00	158.68	428.46	1,280.58	4,286.40
Petrale sole	0	0	0	0	207.84
Winter					
Blackgill rockfish	202.00	791.87	1,137.59	1,818.32	3,182.05
Petrale sole	0	0	0	5.62	143.06

On blackgill targeted hauls, there seems to be co-occurrence with the other three species. However, while there are high rates of encounters of sablefish and shortspine thornyhead (Table 4-35 and Table 4-38), there are relatively lower encounters of petrale sole (Table 4-41 and Table 4-42). This suggests that when targeting blackgill rockfish, vessels are fishing more on the slope rather than the shelf (where petrale are targeted in the winter; see section Petrale Sole Targeted Hauls). The amounts of co-occurring species caught tend to be in smaller amounts, with sablefish seeing the highest average catch (Table 4-36). While some hauls did see greater amounts of the other species compared to blackgill rockfish on a targeted haul, it is reasonable to conclude that on those hauls that blackgill was the primary target; vessels may choose to fish in areas where other valuable species (e.g., sablefish) may be caught to supplement a trip. This might be especially true for non-trawl vessels fishing under blackgill rockfish trip limits. However, the average ratio of the non-target to blackgill rockfish per haul is very low overall, especially for shortspine thornyhead and petrale sole (Table 4-39, Table 4-43, and Table 4-44). Sablefish have been caught in higher proportions in past years (Table 4-36), which may correspond to those years where sablefish was more prevalent off California leading to increased landings.

4.4.1.5 Analysis of Blackgill Rockfish Incidental Catch Needs in IFQ and non-IFQ Target Fisheries

Recent PacFIN data on IFQ and non-IFQ landings of the three target species (sablefish, petrale sole and shortspine thornyheads) in ports south of 40°10’ N latitude were compared with the WCGOP estimates of incidental catch of blackgill rockfish in the corresponding fisheries for those target species. Results of that analysis for IFQ fisheries for the three target species are summarized in Table 4-46, and results for non-IFQ target fisheries are summarized in Table 4-47.

Table 4-46. Estimated Blackgill Rockfish Incidental Catch in Selected IFQ Target Species Fisheries.

Estimated Incidental Catch of Blackgill RF in IFQ Target Species Fisheries							Blackgill RF incidental catch rates per haul in target fisheries (lbs blackgill / lbs target spp)				Proportion of Sampled hauls that caught Blackgill RF (x seasonal catch proportions for Petrale sole)		Implied Blackgill RF Incidental Catch (mt)					
							Avg rate	Max rate	Avg rate	Max rate			Avg rate	Max rate	Avg rate	Max rate	Avg rate	Max rate
	Year	Total Landings (rwt lbs)	# of Vessels Landing	Avg of 3 Lowest Vessel Annual Landings (lbs)	Avg of 3 Highest Vessel Annual Landings (lbs)	Avg Vessel Annual Landings (lbs)	Summer (Petrale sole only)		Winter (Petrale sole only)		Summer	Winter	Summer	Summer	Winter	Winter	Total	Total
Petrale sole	2011	**261,231**	14	569	46,733	18,659	0.01	0.42	0.03	0.08	0.090748	0.337174						
	2012	**305,840**	13	3,692	49,775	23,526	0.02	2.42	0.19	5.16	0.079887	0.429361						
	2013	**536,394**	14	2,343	79,583	38,314	0.06	2.64	0.14	5.98	0.428676	0.183198						
	2014	**579,323**	14	499	88,475	41,380												
2011-2014 Minimum		**261,231**	13	499	46,733	18,659	0.01	0.42	0.03	0.08	0.079887	0.183198	0.1	4.0	0.7	1.7	**0.7**	**5.7**
2011-2014 Maximum		**579,323**	14	3,692	88,475	41,380	0.06	2.64	0.19	5.98	0.428676	0.429361	6.8	297.4	21.4	674.7	**28.2**	**972.1**
2011-2014 Average		**420,697**	14	1,776	66,142	30,470	0.03	1.826667	0.12	3.74	0.199771	0.316578	1.1	69.6	7.2	225.9	**8.4**	**295.6**
Sablefish	2011	**1,717,695**	28	2,917	172,076	61,346	0.01	2.15			0.21							
	2012	**1,013,489**	25	1,383	106,681	40,540	0.09	11.35			0.23							
	2013	**756,143**	21	2,918	78,407	36,007	0.3	13.59			0.52							
	2014	**852,934**	21	412	104,364	40,616												
2011-2014 Minimum		**756,143**	21	412	78,407	36,007	0.01	2.15			0.21		0.7	154.9			**0.7**	**154.9**
2011-2014 Maximum		**1,717,695**	28	2,918	172,076	61,346	0.3	13.59			0.52		121.5	5,506.0			**121.5**	**5,506.0**
2011-2014 Average		**1,085,065**	24	1,908	115,382	44,627	0.133333	9.03			0.32		21.0	1,422.2			**21.0**	**1,422.2**
Sh. thornyheads	2011	**303,135**	23	47	52,650	13,180	0	0.02			0.05							
	2012	**354,967**	21	7	82,202	16,903	0	0.01			0.01							
	2013	**347,609**	18	41	67,448	19,312	0	0.01			0.09							
	2014	**249,710**	15	155	39,904	16,647												
2011-2014 Minimum		**249,710**	15	7	39,904	13,180	0	0.01			0.01		0.0	0.0			**0.0**	**0.0**
2011-2014 Maximum		**354,967**	23	155	82,202	19,312	0	0.02			0.09		0.0	0.3			**0.0**	**0.3**
2011-2014 Average		**313,855**	19	63	60,551	16,510	0	0.013333			0.05		0.0	0.1			**0.0**	**0.1**

Table 4-47. Estimated Blackgill Rockfish Incidental Catch in Selected non-IFQ Target Species Fisheries.

Estimated Incidental Catch of Blackgill RF in non-IFQ Target Species Fisheries							Blackgill RF incidental catch rates per haul in target fisheries (lbs blackgill / lbs target spp)				Proportion of Sampled hauls that caught Blackgill RF		Implied Blackgill RF Incidental Catch (mt)					
							Avg rate	Max rate	Avg rate	Max rate			Avg rate	Max rate	Avg rate	Max rate	Avg rate	Max rate
	Year	Total Landings (rwt lbs)	# of Vessels Landing	Avg of 3 Lowest Vessel Annual Landings (lbs)	Avg of 3 Highest Vessel Annual Landings (lbs)	Avg Vessel Annual Landings (lbs)	Summer (Petrale sole only)		Winter (Petrale sole only)		Summer	Winter	Summer	Summer	Winter	Winter	Total	Total
Petrale sole	2011	**1,719**	15	2	499	115	0.01	0.42	0.03	0.08	0.18	0.68						
	2012	**941**	17	2	238	55	0.02	2.42	0.19	5.16	0.17	0.81						
	2013	**1,943**	16	3	539	121	0.06	2.64	0.14	5.98	0.59	0.67						
	2014	**904**	15	2	270	60												
2011-2014 Minimum		**904**	15	2	238	55	0.01	0.42	0.03	0.08	0.17	0.67	0.0	0.0	0.0	0.0	**0.0**	**0.1**
2011-2014 Maximum		**1,943**	17	3	539	121	0.06	2.64	0.19	5.98	0.59	0.81	0.0	1.4	0.1	4.3	**0.2**	**5.6**
2011-2014 Average		**1,377**	16	2	386	88	0.03	1.826667	0.12	3.74	0.313333	0.72	0.0	0.4	0.1	1.7	**0.1**	**2.0**
Sablefish	2011	**2,940,811**	230	4	103,925	12,786	0.02	2			0.21							
	2012	**2,060,328**	192	5	101,557	10,731	0.12	4.37			0.32							
	2013	**1,876,102**	135	6	79,635	13,897	0.01	0.46			0.23							
	2014	**1,708,455**	148	2	83,223	11,544												
2011-2014 Minimum		**1,708,455**	135	2	79,635	10,731	0.01	0.46			0.21		1.6	74.9			**1.6**	**74.9**
2011-2014 Maximum		**2,940,811**	230	6	103,925	13,897	0.12	4.37			0.32		51.2	1,865.4			**51.2**	**1,865.4**
2011-2014 Average		**2,146,424**	176	4	92,085	12,239	0.05	2.276667			0.253333		12.3	561.5			**12.3**	**561.5**
Sh. thornyheads	2011	**474,220**	100	2	18,172	4,742	0	0.02			0.05							
	2012	**333,935**	84	9	16,684	3,975	0	0.01			0.01							
	2013	**305,374**	74	3	14,086	4,127	0	0.01			0.09							
	2014	**210,099**	67	2	9,895	3,136												
2011-2014 Minimum		**210,099**	67	2	9,895	3,136	0	0.01			0.01		0.0	0.0			**0.0**	**0.0**
2011-2014 Maximum		**474,220**	100	9	18,172	4,742	0	0.02			0.09		0.0	0.4			**0.0**	**0.4**
2011-2014 Average		**330,907**	81	4	14,709	3,995	0	0.013333			0.05		0.0	0.1			**0.0**	**0.1**

The above two tables show estimated blackgill rockfish incidental catch impacts assuming the minimum, maximum and average values observed during the period for blackgill incidental catch rates, target species landings, and the proportion of sampled hauls that included blackgill rockfish catch (encounter rate). For

petrale sole, the tables split the target fishery into "summer" and "winter" periods during which fishing strategies and incidental catch rates differ based on the distribution of the petrale sole stock. For comparison, both tables also show measures of the average, minimum and maximum annual total landings for each of the three target species recorded by vessels during the 2011-2014period.[10]

Table 4-46 shows a wide range of estimated blackgill rockfish incidental catch in IFQ fisheries for petrale sole and sablefish, but very little impact for shortspine thornyhead target fisheries. Total estimated annual incidental catch of blackgill rockfish in IFQ fisheries for petrale sole ranges from 0.7 mt to 972.1 mt depending on whether the average or maximum observed incidental catch rates are applied, and whether the minimum, maximum or average historical values for petrale sole landings and blackgill encounter rates are assumed. For example, assuming the average 2011-2014 petrale sole annual sector landings, average 2011-2013 encounter rate and average 2011-2013 blackgill incidental catch rate, an estimated 8.4 mt of blackgill rockfish would be caught in the petrale sole fishery. However assuming the same average petrale sole landings and encounter rate but applying the maximum observed incidental catch rate, the estimated incidental catch of blackgill rockfish increases to 295.6 mt.

Applying the same logic to data from the IFQ sablefish target fishery shows blackgill rockfish incidental catch estimates ranging from 0.7 mt to 5,506 mt (Table 4-46). Assuming the average 2011-2014 sablefish annual landings, average 2011-2013 blackgill encounter rate and average 2011-2013 blackgill incidental catch rate, an estimated 21 mt of blackgill rockfish would be caught in the IFQ sablefish fishery. However assuming the same average sablefish landings and encounter rate but applying the maximum observed blackgill incidental catch rate, the estimate increases to 1,422.2 mt.

Table 4-47 shows a similarly wide range of estimated blackgill rockfish incidental catch in non-IFQ fisheries for sablefish, but again very little incidental catch in the non-IFQ shortspine thornyhead fishery. There is really no non-IFQ target fishery for petrale sole. Total estimated annual incidental catch of blackgill rockfish in non-IFQ sablefish fisheries ranges from 1.6 mt to 1,865.4 mt depending on whether the average or maximum observed incidental catch rates are applied, and whether the minimum, maximum or average historical values for sablefish landings and blackgill encounter rates are assumed. For example, assuming the average 2011-2014 sablefish annual landings, average 2011-2013 encounter rate, and average 2011-2013 blackgill incidental catch rate, an estimated 12.3 mt of blackgill rockfish would be caught in the non-IFQ sablefish fishery. However assuming the same average sablefish landings and encounter rate but applying the maximum observed incidental catch rate increases estimated blackgill rockfish incidental catch to 561.5 mt.

4.4.1.6 Implications of Blackgill Rockfish Incidental Catch for Possible Constraints on IFQ and non-IFQ Target Fisheries

The preceding analysis of blackgill rockfish catch based on recent PacFIN landings data and WCGOP incidental catch rates indicates that it is possible that the blackgill rockfish sector allocations may become constraining to target species fisheries, especially those for IFQ sablefish, non-IFQ sablefish and IFQ petrale sole, and under conditions where high target species catch allowances coincide with relatively high blackgill rockfish encounter rates and incidental catch rates. Certain individual vessels in the IFQ fisheries could find these factors particularly constraining, especially those operating with relatively small amounts of QPs for blackgill rockfish, and/ or if opportunities to obtain blackgill rockfish quota or QPs in the market is limited due to unavailability or a reluctance to sell.

[10] To preserve data confidentiality the minimum measure is the average of the three lowest vessel annual landings, and the "maximum" measure is the average of the three highest vessel annual total landings.

4.4.1.6.1 Additional Quota Market Considerations

The extent that the removal of blackgill rockfish from the SSRF complex results in it becoming a "choke species" in the IFQ fishery depends partially on the effectiveness of the market at linking up would-be purchasers of QPs with holders of QPs who are willing to sell. The default rule for the division of an IFQ stock complex allocates QS for the resultant new IFQ categories to each QS in amounts equivalent to the QS that they held prior to the division. Thus an entity that holds one percent of the complex prior to the division will hold one percent of each of the resultant IFQ categories. The expectation behind this approach was that after a stock complex split, QS holders would trade QS or QP to balance their accounts to match their particular fishery strategy. This expectation is based on an assumption of efficient markets. Markets that are highly efficient are characterized by relatively abundant linkages between buyers and sellers, relatively low transaction or search costs, and relatively consistent quota prices. Recent research (Holland and Norman 2015) indicates that the market for QPs in the IFQ fishery has not been operating efficiently, particularly for overfished rockfish species for which trades have been sparse. While the authors also note that there are some indications of increasing efficiency in the market for QPs, they also indicate that it may take many years before the market matures to the point that economists would characterize it as efficient. Consequently, issuance of QS for Blackgill Rockfish may be more likely to constrain overall groundfish harvest given the current market inefficiencies than it would if the market were functioning efficiently.

While it is possible that the less-than-efficient market for QPs could be a constraint on fishing, this effect could be reduced by the formation of risk pools that vessels can join. Risk pools for other (overfished) species currently do exist for vessels in the Fort Bragg and Monterrey Bay areas. An important consideration in how binding blackgill rockfish quota may be on IFQ groundfish fisheries is whether or not blackgill catch could be managed through risk pools in a manner similar to risk pools currently operating for other species.

4.4.1.7 Surplus Carry-Over

The surplus carryover provision in the shorebased IFQ program allows up to 10 percent of the quota pound surplus in a vessel account to be carried over from one year to the next (see regulations at 660.140(e)(5)). The current NMFS policy, based on a court ruling in 2014, is that NMFS will not issue surplus carryover for IFQ species that have ACLs established equal to their ABCs (Agenda Item F.4.a, Attachment 1, June 2014).

Given this court ruling and the new NMFS policy, it would be expected that, if the Council elects to remove blackgill from the southern Slope Rockfish complex and manage the stock in the trawl fishery with IFQs, surplus carry-over could be considered for blackgill. This is because the stock is in the precautionary zone and the ACL would be expected to be less than the ABC with application of the default 40-10 harvest control rule in the foreseeable future. This is contrary to the expectation for the remaining species in the complex. These species are either assessed to be healthy and the default HCR is to set the ACL equal to the ABC (e.g., aurora rockfish) or the stock is unassessed and the default HCR is to set the ACL equal to the ABC. In both cases, surplus carry-over would not be issued for the remaining southern Slope Rockfish unless there is a change in policy.

4.4.1.8 Effects of the Alternative Trawl Sector Allocations on Accumulation Limits

Reallocations between fisheries sectors and/or QS owners must be analyzed with respect to the effects of the reallocations on three separate QP use or QS control limits for the southern Slope Rockfish complex (SSRF), blackgill rockfish (blackgill), and the combined rockfish species remaining in the SSRF complex once blackgill has been removed (Other SSRF). The three limits are: (1) the maximum amount of QPs for an IFQ species that can be caught by a vessel in a year (QP use limit), (2) the maximum amount of QS for

a given IFQ species that can be held in a single QS account (QS control limit), and (3) the maximum aggregate amount of QS for all IFQ species combined that can be held in a QS account (Aggregate QS limit).

4.4.1.8.1 Quota Pound Use Limits

The current vessel use limit for SSRF is 9.0%. A 9.0% vessel use limit implies that at least 11 different vessels are needed to harvest the entire No Action trawl allocation of SSRF QPs. Under the No Action trawl allocation of 420.2 mt, a 9.0% use limit means a single vessel could harvest up to a total of 37.8 mt of SSRF in a year.

4.4.1.8.1.1 Blackgill Rockfish

Alternatives 1 and 2 specify separate trawl sector allocations for blackgill and Other SSRF. In order to be able to harvest 37.8 mt of blackgill (as would be permissible under a No Action trawl allocation of 420.2 mt and a 9.0% vessel use limit) under the Alternative 1 blackgill trawl sector allocation of 41.7 mt, a QP use limit of 37.8/41.7 = 90.6% would be needed, implying that as few as two vessels could harvest the entire trawl allocation of blackgill QPs.

The Alternative 2 trawl sector allocation for blackgill of 36.2 mt is less than the 37.8 mt that could be harvested by a single vessel under No Action, implying that a single vessel could harvest the entire trawl allocation of blackgill QPs.

Note that applying these use limits, which are calculated from implied vessel catch allowances under No Action, would not be practical nor is it the intent under the two action alternatives that individual participants harvest the same level of blackgill QPs as would be possible under the No Action trawl allocation and 9.0% vessel use limit.

Applying the current 9% QP use limit to the trawl sector allocations under Alternative 1 implies that a maximum of 3.75 mt of blackgill QPs could be harvested annually by a single vessel. Under Alternative 2, the 9% QP use limit implies a maximum of approximately 3.26 mt of blackgill QPs could be harvested annually by a single vessel.

4.4.1.8.1.2 Other SSRF

In order to be able to harvest up to the 37.8 mt of Other SSRF that is possible under No Action, under the Alternative 1 trawl sector allocation of 514.3 mt for Other SSRF, a QP use limit of 37.8/514.3 = 7.35% is needed, implying that it would take at least 14 vessels to harvest the entire trawl allocation of Other SSRF QPs.

Under the Alternative 2 allocation, this ratio is 37.8 mt/488.6 mt = 7.7% implying that at least 13 vessels would be needed to harvest the entire trawl allocation of Other SSRF QPs.

Applying the current 9% QP use limit to the trawl sector allocations under Alternative 1 implies that a maximum of approximately 46.29 mt of Other SSRF QPs could be harvested annually by a single vessel. Under Alternative 2, the 9% QP use limit implies a maximum of approximately 43.97 mt of Other SSRF QPs could be harvested annually by a single vessel.

4.4.1.8.1.3 Comparing recent landings history with QP limits implied under the Alternatives:

4.4.1.8.1.3.1 Blackgill RF:

Assuming a QP use limit of 9% of the trawl sector allocation, analysis of annual landings data during 2011 through 2014 indicates that a number of vessels had total annual landings during the period that would have exceeded the QP use limits for blackgill that are implied under the two action alternatives.

Under the Alternative 1 trawl allocation of 41.7 mt, two vessels in 2011, four vessels in 2012, four vessels in 2013, and two vessels in 2014 made total blackgill landings that would exceed the 9% blackgill QP use limits. It is not known what proportion of those landings were the result of targeting on blackgill versus landings of blackgill caught by vessels targeting other species (e.g., sablefish, shortspine thornyheads or petrale sole). In order to accommodate the highest historical landings by vessels that landed blackgill during the 2011-2014 period, a QP use limit of 57% would be required under the Alternative 1 blackgill trawl sector allocation, i.e., two vessels could harvest the entire sector allocation.

Under the Alternative 2 trawl allocation of 36.2 mt, two vessels in 2011, four vessels in 2012, five vessels in 2013, and two vessels in 2014 made total blackgill landings that would exceed the 9% blackgill QP use limits. In order to accommodate the highest historical landings by vessels that landed blackgill during the 2011-2014 period, a QP use limit of 65% would be required under the Alternative 2 blackgill trawl sector allocation, i.e., two vessels could harvest the entire sector allocation.

4.4.1.8.1.3.2 Other SSRF Species

There were no vessels with recent historical landings of Other SSRF species during 2011 through 2014 that would exceed the harvest amounts implied by a 9% use limit for Other SSRF QPs under the two action alternatives.

4.4.1.8.1.3.3 All SSRF Species Combined

There were no vessels with recent historical landings of all SSRF species combined during 2011 through 2014 that would exceed the harvest amounts implied by a 9% use limit for all SSRF species QPs under No Action or the two action alternatives.

4.4.1.8.2 Quota Share Control Limits

If the QP use limits were changed to allow participants to harvest up to a certain weight of SSRF, Other SSRF or blackgill under the adopted alternative, then consideration should also be given to adjusting the corresponding QS control limits. The original QS control limit for the SSRF complex was set at 6.0%, equal to 2/3 of the QP use limit of 9.0% (or, alternatively, the QP use limit was set at 1.5x the QS control limit).

Based on QS holdings by QS permit owners as of October 2014, under No Action there were four QS owners who held SSRF QS equal to or exceeding the SSRF QS control limit of 6%.

The individual QS allocations to QS owners would not change under the alternatives (i.e., there is no reallocation of QS among QS owners). Therefore the number of QS permit owners holding QS under the sector reallocation alternatives for SSRF, Other SSRF or blackgill equal to or exceeding the 6% QS control limit would not change. That is, there would be four QS owners holding QS equal to or exceeding the QS control limit of 6% for SSRF under No Action, and under action the alternatives those four QS owners

would hold allocations of both Other SSRF and blackgill equal to or exceeding the 6% QS control limits for those two species groups.

4.4.1.8.3 Aggregate Quota Share Control Limit

The aggregate QS control limit caps the total amount of QS for all non-whiting IFQ species combined that can be held by an individual entity. Calculation of individual account holders' aggregate QS control is a weighted average of QS for all non-whiting IFQ species held in QS accounts weighted by the IFQ sector allocations for each corresponding non-whiting IFQ species (the relative weights). Under Amendment 20 the aggregate QS control limit was set at 2.7%, which means that no individual QS account should contain more than 2.7% of the total weighted average QS for all non-whiting IFQ species combined. To prevent account owners' aggregate QS holdings from varying year to year based solely on periodic changes in ACLs or IFQ sector allocations for certain species, Amendment 20 specified that the 2010 IFQ sector allocations be used as the relative weights for this calculation. However for purposes of comparison, a calculation of aggregate non-whiting QS holdings is also made using current, 2015 IFQ sector allocations.

Using 2010 IFQ sector species allocations as relative weights, under No Action one QS owner's account is over the 2.7% aggregate QS control limit. Since there will be no reallocations of QS among QS owners under the proposed action, the number QS owners' accounts with QS holdings exceeding the 2.7% aggregate QS control limit would remain the same (i.e., one) under both of the action alternatives. The 2010 relative weights that were used to calculate aggregate QS holdings under the alternatives are as follows: under No Action Total SSRF = 0.0066406; under Alternative 1 blackgill = 0.0004985 and Other SSRF = 0.0061421; and under Alternative 2 blackgill = 0.000458 and Other SSRF = 0.0061826.

Using 2015 IFQ sector species allocations (which vary under the alternatives) as relative weights, one additional QS owner's account (i.e., a total of two) would be considered over the 2.7% aggregate QS control limit under No Action and also under the two action alternatives.

5 Consistency with the Groundfish FMP and MSA National Standards

5.1 FMP Goals and Objectives

The goals and objectives of the groundfish FMP provide guidance for decisions about the structure of the allocation alternatives. Those goals and objectives are as follows.

Management Goals

Goal 1 - Conservation. Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources.

Goal 2 - Economics. Maximize the value of the groundfish resource as a whole.

Goal 3 - Utilization. Within the constraints of overfished species rebuilding requirements, achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

Objectives

To accomplish these management goals, a number of objectives will be considered and followed as closely as practicable:

Conservation:

Objective 1. Maintain an information flow on the status of the fishery and the fishery resource that allows for informed management decisions as the fishery occurs.

Objective 2. Adopt harvest specifications and management measures consistent with resource stewardship responsibilities for each groundfish species or species group. Achieve a level of harvest capacity in the fishery that is appropriate for a sustainable harvest and low discard rates and which results in a fishery that is diverse, stable, and profitable. This reduced capacity should lead to more effective management for many other fishery problems.

Objective 3. For species or species groups that are overfished, develop a plan to rebuild the stock as required by the MSA.

Objective 4. Where conservation problems have been identified for non-groundfish species and the best scientific information shows that the groundfish fishery has a direct impact on the ability of that species to maintain its long-term reproductive health, the Council may consider establishing management measures to control the impacts of groundfish fishing on those species. Management measures may be imposed on the groundfish fishery to reduce fishing mortality of a non-groundfish species for documented conservation reasons. The action will be designed to minimize disruption of the groundfish fishery, in so far as consistent with the goal to minimize the bycatch of non-groundfish species, and will not preclude achievement of a quota, harvest guideline, or allocation of groundfish, if any, unless such action is required by other applicable law.

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

Economics:

Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities, and establish management policies that extend those sectors' fishing and marketing opportunities as long as practicable during the fishing year.

Objective 8. Use gear restrictions to minimize the necessity for other management measures whenever practicable. Encourage development of practicable gear restrictions intended to reduce regulatory and/or economic discards through gear research regulated by EFP.

Utilization:

Objective 9. Develop management measures and policies that foster and encourage full utilization (harvesting and processing), in accordance with conservation goals, of the Pacific Coast groundfish resources by domestic fisheries.

Objective 10. Recognizing the multispecies nature of the fishery, establish a concept of managing by species and gear or by groups of interrelated species.

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

Social Factors:

Objective 12. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

Objective 13. Minimize gear conflicts among resource users.

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

Objective 15. Avoid unnecessary adverse impacts on small entities.

Objective 17. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable.

Objective 18. Promote the safety of human life at sea.

The socioeconomic framework of the FMP in Section 6.2.3 provides the guidance for making decisions, such as the contemplated Amendment 21 actions, that affect groundfish fishing sectors and fishing

communities on the west coast. The socioeconomic framework provides the following guidance for these types of decisions:

"If the Council concludes that a management action is necessary to address a social or economic issue, it will prepare a report containing the rationale in support of its conclusion. The report will include the proposed management measure, a description of other viable alternatives considered, and an analysis that addresses the following criteria: (a) how the action is expected to promote achievement of the goals and objectives of the FMP; (b) likely impacts on other management measures, other fisheries, and bycatch; (c) biological impacts; (d) economic impacts, particularly the cost to the fishing industry; (e) impacts on fishing communities; and (f) how the action is expected to accomplish at least one of the following, or any other measurable benefit to the fishery:

1. Enable a quota, HG, or allocation to be achieved.

2. Avoid exceeding a quota, HG, or allocation.

3. Extend domestic fishing and marketing opportunities as long as practicable during the fishing year, for those sectors for which the Council has established this policy.

4. Maintain stability in the fishery by continuing management measures for species that previously were managed under the points of concern mechanism.

5. Maintain or improve product volume and flow to the consumer.

6. Increase economic yield.

7. Improve product quality.

8. Reduce anticipated bycatch and bycatch mortality.

9. Reduce gear conflicts, or conflicts between competing user groups.

10. Develop fisheries for underutilized species with minimal impacts on existing domestic fisheries.

11. Increase sustainable landings.

12. Reduce fishing capacity.

13. Maintain data collection and means for verification.

14. Maintain or improve the recreational fishery."

Further, the process for deciding formal allocations is provided in Section 6.3 of the FMP. The allocation process requires the Council to consider the following factors when intending to recommend direct allocation of the resource:

1. Present participation in and dependence on the fishery, including alternative fisheries

2. Historical fishing practices in and historical dependence on the fishery

3. The economics of the fishery

4. Any consensus harvest sharing agreement or negotiated settlement between the affected participants in the fishery

5. Potential biological yield of any species or species complex affected by the allocation

6. Consistency with the MSA national standards

7. Consistency with the goals and objectives of the FMP

5.2 Consistency of the Proposed Actions with the FMP

The proposed actions are consistent with the goals and objectives of the Groundfish FMP, which were used to derive intersector allocation alternatives and analyses of alternatives. Further, as specified in the FMP under the Socioeconomic and Allocation Frameworks, there was significant public participation in the scoping of alternatives and throughout the decision-making process. Affected parties, primarily members of the fishing industry who represent the affected groundfish sectors, provided input either through the Groundfish Advisory Subpanel (GAP) or through public comment.

Intersector allocations are consistent with the management goals (Goals 1, 2, and 3) outlined in the Groundfish FMP. The proposed actions are designed to improve conservation, economics, and utilization by setting up allocations to support the trawl rationalization program (Amendment 20). Because the intersector allocation decisions support the trawl rationalization program, the reader should also refer to consistency of the trawl rationalization program with the groundfish FMP discussed in Section 6.1 of the trawl rationalization FEIS.

Intersector allocations are consistent with the objectives within the Groundfish FMP. Intersector allocations do not directly address Conservation Objectives 1, 2, 3, and 5, but remain consistent with these objectives as implemented through the Groundfish FMP and federal regulations at 50 CFR Part 660.

Intersector allocations are consistent with Economic Objectives 6 and 7. Intersector allocations attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries (Objective 6) by supporting the action to transition the trawl fishery to catch shares. Intersector allocations are consistent with Objective 7 by continuing to support year-round fishing and marketing opportunities and decreasing the risk of early season closures. Intersector allocations do not directly address the Economic Objective 8, but remain consistent with that objective as implemented through the Groundfish FMP and federal regulations at 50 CFR Part 660.

Intersector allocations are consistent with Utilization Objectives 9, 10, and 11. Through the trawl rationalization program, intersector allocations support increased utilization of the groundfish resource by increasing opportunities to harvest healthy groundfish species while remaining within the constraints of overfished species (Objective 9). Intersector allocations continue to recognize the multispecies nature of the fishery and manage the fishery according to gear types and according to the species and groupings listed in the ABC/OY tables from 50 CFR part 660, subpart G (Objective 10). Intersector allocations are consistent with Objective 11, minimizing bycatch, as described below in Section 6.2 under MSA National Standard 9. In addition to the proposed actions for intersector allocations supporting the trawl rationalization program, Intersector Allocation Decision 5 would also minimize the bycatch of Pacific halibut through a total catch limit.

Intersector allocations are consistent with the social factors described in Objectives 12 through 16. Intersector allocations are consistent with Objective 13 by formalizing allocations between sectors of the fishery (between trawl and non-trawl, and within trawl), reducing the conflicts between groups caused by

one group closing another group early because they have exceeded the OY. Intersector allocations are consistent with Objective 12, attempt to affect users equitably; Objective 14 accomplishes the change with the least disruption; and Objective 15 avoids unnecessary adverse impacts on small entities, because the allocations generally formalize recent harvest levels in the fishery. Intersector allocations are consistent with Objective 16, minimizing adverse economic impacts on fishing communities, as described in Section 6.2 under MSA National Standard 8. Intersector allocations do not directly address Social Objective 17, but remain consistent with the objective as implemented through the Groundfish FMP and federal regulations at 50 CFR part 660.

5.3 Applicable MSA National Standards

An FMP or plan amendment and any pursuant regulations must be consistent with ten national standards contained in the MSA (§301). Because the intersector allocation decisions support the trawl rationalization program, the reader should also refer to consistency of the trawl rationalization program with the MSA National Standards discussed in Section 6.2 of the trawl rationalization EIS.

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

The proposed actions for intersector allocations would support efforts to achieve OY and prevent overfishing. Allocating the trawl-dominant groundfish species between the trawl and non-trawl sectors and within trawl sectors provides more accountability for the sector to remain within its allocation and reduces the risk of other sectors causing premature fishery closures.

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

The analyses contained in this document constitute the best available scientific information.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The intersector allocations follow the management units for the groundfish fishery, except for the southern Slope Rockfish complex, as described in the harvest specification tables in 50 CFR part 660, subpart G, which are based on the delineations from stock assessments. The FEIS for the 2015-16 Groundfish Specifications, as well as the 2014 SAFE document, describe the management units for Pacific Coast groundfish. The action alternatives analyzed in this document would modify the Slope Rockfish complex south of 40°10’ N latitude by removing blackgill rockfish and managing that stock as a stock-dependent management unit.

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

Intersector allocations were developed through the Council process, which facilitates substantial participation by state representatives. Generally, state proposals are brought forward when alternatives are crafted and integrated to the degree practicable. Decisions about catch allocation between different sectors or gear groups are also part of this participatory process, and emphasis is placed on equitable division while

ensuring conservation goals. None of the alternatives analyzed would discriminate against residents of different states.

According to the NS4 guidelines, an allocation scheme may promote conservation by encouraging a rational, more easily managed use of the resource, or it may promote conservation (in the sense of wise use) by optimizing the yield, in terms of size, value, market mix, price, or economic or social benefit of the product. These guidelines were at the forefront of the deliberations associated with the proposed action as the Council, NMFS, and advisors to the Council process continually advocated long-term, sustainable allocations that sought to optimize future yields of the affected species, as well as economic returns from future fisheries dependent on these species.

Further, as stated in the NS4 guidelines, harvest opportunities and privileges must be allocated fairly and equitably among the commercial, recreational, and charter fishing sectors of the fishery. This was a primary objective of this process.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

National Standard 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

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

The intersector allocations analyzed in this EA do not affect costs and do not cause duplication.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The action alternatives supporting the proposed action are primarily driven by the need to ensure conservation of blackgill rockfish south of 40°10’ N latitude, which is in a depressed status with a spawning biomass below the management target.

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

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

The intersector allocation alternatives analyzed in this EA do not address safety at sea.

6 Persons and Agencies Consulted

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