INITIAL REVIEW DRAFT

Environmental Assessment/ Regulatory Impact Review/
Initial Regulatory Flexibility Analysis

Proposed Amendment to the Fishery Management Plan for Groundfish of the Gulf of Alaska and Federal regulations implementing the sablefish and Pacific halibut fisheries off Alaska

Allow the Use of Pot Longline Gear in the Gulf of Alaska Sablefish Individual Fishing Quota Fishery

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Abstract: This document analyzes proposed management measures that would apply exclusively to the sablefish (*Anoplopoma fimbria*) Individual Fishing Quota (IFQ) fishery in the Gulf of Alaska (GOA). The measures under consideration include: (1) redefine legal gear to include pot longline gear, potentially subject to a pot limit, (2) require retention of Pacific halibut (*Hippoglossus stenolepis*) if sufficient IFQ is held by fishermen to cover both the sablefish and halibut IFQ caught using pot longline gear, (3) limit the retention of halibut in sablefish IFQ pot longline gear to incidental catch only (e.g., maximum retainable amount), (4) require removal of pot longline gear (when not fishing with a vessel size exemption) to minimize grounds preemption, and (5) require marking of pot longline gear.

The proposed action would minimize fishery interactions and potential entanglements with marine mammals and seabirds, and adverse impacts on the sablefish IFQ fleet from depredation by sperm whales (*Physeter macrocephalus*) and killer whales (*Orcinus orca*). Depredation has negative consequences for the sablefish IFQ fleet through reduced catch rates and increased operating costs. Depredation also has negative consequences for the whales through increased risk of vessel strike, gear entanglement, and altered foraging strategies. An additional management concern stems from the impact that whale depredation may have on the accuracy of fish stock abundance indices.

List of Acronyms and Abbreviations

‘	Feet
AAC	Alaska Administrative Code
ABC	acceptable biological catch
ADF&G	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
AKFIN	Alaska Fisheries Information Network
BOF	Board of Fish
BSAI	Bering Sea and Aleutian Islands
CAS	Catch Accounting System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COAR	Commercial Operators Annual Report
Council	North Pacific Fishery Management Council
CP	catcher/processor
CV	catcher vessel
DMR	discard mortality rate
DPS	distinct population segment
E	East
E.O.	Executive Order
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESU	endangered species unit
FMP	fishery management plan
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRFA	Final Regulatory Flexibility Analysis
ft	foot or feet
GOA	Gulf of Alaska
IPHC	International Pacific Halibut Commission
IRFA	Initial Regulatory Flexibility Analysis
JAM	jeopardy or adverse modification
lb(s)	pound(s)
LLP	license limitation program
LOA	length overall

m	meter or meters
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MRA	maximum retainable amount
MSST	minimum stock size threshold
mt	metric ton
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fishery Service
NOAA	National Oceanographic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NPPSD	North Pacific Pelagic Seabird Database
Observer Program	North Pacific Groundfish Observer Program
OMB	Office of Management and Budget
PBR	potential biological removal
PSC	prohibited species catch
PPA	Preliminary preferred alternative
PRA	Paperwork Reduction Act
PSEIS	Programmatic Supplemental Environmental Impact Statement
PWS	Prince William Sound
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future action
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SBA	Small Business Act
Secretary	Secretary of Commerce
SPLASH	Structure of Populations, Levels of Abundance, and Status of Humpbacks
SRKW	Southern Resident killer whales
TAC	total allowable catch
U.S.	United States
USCG	United States Coast Guard
W	West

Table of Contents

List of Tables

List of Figures

Executive Summary

This document analyzes proposed management measures that would apply exclusively to the Individual Fishing Quota (IFQ) fishery in the Gulf of Alaska (GOA) for sablefish (*Anoplopoma fimbria*), also known as black cod. A proposed FMP and regulatory amendment would allow the use of pot longline gear for the sablefish IFQ fishery in the GOA. The measures under consideration include: redefining legal gear to include pot longline gear; a vessel pot limit, requiring removal of pot longline gear with an exemption for smaller vessels; gear specification requirements; requiring retention of Pacific halibut (*Hippoglossus stenolepis*) if sufficient IFQs are held by fishermen to cover both the sablefish and halibut IFQ caught using pot longline gear; and restrictions to limit the retention of halibut in sablefish IFQ pot longline gear to incidental catch only (e.g., maximum retainable amount (MRA)), and gear marking requirements.

Purpose and Need

Interactions with sperm whales in the Central and Eastern Gulf, and killer whales in the Western Gulf affect the ability of sablefish quota share holders to harvest their sablefish IFQs by reducing catch per unit of effort and increasing fishing costs. Research into developing technological solutions to deter whales and changes in fishing strategies has not resolved the problem. Additional sablefish mortality associated with whale depredation is difficult to quantify, but increases total mortality and uncertainty in sablefish abundance indices. The use of pot gear for sablefish could reduce sperm whale and killer whale interactions with fishing gear in the Gulf of Alaska. The Council seeks to reduce the problems associated with whale depredation while minimizing gear conflicts that could result from allowing pot and longline gear to fish in the same regulatory areas.

Alternatives

Staff recommends that the North Pacific Fishery Management Council (Council) adopt a streamlined suite of elements and options for analysis for revision to the GOA Groundfish FMP and Federal regulations, as follows. The language below does not change the intent of the Council's original motion. An option under Alternative 2, Element 4 is suggested by staff in order to reflect the Council's intent that retained halibut bycatch in sablefish IFQ pot longline gear be "incidental" in nature.

Alternative 1. No action.

Revised Alternative 2. Allow the use of pot longline gear in the GOA sablefish IFQ fishery

Element 1. Limit of 0 to 400 pots (per vessel).

Element 2. Gear retrieval

Option 1. Require vessels to remove their pot gear when making a landing.

Suboption. Provide an exemption for vessels less than 60', 50', or 40'.

Option 2. Require the location of pots left on the grounds or lost on the grounds to be submitted when landings are made.

Element 3. Gear specifications.

Option 1. Require the use of neutrally buoyant groundline.

Option 2. Require both ends of the pot longline set to be marked.

Element 4. Retention of incidentally caught halibut.

Allow the retention of halibut caught incidentally in sablefish pots, provided the sablefish IFQ holder also holds sufficient halibut IFQ.

Option 1. Allow the retention of halibut caught incidentally in sablefish pots up to an MRA percentage, provided the sablefish IFQ holder also holds sufficient halibut IFQ.

Environmental Assessment

The proposed action to allow a new gear type to harvest sablefish (and possibly incidental amounts of halibut) IFQ in the GOA is limited in scope and will not likely affect all environmental components of the GOA. No effects are expected on the physical environment, habitat, groundfish (other than sablefish), ecosystem component species (other than halibut), and ecosystem components of the environment because current or proposed fishing regulations, harvest limits, and habitat protections as described in previous NEPA documents would not be changed by any of the alternatives. Five potentially affected components are shown in Table 2: sablefish, halibut, marine mammals (specifically sperm and killer whales), seabirds, and socioeconomics. The effects of the alternatives on the resource components would be caused by: (1) increased efficiency in harvesting sablefish and halibut IFQ: (2) decreased unaccounted mortality of sablefish (and potentially halibut) that are lost to whale depredation during IFQ fishing operations; and (3) potential decrease in whale and seabird interactions (i.e., entanglements) with pot longline gear (compared with the status quo gear of HAL longline gear) in the GOA. No increase in sablefish or halibut catches would occur, as those fisheries are managed under IFQs and those harvests are effectively capped. The socioeconomic environment may be affected by increased efficiency in harvesting sablefish IFQ (e.g., catch per unit effort, reduced fuel/bait costs, reduced opportunity costs), but could also be affected by the redistribution of effort among members of the existing harvest fleet.

Sablefish

Table ES-1 Criteria used to determine significance of effects

Effect	Criteria			
	Significantly Negative	Not Significant	Significantly Positive	Unknown
Stock Biomass: potential for increasing and reducing stock size	Changes in fishing mortality are expected to jeopardize the ability of the stock to sustain itself at or above its MSST (minimum standing stock threshold)	Changes in fishing mortality are expected to maintain the stock's ability to sustain itself above MSST	Changes in fishing mortality are expected to enhance the stock's ability to sustain itself at or above its MSST	Magnitude and/or direction of effects are unknown
Fishing mortality	Reasonably expected to jeopardize the capacity of the stock to yield sustainable biomass on a continuing basis.	Reasonably expected not to jeopardize the capacity of the stock to yield sustainable biomass on a continuing basis.	Action allows the stock to return to its unfished biomass.	Magnitude and/or direction of effects are unknown
Spatial or temporal distribution	Reasonably expected to adversely affect the distribution of harvested stocks either spatially or temporally such that it jeopardizes the ability of the stock to sustain itself.	Unlikely to affect the distribution of harvested stocks either spatially or temporally such that it has an effect on the ability of the stock to sustain itself.	Reasonably expected to positively affect the harvested stocks through spatial or temporal increases in abundance such that it enhances the ability of the stock to sustain itself.	Magnitude and/or direction of effects are unknown

Continued use of currently allowed gear would not decrease fishing mortality on sablefish, as hooked fish would continue to be predated upon by whales; efforts to better quantify this mortality are underway. While unknown, mortality of sablefish by whales on hook-and-line gear is gauged to be on the order of a few hundred tons. Whale predation may occur on 5 percent to 10 percent of sets, but could be as high as

30 percent to 40 percent on an individual set of longline gear. Generally, sperm whale depredation occurs in the Central GOA and Eastern GOA, while killer whale depredation occurs in the Western GOA. Taking no action would not address the stated purpose and need for the action. The Council has identified the need to maximize the ability of sablefish QS holders to harvest their sablefish IFQ by increasing catch per unit of effort and reducing fishing costs; this concern is further addressed in the RIR.

Alternative 2 would allow, but not require, pot longline gear for use in the sablefish IFQ fishery in the GOA. There are no significant impacts identified for sablefish. Some (unquantified) benefit would occur under Alternative 2. Unaccounted fishing mortality due to whale depredation would be reduced as sablefish IFQ fishermen voluntarily switch from HAL longline gear to pot longline gear, but that effect would be masked by recent lack of recruitment to the stock. Additional savings in lost mortality would accrue to species also caught by sablefish IFQ fishermen using HAL gear, such as grenadiers and Pacific halibut.

Pacific Halibut

The sablefish and halibut IFQ fisheries are prosecuted simultaneously and harvests of both fish may be landed together, as long as sufficient IFQ are held by those on board to cover those harvests. Taking no action would not address the stated purpose and need for the action. All halibut would continue to be discarded if caught with pot longline gear if the Council takes no action on Element 4. Such a requirement is in conflict with one of the tenets of the halibut/sablefish IFQ program, which is to allow fishermen to retain all legal fish of both species if sufficient IFQ are held to cover that harvest.

The Council has identified the need to maximize the ability of sablefish QS holders to harvest their sablefish IFQ by increasing catch per unit of effort and reducing fishing costs. The Council did not, however, identify management measures to limit halibut IFQ retention to *incidental* amounts as suboptions for analysis under Alternative 2, Element 4. The impacts identified for halibut will depend on the magnitude of sablefish IFQ catch switched from HAL longline to pot longline gear, and the limits potentially imposed on halibut retention under Alternative 2 Element 4. If the magnitude was found to be sufficiently high, data for a stock assessment selection curve would be needed to estimate the impact of the removals. If whale depredation is decreased, some (unquantified) benefit would occur under Alternative 2, Element 4. However, whale depredation of halibut is currently accounted for as part of natural mortality with the halibut assessment. Halibut discard mortality would continue to occur for those halibut not allowed to be retained. This mortality would accrue from two scenarios: (1) when no halibut may be retained in sablefish pot longline gear and (2) when halibut in excess of possible regulatory limits would be imposed to keep halibut retention at incidental amounts, not part of a directed fishery. The requirement to discard under 32 inch length halibut would continue.

Marine Mammals

Table ES-2 Criteria for determining significance of impacts to marine mammals

	Incidental take and entanglement in marine debris	Prey availability	Disturbance
Adverse impact	Mammals are taken incidentally to fishing operations or become entangled in marine debris.	Fisheries reduce the availability of marine mammal prey.	Fishing operations disturb marine mammals.
Beneficial impact	Decreased fishery interactions with fishing gear can be identified.	Availability of prey from fishing operations may provide additional, readily accessible, sources of food.	Decreased fishery interactions with fishing gear can be identified.
Significantly adverse impact	Incidental take is more than PBR or is considered major in relation to estimated population when PBR is undefined.	Competition for key prey species likely to constrain foraging success of marine mammal species causing population decline.	Disturbance of mammal is such that population is likely to decrease.
Significantly beneficial impact	No threshold can be identified.	Food availability increased substantially from baseline such that whale population levels survival or reproduction success is likely to increase.	Not applicable
Unknown impact	Insufficient information available on take rates.	Insufficient information as to what constitutes a key area or important time of year.	Insufficient information as to what constitutes disturbance.

A quantitatively unknown, but positive, effect is expected from allowing the use of longline pot gear in the GOA sablefish IFQ fishery, when compared with the status quo. Sperm whales and killer whales that depredate on longline fishing gear could be negatively impacted. Removing hooked sablefish from longline gear does not represent natural foraging for either whale species. Sperm whales and killer whales that depredate on longlining gear may be at greater risk of vessel strike and/or entanglement in fishing gear. If the sablefish IFQ fishery switches to longline pots, there will likely be decreased interactions between killer whales and sperm whales and fish sablefish fishery. This action would lead to a decrease in disturbances and likelihood of entanglements beyond those resulting from current avoidance techniques used by fishermen. Overall, Alternative 2 is expected to result in beneficial impacts on killer whales and sperm whales compared with the status quo.

Seabirds

Table ES-3 Criteria for determining significance of impacts on seabirds

	Incidental take	Prey availability
Insignificant	No substantive change in takes of seabirds during the operation of fishing gear.	No substantive change in forage used by seabirds.
Adverse impact	Non-zero take of seabirds by fishing gear.	Reduction in forage fish populations, or the availability of forage fish, to seabird populations.
Beneficial impact	Decreased fishery interactions with fishing gear can be identified.	Availability of offal from fishing operations may provide additional, readily accessible, sources of food.
Significantly adverse impact	Trawl and hook-and-line take levels increase substantially from the baseline level, or level of take is likely to have population level impact on species.	Food availability decreased substantially from baseline such that seabird population level survival or reproduction success is likely to decrease.
Significantly beneficial impact	No threshold can be identified.	Food availability increased substantially from baseline such that seabird population level survival or reproduction success is likely to increase.
Unknown impacts	Insufficient information available on take rates or population levels.	Insufficient information available on abundance of key prey species or the scope of fishery impacts on prey.

A continued prohibition on the use of pot longline gear in the GOA would not minimize potential fishery interactions with seabirds. The longline fleet has traditionally been responsible for about 91% of the overall seabird bycatch in Alaska. Of special concern is the endangered Short-tailed Albatross (Phoebastria albatrus). Fishing vessels in the GOA encounter seabirds (e.g. albatrosses, fulmars, gulls, shearwaters) during the course of fishing. These interactions can result in direct mortality for seabirds if they become entangled in fishing gear or strike the vessel or fishing gear while flying. Interactions with longline fisheries are of particular concern, as seabirds are attracted to sinking baited hooks and can become hooked and drowned. A transition from hook-and-line gear to pot longline gear is expected to reduce seabird interactions and decrease the likelihood of incidental takes of seabirds, which is viewed as a beneficial outcome of the proposed action. These decreased fishery interactions likely result from decreased prey availability. While decreased prey availability may negatively impact seabirds in the short run because they must return to natural predatory behavior, it benefits their survival in the long run due to decreased opportunities for entanglements (potentially those resulting in injuries and drownings).

Cumulative Effects

Three reasonably foreseeable future actions are identified as likely to have an impact on a resource component within the considered action area and timeframe. First, the Council is considering a regulatory amendment that would allow the retention of halibut IFQ in sablefish pot gear in halibut management area 4A (BS and AI areas). Second, the Council is currently reviewing a discussion paper on two proposals to amend the regulations that set vessel IFQ caps in the halibut and sablefish fisheries. One proposal pertains to vessel category A (freezer vessel) IFQ. The proposal asks for consideration of allowing vessels that *exclusively* fish category A IFQ to be allowed to fish above the vessel cap. The area scope of this potential action (GOA, BSAI, or all areas) has not yet been defined. The second vessel cap proposal seeks a "floor" on the annual vessel IFQ caps for halibut IFQ fishing in management areas 3 and 4. Third, the Council is in the midst of selecting a preferred alternative for an action that would lower the existing MRAs for skates in the GOA. Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the cumulative impacts of the proposed action are determined to be not significant.

Regulatory Impact Review

Alternative 1

Depredation on sablefish HAL sets is known to occur in the BSAI and GOA IFQ fisheries, and is a major cost to the sablefish IFQ fishery. Fishermen endure lost catch, spend time waiting out whales in the area before hauling gear, or spend time a fuel relocating to avoid whales. Measures taken to avoid depredation reduce fishing efficiency through variable operational costs (fuel, labor) and through the opportunity cost of time lost that would have been available for additional fishing effort or dedicated to other fishing and non-fishing activities. Because the sablefish IFQ fishery is quota-based, the key cost of depredation to fishermen is the cost of the additional time and bait required to catch the same amount of fish. Gear damage from depredation is also a direct cost. In a study conducted with six longline vessels operating in the Western GOA and BSAI areas during 2011 and 2012, killer whale depredation resulted in an estimated additional $980 per vessel-day for additional fuel, crew food and the opportunity cost of lost time. Based on data from the observed commercial fishery, the additional costs associated with catching the same amount of sablefish on killer whale depredated sets was estimated to be approximately $433 ± 147 per set for additional fuel alone (not including additional crew, bait or opportunity costs). The estimated reduction in CPUE for depredated sets in that area ranged between 35% to 69% for observed sets during the time period from 1998 through 2012. Estimated fuel costs associated with those sets were 82% higher. The study published in 2014 estimated opportunity costs of time lost to fishing at $522 per vessel-day.

Use of pot gear in areas where it is permitted has increased in recent years, at least in part due to depredation concerns. In 2007, pot gear accounted for 81% of the BS fixed gear IFQ catch and 56% of the AI catch.

Alternative 2

The use of pot longlines in the GOA sablefish IFQ fishery would be consistent with the allowance of pot gear in the BSAI sablefish IFQ fisheries. The purpose and need statement for this action outlines three first-order considerations for weighing the action alternative against the status quo. First, the Council is seeking an alternative that would mitigate the reduced CPUE and increased fishing costs (direct and indirect) that are attributed in part to whale depredation off of HAL gear. Second, the Council acknowledges that depredation off of HAL gear constitutes unaccounted mortality in the sablefish stock. Mortality from whale depredation is a direct negative impact on the sablefish stock, but the inability to account for this mortality (assumed to be greater than natural sablefish mortality due to whale predation) increases uncertainty in the sablefish abundance indices that are critical to sound management. Third, the Council is seeking an alternative that would provide continued, equitable fishing opportunities for harvesters who do not choose to switch to pot gear, minimizing the likelihood and severity of excessive grounds preemption, gear conflicts, and consolidation in the GOA sablefish IFQ fleet.

The Council and industry committees have noted potential benefits of pot gear for sablefish fishing that include: mitigation of marine mammal interactions, reduced bycatch of seabirds and other fish species, reduced overall halibut mortality, and better accounting of total sablefish fishing mortality.

The potential economic and social costs of allowing pot gear in areas where HAL gear is also used include: the capital cost of purchasing pot gear and/or re-tooling a vessel, increased preemption of fishing grounds, gear conflict potentially resulting in gear damage or loss, and competitive imbalance between users of different gear types.

In some aspects, the relative benefit of pot gear fishing as opposed to HAL gear is either unclear or is conditional on factors that are not forecasted in this analysis. Those external factors include the local biomass distribution of sablefish in the future, changes in future product markets, and the future behavior

of marine mammals (particularly depredating whales). Based on available information, the analysts are not able to definitively state whether fishing with pot gear would generate a higher sablefish CPUE in the GOA (noting that CPUE is likely to differ across GOA subareas), whether pot fishing will increase or decrease per unit ex-vessel values for sablefish, or whether pot fishing will reduce expenditures on bait, fuel, and travel time to and between fishing grounds.

It is possible that many GOA sablefish QS holders would not be able to take advantage of the opportunity to use pot longline gear, either because their vessels are too small to fish pot gear safely or practicably, or because they cannot afford cost of acquiring pot gear and reconfiguring their boat. Vessel owners with higher fishing revenues or greater capital assets would find it easier to secure financing. IFQ crewmen who own sablefish QS, but not a vessel, may find it more difficult to step up to vessel ownership if jumping up all the way to a vessel capable of fishing pots becomes the only viable way to fish sablefish IFQ in the GOA. Vessels that already fish pots in other fisheries, such as the Pacific cod fishery, would face much lower conversion costs than the small boat fleet. On an area basis, the Southeast Alaska fleet would likely face the longest build-up period in establishing pot gear operations. Larger vessels can safely carry more pots, meaning that they have a competitive advantage and would also impose costs on smaller vessels by preempting more of the sablefish fishing grounds.

If fishing sablefish IFQ with pot gear emerges as a dominant strategy, perhaps concentrating depredation by whale populations onto remaining HAL gear, direct costs and opportunity costs for non-pot participants could increase relative to the status quo. In the extreme, fishing with HAL gear could become less profitable. If operating margins for non-pot participants fall below the profitability line, vessel owners could choose to forgo the cost of operating their own vessel and "walk on" to vessels able to fish pot gear, thus reducing the number of active vessels in the fleet. Operators unable to convert to pot gear might choose to sell their QS, which could also lead to consolidation in the fleet. Fleet consolidation would be the most imminent threat to the number of available crew jobs. Pot operations do not seem to have inherently more or less crew on board than do HAL vessels.

Presuming that the conversion of some of the GOA sablefish fleet to pot longline gear reduces unaccounted whale depredation, and consequently reduces uncertainty in sablefish stock abundance indices, future TAC levels may increase. Transfer prices for the QS that underlie annual sablefish IFQ are based on perception of the future harvest opportunities in the fishery, so higher TACs could have a positive effect on QS value. Current QS holders would benefit from the enhanced value of their tradable asset, though individuals looking to purchase QS on the transfer market – such as new entrants, holders of small QS amounts, or crew members – might encounter higher barriers to entry.

Because the GOA sablefish fishery is an area-based IFQ fishery that is typically fully harvested, the gear used to make the catch should not affect the total amount of deliveries to processors in each area. There is some potential for the redistribution of catch if larger vessels if consolidation occurs. Sablefish caught with pot gear are not expected to be larger or smaller, on the whole, than those caught with HAL gear. As a result, processors would not likely have to alter their mix of product forms to suit a different average sized fish. The impact of a shift to pot longline gear on delivered sablefish quality is not clear. If reduced unaccounted whale depredation mortality decreases due to the use of pot gear, processors would benefit from increased TACs in the same manner as harvesters. However, marginal returns may be diminishing with increased sablefish production. Nominal average annual ex-vessel prices for sablefish in all areas have been in decline since their peak in 2011. Ex-vessel prices have many determinant factors in addition to the quantity supplied to the market. Nevertheless, one might conclude that demand for sablefish on the world market is not ever-expanding.

Potential impacts on communities follow the same logic as those described for processors. If fleet consolidation were to occur, communities that rank highly in processor reliance but not in processor

engagement (i.e. the community receives a small amount of deliveries, but that activity makes up a significant portion of the community's economic activity) would be among the most at risk. Those communities include Elfin Cove, Port Alexander, Akhiok, Excursion Inlet, and False Pass. GOA communities with shipyard operations might benefit from the removal of pot gear restrictions, as vessels may need to be re-fitted or modified in order to carry, launch, and haul longline pots.

Net Benefits Summary

Two general outcomes are possible under the proposed action, each of which would have different net benefit impacts. The first possible outcome is that HAL gear remains the only legal gear for the harvest of GOA sablefish IFQ. Net benefits would not change from the status quo under this outcome. The IFQ fishery would continue to operate in its current manner: whale depredation would continue to impose direct and opportunity costs on IFQ fishermen, and HAL bycatch of other groundfish species and seabirds would be unchanged from their present rates. The second possible outcome is that longline pot gear would be permitted in the GOA sablefish IFQ fishery, but would not be required. Given the diversity in the size of the vessels and the resources of the vessel owners in the fleet, it is likely that the fishery will be prosecuted with two different gear types deployed in the same management areas.

The likely benefits of replacing some HAL effort with longline pot effort are aligned with the Council's purpose and need for this action. Specifically, reducing the amount of prey availability for marine mammals and seabirds (sablefish and other groundfish hooked on HAL gear) should reduce interactions with fishing gear. Marine mammals and seabirds would experience a marginal benefit, in which the Council has expressed an interest, and those sablefish IFQ harvesters who use pot longline gear will have mitigated the depredation events that depress their CPUE. Bycatch of other groundfish species that are commonly taken with HAL gear but encountered less often with pot gear (e.g. halibut, rockfish, and skates) would decrease in the aggregate. More of those bycatch species would be available to other directed fisheries, benefitting sablefish IFQ participants who are active in those fisheries, as well as other stakeholder groups. The amount of sablefish that are depredated off of HAL gear without being accounted in stock abundance indices would decrease as less HAL gear is deployed, thereby improving stock management and potentially leading to greater harvestable biomass in future time periods.

Participants who are not able to fish longline pot gear on their vessels – due to either financial or operational constraints – would not experience the same benefit of reduced whale depredation. In fact, it is possible that they would experience greater rates of depredation as the sablefish hooked on HAL gear becomes concentrated on fewer vessels in a given area. Therefore, some distributional impacts are likely to result from the action alternative; those impacts are likely to affect smaller vessels in the sablefish IFQ fleet. Furthermore, allowing two gear types in the same areas could increase the likelihood of gear conflicts in which HAL gear is at risk of damage or loss.

Because pot longline fishing for sablefish has not been permitted in the GOA during the existing IFQ management regime, the analysis lacks some information that would allow for a definitive assessment of whether or not pot fishing will actually generate greater net benefits. GOA data on sablefish catch rates with longline pot gear, and ex-vessel prices for pot-caught sablefish are not available. On the other hand, it is known that fitting a vessel with longline pot gear will be costly. Lacking that information, it is not clear that investments in setting up a pot longline operation will return a net benefit in the form of reduced gear damage and reduced opportunity costs incurred when avoiding whale depredation.

Based on the analysis and criteria under E.O. 12866, there may likely be some distributional impacts among the various participants affected. Precisely what, when, and how great these impacts might be is an empirical question. The qualitative benefits of reduced whale and seabird interactions are likely to be

achieved under the action alternative. The balance of benefits between pot longline and HAL sablefish fishermen is, at this point, less obvious due to limited data.

Management and Enforcement Considerations

If the proposed action alternative (Alternative 2) to allow the use of pot longline gear in the GOA sablefish IFQ fishery is recommended by the Council, then management, monitoring and enforcement of the fishery would be conducted by Inseason Management, the Observer Program and OLE as is currently done in the HAL fishery for sablefish in the GOA. However, the methods used to manage the fishery under the status quo alternative could not be used to fully monitor and enforce the 4 elements proposed under Alternative 2. Neither OLE nor the Observer Program has the resources to expand duties to fully monitor the proposed gear limitation elements under Alternative 2. However, a few OLE monitoring procedures and Observer Program data collection tasks that are already conducted could be extended to the GOA sablefish pot longline fishery in order to inform limited aspects of the action alternative elements. Accommodating new observer duties is only possible if the duty closely aligns with existing protocol, because observer time is fully committed to performing duties in support of existing program goals and regulations. Additional duties, such as those that would be necessary to fully monitor Elements 1 through 4 of the action alternative, cannot be performed using current resources.

Comparison of Alternatives for Decision making

Table ES-4 Summary of alternatives and major impacts

	Alternative 1	Alternative 2		
	Status quo. No action.	Allow pot longline gear in sablefish IFQ fishery	Status quo options	Proposed Options (as noted below)
Differences in Alternatives (Sections 2.1 and 2.2)				
FMP amendment	No	Yes	No	No
Regulatory amendment	No	Yes	No	Yes
Gear	None	Hook-and-line longline and pot longline gears only		Adoption of any changes to "groundfish pot" longline gear would create a "sablefish pot" and a new gear code.
Element 1. Pot limits	None		None	Maximum number of pots = 400
Element 2. Gear retrieval	None		None	Require pot removal during landing
			None	Require reporting of lost pots
Element 3. Gear specifications	None		None	Require neutrally buoyant groundline
			None	Require pot longline to be marked at both ends
Element 4. Halibut Retention	None		None	Require halibut retention; Set halibut MRA for GOA sablefish fishery
Environmental Impacts				
Whales	No changes. (Section 3.5)	Minimize gear interactions		Marking of both end of pot longlines could double the chance of whale entanglements
Seabirds	No changes.	Minimizes gear interactions		Marking of both end of pot longlines could double the chance of seabird entanglements
Sablefish	No changes.	Minimizes unaccounted for mortality.		
Halibut	No changes.	Minimizes discard mortality		
Economic Impacts				
Fishing effort		Reduces fishing costs from reduced gear, bait, harvest, fuel, ice, and time to retain the same amount of sablefish IFQ harvest Additional efficiencies associated with retaining halibut incidental harvest against IFQs		Exemption from pot removal requirement could allow additional vessels to use longline pot gear
Distributional impacts	No changes.	Vessels that do not use pot gear might experience greater depredation, opportunity costs		
Interagency Coordination				
Requires complementary action by the Alaska Board of Fisheries	No	Yes	No	Elements 1 – 3 could require complementary state action for consistency.
Requires complementary action by the International Pacific Halibut Commission	No	Yes	No	Element 4 would require the IPHC to amend its regulations to identify pots as legal gear in the GOA.

1 Introduction

This document analyzes proposed management measures that would apply exclusively to the Individual Fishing Quota (IFQ) fishery in the Gulf of Alaska (GOA) for sablefish (*Anoplopoma fimbria*), also known as black cod. A proposed FMP and regulatory amendment would allow the use of pot longline gear for the sablefish IFQ fishery in the GOA. The measures under consideration include: redefining legal gear to include pot longline gear, requiring removal of pot longline gear (subject to exemptions based on vessel size), gear specification requirements, requiring retention of Pacific halibut (*Hippoglossus stenolepis*) if sufficient IFQs are held by fishermen to cover both the sablefish and halibut IFQ caught using pot longline gear, and restrictions to limit the retention of halibut in sablefish IFQ pot longline gear to incidental catch only (e.g., maximum retainable amount (MRA)).

This document is an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA). An EA/RIR/IRFA provides assessments of the environmental impacts of an action and its reasonable alternatives (the EA), the distribution of economic benefits and costs of the action alternatives (the RIR), and the impacts of the action on directly regulated small entities (the IRFA). This EA/RIR/IRFA addresses the statutory requirements of the Magnuson Stevens Fishery Conservation and Management Act, the National Environmental Policy Act, Presidential Executive Order 12866, and the Regulatory Flexibility Act. An EA/RIR/IRFA is a standard document produced by the North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) Alaska Region to provide the analytical background for decision-making.

1.1 Purpose and Need

The Council adopted the following purpose and need statement to originate this action in December 2013.

> *Interactions with sperm whales in the Central and Eastern Gulf, and killer whales in the Western Gulf affect the ability of sablefish quota share holders to harvest their sablefish IFQs by reducing catch per unit of effort and increasing fishing costs. Research into developing technological solutions to deter whales and changes in fishing strategies has not resolved the problem. Additional sablefish mortality associated with whale depredation is difficult to quantify, but increases total mortality and uncertainty in sablefish abundance indices. The use of pot gear for sablefish could reduce sperm whale and killer whale interactions with fishing gear in the Gulf of Alaska. The Council seeks to reduce the problems associated with whale depredation while minimizing gear conflicts that could result from allowing pot and longline gear to fish in the same regulatory areas.*

The action is proposed to minimize fishery interaction with marine mammals and seabirds and adverse impacts on the sablefish IFQ fleet from depredation by sperm whales (*Physeter macrocephalus*) and killer whale (*Orcinus orca*). Depredation has negative consequences for the sablefish IFQ fleet through reduced catch rates and increased operating costs. Depredation also has negative consequences for the whales through increased risk of vessel strike, gear entanglement, fisherman aggression, and altered foraging strategies. An additional management concern stems from the impact that whale depredation may have on the accuracy of sablefish stock abundance indices.

1.2 History of this Action

Mr. Michael Douville of Craig, Alaska submitted a proposal on March 31, 2006 to allow the use of pots in the sablefish fishery in southeast Alaska. He identified that his proposal would address several Council concerns: (a) seabird by-catch and (b) interaction with whales. He identified that there would be no negative impact on anyone under his proposal. As an allowable gear type, fishermen could choose to use pots, but would not be required to invest in new gear, if they are happy with hook-and-line (HAL, or

"longline") longline gear. He identified potential positive outcomes of a decline in seabird by-catch, including albatross, and a decrease in fishing gear/whale interactions. Bycatch of rockfish would also be reduced, with less bait and effort to catch the same amount of sablefish. He suggested that the use of bird deterrent lines is cumbersome and unnecessary for many areas in Southeast Alaska and that research has demonstrated that whales will continue to take fish from longline gear.

The Council called for IFQ proposals in 2009. The IFQ Implementation Committee forwarded this proposal in November 2009 for Council consideration. The IFQ Implementation Committee noted that while seabird interactions are no longer a serious concern, there have been extreme sperm whale and killer whale interactions with the sablefish fleet in the GOA. These interactions often result in depredation, the technical term for whales stealing or damaging fish caught on fishing gear. Allowing pot longline gear in this fishery could mitigate the adverse impacts of whales on the sablefish IFQ longline fishery (and potentially the Pacific halibut IFQ longline fishery), but there are a number of implications that must be considered, such as gear conflicts, gear loss, and changes in crew jobs. The IFQ Implementation Committee adopted the following motion.

> *"Recommend that the proposal has merit for Council review and analysis. If the Council adopts this proposal for analysis the team recommended that the proposal be expanded to the GOA, and the analysis should address the following issues: 1) restrictions to gear usage (a) single v longline pots, b) pots retained on grounds for long soaks v retrieved during deliveries, c) pot storage, d) gear configuration requirements; e) gear conflicts, f) use the 200 fathom depth contour to mark open areas, g) pot soak timeslot; 2) area management (SE v GOA); 3) exacerbation of halibut mortality; 4) dynamic (social/economic) effects, including a) small vessels could not safely use pots, b) crew employment, c) QS prices; d) ongoing acoustic research for avoiding whale depredation." Passed 10:1.*

An interagency staff group reviewed the proposal to allow retention of sablefish in pots in the GOA Southeast Outside management area. The staff recommendations follow.

> *"This would require a regulatory amendment to Section 679 (plan amendment too) to allow a new gear type for sablefish. USCG staff recommends defining areas by lat/long where the new gear type would be allowed, and not by the 200 fathom contour. Enforcement of Proposal 2 is within the scope of the Joint Enforcement Agreement, it's not currently addressed in the Annual Operations Plan. If this proposal is implemented in regulations, NOAA would likely discuss the issue with Wildlife Troopers and possibly include it in the annual operations plan, as well as rely heavily upon the USCG for enforcement. If the Council recommends that this proposal be analyzed, staff recommends expanding the proposed action to require distinctive marking of buoys by gear type for all groundfish fisheries. This proposal would affect the EEZ only, and would be outside the scope of the joint enforcement agreement with the State of Alaska."*

The Advisory Panel concurred with the IFQ Implementation Committee recommendation in February 2010. The AP unanimously recommended that the Council initiate a discussion paper on the use of pots in the GOA and/or Southeast Alaska (SE) sablefish fishery and establish a gear committee to identify possible gear conflicts and grounds preemption issues. The motion passed 17:0.

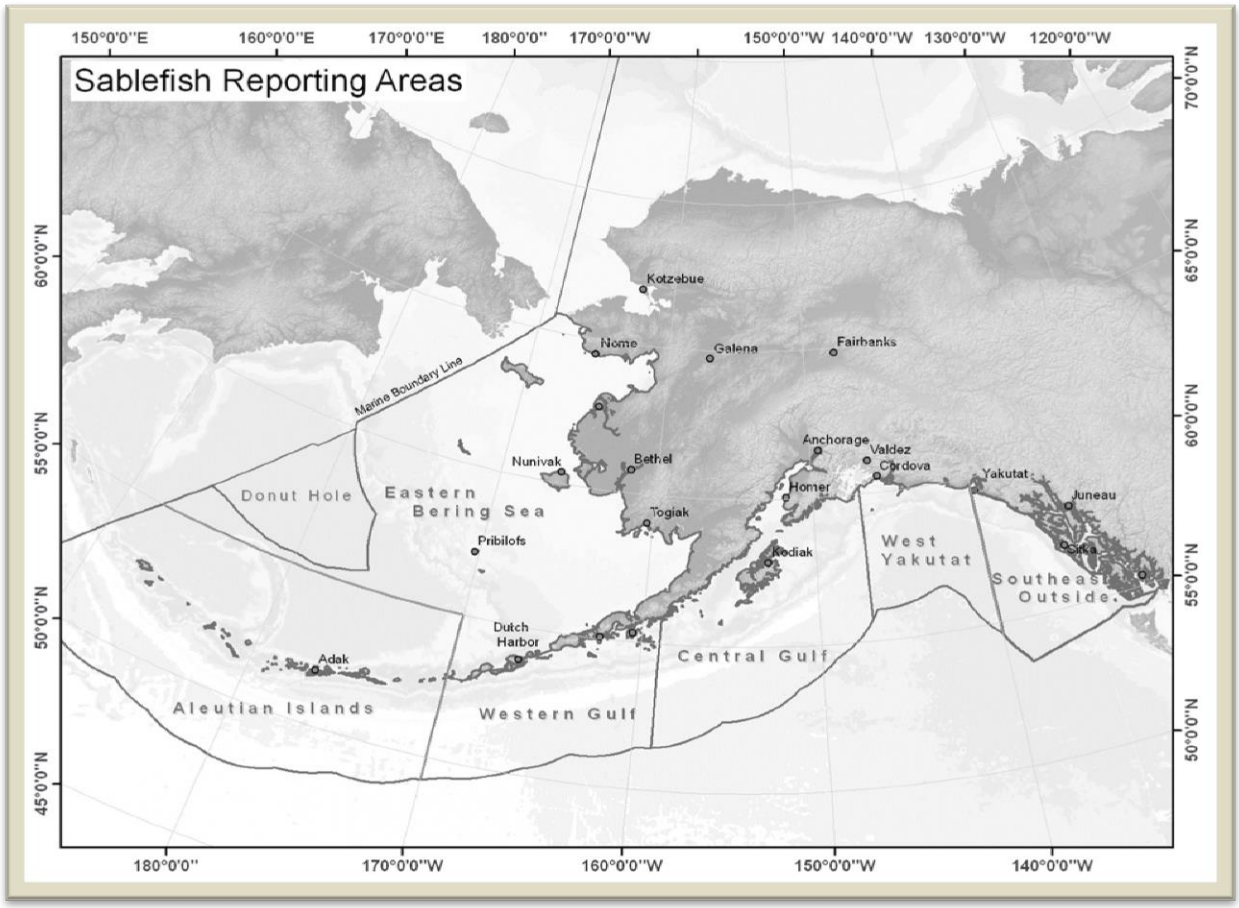
In February 2010 the Council adopted the AP motion and identified an extensive list of issues that the paper should discuss.

In April 2012, the Council noticed the public of its intent to form a gear committee to advise the Council on gear issues, but did not called for nominations or appoint the committee. The Council stated that the discussion paper that considered whether to allow IFQ halibut to be retained in sablefish pots in Area 4A may be informative on allowing the use of sablefish pots in the GOA. The Area 4A paper is posted at http://www.npfmc.org/wp-content/PDFdocuments/halibut/4AhalibutPots_dp_1212.pdf.

1.3 Description of Action Area

Figure 1 shows the action area for this proposed action. The Gulf of Alaska includes the Western Gulf, Central Gulf, and Eastern Gulf (West Yakutat and Southeast Outside districts).

Figure 1 Sablefish Regulatory Areas and Districts in the GOA.



2 Description of Alternatives

NEPA requires that an EA analyze a reasonable range of alternatives consistent with the purpose and need for the proposed action. The alternatives in this chapter were designed to accomplish the stated purpose and need for the action. The proposed action alternative and its options were designed to amend the definition of legal gear in Federal regulations and the GOA Groundfish FMP that govern the sablefish IFQ fishery in the GOA.

The Council adopted the following alternatives for analysis in December 2013.

2.1 Alternative 1

Under the No Action alternative (Alternative 1), the sablefish IFQ fishery in the GOA would remain limited to hook-and-line gear. The GOA Groundfish FMP and Federal regulations currently define legal gear for the sablefish IFQ fishery in the GOA as hook-and-line (HAL) gear.

2.1.1 FMP Gear Restrictions for Directed Sablefish IFQ Fishery

Two early GOA Groundfish FMP amendments, 12 (withdrawn) and 14, addressed a prohibition on the use of pot (single or longline) gear for sablefish in the GOA. Amendment 12 was adopted by the Council in July 1982 and then withdrawn after adoption of Amendment 14. Amendment 12 was intended to address two potential problems in the Southeast sablefish fishery and proposed to prohibit the use of pot longline gear for sablefish between 140°W longitude and Cape Addington. The objectives of the proposed Amendment 12 were to:

1) Conserve and restore the depressed sablefish fishery; and
2) Prevent fishing grounds preemption and wastage of the existing sablefish resource.

Amendment 14 prohibited the use of all pot gear in the GOA sablefish fishery. As described in the Amendment 14 EA/RIR/IRFA, the amendment was designed to address excess capacity and grounds preemption problems in existence at the time. The Council decided that gear and area restrictions and apportionments to gear types would be most effective at addressing those problems in the fishery. The gear prohibition was adopted by the Council in May 1985. NMFS published the proposed rule on July 26, 1985 (50 FR 30481), and a final rule on October 24, 1985, effective November 18, 1985 (50 FR 43193). The purpose and need for the action is summarized below from the proposed rule.

The sablefish fishery traditionally had been a foreign longline fishery off Alaska, but in the Eastern GOA in the early 1980s, domestic longliners had increased their harvests rapidly as markets developed, largely due to an agreement by the foreign longline fleets to abstain from fishing in the GOA after October 7, 1984. This agreement was intended to allow U.S. fishermen the opportunity to prove the claim that they could take the entire GOA groundfish catch limits. New market opportunities fueled the domestic fishery, and U.S. fishermen took the bulk of the catch limits in both the Eastern and Central regulatory areas, and substantially increased their catches in the Western area. The bulk of this catch was taken with hook-and-line longline gear, although two new gear types, pots and sunken gillnets, entered the fishery in 1984. In addition, trawling by foreign joint ventures in the Central and Western Gulf also took sablefish. All these gears created an overcapacity problem in the domestic sablefish fishery, as well as gear conflicts between longline and pot fishermen. Therefore, the concerns expressed to the Council at the time were two-fold: (1) fishermen experimenting with new gear when the foreign sablefish fishery was Americanized caused gear conflicts; and (2) new gear diminished the harvest share of traditional gear types and led to adverse effects on traditional gear fishermen.

Prior to implementation of Amendment 14, pots were legal gear in the GOA. According to the proposed rule for Amendment 14, pots had been used periodically in the sablefish fishery off Alaska since the mid-1970s, although hook-and-line vessels dominated the fishery. Directed fishing for sablefish using trawls and gillnets also was minimal. As the sablefish catch limits (then set at optimum yield (OY)) became fully harvested in each of the sablefish regulatory areas of the GOA in the early 1980s, it became apparent that the sablefish resource would be insufficient to accommodate all users.

Historically the Southeast Alaska sablefish fishery began in spring when weather and fishing conditions improved and the fish had recovered from spawning. In January 1985, however, three large vessels fished for sablefish using pot gear. Pot gear was set within a narrow depth range (250 – 500 fathoms) as is hook-and-line gear. Fishing was good and the catch by pot gear totaled about 34 percent of the combined Southeast and East Yakutat district OY. When the pot vessels left the area to unload their catch, some pots were stored on the grounds, preempting the grounds and creating the potential for gear conflicts. When hook-and-line gear, which is relatively light weight, becomes entangled with the heavier pot gear, the hook-and-line gear breaks and is often lost. Gear conflicts were likely between these two gear types since fishing was concentrated along the narrow shelf edge. Hook-and-line fishermen testified to the Council that the presence of just one or two vessels using pot gear could preempt a substantial area, forcing hook-and-line fishermen to move to avoid gear loss. Pots lost or stored on the fishing grounds over a long period of time can also contribute to this problem.

In response to this information, the Council requested an emergency rule in February 1985 to prohibit the use of pots in the directed sablefish fishery in the Eastern regulatory area as an interim solution; the Secretary implemented the emergency rule on April 1, 1985, to be effective until June 25, 1985.

After considering extensive public testimony and advice from its Advisory Panel (AP) and Scientific and Statistical Committee (SSC), the Council adopted Amendment 14, which contained a number of measures to manage the sablefish fishery in the GOA. It made hook-and-line gear the only legal gear type for the directed sablefish fishery in the Eastern regulatory area starting in 1986. It also made hook-and-line and trawl gear the only legal gear types for the directed sablefish fishery in the Central regulatory area starting in 1987, and in the Western regulatory area in 1989.

Amendment 14 also allocated the sablefish OYs among the gear types. In the Eastern regulatory area, 95 percent of the OY is allocated to hook-and-line gear; the remaining 5 percent is allocated to trawl gear as a bycatch to support target fisheries for other species. In the Central regulatory area, 55, 25, and 20 percent of the OY was allocated to HAL, pot, and trawl gear, respectively, in 1986. When pot gear was phased out of the Central regulatory area in 1987, the surplus portion of the sablefish OY for that area was allocated to hook-and-line gear; the share allocated to trawl gear remained at 20 percent. In the Western regulatory area, 55, 25, and 20 percent of the OY was allocated to HAL, pot, and trawl gear, respectively, in 1986, 1987, and 1988. When pot gear was phased out of the Western regulatory area in 1989, the surplus portion of the OY was allocated to hook-and-line gear; the share allocated to trawl gear remained at 20 percent.

The schedule for phasing out pot gear and allocating the sablefish OYs among the gear types was determined by the Council in recognition of several important factors. These included historical economic dependence of hook-and-line vessels on the sablefish fishery, their development of the market in a fishery that was largely foreign-dominated until 1983, and the problems with grounds preemption and potential for gear conflicts between hook-and-line and pot gear. The Council's choice was the result of extensive debate and consistent with a recommendation from its AP. The Council's decision to ban pot gear in the Eastern regulatory area starting in 1986 reflects the traditional dependence by Southeast Alaska communities on the sablefish hook-and-line fishing industry. The one-year and three-year phasing out of pot gear in the Central and Western regulatory areas reflected the concerns voiced by the public and by certain AP members that some pot vessel operators have invested substantial funds in converting their vessels to pot gear, and that sufficient time was needed to convert to the use of other gear for sablefish

fishing or for entry into some other fishery. The action also provided sufficient bycatch amounts of sablefish to trawl vessels conducting fisheries on other target species.

2.2 Alternative 2

The Council recommended the following Elements, Options, and Suboptions for the action alternative (Alternative 2) in December 2013.

Alternative 2. Allow the use of pot longline gear in the GOA Sablefish IFQ fishery

Element 1. Pot limits

Option 1. No limits

Option 2. 0 to 400 pots.

Element 2. Gear retrieval

Option 1. Allow pot gear to be left on the fishing grounds. (No Action)

Option 2. Require vessels to remove their pot gear when making a landing.

Suboption 2a. Provide an exemption for vessels less than 60', 50', or 40'.

Suboption 2b. Allow exemptions for the gear removal requirement for safety issues.

Option 3. Require the location of pots left on the grounds or lost on the grounds to be submitted when landings are made.

Element 3. Gear specifications.

Option 1. No gear specifications.

Option 2. Require pots to be used in a longline configuration.

Option 3. Require the use of neutrally buoyant groundline.

Option 4. Require both ends of the pot longline set to be marked.

Element 4. Retention of incidentally caught halibut.

Allow the retention of halibut caught incidentally in sablefish pots, provided the sablefish IFQ holder also holds sufficient halibut IFQ.

Staff recommends that the Council consider streamlining the proposed action alternative to reflect the current status of the fishery and its regulations (status quo), as well as Council clarifications on the intent of its motion to adopt Alternative 2 for analysis, made during its February 2014 meeting. The following revisions are suggested.

- Delete "Alternative 2, Element 2, Option 1. Allow pot gear to be left on the fishing grounds," as Federal regulations already allow for this (i.e., no action is needed). While pot gear may be left on the fishing grounds, fish may not be retained (and must be discarded) depending on the status of the fisheries.
- Delete "Alternative 2, Element 2, Suboption 2b. Allow exemptions for the gear removal requirement for safety issues," as the FMP currently allows such exemptions (thus, this is the status quo). This issue is discussed in the analysis under Alternative 1 (No Action). The GOA Groundfish FMP Section 3.8.2.3 Vessel Safety states:

"The Council will consider, and may provide for, temporary adjustments regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of the vessels, after consultation with the U.S. Coast Guard and persons utilizing the fishery."

- Delete "Alternative 2, Element 3. Option 1. No action on gear specifications," as the no action alternative is inferred under each element, but only listed here.
- Delete "Alternative 2, Element 3. Option 2. Require pots to be used in a longline configuration," as this option was clarified by the Council in February 2014 to be part of the main alternative.
- Consider addition of "Alternative 2. Element 4. Option 1. Allow the retention of halibut caught incidentally in sablefish pots up to an MRA percentage, provided the sablefish IFQ holder also holds sufficient halibut IFQ." If approved by the Council, this option would limit the amount of halibut that can be retained in sablefish pots to an amount that ensures the "incidental" nature of halibut catch in sablefish pots.

Should the Council adopt the above staff recommendations during its initial review of this analysis in December 2014, then the following streamlined suite of elements and options would be used for analysis of revisions to the GOA Groundfish FMP and Federal regulations. *Since these recommendations reflect the status quo, they will be used as the set of alternatives in this analysis.*

Revised Alternative 2. Allow the use of pot longline gear in the GOA sablefish IFQ fishery

Element 1. Limit of 0 to 400 pots (per vessel).

Element 2. Gear retrieval

Option 1. Require vessels to remove their pot gear when making a landing.

Suboption. Provide an exemption for vessels less than 60', 50', or 40'.

Option 2. Require the location of pots left on the grounds or lost on the grounds to be submitted when landings are made.

Element 3. Gear specifications.

Option 1. Require the use of neutrally buoyant groundline.

Option 2. Require both ends of the pot longline set to be marked.

Element 4. Retention of incidentally caught halibut.

Allow the retention of halibut caught incidentally in sablefish pots, provided the sablefish IFQ holder also holds sufficient halibut IFQ.

Option 1. Allow the retention of halibut caught incidentally in sablefish pots up to an MRA percentage, provided the sablefish IFQ holder also holds sufficient halibut IFQ.

Staff assumes that the intent of Element 4 is to allow the retention of incidental amounts of halibut caught during sablefish longline pot fishing. Any allowance to retain halibut in GOA pot gear would require complimentary action by IPHC to redefine legal gear in the area. In order to avoid the targeting of halibut, it is also assumed that the relevant management bodies will likely consider establishing an MRA for halibut in the GOA sablefish IFQ pot fishery. The Council expressed this notion in a letter to the IPHC dated September 24, 2013. This is discussed further in the RIR under Management and Enforcement Considerations (Section 4.8.2.4).

2.3 Comparison of Alternatives

Alternative 1 is the status quo (or No Action) alternative. If the Council takes no action, use of pot longline gear would continue to be prohibited in the GOA sablefish IFQ fishery.

If the Council selects the action alternative (Alternative 2) as its preferred alternative at final action, the Council would allow the use of pot longline gear in the GOA sablefish IFQ fishery. Alternative 2 also includes options that would place restrictions on the use of pot longline gear in this fishery. These include the following restrictions: (1) limit the total number of pots allowed per vessel (while the Council did not specify the pot limit as being applied "per vessel" in its December 2013 motion, staff assumes that this is Council intent and this is reflected in the revised suite of alternatives and options); (2) require the removal of all pots when making a landing; (3) require the reporting of longline pots left on the grounds or lost; (4) require neutrally buoyant groundline; and (5) require that a pot longline be marked on both ends. The Council is also considering adding flexibility to the IFQ program by allowing halibut to be retained in pot longline gear if sufficient IFQs are held by IFQ holders on board the vessel. As a corollary, the Council might also consider whether to limit the amount incidentally caught halibut that may be retained by an MRA for the directed sablefish pot longline fishery in the GOA.

Table 1 summarizes the major environmental and economic impacts of the alternatives in this analysis. Alternative 2 would require amendments to both the GOA Groundfish FMP and Federal regulations at Section 679.24 Definitions. IPHC regulations might also need to be revised if the Council takes action on Element 4 under Alternative 2 (further specified in Section 4.8). These proposed revisions are listed under Appendix 1.

Table 1 Summary of alternatives and major impacts

	Alternative 1	Alternative 2		
	Status quo. No action.	Allow pot longline gear in sablefish IFQ fishery	Status quo options	Proposed Options (as noted below)
Differences in Alternatives (Sections 2.1 and 2.2)				
FMP amendment	No	Yes	No	No
Regulatory amendment	No	Yes	No	Yes
Gear	None	Hook-and-line longline and pot longline gears only		Adoption of any changes to "groundfish pot" longline gear would create a "sablefish pot" and a new gear code.
Element 1. Pot limits	None		None	Maximum number of pots = 400
Element 2. Gear retrieval	None		None	Require pot removal during landing
			None	Require reporting of lost pots
Element 3. Gear specifications	None		None	Require neutrally buoyant groundline
			None	Require pot longline to be marked at both ends
Element 4. Halibut Retention	None		None	Require halibut retention; Set MRA for halibut
Environmental Impacts				
Whales	No changes. (Section 3.5)	Minimize gear interactions		Marking of both end of pot longlines could double the chance of whale entanglements
Seabirds	No changes.	Minimizes gear interactions		Marking of both end of pot longlines could double the chance of seabird entanglements
Sablefish	No changes.	Minimizes unaccounted for mortality.		
Halibut	No changes.	Minimizes discard mortality		
Economic Impacts				
Fishing effort		Reduces fishing costs from reduced gear, bait, harvest, fuel, ice, and time to retain the same amount of sablefish IFQ harvest Additional efficiencies associated with retaining halibut incidental harvest against IFQs		Exemption from pot removal requirement could allow additional vessels to use longline pot gear
Distributional impacts	No changes.	Vessels that do not use pot gear might experience greater depredation, opportunity costs		
Interagency Coordination				
Requires complementary action by the Alaska Board of Fisheries	No	Yes	No	Elements 1 – 3 could require complementary state action for consistency.
Requires complementary action by the International Pacific Halibut Commission	No	Yes	No	Element 4 would require the IPHC to amend its regulations to identify pots as legal gear in the GOA.

2.4 Alternatives Considered but Not Analyzed Further

As part of its scoping of this issue with the public, and through its advisory committees, the Council considered and rejected other management approaches. The Council opted to not pursue the use of single pots in the sablefish IFQ fishery. Despite both single and longline pots defined as legal gear in the sablefish IFQ fisheries in the Bering Sea and Aleutian Islands (BSAI), several advisory committees recommended against the use of single pots as legal gear in the sablefish IFQ fishery in the GOA. The IFQ Implementation Committee, Sablefish Gear Committee, and Advisory Panel recommended that the proposed action be considered for pot longlines only (continue prohibition on single pots). The committees noted the benefits of using pot longlines versus single pots to maximize fishing efficiency and ex-vessel value of the fishery. Single pots are heavy and their deployment results in lost gear and resultant ghost fishing. Longline pot strings, reportedly worth $10,000 to $12,000 each, can be parted and rejoined if they become wrapped up with other gear. Use of single pots creates more gear conflict from increased number of buoys, and could result in increased whale interactions with the gear, some of which are protected under the Endangered Species Act and Marine Mammal Protection Act. Typically, pots deployed in a longline format are lighter. The committees noted that handling of lighter pot longlines enhance crew safety, particularly on smaller vessels. The Council accepted these recommendations.

The Council considered, but rejected, allowing the use of pot longline gear only in the Southeast (SE) regulatory area, as originally proposed. While Southeast Alaska currently does not have gear conflicts (due to prohibition on the use of trawl and pot gear), it has several vessel size and bottom topography issues that would influence the potential usage of pot gear. These issues include a fleet with smaller boats that may not be able to carry and deploy pots, different business plans (smaller, owner/operator fleet) and fishery techniques, habitat composed of rocky bottoms and corals, and remaining HAL operations that may experience more depredation if part of the fleet switches to pot gear.

The Council also considered but rejected the use of the 200 fathom depth contour to mark open areas for the pot longline sablefish IFQ fishery. The rationale for using the 200 fathom contour to regulate fishing gear in the sablefish IFQ fishery was not clearly articulated. An interagency staff group, including monitoring and enforcement agencies, recommended against using depth contours for regulating the fishery, instead recommending the use of latitude and longitude. The Sablefish Gear Committee unanimously recommended not considering the 200 fathom line as part of this action as no benefit could be identified to this approach. Enforcement agencies also recommended against this approach.

3 Environmental Assessment

There are four required components for an environmental assessment. The need for the proposal is described in Section 1, and the alternatives are described in Section 2. This section addresses the probable environmental impacts of the proposed action and alternatives. Section 4 addresses the probable social and economic impacts of the proposed alternatives. Section 5 considers how the proposed action might differentially impact small entities. Section 6 lists the ways in which this analysis addresses the requirements of relevant Federal regulations. A list of agencies and persons consulted is included in Section 6.

Recent and relevant information, necessary to understand the affected environment for each resource component, is summarized in the relevant subsection. For each resource component, the analysis identifies the potential impacts of each alternative, and uses criteria to evaluate the significance of these impacts. If significant impacts are likely to occur, preparation of an Environmental Impact Statement (EIS) is required. Although an EIS would evaluate economic and socioeconomic impacts that are interrelated with natural and physical environmental effects, economic and social impacts by themselves are not sufficient to require the preparation of an EIS (see 40 CFR 1508.14).

The National Environmental Protection Act (NEPA) also requires an analysis of the potential cumulative effects of a proposed action and its alternatives. An environmental assessment or environmental impact statement must consider cumulative effects when determining whether an action significantly affects environmental quality. The Council on Environmental Quality (CEQ) regulations for implementing NEPA defines cumulative effects as:

> *"the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7*).

The discussion of past and present cumulative effects is addressed with the analysis of direct and indirect impacts for each resource component below. There are no known cumulative impacts of reasonably foreseeable future actions on any stock or component of the GOA.

Documents incorporated by reference in this analysis

This EA relies heavily on the information and evaluation contained in previous environmental analyses, and these documents are incorporated by reference. The documents listed below contain information about the fishery management areas[1], fisheries, marine resources, ecosystem, social, and economic elements of the groundfish fisheries. They also include comprehensive analysis of the effects of the fisheries on the human environment, and are referenced in the analysis of impacts throughout this chapter.

Alaska Groundfish Harvest Specifications Final Environmental Impact Statement (NMFS 2007).

This EIS provides decision makers and the public an evaluation of the environmental, social, and economic effects of alternative harvest strategies for the federally managed groundfish fisheries in the GOA and the BSAI management areas and is referenced here for an understanding of the groundfish fishery.[2] The EIS examines alternative harvest strategies that comply with Federal regulations, the Fishery Management Plan (FMP) for Groundfish of the GOA, the Fishery Management Plan (FMP) for Groundfish of the BSAI Management Area, and the Magnuson-Stevens Fishery Conservation and

[1] Or, for halibut, "regulatory area".
[2] The alternatives considered in this EA will not cause any of the potentially significant impacts addressed in the Alaska Groundfish Harvest Specifications Final EIS to recur.

Management Act (MSA). These strategies are applied using the best available scientific information to derive the total allowable catch (TAC) estimates for the groundfish fisheries. The EIS evaluates the effects of different alternatives on target species, non-specified species, forage species, prohibited species, marine mammals, seabirds, essential fish habitat, ecosystem relationships, and economic aspects of the groundfish fisheries.[3]

Stock Assessment and Fishery Evaluation (SAFE) Report for the Groundfish Resources of the *GOA (Hanselman et al. 2013)*.

Annual SAFE reports review recent research and provide estimates of the biomass of each species and other biological parameters. The SAFE report includes the acceptable biological catch (ABC) specifications used by NMFS in the annual harvest specifications. The SAFE report also summarizes available information on the ecosystems and the economic condition of the groundfish fisheries off Alaska. This document is available from: http://www.afsc.noaa.gov/refm/stocks/assessments.htm.

Final Programmatic Supplemental Environmental Impact Statement (PSEIS) on the Alaska Groundfish Fisheries (NMFS 2004).

The PSEIS evaluates the Alaska groundfish fisheries management program as a whole, and includes analysis of alternative management strategies for the GOA and BSAI groundfish fisheries. The EIS is a comprehensive evaluation of the status of the environmental components and the effects of these components on target species, non-specified species, forage species, prohibited species, marine mammals, seabirds, essential fish habitat, ecosystem relationships, and economic aspects of the groundfish fisheries. This document is available from: http://alaskafisheries.noaa.gov/sustainablefisheries/seis/intro.htm.

Analytical method

Table 2 shows the components of the human environment and whether the proposed action or its alternative may have an impact on the component and require further analysis. Extensive environmental analysis on all environmental components is not needed in this document because the proposed action is not anticipated to have environmental impacts on any other environmental components. Sablefish, Pacific halibut (which is a prohibited species under the ecosystem component category in the GOA Groundfish FMP), other GOA Groundfish FMP species, marine mammals, and seabirds are the only environmental components which the proposed action may impact.

Table 2 Resources components potentially affected by the alternatives

		Potentially Affected Component							
Alternatives	Physical	Habitat	Other Groundfish	Marine Mammals	Seabirds	Sablefish	Pacific Halibut	Ecosystem Component	Socio-economic
Alt 1	N	N	N	Y	Y	Y	N	N	Y
Alt 2 Element1. Gear	N	N	N	Y	Y	Y	N	N	Y
Alt 2 Element 2. Pot limit	N	N	N	Y	Y	Y	N	N	Y
Alt 2 Element 3. Gear Specifications	N	N	N	Y	Y	Y	N	N	Y
Alt 2 Element 4. Halibut Retention	N	N	N	Y	Y	Y	Y	N	Y

N = no impact beyond status quo anticipated by the option on the component.
Y = an impact beyond status quo is possible if the option is implemented.

No effects are expected on the physical environment, habitat, groundfish (other than sablefish), ecosystem component species (other than halibut), and ecosystem components of the environment. No effect is

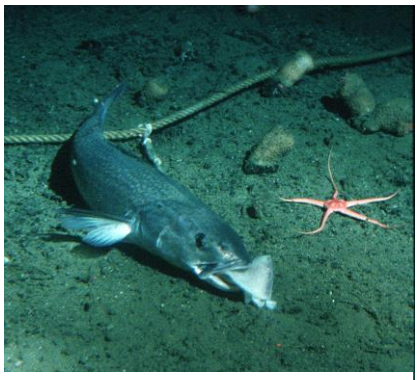
[3] http://alaskafisheries.noaa.gov/analyses/specs/eis/default.htm.

presumed for these components because current or proposed fishing regulations, harvest limits, and habitat protections as described in previous NEPA documents (above) would not be changed by any of the alternatives. No effects are presumed for bottom habitat because Essential Fish Habitat (EFH) is not described for coral in the GOA, nor has coral habitat distribution been mapped. The Long-term Effect Index (LEI) found 0-1% (the lowest score) fishing effects on coral in the eastern GOA (NMFS 2005). The LEI increases as fishing moves west past Yakutat and as the gears that could interact with coral (see Figure B2-6b in NMFS 2005) occupy the same depth. The likely effects on coral from HAL longline gear and pot longline gear are reported to be similar, although no side by side comparisons have been done. Most sablefish and halibut IFQ fishermen are knowledgeable of the location of coral areas are and strive to minimize gear damage/loss and increase their catch. Also, the intensity of trawling would remain unchanged because current regulations define the seasons in which trawl fishing is allowed, methods that may be used, areas in which trawling is allowed, and restrict the maximum amount of trawling to TAC levels. Trawling is already prohibited in GOA areas where the sablefish and halibut IFQ fisheries occur. None of the alternatives would change TAC amounts, methods, seasons, or areas closed to trawling.

The proposed action to allow a new gear type to harvest sablefish (and possibly incidental amounts of halibut) IFQ in the GOA is limited in scope and will not likely affect all environmental components of the GOA. Five potentially affected components are shown in Table 2: sablefish, halibut, marine mammals (specifically sperm and killer whales), seabirds, and socioeconomics. The effects of the alternatives on the resource components would be caused by: (1) increased efficiency in harvesting sablefish and halibut IFQ: (2) decreased unaccounted mortality of sablefish (and potentially halibut) that are lost to whale depredation during IFQ fishing operations; and (3) potential decrease in whale and seabird interactions (i.e., entanglements) with pot longline gear (compared with the status quo gear of HAL longline gear) in the GOA. No increase in sablefish or halibut catches would occur, as those fisheries are managed under IFQs and those harvests are effectively capped. The socioeconomic environment may be affected by increased efficiency in harvesting sablefish IFQ (e.g., catch per unit effort, reduced fuel/bait costs, reduced opportunity costs), but could also be affected by the redistribution of effort among members of the existing harvest fleet (these issues are further discussed in the RIR, Section 4). The following subsections discuss the affected environmental resource in relation to each of the considered management alternatives.

3.1 Sablefish

Biology:



AFSC, NOAA Fisheries

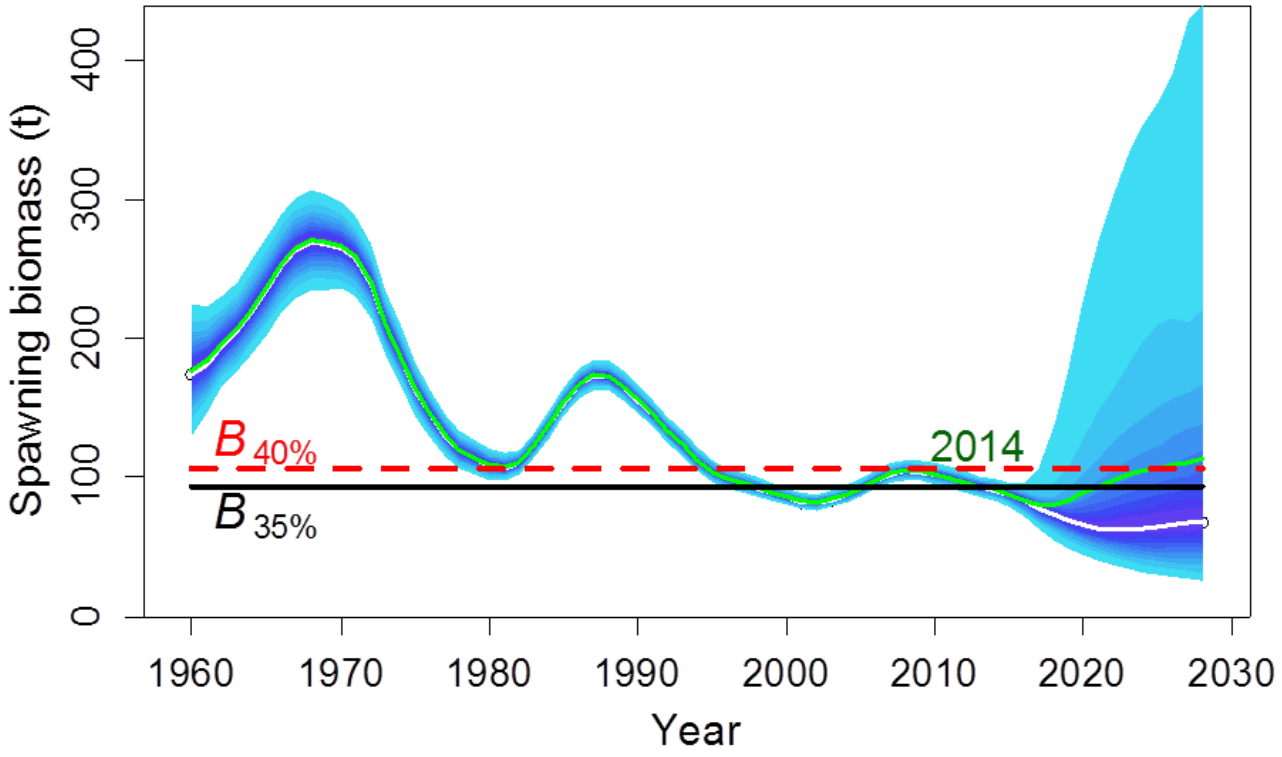
Sablefish distribution extends from northern Mexico through the GOA, the AI and into the BS. Adult sablefish are generally found at depths greater than 200 m along the continental slope, shelf gullies and deep fjords. Juvenile sablefish (less than 40 cm) spend the first 2-3 years farther inshore along the continental shelf and begin to move out to the continental slope around age 4. Young-of-the-year sablefish feed primarily on euphausiids and copepods while adults are more opportunistic feeders, relying more heavily on pollock, Pacific herring, Pacific cod, squid and jellyfish. Coho and Chinook salmon are the main predators of young-of-the-year sablefish.

Sablefish are relatively long lived. They begin to recruit to the fishery at age 4 or 5 and longevity often reaches 40 years (the oldest recorded sablefish in Alaska was 94 years old). Female size at 50 percent maturity is around 65 cm (approximately age 6.5). Females are slightly larger than males, and natural mortality is estimated at M = 0.10. Alaskan sablefish spawn at pelagic depths near the edges of the continental slope (300-500m) between January and April.

Stock Assessment:

The sablefish assessment is based on a statistical sex-specific age-structured model. This model incorporates fishery data and fishery independent data from domestic and Japan-US cooperative longline surveys and the NMFS GOA trawl survey. Sablefish fall under Tier 3b of the ABC/OFL control rule. The 2013 age 4+ biomass was estimated to be 149,000 mt for the GOA. Spawning biomass has increased from a low of 30 percent of unfished biomass in 2002 to 34 percent projected for 2014 and is now trending downward (Figure 2). The 1997 year class has been an important contributor to the population but has been reduced and is expected to comprise less than 8 percent of the 2014 spawning biomass. The 2000 year class is still the largest contributor, with 18 percent of the spawning biomass in 2014. The 2008 year class is slightly above average and will comprise 8 percent of spawning biomass in 2014 even though it is only 40 percent mature (Figure 3). Depredation of sablefish off of hook-and-line gear by killer whales is accounted for in the sablefish stock assessment by dropping depredated sets from the assessment. Sets that are depredated by sperm whales are included in the assessment, as sperm whale impact on the set is generally less severe. The Groundfish Plan Team is developing methods to incorporate sperm whale depredating into the assessment. Summary information on those efforts is available on the Plan Team's website[4], and forthcoming SAFE reports will include an appendix on depredation work and accounting methods.

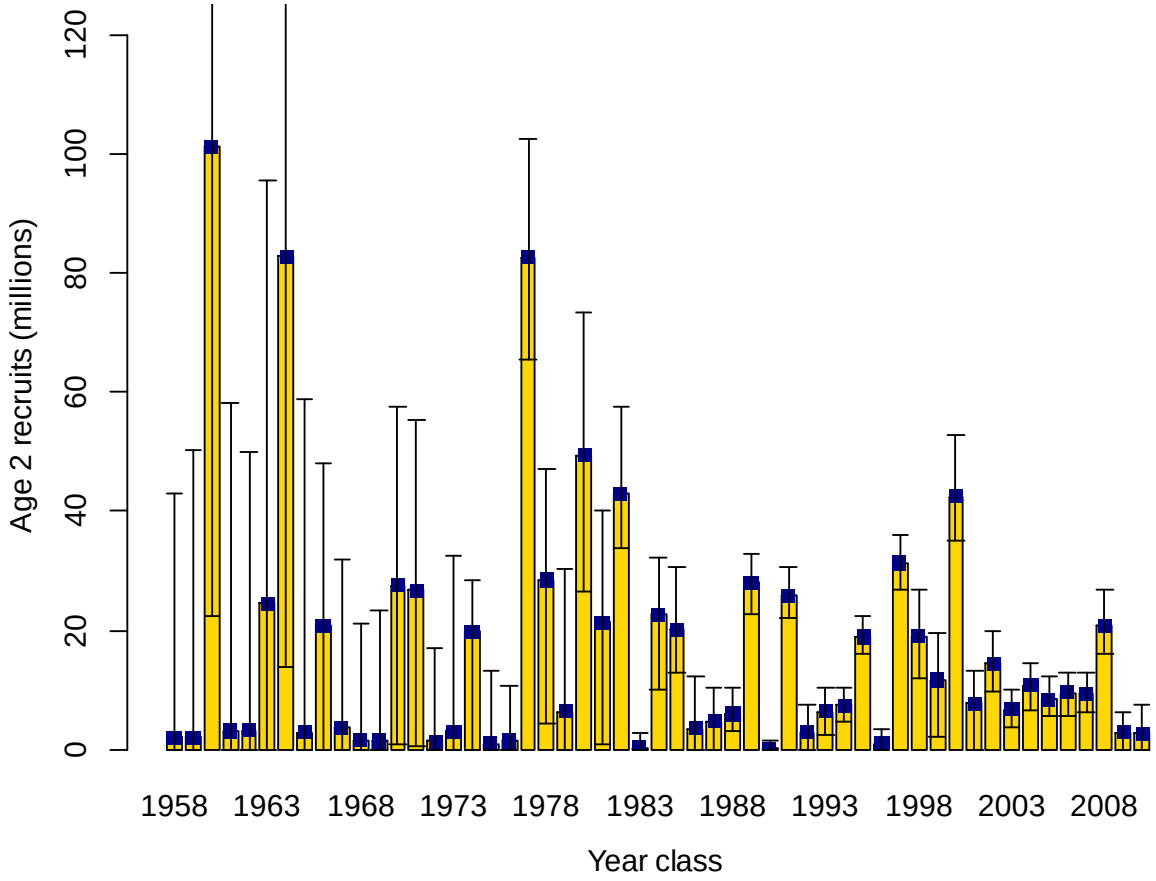
Figure 2 Estimates of female spawning biomass (thousands t) and their uncertainty. White line is the median and green line is the mean, shaded fills are 5% increments of the posterior probability distribution of spawning biomass based on 10,000,000 MCMC simulations. Width of shaded area is the 95% credibility interval. Harvest policy is the same as the projections in Scenario 2 (Author's F).



Source: Hanselman et al. (NMFS, 2013)

[4] http://www.afsc.noaa.gov/refm/stocks/plan_team/2014/Sept/Sablefish_September_Plan_Team_Draft_3.pdf

Figure 3 Estimates of the number of age-2 sablefish (millions) with 95 percent confidence intervals by year class.



Source: Hanselman et al. (NMFS, 2013)

Fishery:

The fishing fleet for sablefish is primarily composed of owner-operated vessels that use hook-and-line gear (pot gear is prohibited for directed sablefish fishing in the GOA). The sablefish IFQ fishery season opening date is concurrent with the halibut fishery for the purposes of reducing bycatch and regulatory discards between the two fisheries. The IFQ program was designed, in part, to help improve safety for fishermen, enhance efficiency, reduce excessive investment in fishing capacity, and protect the owner-operator character of the fleet. The program set caps on the amount of quota share that any one person may hold, limited transfers to *bona fide* fishermen, issued quota in four vessel categories, and prohibited quota share transfers across vessel categories (Fissel et al., 2013).

The majority of the catch from sablefish fisheries in the GOA is taken with stationary lines, onto which baited hooks are attached. Gear components that contact the bottom include the anchors, groundline, gangions, and hooks. In the sablefish fishery, anchors are two-prong standard 50 lb to 90 lb anchors, and groundlines are generally constructed of 3/8-inch sinking line, with 6”to 18” long gangions of #72 to #86 twine, spaced 30” to 48” apart, with 9/0- 15/0 circle hooks. Some catcher vessels use snap-on gear with gangions spaced at 3’ to 4’ intervals. On catcher vessels, an average set consists of 20 skates of groundline, with each skate 100 fathoms to 150 fathoms long. Preferred baits are squid, pollock, and herring. Automatic baiting machines are used on many vessels.

The ends of each set are anchored and marked with buoys. The lower shot(s) (33 fathoms each) of the anchor line is (are) made of 3/4-inch floating poly, and the upper shot of line is made of 5/8-inch sinking

line. A buoy marks the beginning of a set, and a flag (up to 10' high) typically marks the end of a set ("bag and flag" set-up).

To make a set, the first anchor is dropped and the boat steams ahead with the groundline and baited hooks being set off the stern of the boat. The set is not made in a straight line; instead the boat will steer to ensure that the groundline is set in the preferred areas based on depth contour and bottom structure. The second anchor is deployed, and the line is left to fish for 5 hours to 24 hours depending upon the catch rates. Upon haulback, the groundline is fed through a hauler, and the fish are carefully taken off the hooks. Fish are bled, packed in the round, or headed and gutted, and put in the hold on ice or slush-ice. Catcher processors freeze headed and gutted sablefish.

The sablefish longline fishery is prosecuted along the continental slope and deep gully areas on the shelf over gravel, cobble, and mud bottom at depths of 200 to more than 1,000 fathoms. This fishery is often a mixed halibut/sablefish fishery, with Greenland turbot, grenadiers, and shortraker, rougheye, and thornyhead rockfish also taken.

Fishery Management:

BSAI and GOA sablefish are managed as one population in federal waters due to their highly migratory behavior during certain life history stages. There are four groundfish (sablefish) management areas in the GOA; Western, Central, West Yakutat and East Yakutat/Southeast Outside. In 1985, Amendment 14 to the GOA Groundfish FMP allocated sablefish TAC by gear type; 80 percent to fixed gear (including pots, which were legal gear at the time in both areas), and 20 percent to trawl in the Western and Central GOA, 95 percent to fixed gear and 5 percent to trawl gear in the Eastern GOA.

Amendment 20 to the GOA FMP established IFQ management for the GOA sablefish fishery, which began in 1995. The IFQ program assigns the privilege of harvesting a percentage of all sablefish quota share to specific individuals with a history of harvest in the fisheries, or those that purchased quota share. The quota share originally assigned to each person was proportional to their fixed gear landings, by management area, during the qualifying period, and are represented as quota shares (QS). Under this program, only persons holding QS are allowed to make commercial landings of sablefish in the management areas identified. There are several key provisions of the program: the process for initial allocation of QS by regulatory area; assignment of shares to vessel categories; share transfer provisions; use and ownership provisions; QS blocks to ensure small allocations are available for entry; the annual process for allocating QS; and the establishment of halibut and sablefish Community Development Quotas.

To qualify for an initial allocation of QS, a person must have made legal landings of sablefish, harvested with fixed gear, during 5 years of the 6-year base period 1985 through 1990. Each person eligible to receive QS had it assigned to one of three vessel categories: "A" – catcher/processor (freezer) vessels of any length; "B" – catcher vessels greater than 60'; "C" – catcher vessels less than or equal to 60'. Restrictions on transfer, together with use and ownership caps, were designed to maintain the owner/operator characteristics of the fleet, and to prevent consolidation of QS in the hands of a few participants.

In 2010, there were 396 vessels that participated in the sablefish IFQ and CDQ fisheries. Of this total, 17 vessels participated in CDQ fisheries and 389 in sablefish IFQ fisheries. About 90 percent (357 vessels) of the sablefish fleet also participated in the halibut IFQ fisheries.

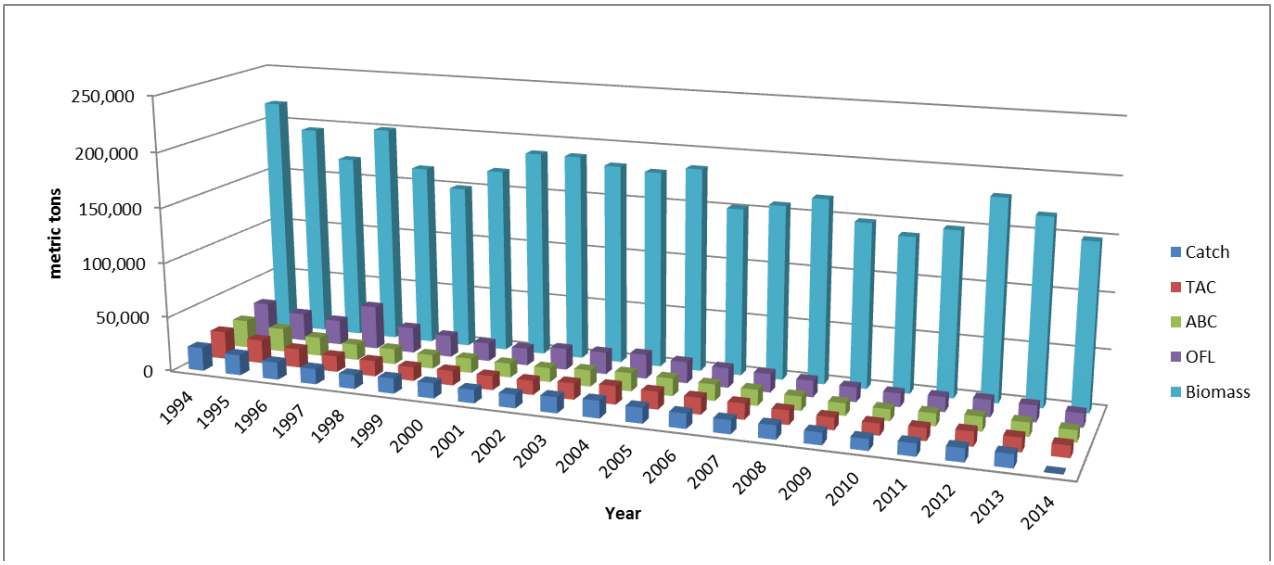
Catch History:

US fishermen have harvested sablefish since the end of the 19th century as a byproduct of halibut fisheries. Harvests were relatively small, averaging 1,666 mt from 1930-1957. Japanese longlining began in the EBS around 1958 and expanded into the AI and GOA through the 1970s. Japanese fleet catches increased throughout the 1960s, and peak sablefish catch reached 36,776 mt in 1972. High fishing

pressure in the early 1970s by Japanese and USSR vessels may have resulted in a population decline of sablefish in the mid-1970s. By 1988, US fishermen took the majority of the sablefish harvested in the GOA and BSAI. Sablefish was increasingly harvested as a derby-style fishery in the late 1980s and early 1990s until the IFQ program was implemented for the HAL fishery in 1995.

Catch specifications for 2014 in the GOA are as follows; OFL = 12,500 mt, ABC = 10,572 mt, TAC = 10,572 mt. Separate ABCs and TACs are established for each GOA management area: Western, Central, West Yakutat, and Southeast Outside. Historical harvest specifications for GOA sablefish are depicted in Figure 4.

Figure 4 Biomass, Overfishing Level, Acceptable Biological Catch, and Total Allowable Catch for 1994 through 2014 and Catch, 1994 through 2013



Source: Hanselman et al. (NMFS, 2013)

3.1.1 Effects of the Alternatives

The effects of the use of current and proposed gear in the sablefish IFQ hook-and-line fishery are addressed here. The GOA sablefish stock is assessed annually in the GOA SAFE report (Hanselman et al. 2013), and was also evaluated in the Alaska Groundfish Fisheries Harvest Specifications EIS (NMFS 2007a). Table 3 describes the criteria used to determine whether the impacts of this action on the GOA sablefish stock are likely to be significant. The sablefish stock is neither overfished nor subject to overfishing; GOA sablefish biomass levels are projected to decrease in the near future due to a lack of recruitment (Figure 3). It is estimated that the GOA sablefish fishery under the status quo is sustainable.

Table 3 Criteria used to determine significance of effects on GOA sablefish stock.

Effect	Criteria			
	Significantly Negative	Not Significant	Significantly Positive	Unknown
Stock Biomass: potential for increasing and reducing stock size	Changes in fishing mortality are expected to jeopardize the ability of the stock to sustain itself at or above its MSST (minimum standing stock threshold)	Changes in fishing mortality are expected to maintain the stock's ability to sustain itself above MSST	Changes in fishing mortality are expected to enhance the stock's ability to sustain itself at or above its MSST	Magnitude and/or direction of effects are unknown
Fishing mortality	Reasonably expected to jeopardize the capacity of the stock to yield sustainable biomass on a continuing basis.	Reasonably expected not to jeopardize the capacity of the stock to yield sustainable biomass on a continuing basis.	Action allows the stock to return to its unfished biomass.	Magnitude and/or direction of effects are unknown
Spatial or temporal distribution	Reasonably expected to adversely affect the distribution of harvested stocks either spatially or temporally such that it jeopardizes the ability of the stock to sustain itself.	Unlikely to affect the distribution of harvested stocks either spatially or temporally such that it has an effect on the ability of the stock to sustain itself.	Reasonably expected to positively affect the harvested stocks through spatial or temporal increases in abundance such that it enhances the ability of the stock to sustain itself.	Magnitude and/or direction of effects are unknown

3.1.1.1 Alternative 1

Maintaining the current prohibition of the use of pot (single or longline) gear in the GOA is the status quo, or No Action alternative. Continued use of currently allowed gear would not decrease fishing mortality on sablefish, as hooked fish would continue to be predated upon by whales; efforts to better quantify this mortality are underway. While unknown, mortality of sablefish by whales on hook-and-line gear is gauged to be on the order of a few hundred tons. Whale predation may occur on 5 percent to 10 percent of sets, but could be as high as 30 percent to 40 percent on an individual set of longline gear. Generally, sperm whale depredation occurs in the Central GOA and Eastern GOA, while killer whale depredation occurs in the Western GOA. The sablefish stock assessment authors have observed that continued recruitment failure likely dwarfs unaccounted sablefish mortality due to whale depredation. Therefore, Alternative 1 would have an insignificant effect on the sablefish population.

Taking no action would not address the stated purpose and need for the action. The Council has identified the need to maximize the ability of sablefish QS holders to harvest their sablefish IFQ by increasing catch per unit of effort and reducing fishing costs; this concern is further addressed in Section 4.

3.1.1.2 Alternative 2

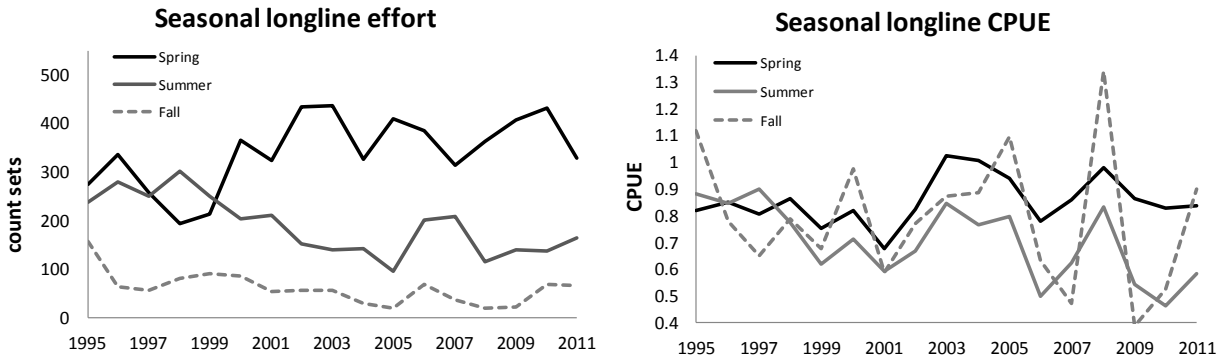
Alternative 2 would allow, but not require, pot longline gear for use in the sablefish IFQ fishery in the GOA. The effects of the use of pot longline gear on the sablefish stock would be proportionate to the actual gear use. The amount of sablefish that would have been lost to depredation, but that could be expected to be minimized under Alternative 2, is unknown. It is assumed to be proportionate to the use of pot longline gear. Under the proposed action, cumulative IFQ catch would still not be permitted to exceed the sablefish TAC.

The following information on catch rates, spatial and temporal patterns, length frequencies, diet, and sample size of sablefish caught in pots in the BSAI was requested by the Council and presented in a

discussion paper published in December 2013.[5] Information from the BSAI is the only available data on sablefish caught in pots, and is presented for purposes of completeness.

Catch rates: The sablefish stock assessment authors have examined fishery hook-and-line (HAL) data for seasonal and annual differences in effort and catch rate (CPUE, lbs./hook). Such changes may cause fishery catch rates to be unrepresentative of abundance. In the observed HAL data since 2000, the majority of effort occurs in the spring and less in the summer and fall (Figure 5). Since 1998, catch rates are also highest in the spring, moderate in the summer, and variable in the fall (due to lower sample sizes in the fall).

Figure 5 Fishery longline (HAL) data for seasonal and annual differences in effort and catch rate



Source: Hanselman et al. (NMFS, 2013)

Data from pot gear only are available from the BS and AI, and cannot be distinguished between single and longlined pots. Because pot data is sparser than HAL data, and is confidential in some years, specific annual data are not presented. It is also difficult to discern trends, since pot catch rates have wider confidence intervals than HAL data due to their smaller sample sizes. Overall, there are more vessels reporting in both the logbook and observer data in the BS than the AI in the sablefish pot fishery. Since 2006, in the annual BS logbook data there have been between 5 and 9 vessels reporting, and between 5 and 8 vessels reporting in observer data. In the AI, there have been 1 and 5 vessels reporting in logbooks, and between 1 and 4 vessels reporting in observer data. In 2012, the total number of vessels and sets reported was down; this decrease was greater in the AI. From 2006-2012 the average catch rate in logbook data was 26 lbs/pot in the AI (number sets (n) = 710) and 25 lbs/pot in the BS (n = 5,334). In observer data the average catch rate was 11 lbs/pot (n = 1,156) in the AI and 19 lbs/pot (n = 2,885) in the BS. There is approximately equal effort in all seasons.

Because of the high variability, catch rates within management areas were not significantly different between any years in both the observer and logbook data. For both the BS and AI areas, no trend in catch rates is discernible. The composition of species caught in pots in the BSAI was similar in 2005. Sablefish comprised most of the catch by weight (BS = 60%, AI = 69%) and the next most abundant fish by weight was arrowtooth flounder (BS = 13%, AI = 10%). Other species of fish and invertebrates contributed no more than 6 percent each to the total catch weight.

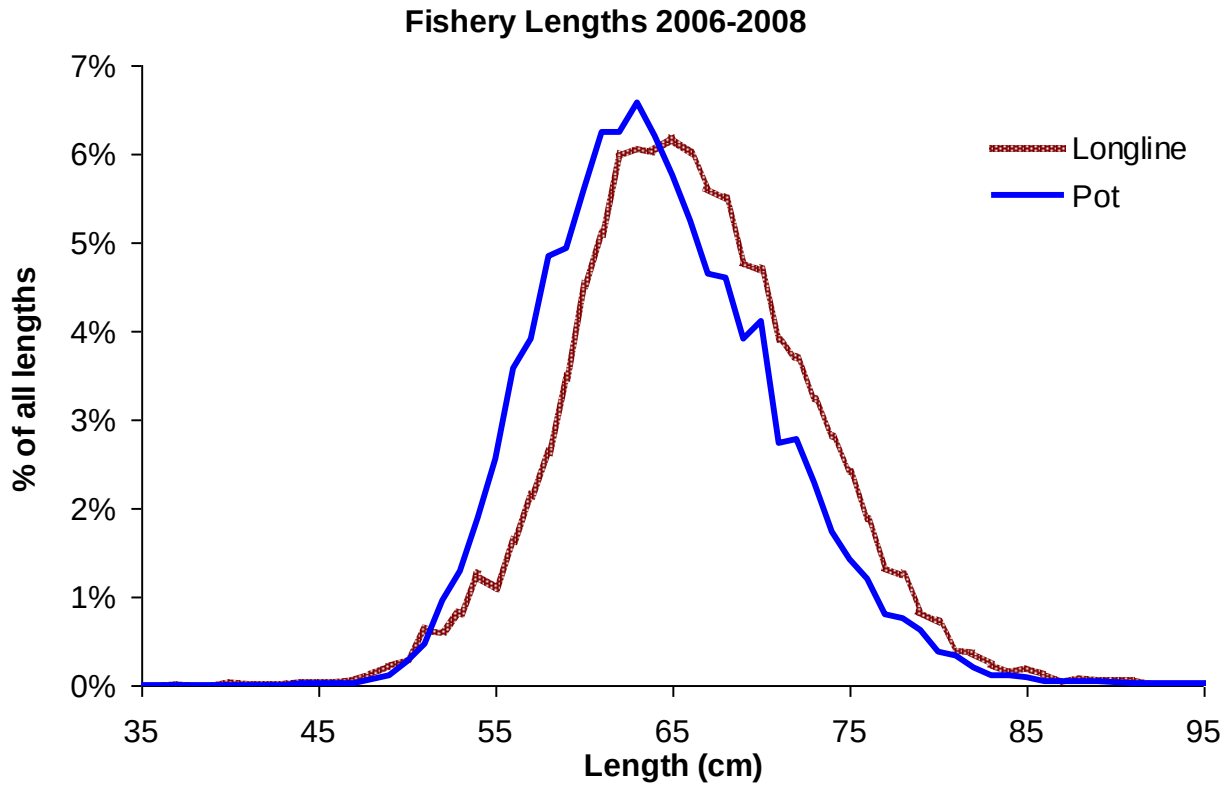
Spatial and temporal patterns: Seasonal changes in effort were examined in the 2007 SAFE Report, but no distinct trends were found.

[5] https://npfmc.legistar.com/View.ashx?M=F&ID=2724871&GUID=A22B0F15-6383-4369-A261-CEB8291244BA .

Length frequencies:

The stock assessment authors compared the length frequencies recorded by observers from the 2006 through 2008 HAL and pot fisheries (Figure 6). The average length of sablefish in the BSAI was smaller for sablefish caught by pot gear (63.8 cm) than HAL longline gear (66.0 cm), but the distributions indicate that both fisheries focus primarily on adults. Pot and longline gear are set at similar depths in the BSAI and sex ratio of the catch is 1:1 in both gears. The authors do not believe that the difference in lengths is significant enough to affect population recruitment and did not see any indication that undersized fish were being selected by pots.

Figure 6 Sablefish lengths for longline (HAL) and pot gear in commercial IFQ fisheries.

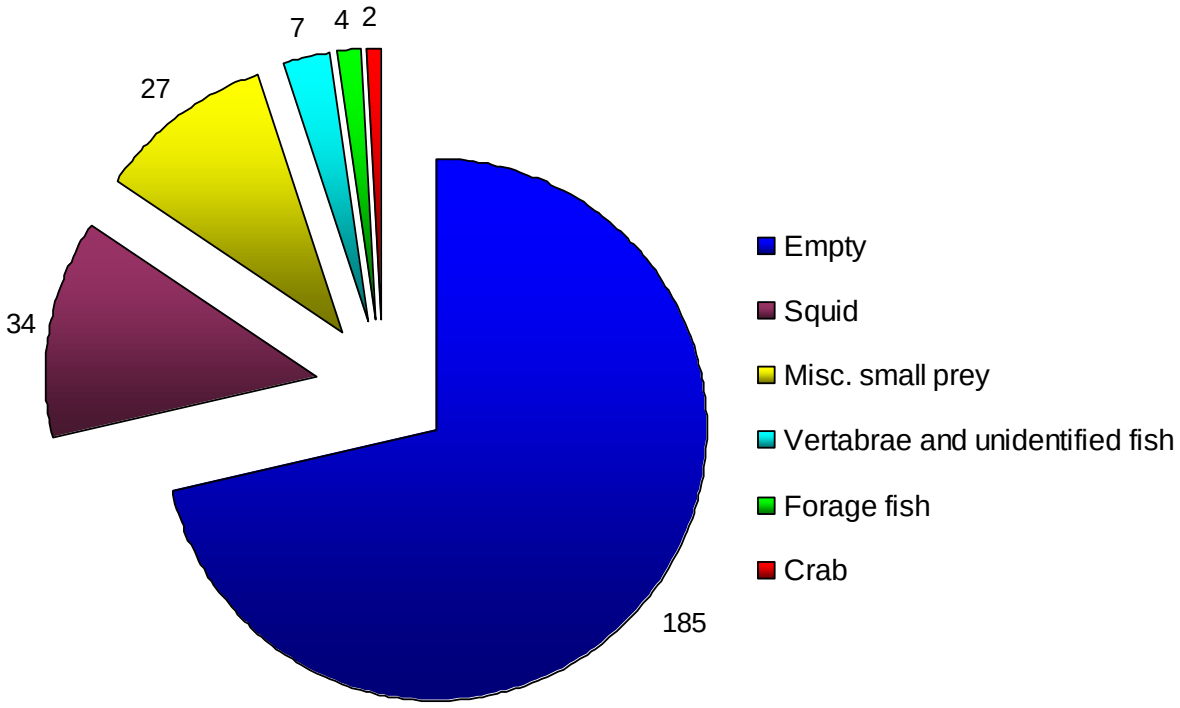


Sablefish diets:

In December 2005, the Council requested that the stock assessment authors investigate the possibility of sablefish cannibalism in the BSAI pot fishery. Because few small sablefish are found in pots, there was concern that small sablefish were entering the pots and being cannibalized by larger sablefish.

A total of 257 sablefish stomachs were examined during 2006 and 2007 at sea and in plants in Dutch Harbor, AK. Of these sablefish, 80 percent were females (attributed to selecting fish greater than 65 cm). A total of 72 percent of the stomachs sampled were empty. The prey item that occurred most commonly was squid (13 percent), followed by miscellaneous small prey < 15 cm (10 percent), vertebrae and unidentified digested fish (3 percent), forage fish (2 percent), and crab (1 percent). Some of the squid in the stomachs were noted to be bait from the pots. Miscellaneous small prey included brittle stars and unidentified small prey. The frequency of prey occurrence (out of 257 stomachs) is detailed in Figure 7.

Figure 7 Stomach contents of sablefish samples in 2006 and 2007, Dutch Harbor. (Source: GOA Safe Report, 2008)[6]



No sablefish were found in the stomachs of large pot-caught sablefish. Several caveats exist to these results. The authors were not provided with the soak time of these pots, so it is possible some of the vertebrae were from digested sablefish. However, sablefish in a benthic environment would likely be at least 35 cm (age 2+) and would take some time to digest to the point of becoming unidentifiable vertebrae. In addition, some stomach contents may have been regurgitated when the pots were retrieved. However, because no sablefish were present in the stomach samples, cannibalism in pots either does not occur or is a rare event.

Pot sample sizes:

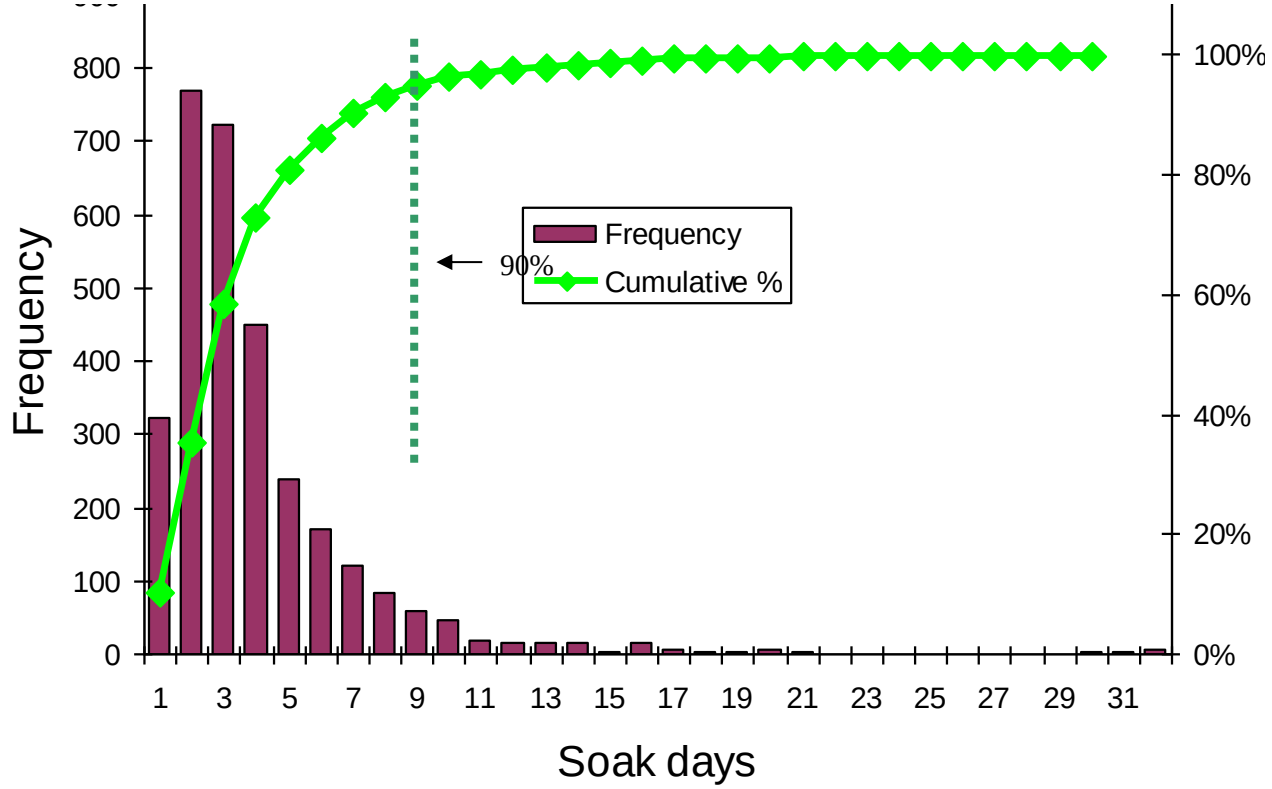
Sablefish pot fishing has increased dramatically in the BS and AI since 1999. In 2007, pot gear accounted for 81 percent of the BS fixed gear sablefish and halibut IFQ catch, and 56 percent of the AI sablefish and halibut IFQ catch. Fishery catch and effort data for pot gear are available from observer data since 1999; however, due to confidentiality agreements, the authors cannot present these data due to low sample sizes. Pot fishery data are also available from logbooks since 2004; however, these data are also sparse. The number of observed sets and the number of pots fished increased dramatically in 2005 and remained high through 2007. The number of logbook pot sets has continued to increase in the BS and has stayed consistent in the AI. Over all years, the average number of pots used per set was 78.

In 2006, some questions were raised about storing pots at sea, pot escape rings, and biodegradable panels. While the consequences of these potential regulatory provisions were not analyzed, the soak times of observed pot sets were examined in 2006. From 1999 through 2005, 90 percent of the observed pot sets in the BSAI were soaked for seven or fewer days (Figure 8).

In an experiment examining escape mechanisms for Canadian sablefish, Scarsbrook et al. (1988) showed that in their control pots fish had only 5 percent mortality up to 10 days.

[6] Available at http://www.afsc.noaa.gov/refm/docs/2008/sablefishgoa.pdf

Figure 8 Number of soak days for 1999-2005 BSAI pot fisheries. (Source: GOA Safe Report, 2008)[7]



The Council's Sablefish Gear Committee convened in December 2013 to consider the staff discussion paper on this action, provide information on a number of gear issues related to the action, and recommend alternatives for analysis[8]. The committee opined that overall HAL longline gear is more effective (higher CPUE) than pot longline gear due to regular spacing of hooks versus pot "bait bombs" every 50 fathoms.

The Council requested that the sablefish stock assessment authors evaluate the impacts of Alternative 2 on their ability to assess the status of the sablefish stock. The stock assessment authors report that development of a fishery index of abundance for pot gear would remain unlikely. The introduction of pot longline gear in the GOA would complicate progress toward an improved HAL longline fishery index of abundance, as IFQ fishermen trade HAL longline gear for pot longline gear. A second consideration is whether the selectivity of the pot longline gear would be vastly different from HAL longline gear. Presently the two gear types are combined for assessment purposes in the BS because of a lack of measured difference. However, GOA sablefish are known to generally be larger, and some differences based on escape ring size and depths at which the pot longline gear is fished may become evident. In summary, length and possibly age composition would be needed from the new gear type before the stock assessment authors could evaluate the potential effects on the sablefish stock and stock assessment.

Conclusions:

There are no significant impacts identified for sablefish. Some (unquantified) benefit would occur under Alternative 2. Unaccounted fishing mortality due to whale depredation would be reduced as sablefish IFQ fishermen voluntarily switch from HAL longline gear to pot longline gear, but that effect would be masked by recent lack of recruitment to the stock. Additional savings in lost mortality would accrue to species also caught by sablefish IFQ fishermen using HAL gear, such as grenadiers and Pacific halibut.

[7] Available at http://www.afsc.noaa.gov/refm/docs/2008/sablefishgoa.pdf
[8] http://www.npfmc.org/wp-content/PDFdocuments/catch_shares/SablefishGearMin_9-30-13.pdf

3.2 Pacific Halibut

Biology:

Pacific halibut is a flatfish which inhabits the continental shelf of the United States and Canada, ranging from California to the Bering Sea, and extends into Russia and Japan (IPHC 1998). As described by ADF&G[9] and IPHC[10], most male halibut are sexually mature by about 8 years of age, while half of the females are mature by about age 12. Most halibut spawn during the period November through March, at depths of 300 to 1,500 feet. Female halibut release a few thousand eggs to several million eggs, depending on the size of the fish. Eggs are fertilized externally by the males. About 15 days later, the eggs hatch and the larvae drift with deep ocean currents. As the larvae mature, they move higher in the water column and ride the surface currents to shallower, more nourishing coastal waters. In the GOA, the eggs and larvae are carried generally westward with the Alaska Coastal Current and may be transported hundreds of miles from the spawning ground. Halibut larvae start life in an upright position like other fish, with an eye on each side of the head. The left eye moves to the right side of the head when the larvae are about one inch long. At the same time, the coloration on the left side of the body fades. The fish end up with both eyes on the pigmented (olive to dark brown), or right, or upper side of the body, while their underside is white. By the age of 6 months, young halibut settle to the bottom in shallow nearshore areas.

Halibut feed on plankton during their first year of life. Young halibut (1 to 3 years old) feed on euphausiids (small shrimp-like crustaceans) and small fish. As halibut grow, fish make up a larger part of their diet. Larger halibut eat other fish, such as herring, sand lance, capelin, smelt, pollock, sablefish, cod, and rockfish. They also consume octopus, crabs, and clams.

Female halibut grow faster and reach larger sizes than male halibut. The growth rate of halibut has changed over time. The growth rate was highest in the 1980s and lowest in the 1920s and 2000s. By the 2000s, 12-year-old halibut were about three-quarters the length and about one-half the weight they were in the 1980s. The growth rate is believed to decrease due to competition among halibut or between halibut and other species, such as arrowtooth flounder, that have a similar diet.

For at least the past 15 years, halibut growth rates have been depressed to levels that have not been seen since the 1920s. Both females and male halibut have the potential to grow rapidly until about age 10, about 2 inches per year for males and 2.5 inches for females. Thereafter, females have the potential to grow even faster, while males generally would slow down relative to female growth. Growth rates for these larger fish in the last 10 or so years are more on the order of one inch or less per year. This translates into a much smaller fish at any given age.

There was a dramatic increase in halibut growth rates in the middle of this century, especially in Alaska. Sometime around 1980, growth rates started to drop, and now Alaska halibut of a given age and sex are about the same size as they were in the 1920s. For example, in the northern GOA, an 11-year-old female halibut weighed about 20 pounds in the 1920s, nearly 50 pounds in the 1970s, and now again about 20 pounds. In the late 2000s, 15-year-old female halibut in the Central GOA have averaged 28 pounds, a decline of 70 percent in 30 years. Similar, though slightly smaller, declines have been noted in all areas. The declines in size at age occur at all ages and for both sexes; the declines increase markedly with age. The reasons for both the increase and the decrease are not yet known but may be tied to increased abundance of other species, such as arrowtooth flounder, and availability of food supply.

Halibut tagged in the BS have been caught as far south as the coast of Oregon, a migration of over 2,000 miles. Because of the extensive movements of juvenile and adult halibut, the entire Eastern Pacific

[9] http://www.adfg.alaska.gov/index.cfm?adfg=halibut.main
[10] http://www.iphc.int/publications/rara/2010/2010.261.Evaluationoftheimpactofmigrationonlostyield.pdf

population is treated as a single stock for purposes of assessment. Research is continuing to determine if there are spawning sub-stocks of varying productivity.

Halibut also move seasonally between shallow waters and deep waters. Mature fish move to deeper offshore areas in the fall to spawn, and return to nearshore feeding areas in early summer. It is not yet clear if fish return to the same areas to spawn or feed year after year.

Halibut abundance changes along its geographic range, with the current center of abundance located around Kodiak Island (Area 3A) in the GOA. During summer, halibut are distributed on the continental shelf but during the winter mature halibut migrate to spawning grounds located in deeper waters. Recent archival tagging has identified winter spawning migrations as long as 1200 km as well as some degree of site fidelity to summer areas. After spawning, halibut eggs and larvae are carried by prevailing currents north and westward towards the western GOA and the BS. Juvenile halibut undertake an ontogenetic eastward-southward migration that counters the drift of eggs and larvae.

Status of the Stock:

The stock assessment for Pacific halibut showed that the stock has been declining continuously since 1997. The decline is two-fold: decreasing size at age (mature fish are generally smaller than in the past) and poor recruitment strengths (lower numbers of fish "recruiting" to legal size). Despite this, the exploitable biomass and spawning biomass seem to have plateaued over the last few years. Spawning biomass is estimated to have increased from 190 million lbs. in 2011 to 197 million lbs. in 2012, with a projected further increase to 201 million lbs. in 2013 (Figure 9). Trends in survey abundance are provided by management area (Figure 10).

The assessment concludes that incoming recruitments to the population is likely to be low; size-at-age changes slowly and is currently low; the stock trend is projected to be relatively flat or declining in the near-term; and stock response to management actions may increase, as the stock stabilizes at lower biomass levels.

Figure 9 Estimates of female spawning biomass (thousands t) Source: IPHC (2013)

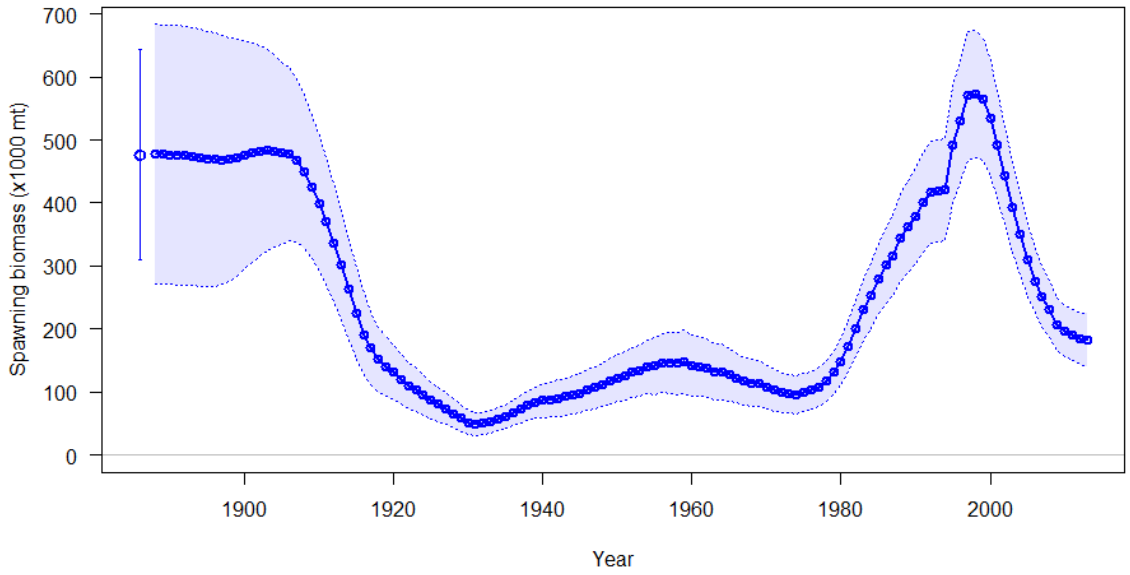
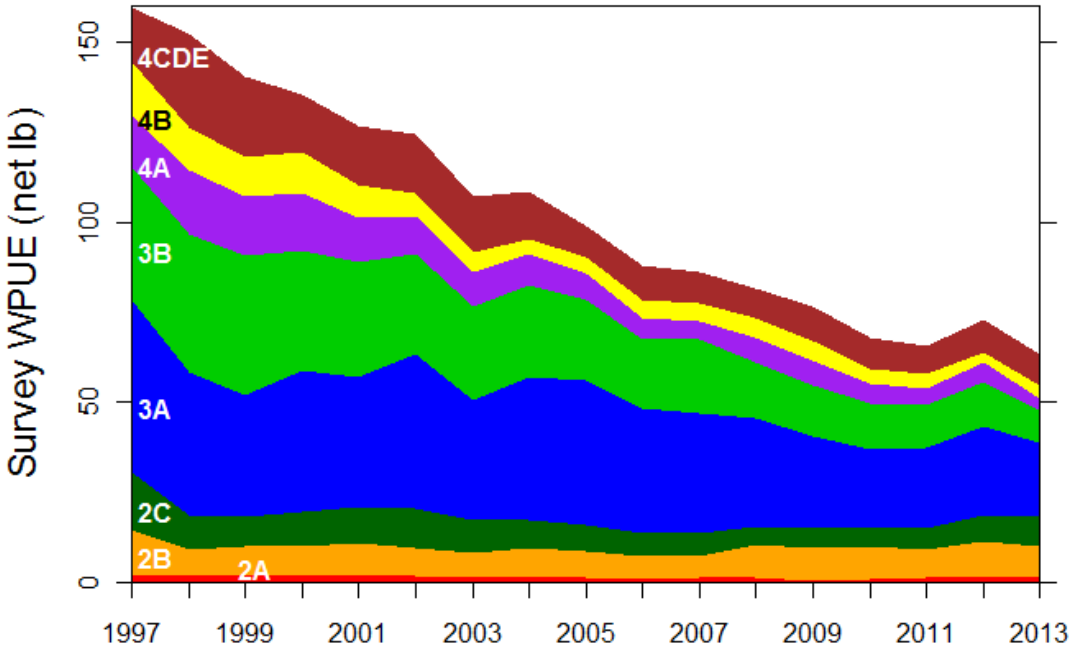


Figure 10 Pacific halibut survey trends by halibut regulatory area (Source: IPHC)



Fishery Management:

Pacific halibut fisheries are regulated by the IPHC (in compliance with the terms of the Northern Pacific Halibut Act between the United States and Canada) and the Council. In practice, the IPHC establishes total annual catch limits and other conservation measures by regulatory area, and the Council develops regulations to govern the fishery including limited access and allocation decisions (Figure 11).

The Pacific halibut fixed gear fishery (together with the sablefish fixed gear fishery) has been managed under an IFQ program since 1995; the IFQ program is summarized under Section 3.1.

The total 2013 catch from the IFQ/CDQ halibut fishery for the waters off Alaska was 22 million lbs., 5 percent under the catch limit (Table 4). For comparison, the 2012 commercial catch was 3 percent under the catch limit. For Areas 2C and 3A, the commercial QS catches were under the catch limits by 2 percent. Area 3B was 6 percent under its catch limit.

The fishing fleet for halibut is primarily composed of owner-operated vessels that use HAL longline gear (pot and trawl gear are prohibited). The halibut IFQ fishery season opening date is set by the IPHC, and typically occurs between sometime in March and sometime in November; the 2014 season runs March 8 through November 7.

Figure 11 Pacific halibut regulatory areas. Shaded region indicates the Exclusive Economic Zone of the United States and Canada. (Source: IPHC)

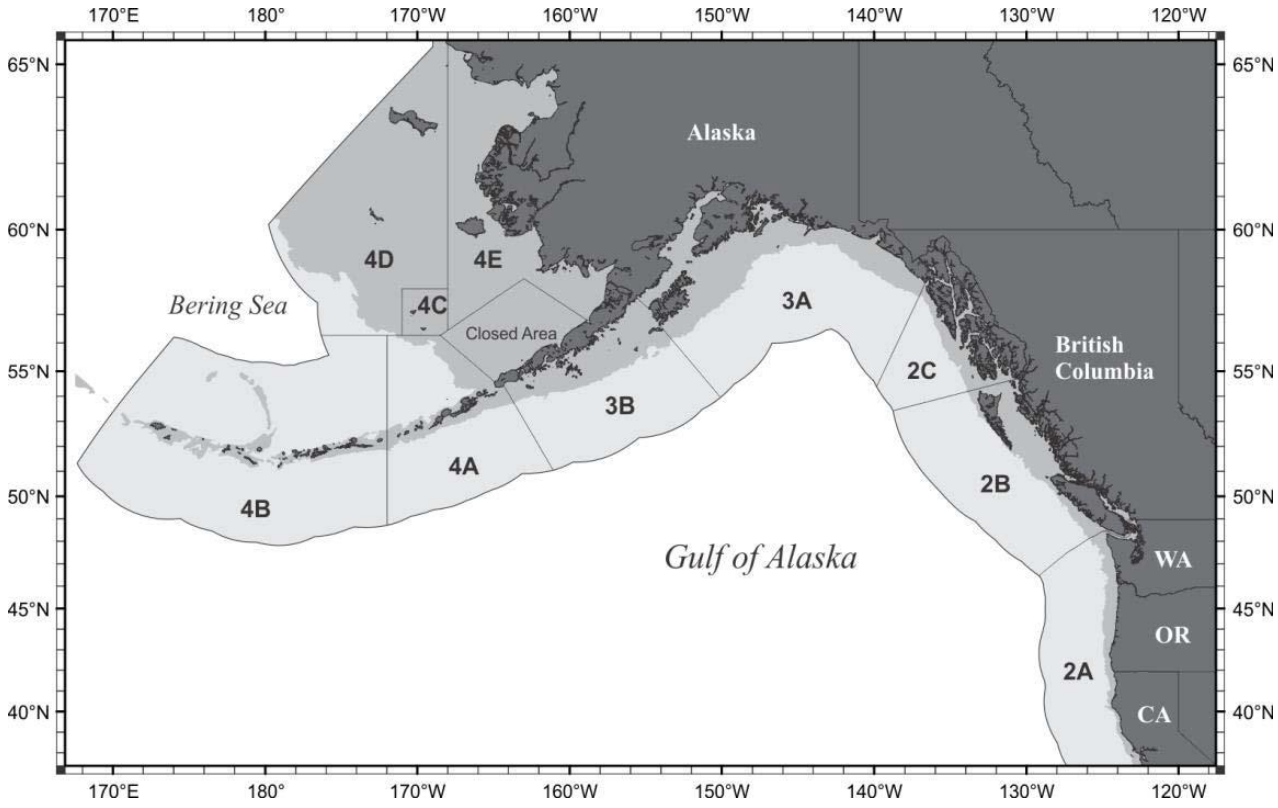


Table 4 Commercial catch (including IPHC research catch) and catch limits of Pacific halibut (in thousands of pounds, net weight) by IPHC regulatory area, 2004 - 2013. (Source: IPHC)

Regulatory Area	Commercial Catch[1]									
	2004	2005	2006	2007	2008	2009	2010	2011	2012[2]	2013[3]
2A[4]	884	803	829	789	682	490	418	541	573	544
2B	12,162	12,331	12,005	9,772	7,756	6,637	6,729	6,692	5,983	5,919
2C	10,233	10,625	10,492	8,473	6,206	4,955	4,486	2,454	2,694	3,037
3A	25,168	26,033	25,714	26,493	24,521	21,755	20,502	14,669	12,032	11,050
3B	15,460	13,171	10,792	9,249	19,748	10,781	10,114	7,321	5,045	4,116
4A	3,562	3,404	3,332	2,828	3,015	2,528	2,325	2,351	1,583	1,233
4B	2,719	1,975	1,590	1,416	1,763	1,593	1,829	2,054	1,738	1,237
4C[5]	954	534	493	551	724	645	789	790	563	513
4D[5,6]	1,655	2,578	2,368	2,720	2,552	2,210	2,116	2,182	1,431	982
4E[6,7]	314	369	366[7]	579	600	455	410	457	347	280[7]
Total	73,111	71,823	67,981	62,870	58,567	52,049	49,718	39,511	31,989	28,911
Regulatory Area	Commercial Catch Limits[8]									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
2A[4]	890.4	788.6	818.5	799.2	718.4	511.2	420.0	480.7	546.6	573.8
2B	12,141.0	11,658.0	11,631.0	10,089.4	7,918	6,711.6	6,598.6	6,702.2	5,953.4	5,958
2C	10,500.0	10,930.0	10,630.0	8,510.0	6,210.0	5,020.0	4,400.0	2,330.0	2,624.0	2,970
3A	25,060.0	25,470.0	25,200.0	26,200.0	24,220.0	21,700.0	19,990.0	14,360.0	11,918.0	11,030
3B	15,600.0	13,150.0	10,860.0	9,220.0	10,900.0	10,900.0	9,900.0	7,510.0	5,070.0	4,290
4A	3,470.0	3,440.0	3,350.0	2,890.0	3,100.0	2,550.0	2,330.0	2,410.0	1,567.0	1,330
4B	2,810.0	2,260.0	1,670.0	1,440.0	1,860.0	1,870.0	2,160.0	2,180.0	1,869.0	1,450
4C	1,720.0	1,815.0	1,610.0	1,866.5	1,769.0	1,569.0	1,625.0	1,690.0	1,107.0	859
4D	1,720.0	1,815.0	1,610.0	1,866.5	1,769.0	1,569.0	1,625.0	1,690.0	1,107.0	859
4E	345.0	359.0	330.0	367.0	352.0	322.0	330.0	340.0	250.0	212
Total	74, 256.4	71,685.6	67,709.5	63,248.6	58,816.4	52,722.8	49,378.6	39,692.9	32,012.0	29,531.8

[1] Commercial catch includes IPHC research catch and, in Area 2C, the Metlakatla fishery catch.
[2] Poundage figures have been updated from previous publications.
[3] Preliminary (as of November 11, 2013).
[4] Does not include treaty Indian ceremonial and subsistence fish.
[5] Area 4C IFQ and CDQ could be fished in Area 4D (since 2005).
[6] Area 4D CDQ could be fished in Area 4E.
[7] Area 4E includes research catch in the IPHC Closed Area.
[8] Additional carryover from the underage/overage plans is not included.

Catch History:

The halibut fisheries are prosecuted with stationary groundlines, onto which baited hooks are attached. Gear in the halibut fishery can vary somewhat across vessels. In most cases, anchors are two-prong standard 50 pound anchors, and groundlines are generally constructed of 3/8-inch sinking line, with gangions of #72 to #86 twine, and 14/0 - 16/0 circle hooks. Some catcher vessels use snap-on gear with 3' to 4' long gangions spaced at 10' to 20' intervals. Some vessels use stuck gear (not snap on) with 12" to 16" gangions spaced at 10' to 20' intervals. Other vessels use combination gear (used to target both halibut and sablefish) with shorter gangions, shorter hook spacing (4' to 6'), and smaller hooks (13/0-15/0). Automatic baiting machines are used on many vessels. An average set consists of 10 to 20 skates of groundline, with each skate 100 fathoms to 150 fathoms long. Squid and herring are the preferred baits, although pink salmon and Pacific cod may also be used. The ends of each set are anchored and marked with buoys. The lower shot(s) (33 fathoms each) of the anchor line is (are) made of up to 3/4-inch floating poly, and the upper shot of line is made of up to 5/8-inch sinking line. A buoy marks the beginning of a set, and a flag (up to 10' high) typically marks the end of a set ("bag and flag" set-up).

To make a set, the first anchor is dropped and the boat steams ahead with the groundline and baited hooks being set off the stern of the boat. The set is not necessarily made in a straight line; rather, the boat will steer to ensure that the groundline is set in the preferred areas based on depth contour and bottom structure. The second anchor is deployed, and the line is left to fish for 5 hours to 24 hours, depending

upon the catch rates. Upon haulback, the groundline is fed through a hauler, and the fish are carefully taken off the hooks. The fish are bled and gutted, and put on ice, or in a hold of slush-ice on shorter trips.

Halibut fishing grounds occur throughout the entire GOA shelf and AI shelf area. In the Eastern Bering Sea, halibut are taken in the upper slope area and the shelf area in the immediate vicinity of the Pribilof Islands. Although halibut have been caught as deep as 550 m, they are most often caught between 25 m and 275 m.

Many of the 1,060 vessels that fish halibut also participate in other fleets; 357 vessels in the sablefish fleet, 61 vessels in the longline groundfish fleet, 53 vessels in the groundfish pot fleet, and a few vessels that participate in almost every other federal fishery.

Bycatch:

In general, observer coverage of fisheries in the GOA has been lower than in the BSAI, resulting in poorly estimated halibut bycatch. Most vessels either operate in state waters where there are minimal, if any, observer coverage requirements, or are less than the 40' LOA minimum size threshold for observer coverage in Federal waters. IPHC summarized NMFS-reported data on bycatch by hook-and-line vessels fishing in the Federal waters for 2013. These vessels primarily target Pacific cod (*Gadus macrocephalus*). A minor amount of bycatch by vessels fishing in the Federal sablefish IFQ fishery is also included.

Bycatch mortality in Area 3 (Eastern, Central, and Western GOA) in 2013 was estimated at 2.3 million lbs., a decrease of 33 percent from 2012 (Figure 12). This is a large change between two years, one of the biggest observed. Bycatch is estimated to have decreased in both Area 3A and 3B, with the biggest drop occurring in Area 3B. Decreases were noted in both trawl and hook-and-line fisheries. The total for Area 3 is below the 10-year average of 4.3 million pounds.

Trawl fishery bycatch was 79% of the total bycatch in the area, estimated at 1.8 million pounds. Area 3A accounted for 1.2 million pounds of this total, with the remainder (0.6 million pounds) from Area 3B. Target fisheries for arrowtooth flounder (*Atheresthes stomias*) and flatfish (primarily rock sole (*Lepidopsetta* spp.) and yellowfin sole (Limanda aspera)), accounted for over half of the trawl bycatch in Area 3. Roughly 75% of this mortality was taken in Area 3A.

Bycatch mortality in hook-and-line fisheries primarily occurs in target fisheries for Pacific cod (*Gadus macrocephalus*). Since 2006, slightly more than half of the annual bycatch mortality from this fishery has usually been taken in Area 3B. The cod fishery occurs in January-March, when halibut tend to be in deeper water for spawning and cod are schooling in shallow water.

Figure 13 depicts total halibut PSC (mt) and rate (kg/mt) for 2004 through 2013, for total groundfish excluding and including pollock catch. Pollock catch is excluded in the top panel because it comprises a large amount of total groundfish catch, and its associated halibut bycatch is minimal, thus masking both halibut discards and mortality in other groundfish fisheries. The bottom panel of the figure best demonstrates the effect the of the Council's proposed action to decrease halibut discards and mortality.

Halibut managers have emphasized bycatch reduction of halibut in non-target fisheries in recent management initiatives. The Council and IPHC co-sponsored a workshop on Halibut Bycatch Estimation, Halibut Growth and Migration, & Effects on Harvest Strategy in April 2012. Participants reviewed the methodology and accuracy of the estimation of Pacific halibut bycatch in trawl/longline groundfish fisheries off Alaska, and the impacts of halibut bycatch on the halibut stock as a whole and by area, given the current understanding of halibut migration. The workshop also discussed general halibut ecology, including recent trends in exploitable biomass, spawning biomass, and size at age, and information concerning the causes and implications of declining size at age of halibut. The IPHC also created several committees that were tasked with developing background information on halibut bycatch in US and Canadian fisheries, programs implemented and under consideration to reduce bycatch, and recommendations for further consideration by the IPHC. Since 2011, a Halibut Bycatch Project Team,

composed of IPHC commissioners and Canadian and U.S. agency staff, has been discussing and reviewing the status of halibut bycatch in the North Pacific. The Team is exploring options for reducing and mitigating halibut bycatch. The Team's draft report contains its findings (http://www.iphc.int/research/245-bycatch.html).

Economics:

The fleet's primary target is Pacific halibut. The fleet delivered to 34 different ports. Kodiak and Homer were the top two ports and received 33 percent of the landings. The average ex-vessel price per pound for halibut was $3.65, an increase of $1.26 from the prior year. Ex-vessel price per pound was highest for sablefish and halibut, and lower for Pacific cod, pollock, and other species landed by participating vessels.

Figure 12 Total estimated removals by source in Areas 2C, 3A, and 3B since 1888. Note that the y-axes differ in scale. (Source: IPHC)

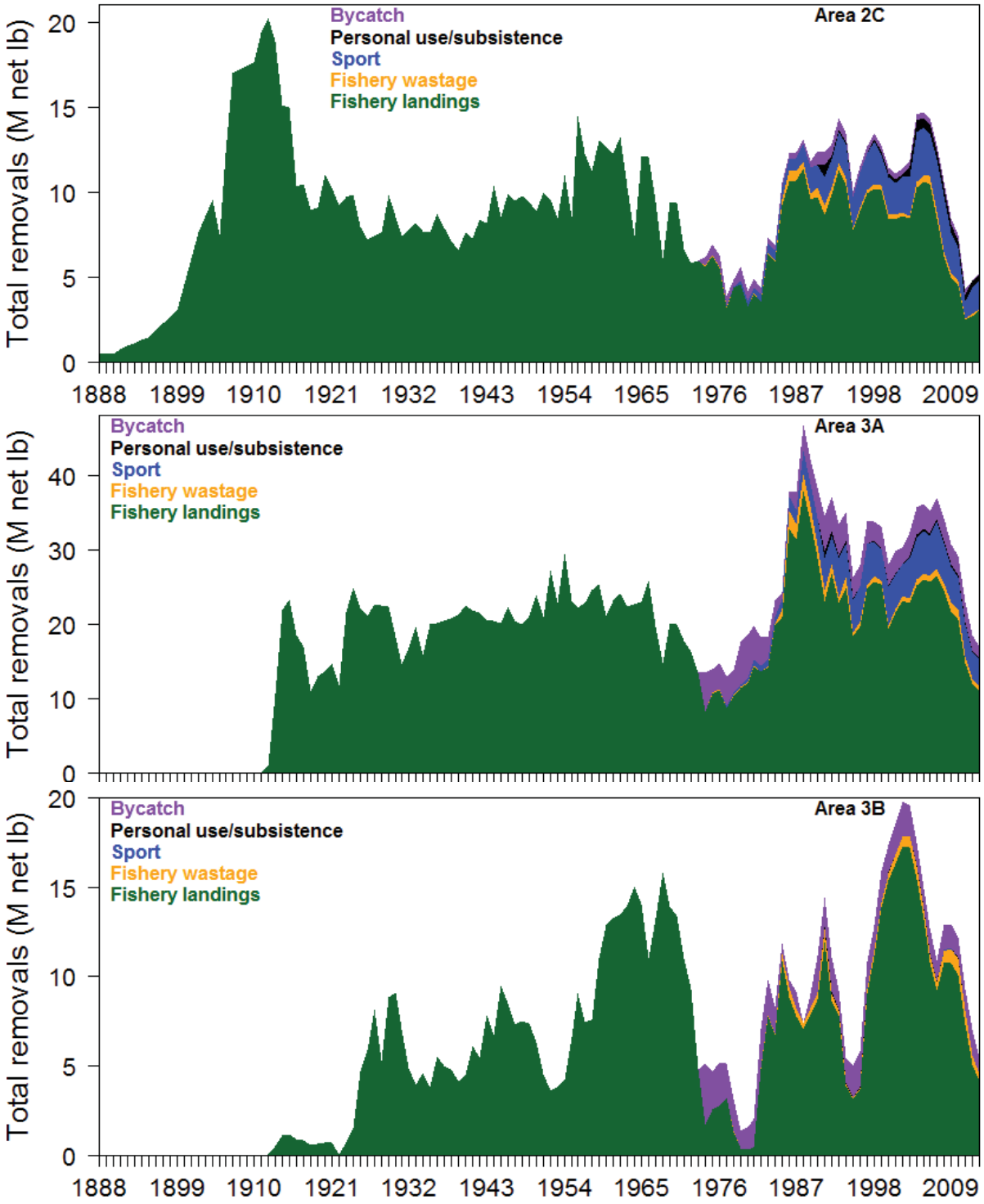
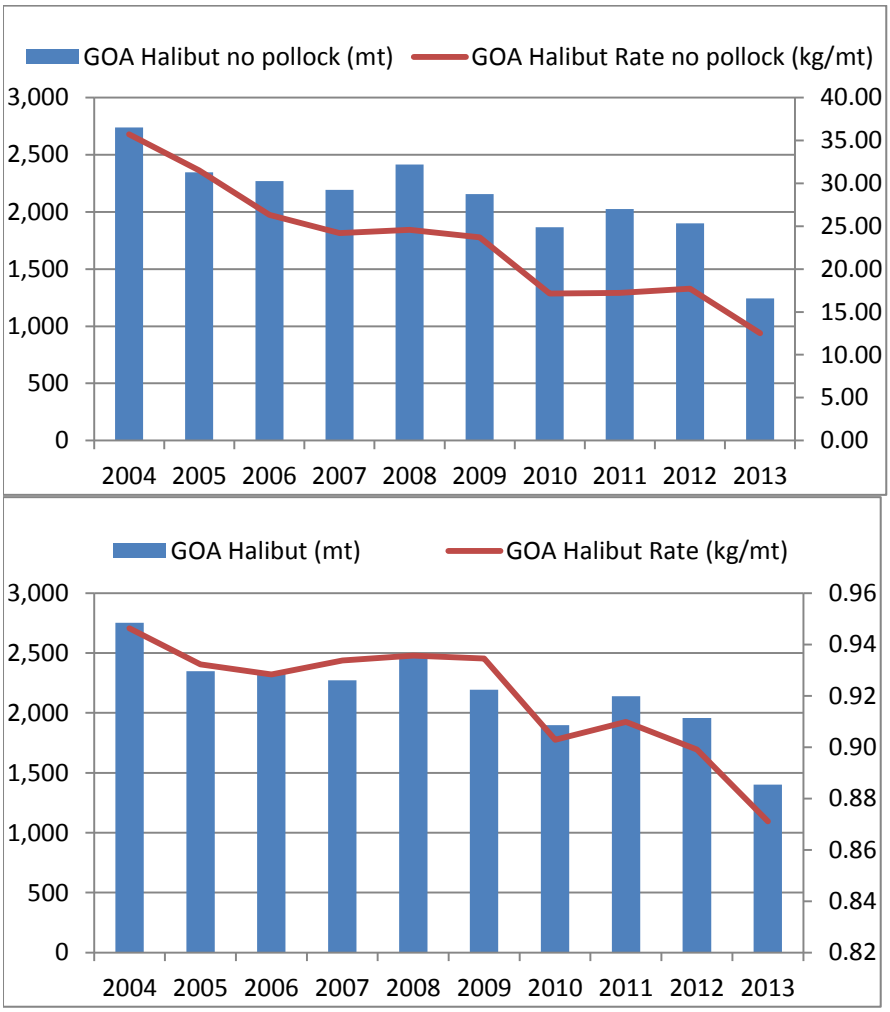


Figure 13 Pacific halibut bycatch in tons (left y-axis) and rates (right y-axis), 2004 through 2013. (Source: NMFS)



3.2.1 Effects of the Alternatives

The effects of the use of current and proposed gear in the halibut IFQ hook-and-line longline fishery are addressed here. The halibut fishery is assessed annually in the Report of Assessment and Research Activities (RARA); the latest edition is IPHC (2014). Table 3 in Section 3.1.1 described the criteria that are used to determine whether the impacts on the GOA halibut stock are likely to be significant. The halibut stock is neither overfished nor subject to overfishing. GOA biomass levels are projected to decrease in the near future due to a lack of recruitment, and size-at-age (Figure 3). It is estimated that the GOA halibut fishery under the status quo is sustainable.

The sablefish and halibut IFQ fisheries are prosecuted simultaneously and harvests of both fish may be landed together, as long as sufficient IFQ are held by those on board to cover those harvests. Alternative 2, Element 4 addresses management of Pacific halibut, which is shared among various agencies: the Council, IPHC, and NMFS. The IPHC is authorized to set catch limits and define gear for halibut, among other responsibilities. Element 4 would allow halibut IFQ to be retained in addition to sablefish IFQ using pot longline gear in the GOA; however, this allowance would require a separate and complementary action by the IPHC to redefine allowable gear for the retention of halibut in the GOA. Both the Council and IPHC have expressed intent that retention of halibut in sablefish pot longline gear, if approved, be

limited to incidental amounts and not become a targeted halibut IFQ fishery. Potential management measures to limit halibut IFQ harvest in pot longlines are analyzed in Section 4.8.2.4.

3.2.1.1 Alternative 1

Maintaining the current prohibition of the use of pot (single or longline) gear in the GOA is the status quo, or No Action, alternative. Continued prohibition on the use of pot longline gear would not change (increase or decrease) the fishing mortality on halibut, as hooked fish would continue to be predated upon by whales. These halibut mortalities, which are not legally landed, are considered part of the incidental mortality of Pacific halibut in the sablefish IFQ fishery.

The incidental mortality of halibut due to whale depredation on halibut fishery hook-and-line gear is accounted for as part of natural mortality within the stock assessment. Therefore Alternative 1 would continue with the current impact on the halibut population.

Taking no action would not address the stated purpose and need for the action. All halibut would continue to be discarded if caught with pot longline gear if the Council takes no action on Element 4. Such a requirement is in conflict with one of the tenets of the halibut/sablefish IFQ program, which is to allow fishermen to retain all legal fish of both species if sufficient IFQ are held to cover that harvest.

3.2.1.2 Alternative 2, Element 4

The Council has identified the need to maximize the ability of sablefish QS holders to harvest their sablefish IFQ by increasing catch per unit of effort and reducing fishing costs. The Council has identified marine mammal depredation (from sperm and killer whales) on halibut in the IFQ fishery as a continuing issue, and one that is difficult to quantify. If it selects Alternative 2 as its preferred alternative, the Council also could recommend that legal sized (over 32 inch) halibut be retained, if sufficient IFQ are held to cover the harvest. The Council may wish to consider measures to ensure that halibut retained in the sablefish IFQ fishery are of a level that maintains the incidental nature of the catch. Identification of "incidental" levels of harvest, however, would be difficult. *For ease of use in the fishery, public understanding, implementation, and enforcement, the Council may wish to consider adopting the use of pots, with no additional limits (other than those general IFQ program limitations currently in Federal regulations) in order to eliminate the aforementioned inefficiencies associated with depredation from HAL longline gear*. Such a policy change to the halibut IFQ program, however, would benefit from greater dialogue with the halibut IFQ fleet and the IPHC, as identification of legal gear for the harvest of halibut also requires amending IPHC regulations.

The Council did not, however, identify management measures to limit halibut IFQ retention to *incidental* amounts as suboptions for analysis under Alternative 2, Element 4. As a default, the analysts have incorporated into this analysis those management measures for implementation in Federal regulations that the Council tentatively proposed for a similar action in Area 4A. Those measures are: (1) mandatory retention of all legal size halibut, and (2) MRAs for halibut in the sablefish IFQ fishery (which may appear contradictory but is intended to not allow a target halibut IFQ fishery using pots, although it likely will result in some discards and associated mortality). While suggested by the Council for consideration under the proposed Area 4A action, analysis of potential DMRs are not necessary or appropriate under either action, and was not incorporated into the default set of potential requirements. The potential for DMRs could be considered, if appropriate and if sufficient data are available, under the triennial DMR report provided to the Council by the IPHC staff, as part of the Groundfish SAFE Reports. The next DMR report is scheduled for Council review in October/December 2015, so that it may adopt DMRs for the groundfish fisheries for 2016 through 2018.

The Council also noted the need to coordinate the timing of implementation of complementary sets of regulations. Both Federal (NMFS) regulations and IPHC (annual management measures) regulations would need to be amended to identify pots as legal gear for halibut.

Gear retrieval and marking requirements are proposed under Elements 2 and 3, respectively. Some of them were derived from issues thought to be related to halibut mortality in sablefish pots that were proposed for consideration through the Council in 2012 and 2013 discussion papers, and recommended by the Sablefish Gear Committee (see items A. through D. below) and Advisory Panel. The following management topics were identified by the Sablefish Gear Committee as of interest to Element 4.

A. Exacerbation of halibut mortality

The Sablefish Gear Committee briefly discussed whether additional halibut mortality is associated with pot gear. It observed that halibut mortality could be increased due to increased soak times and concluded that the net change in halibut mortality from switching from longline gear to pot longline gear would be difficult to quantify. Halibut bycatch in pots is low, and lower than on hook-and-line gear, based on reports in BSAI sablefish fisheries. The overall effect of switching some fishing effort from hook-and-line gear to pot gear may be to reduce halibut mortality, even though those few fish must be discarded.

Sablefish Gear Committee members reported that the pot tunnel size likely will determine how much halibut bycatch occurs. A committee member suggested that halibut bycatch and overall mortality would be less with pot gear. Pots would catch fewer halibut; and even if the halibut mortality may be higher in pots, the overall mortality would be less. If the IPHC allowed pots as legal gear for halibut for those holding halibut IFQ permits, bycatch and halibut mortality would decrease (see discussion of Area 4A halibut pot proposal before the IPHC in January 2014).

The Committee also noted that pots in the BSAI sablefish IFQ fishery use a "sock tunnel". It is very difficult for halibut to push their way through into the pot. One committee member's experience in longlining pots in the Bering Sea sablefish IFQ fishery was that halibut bycatch was minimal, 1 or 2 fish per string. The depth at which longline pots are deployed in the Bering Sea avoids halibut concentrations.

B. Shifting predation to halibut

The Sablefish Gear Committee briefly discussed the potential for increased halibut mortality if whale depredation shifted to the hook-and-line halibut FIQ fishery, and concluded that it would be difficult to quantify net changes.

C. Halibut retention in pots

No studies were found comparing catch rates of Pacific halibut in different types of groundfish pots. Williams et al. (1982) compared catch rates of halibut in several types of crab pots. Top-entry crab pots had substantially lower catch rates of halibut than side-entry pots. "Tanner boards," which are placed horizontally across the upper half of the tunnel opening, reduced the catch rate of halibut by side-entry pots by 63 percent. In addition, the catch of halibut over 90 cm long was almost eliminated. The authors recommended further gear research to determine if side-entry pots can be modified to significantly reduce halibut loss with little cost.

The Sablefish Gear Committee unanimously recommended that the proposed action include adoption of retention of halibut in sablefish pots by IFQ holders in all halibut management areas. However, the committee recognized that consideration of halibut retention in sablefish IFQ pots in all areas was beyond the charge to the committee.

D. Spatial distribution of halibut and sablefish harvest in affected area

Figure 14 (percent) and Figure 15 (number) show the distribution of IFQ sablefish pot landings (blocks) with halibut bycatch (vertical bars) summed over four years (2009-2012). The highest amounts in percent

and numbers of both sabelfish and halibut catch appears closest to the port of Dutch Harbor. Appendix 1 shows the relationship between sabelfish pot landings, and halibut bycatch, by month during the IFQ season.

Alternative 2 would allow, but not require, a new gear for use in the GOA sablefish IFQ fishery; however the incidental amounts of halibut that would be allowed to be retained (up to what would be determined to be legal limits under this action) using pot longline gear in the sablefish IFQ fishery, would be *required* to be retained under Alternative 2, Element 4, if adopted by both the Council and IPHC, and approved by the Secretary. The effects of the use of pot longline gear on the halibut stock would be proportionate to its actual use and to the extent that sablefish harvesters possess halibut QS, but is expected to be minor. If the pot catch of halibut was sufficiently large enough, the IPHC would need to determine a pot gear selectivity curve for halibut stock assessment in order to properly account for the resulting halibut removals. The amount of halibut that otherwise would have been lost to depredation that could be expected to be reduced under Alternative 2, Element 4 also is unknown, but is likely proportionate to the use of pot longline gear and the proportion of retainable halibut (over 32 inches) in the catch. The amount of halibut that would have been lost to depredation is assumed to be completely harvested by sablefish IFQ fisheries under the proposed alternative (up to any regulatory limits), but could not exceed the total amount of IFQ derived from QS held by fishery participants. Cumulative harvest of IFQ could not exceed the halibut commercial catch limit.

Figure 14 Number of halibut as a percent of total (summed over 2009-2012) halibut caught incidentally in IFQ sablefish fishery in pot gear.

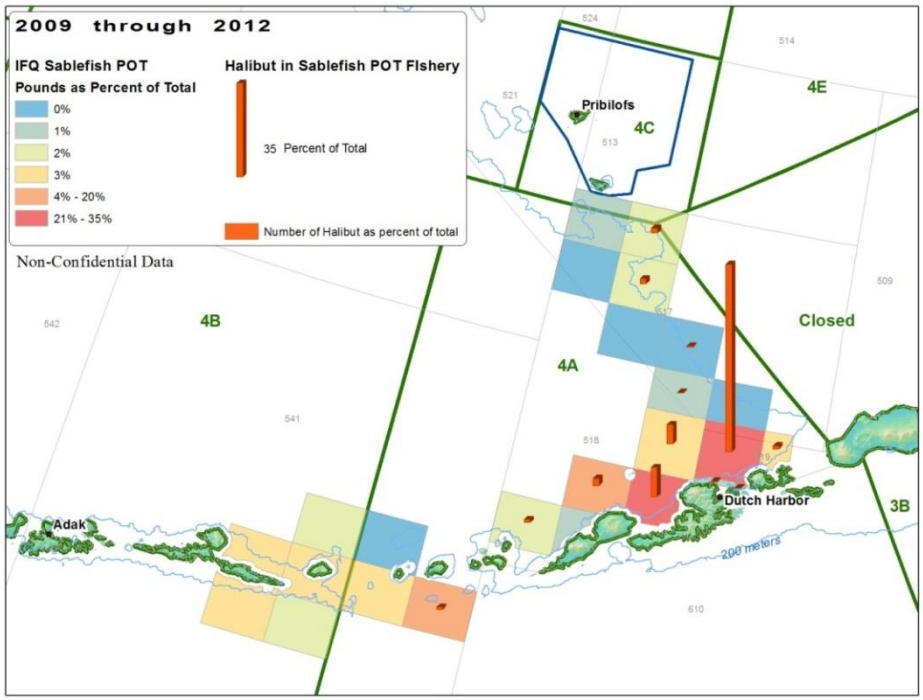
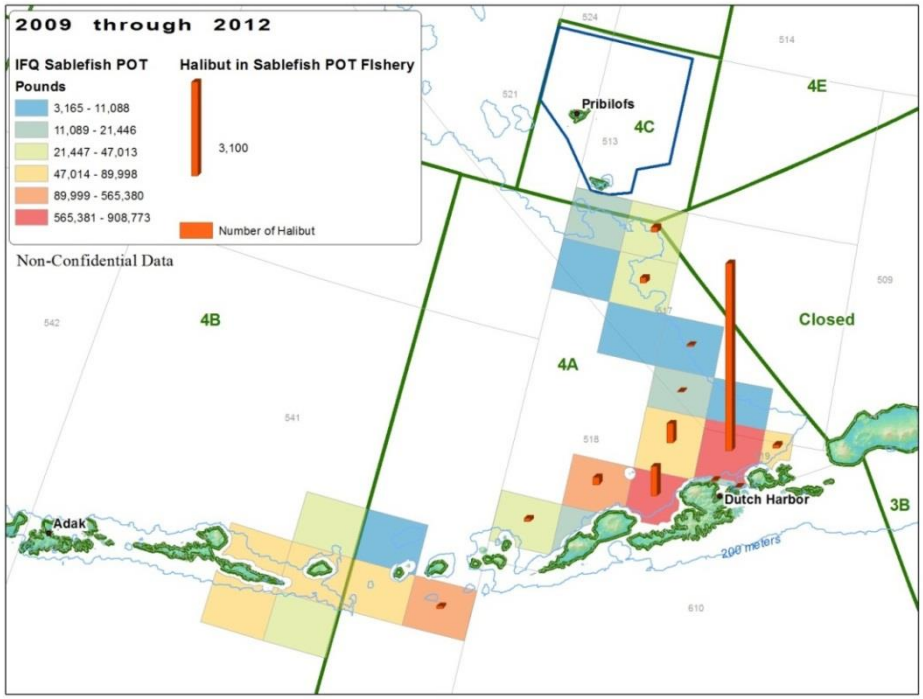


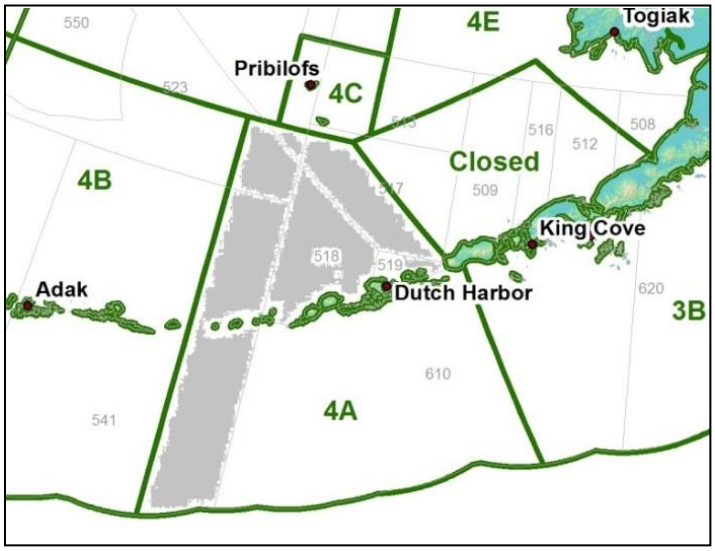
Figure 15 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear.



Area 4A action

In a related action, the Council recommended that the IPHC allow incidental retention of halibut IFQs in sablefish pots in IPHC Area 4A. In April 2013 the Council recommended that the IPHC amend its regulations to allow the retention of Area 4A halibut IFQs that are incidentally caught while targeting sablefish IFQs using pot gear in the area of overlap with the BSAI sablefish regulatory areas, if the harvester holds both halibut and sablefish IFQs to cover both harvests in the subsection of Area 4A that overlaps with sablefish management areas (Figure 16).

Figure 16 Area of overlap between Pacific halibut regulatory area 4A and Bering Sea and Aleutian Island sablefish management areas



The Council based its recommendation for Area 4A on a March 2013 discussion paper and a revised table on the amount of halibut caught in sablefish IFQ pots in the affected area. These are posted at: http://www.npfmc.org/wp-content/PDFdocuments/halibut/4AhalibutPots_ExpanDP-413.pdf and http://www.npfmc.org/wp-content/PDFdocuments/halibut/4AhalibutPots_Table1.pdf, respectively.

Table 5 lists the number of halibut retained in sablefish pots in an area of overlap of Area 4A and the sablefish BS and AI regulatory areas, and is provided for reference. No comparisons may be drawn from this data for the GOA.

Table 5 Number of Area 4A halibut bycatch and pounds of BS or AI Sablefish harvested in pot gear, monthly data for 2009 through 2012

Month	Sablefish (round lbs.)	Halibut (numbers)	Halibut (net weight lbs.)*	Percent Total Sablefish (based on lbs.)	Percent Total Halibut (based on numbers)
3	246,978	290	3,770	5.71%	2.18%
4	629,310	1,542	20,046	14.56%	11.59%
5	635,563	8,044	104,572	14.70%	60.46%
6	431,946	1,608	20,904	9.99%	12.09%
7	416,230	1,077	14,001	9.63%	8.10%
8	382,767	92	1,196	8.85%	0.69%
9	586,651	320	4,160	13.57%	2.41%
10	724,100	260	3,380	16.75%	1.95%
11	269,529	71	923	6.23%	0.53%
Total	4,323,074	13,304	172,952		
* Confidential, catch weight in product amounts; based on 2011 mean of 13.0 lbs net weight/fish (Source: IPHC)					
Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT					

A timeline for a Council decision on measures to restrict retention of Area 4A halibut in sablefish IFQ is scheduled to occur after final action on this action. *The Council may wish to consider adopting the same regulatory requirements (for marking gear, etc.) for the Area 4A action, as it ultimately adopts as its preferred alternative under this action. This would streamline the Area 4A action as the preliminary preferred alternative could be identified in the analysis, and could be considered as initial review/final action in one meeting.*

Conclusions:

The impacts identified for halibut will depend on the magnitude of sablefish IFQ catch switched from HAL longline to pot longline gear, and the limits potentially imposed on halibut retention under Alternative 2 Element 4. If the magnitude was found to be sufficiently high, data for a stock assessment selection curve would be needed to estimate the impact of the removals. If whale depredation is decreased, some (unquantified) benefit would occur under Alternative 2, Element 4. However, whale depredation of halibut is currently accounted for as part of natural mortality with the halibut assessment. Halibut discard mortality would continue to occur for those halibut not allowed to be retained. This mortality would accrue from two scenarios: (1) when no halibut may be retained in sablefish pot longline gear and (2) when halibut in excess of possible regulatory limits would be imposed to keep halibut retention at incidental amounts, not part of a directed fishery. The requirement to discard under 32 inch length halibut would continue.

3.3 Other Fish Species

Groundfish species that are managed under the GOA Groundfish FMP and caught incidentally in the GOA sablefish hook-and-line fishery are listed in Table 6. None of these species are either overfished or experiencing overfishing. Further information on these groundfish species and, for some, their directed fisheries can be found in the most recent GOA Groundfish SAFE Report (NPFMC, 2013). Catch of non-target species and prohibited species in the GOA sablefish fishery is described in Section 4.5.4.2, with the primary species of interaction being grenadier.

Table 6 Bycatch of FMP groundfish species in the GOA sablefish hook-and-line fishery, cumulative from 2008 through 2013

Species Name	Retained (mt)	Discarded (mt)
GOA Thornyhead Rockfish	2,040	793
Halibut	1,049	1,314
GOA Shortraker Rockfish	574	717
GOA Rougheye Rockfish	487	298
Pacific Cod	263	277
Arrowtooth Flounder	161	1,105
GOA Demersal Shelf Rockfish	63	3
Other Rockfish	59	137
GOA Skate, Longnose	38	778
GOA Skate, Other	29	795
GOA Shallow Water Flatfish	6	18
GOA Skate, Big	5	28
GOA Pelagic Shelf Rockfish	2	7
Pollock	1	9
GOA Deep Water Flatfish	1	46
GOA Dusky Rockfish	1	1
Shark	1	1,651
Other Species	< 1	289
Octopus	< 1	15
Pacific Ocean Perch	< 1	3
Northern Rockfish	< 1	< 1
Squid		< 1
Sculpin		47
GOA Rex Sole		< 1
Atka Mackerel		< 1
Flathead Sole		4

"Other Species" includes different shark, squid, and sculpin species that are not captured in other AKFIN species groupings.
Source: NMFS AKRO Blend/Catch Accounting System via AKFIN.

3.3.1 Effects of the Alternatives

The effects of the use of current and proposed gear in the sablefish IFQ hook-and-line fishery are addressed here. The GOA groundfish stocks are assessed in the GOA SAFE report (Hanselman et al. 2013), and are also evaluated in the Alaska Groundfish Fisheries Harvest Specifications EIS (NMFS 2007a). Table 3 describes the criteria used to determine whether the impacts of this action on the GOA FMP groundfish stock are likely to be significant.

3.3.1.1 Alternative 1

Maintaining the current prohibition of the use of pot (single or longline) gear in the GOA is the status quo, or No Action, alternative. Continued prohibition on the use of pot longline gear would not change (increase or decrease) the fishing mortality on other fish species, as hooked fish would continue to be predated upon by whales, retained as bycatch, or discarded. These mortalities are accounted for in the management of the species under the GOA Groundfish FMP, which is designed to prevent negative effects to groundfish stocks. Total catch of targeted groundfish is managed to prevent exceeding ABCs.

3.3.1.2 Alternative 2

Allowing the use of pot gear in the GOA sablefish IFQ fishery could decrease the overall amount of hook-and-line (HAL) effort, replacing it with pot gear. Based on historical bycatch amounts for GOA sablefish HAL fishing (Table 6) and for GOA Pacific cod pot fishing (Table 23, in Section 4.5.4.2 of the RIR), shifting to pot gear could marginally reduce the bycatch of skates, sharks, rockfish, and sculpins, while potentially increasing the bycatch of octopus and crab. In BSAI sablefish pot fisheries, the most common bycatch species was arrowtooth flounder. Though unquantified in this report, reducing the amount of whale prey species caught on HAL gear could alter the feeding habits of whales and could increase predation on species that are more easily accessible when not caught on fishing gear. Similarly, whale depredation could shift to remaining longline gear in the GOA, thereby increasing depredation of HAL bycatch species from what gear remains.

3.4 Marine Mammals

Alaska supports one of the richest assemblages of marine mammals in the world. Twenty-two species are present from the orders Pinnipedia (seals and sea lions), Carnivora (sea otters), and Cetacea (whales, dolphins, and porpoises). Some marine mammal species are resident throughout the year, while others migrate into or out of Alaska fisheries management areas. Marine mammals occur in diverse habitats, including deep oceanic waters, the continental slope, and the continental shelf (Lowry et al. 1982).

A number of concerns may be related to marine mammals and potential impacts of fishing. For individual species, these concerns include:

- listing as endangered or threatened under the Endangered Species Act (ESA);
- protection under the Marine Mammal Protection Act (MMPA);
- announcement as candidate or being considered as candidates for ESA listings;
- declining populations in a manner of concern to State or Federal agencies;
- experiencing large PSC or other mortality related to fishing activities; or
- being vulnerable to direct or indirect adverse effects from some fishing activities.

Marine mammals have been given various levels of protection under the current fishery management plans of the Council, and are the subjects of continuing research and monitoring to further define the nature and extent of fishery impacts on these species. The Alaska groundfish harvest specifications environmental impact statement (NMFS 2007) provides information regarding fisheries interactions with marine mammals. The most recent status information is available in the 2012 Marine Mammal Stock Assessment Reports (SARs). A table listing marine mammal species and their status, fishing mortality, subsistence mortality, and total mortality is in Appendix 2 on page 217 of the SAR available at http://www.nmfs.noaa.gov/pr/sars/pdf/ak2012.pdf.

Marine mammals, including those currently listed as endangered or threatened under the ESA, that may be present in the action area are listed in Table 7. All of these species are managed by NMFS, with the exception of Pacific walrus, polar bears, and Northern sea otters, which are managed by USFWS. ESA Section 7 consultations with respect to the actions of the Federal groundfish fisheries have been

completed for all of the ESA-listed species, either individually or in groups. Of the species listed under the ESA and present in the action area, several species may be adversely affected by commercial groundfish fishing. These include: Steller sea lions, humpback whales, fin whales, and sperm whales (NMFS 2006a; NMFS 2010a). Effects of the proposed action on killer whales and sperm whales are the focus of this section of the EA (Table 8).

Table 7 Marine mammals likely to occur in the Gulf of Alaska.

	Species	Stocks
Pinnipedia	Steller sea lion*	Western U.S (west of 144° W long.)* and Eastern U.S. (east of 144° W long.)
	Northern fur seal**	Eastern Pacific
	Harbor seal	Southeast Alaska, Gulf of Alaska, Bering Sea
	Ribbon seal	Alaska
	Northern elephant seal	California
Cetacea	Beluga Whale*	Cook Inlet
	Killer whale**	Eastern North Pacific Northern Resident, Eastern North Pacific Alaska Resident, Eastern North Pacific GOA, Aleutian Islands, and Bering Sea transient, AT1 transient**, West Coast Transient
	Pacific White-sided dolphin	North Pacific
	Harbor porpoise	Southeast Alaska, Gulf of Alaska, and Bering Sea
	Dall's porpoise	Alaska
	Sperm whale*	North Pacific
	Baird's beaked whale	Alaska
	Cuvier's beaked whale	Alaska
	Stejneger's beaked whale	Alaska
	Gray whale	Eastern North Pacific
	Humpback whale*	Western North Pacific, Central North Pacific
	Fin whale*	Northeast Pacific
	Minke whale	Alaska
	North Pacific right whale*	North Pacific
	Blue whale*	North Pacific
	Sei whale*	North Pacific
Mustelidae	Northern sea otter*	Southeast Alaska, Southcentral Alaska, Southwest Alaska*

*ESA-listed species; **Listed as depleted under the MMPA

The PSEIS (NMFS 2004) provides descriptions of the range, habitat, diet, abundance, and population status for marine mammals. SARs are prepared annually for the strategic marine mammal stocks (Steller sea lions, northern fur seals, harbor porpoise, North Pacific right whales, humpback whales, sperm whales, and fin whales)[11]. The SARs provide population estimates, population trends, and estimates of the potential biological removal (PBR) levels for each stock. The SARs also identify potential causes of mortality and whether the stock is considered a strategic stock under the MMPA. The information from the PSEIS and the SARs is incorporated by reference.

[11]The SARs are available on the NMFS Protected Resources Division website at http://www.nmfs.noaa.gov/pr/sars/region.htm.

Table 8 Status of Cetacea stocks potentially affected by the action.

Cetacea species and stock	Status under the ESA	Status under the MMPA	Population trends	Distribution in action area
Killer whale – AT1 Transient, E N Pacific transient, W Coast transient, Alaska resident	Southern resident endangered; remaining stocks none	AT1 depleted and a strategic stock, Southern Resident depleted. The rest of the stocks: None	Southern residents have declined by more than half since 1960s and 1970s. Unknown abundance for the Alaska resident; and Eastern North Pacific GOA, Aleutian Islands, and Bering Sea transient stocks. The minimum abundance estimate for the Eastern North Pacific Alaska Resident stock is likely underestimated because researchers continue to encounter new whales in the Alaskan waters.	Transient-type killer whales from the GOA, Aleutian Islands, and Bering Sea are considered to be part of a single population.
Sperm whale North Pacific	Endangered	Depleted & a strategic stock	Abundance and population trends in Alaska waters are unknown.	Inhabit waters 600 m or more depth, south of 62°N lat. Widely distributed in North Pacific. Found year-round In GOA.

Sources: Allen and Angliss 2013; List of Fisheries for 2013 (78 FR 53336, August 29, 2013); http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/spermwhale.htm. North Pacific right whale included based on NMFS (2006a) and Salveson (2008). AT1 Killer Whales information based on 69 FR 31321, June 3, 2004. North Pacific Right Whale critical habitat information: 73 FR 19000, April 8, 2008. For beluga whales: 73 FR 62919, October 27, 2008.

The Alaska Groundfish Harvest Specifications EIS provides information on the effects of the groundfish fisheries on marine mammals (NMFS 2007), and has been updated with the 2014 Supplemental Information Report (SIR) http://www.alaskafisheries.noaa.gov/analyses/groundfish/041014 bsaigoaspecssir.pdf. These documents are also incorporated by reference. Direct and indirect interactions between marine mammals and groundfish fishing vessels may occur due to overlap in the size and species of groundfish harvested in the fisheries that are also important marine mammal prey, and due to temporal and spatial overlap in marine mammal occurrence and commercial fishing activities. This discussion focuses on those marine mammals that may interact with or be affected by fishing gear currently being used and proposed to be used in the sablefish IFQ fishery in the GOA, specifically, sperm whales and killer whales, which are known to predate on fish caught in the sablefish IFQ fishery (Table 8).

3.4.1 Effects on Marine Mammals

Table 9 contains the significance criteria for analyzing the effects of the proposed action on marine mammals. No beneficial impacts to marine mammals are likely with groundfish harvest. Generally, changes to the fisheries do not benefit marine mammals in relation to incidental take, prey availability, and disturbances; changes increase or decrease potential adverse impacts. The only exception to this may be in instances when marine mammals target prey from fishing gear, as seen with killer whales and sperm whales removing fish from hook-and-line gear. In this example, the prey availability is enhanced for these animals because they need less energy for foraging.

Table 9 Criteria for determining significance of impacts to marine mammals.

	Incidental take and entanglement in marine debris	Prey availability	Disturbance
Adverse impact	Mammals are taken incidentally to fishing operations or become entangled in marine debris.	Fisheries reduce the availability of marine mammal prey.	Fishing operations disturb marine mammals.
Beneficial impact	Decreased fishery interactions with fishing gear can be identified.	Availability of prey from fishing operations may provide additional, readily accessible, sources of food.	Decreased fishery interactions with fishing gear can be identified.
Significantly adverse impact	Incidental take is more than PBR or is considered major in relation to estimated population when PBR is undefined.	Competition for key prey species likely to constrain foraging success of marine mammal species causing population decline.	Disturbance of mammal is such that population is likely to decrease.
Significantly beneficial impact	No threshold can be identified.	Food availability increased substantially from baseline such that whale population levels survival or reproduction success is likely to increase.	Not applicable
Unknown impact	Insufficient information available on take rates.	Insufficient information as to what constitutes a key area or important time of year.	Insufficient information as to what constitutes disturbance.

3.4.1.1 Alternative 1

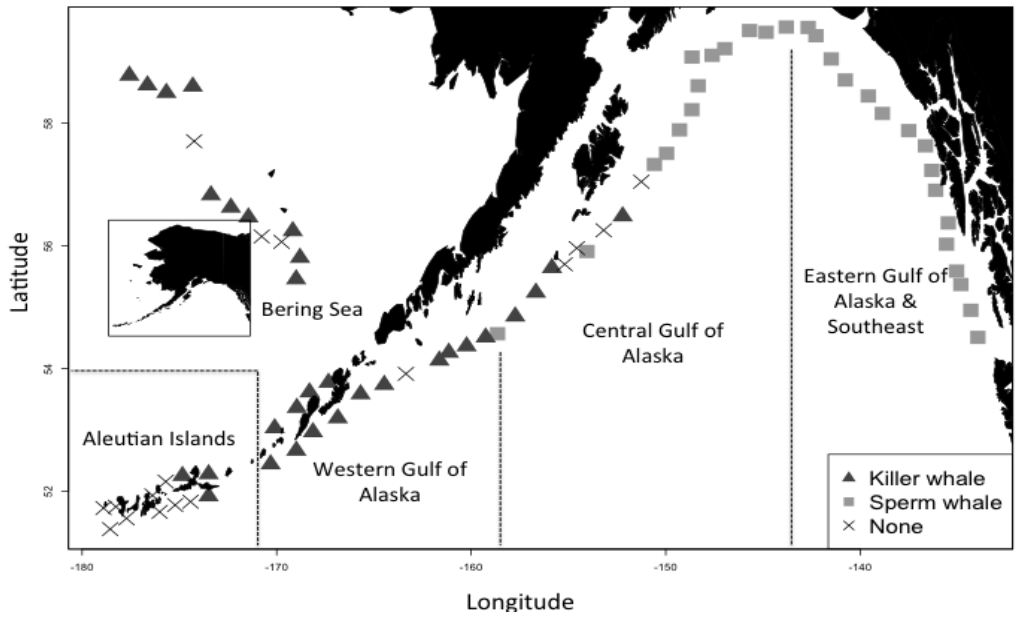
Maintaining the current prohibition of the use of pot (single or longline) gear in the GOA is the status quo, or No Action, alternative. Continued use of currently allowed gear would not address the purpose and need for the action, which stresses the need to:

1. Minimize fishery interactions with sperm whales in the Central and Eastern Gulf, and killer whales in the Western Gulf and
2. Maximize the ability of sablefish quota share holders to harvest their sablefish IFQ by increasing catch per unit of effort and reducing fishing costs.

The following describes the current state of knowledge on interactions between the sablefish IFQ fishery in the GOA with killer whales and sperm whales.

Depredation by killer whales and sperm whales is common in the Alaska sablefish IFQ fishery (Sigler et al. 2008, Peterson et al. 2013). Killer whale depredation generally occurs in the BS, AI, and Western GOA, whereas sperm whale depredation tends to be more problematic in the central and eastern Gulf through Southeast Alaska (Figure 6). In October 2006, fishermen and scientists from around the world, including sablefish fishermen and scientists from Alaska, participated in a depredation workshop focused on mitigating the effects of depredation. Workshop abstracts and summaries are available at: http://depredation.org. A second international depredation and bycatch mitigation workshop was held at the Woods Hole Oceanographic Institution in October 2013 (abstracts available at http://www.bycatch.org/node/796).

Figure 17. Whale depredation by whale species and sablefish management area based on NMFS longline survey, 1998-2011. NMFS longline survey locations mirror commercial longline fishing grounds along the continental slope (Peterson and Carothers 2013).

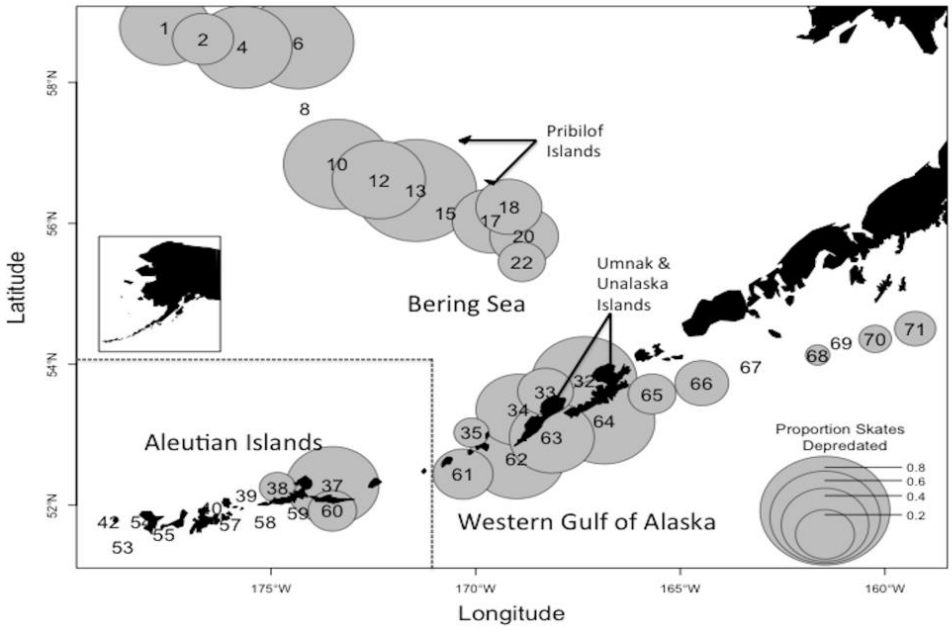


Killer whale depredation is problematic in Western Alaska, where high-value longline fisheries overlap with regions supporting some of the greatest densities of "fish-eating" or resident killer whales in the world (Forney and Wade 2006, Fearnbach 2012). It was estimated in 2010 that a minimum of 1300 resident killer whales inhabit the BSAI and Western GOA (Angliss and Outlaw, 2010). However, more recent photographic mark-recapture assessments indicate that significantly more (perhaps twice this number) fish-eating residents may use the coastal waters around the Eastern and Central Aleutians alone in some years (Fearnbach 2012). Although diet data is limited in the region, Alaskan resident killer whales have been observed feeding on Pacific salmon, Atka mackerel and Pacific halibut (Ford et al. 1998, Herman et al. 2005, Krahn et al. 2007, Fearnbach et. 2012, Peterson et al. 2013). Resident killer whales in Western Alaska show strong long-term associations consistent with a matrilineal pattern and have been shown to exhibit a high degree of site fidelity over time, with ranges generally limited to around 200 km, although longer movements are documented (Ford and Ellis 2006, Forney and Wade 2006, Matkin et al. 2007, Fearnbach, 2012).

Killer whale depredation on the longline survey

Killer whales depredate a number of groundfish species caught on longline gear in Western Alaska including: sablefish, Greenland turbot, arrowtooth flounder and Pacific halibut (Yano and Dalheim 1995, Peterson et al. 2013). Peterson et al. (2013) used NMFS longline survey data to explore spatial and temporal trends in killer whale depredation and to quantify the effect of killer whale depredation on catches of groundfish species in the BS, AI, and Western GOA (Figure 7). When killer whales were present during survey gear retrieval, whales removed an estimated 54 to 72% of sablefish, 41–84% of arrowtooth flounder and 73% (BS only) of Greenland turbot. Overall sablefish catches (depredated and non-depredated sets) were lower by 11-29% in all three management areas. The frequency of killer whale interactions remained fairly stable in the BS while increasing in the AI and Western GOA during the study period (Peterson et al. 2013).

Figure 18 Stations surveyed (numbered 1-71) in the Bering Sea, Aleutian Islands and Western Gulf of Alaska, NMFS longline survey 1998-2011. Symbol sizes (grey circles) are equivalent to the average proportion of skates (string of 45 hooks) depredated by killer whales at each station (Peterson et al. 2013).



Killer whale depredation on the commercial fishery

In a follow-up study, Peterson et al. (2014) extended the analyses discussed above to evaluate the impacts of killer whale depredation on commercial HAL longline fisheries in Western Alaska. This study synthesized NMFS observer data and fishermen-collected depredation data to: (1) estimate the frequency of killer whale depredation on commercial longline fisheries; (2) estimate depredation-related catch per unit effort reductions; and (3) assess direct costs and opportunity costs incurred by commercial longline fleets in Western Alaska as a result of killer whale interactions. The percentage of commercial fishery sets affected by killer whales was highest for sablefish in the BS (21%) and was relatively low in the AI and Western GOA (~2%). On depredated sets, sablefish catch per unit effort reductions associated with depredating killer whales ranged from 55-69% (Peterson et al. 2014).

In direct response to depressed CPUEs associated with killer whale depredation, affected commercial longline fishermen reportedly react in two primary ways: 1) dropping their gear back down to "wait the whales out," 2) or moving to a different fishing site to avoid the whales (Peterson and Carothers 2013). Both of these depredation avoidance measures result in reduced fishing efficiency through increased operation costs and opportunity costs in lost time (extended soak times and distances traveled). Fishermen operating in western Alaska reported waiting on average at least 12 hours and /or steaming in excess of 25 nm to avoid depredating killer whales (Peterson and Carothers 2013). These depredation avoidance measures can be costly for commercial longliners as fishermen are forced to travel farther and stay on the grounds longer to catch the same amount of IFQ. In a study conducted with six longline vessels operating in Western Alaska in 2011 and 2012, killer whale depredation resulted in an estimated additional $980 per vessel-day for additional fuel, crew food and the opportunity cost of lost time. Based on data from the observed commercial fishery, the additional costs associated with catching the same amount of fish on killer whale depredated sets was estimated to be approximately $433 ± 147 per set for additional fuel alone (not including additional crew, bait or opportunity costs; Peterson et al.2014).

Based on NMFS survey data, NMFS observer data and fishermen accounts, killer whale depredation is most severe in the BS. Killer whale depredation in the Western GOA may be a more recent issue and is less consistent (Peterson et al. 2013). Despite low interaction rates for the observed fleet in the Western

GOA, fishermen accounts and NMFS longline survey data suggest that killer whale depredation on sablefish longline fisheries in the Western GOA is problematic and may be getting worse (Peterson et al. 2013, Peterson and Carothers, 2013). Based on 70 semi-directed interviews and 95 written surveys conducted with longline fishermen in Alaska, fishermen's perspective on legalizing pot fishing gear for sablefish in the Gulf of Alaska were varied. Written survey respondents were asked if the switch to pot fishing gear was an option for their vessel. Answers were mixed and varied by region fished and vessel category. Generally, sablefish longliners operating vessels greater than 60 feet were most likely to agree that the transition to pot gear was a feasible option for them. The majority of fishermen operating with smaller vessels or fishing out of Southeast Alaska reported the transition to pot gear would be less feasible for their operations (Peterson and Carothers, 2013).

SPERM WHALES

Sperm whale depredation affects longline catches in the GOA. Data on sperm whale depredation of longline survey catches have been collected since 1998 (Figure 8). Apparent sperm whale depredation is defined as sperm whales being present with the occurrence of damaged sablefish. While it is difficult to estimate the loss of fish due to depredation, estimates are generally conservative because it is not possible to attribute an empty hook (bait removed or disintegrated) to depredation. Additionally it can be difficult to distinguish whether other species, such as sharks or killer whales, have contributed to the damage or loss of hooked fish. Damage and loss of fish has significant economic and management implications for both fisherman and fishery biologists tasked with assessing fish stocks. In general, depredation by sperm whales seems to be low to moderate, but it is highly variable in extent both among and within fishing areas. The frequency of sperm whales present during fishing operations varies widely from 0 – 100%. Illustrative estimates include 16% of sampling days during the annual sablefish longline survey in the GOA (Lunsford et al. 2006); 39% of longline fishery hauls near Sitka (Straley et al. 2006). Information on the timing and movement patterns of sperm whales may provide a means for fishermen to avoid fishing at whale hot spots, potentially reducing interactions between whales and fishermen (Straley et al. 2014).

Sperm whale depredation on the longline survey

Between 1998 and 2012, sperm whale depredation on GOA longline survey stations occurred on approximately 7-35% of sets ($\bar{x}$=16.8%; Figure 8). The percentage of sets impacted by sperm whale depredation was greatest in West Yakutat in most years (38%), followed by Southeast Alaska (28%) and the Central Gulf (8%; Figure 9). In the 2002 SAFE Report, an analysis using longline survey data from 1998-2001 found that sablefish catches were significantly less at stations affected by sperm whale depredation. This work was repeated in 2006 using additional data from 2002-2004 which were analyzed by fitting the data with a general linear model (Sigler et al. 2008). Neither sperm whale presence nor depredation rate increased significantly from 1998 to 2004. Catch rates were about 2% less at locations where depredation occurred, but the effect was not significant. Sigler (2008) reported a 5% lower catch rate in sets with depredation evidence in a comparison of all sets with sperm whales present from 1999 to 2001.

Longline survey catch rates are not adjusted for sperm whale depredation because it is not known when measureable depredation began during the survey time series, and because studies of depredation on the longline survey showed no significant effect (Sigler et al. 2008). Current abundance is unbiased if depredation has consistently occurred over time. If significant depredation began recently, then current biomass is underestimated because the relationship between the survey index and biomass has changed. However, if recent catch rates are adjusted for sperm whale depredation when in fact it has happened all along, then current biomass will be overestimated.

Figure 19 Sperm whale depredation on Gulf of Alaska stations, NMFS longline survey 1998-2012.

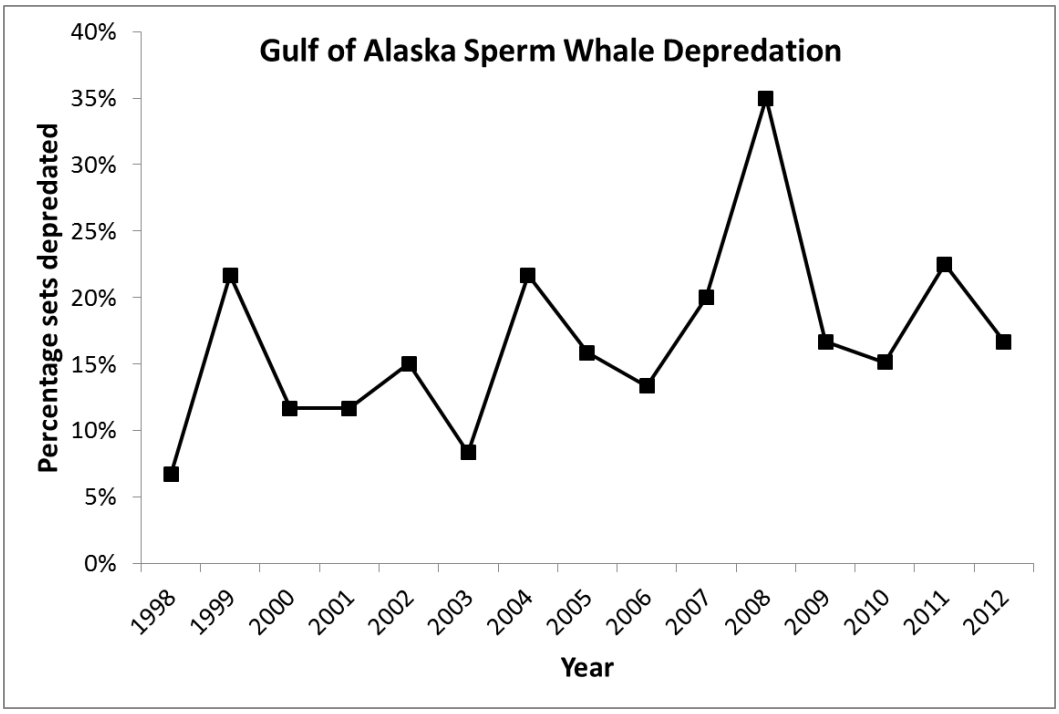
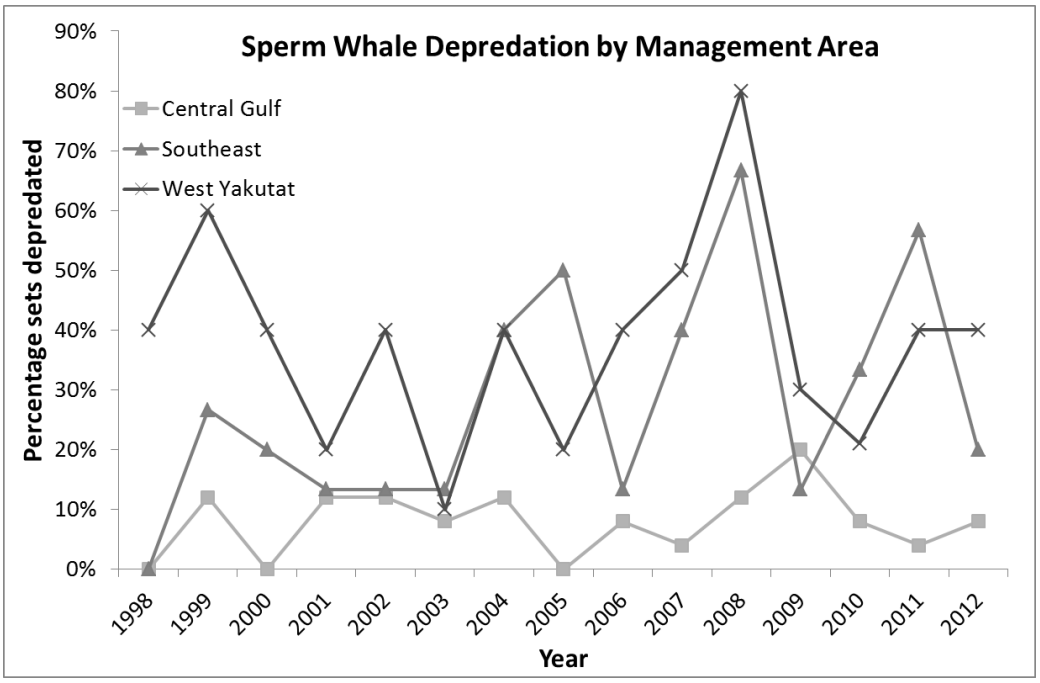


Figure 20 Sperm whale depredation in the Central Gulf of Alaska, West Yakutat and Southeast Alaska management areas, NMFS longline survey 1998-2012.



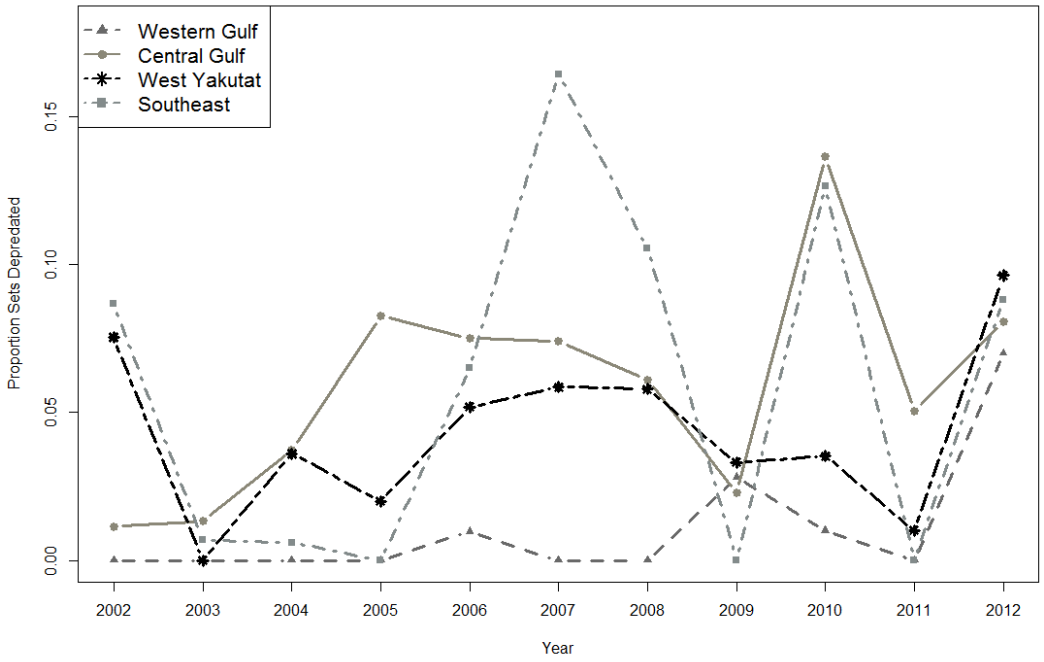
Sperm whale depredation on the commercial hook-and-line longline fishery

An early study using data collected by fisheries observers in Alaskan waters found no significant effect on catch (Hill et al. 1999). Another study using data collected in Southeast Alaska, found a small, significant effect comparing longline fishery catches between sets with sperm whales present and sets with sperm

whales absent (3% reduction, Straley et al. 2005). The rate of depredation, quantified in varying ways, also fluctuates widely. Examples include 0.6% of annual sablefish catch for Alaska and catch is reduced by 1.8% when depredation occurs (Sigler et al. 2008, Lunsford et al. 2006) and 3% of catch in the Sitka fishing grounds, which extends approximately from Dixon Entrance to Cape Ommaney (Straley et al. 2006). Perez et al. (2006) estimated that marine mammal depredation on the combined longline fisheries in Alaska caused a loss of about 2.2 % of the total fishery groundfish catch during 1998-2004, based on visual evidence of torn or partial fish.

Sperm whale sightings were also noted in some logbooks and observer data, however sperm whale presence does not imply depredation and when depredation occurs it is often minimal and difficult to quantify in comparison to killer whale depredation. Therefore, sperm whale depredated sets are not excluded from observer data or logbook data. A preliminary review of NMFS observer data suggests that the proportion of observed longline sets impacted by sperm whales was variable in the GOA between 2002 and 2012. Sets targeting sablefish were identified based on the predominant groundfish species in the set. Between 2002 and 2012, 0-7% ($\bar{x}$= 1.1%) sets were labeled as depredated by sperm whales in in the Western GOA, 1-14% ($\bar{x}$= 5.9%) in the Central GOA, 0-10% ($\bar{x}$= 4.3%) in West Yakutat, and 0-16% ($\bar{x}$= 5.9%) in Southeast (Figure 10).

Figure 21 The proportion of sets labeled as impacted by “considerable sperm whale predation” by management area, NMFS observer commercial data 2002-2012.



General information:

Three populations of sperm whales in the US are recognized: (1) California Current, (2) Hawaii, and (3) Alaska. Sperm whales present in the California Current are differentiated genetically, whereas sperm whales from the Hawaiian Archipelago and the eastern tropical Pacific could not be fully differentiated (Mesnick et al. 2011). High-latitude male sperm whales in Alaska originated from not one but multiple populations.

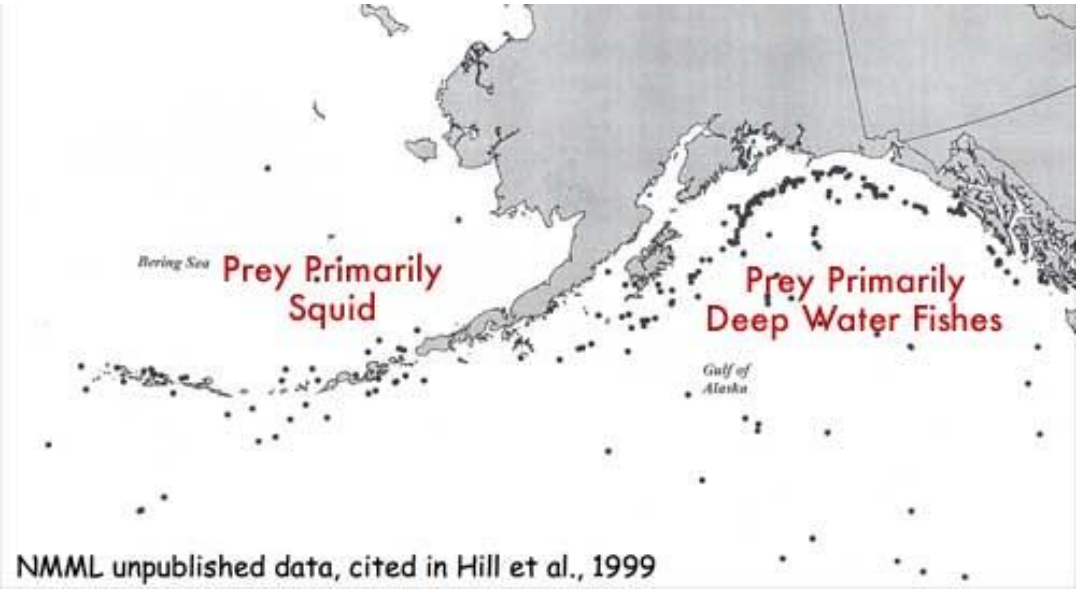
Horizontal movements of male sperm whales in the GOA consist of periodic, but not seasonal, transits between the lower latitude feeding/breeding grounds and higher latitude feeding grounds (Mesnick et al. 2011). At higher latitudes in the GOA, some individuals stayed in the same general area, while others were more nomadic. Sperm whales moving along the slope of the GOA are typically alone and rarely in

pairs or travelling or diving in synchrony with another whale. While these whales may appear solitary, they could be connecting with each other acoustically, moving in a loosely connected group, and communicating long distances while spatially separated. Skilled depredators may be functioning as scouts by showing or leading other whales to foraging hotspots, as some fishermen have speculated (Mesnick et al. 2011).

The current population size of sperm whales in the GOA is unknown. Because they are an endangered species, fishermen and scientists are concerned about potential entanglements in fishing gear. Few reports of entanglement, injury or death in longline gear have been recorded. Such entanglements are costly and dangerous to fishermen and can force fishery closures. Entanglements in fishing gear with no apparent serious injury have been reported in Alaska (Angliss and Lodge 2003, Angliss and Outlaw 2005).

Mesnick et al. (undated expanded abstract) reports the following. All fishing grounds where depredation is reported to occur overlap with known natural feeding grounds of sperm whales. The species of fishes recorded during sperm whale depredation is often the same species reported to be found in the stomachs of sperm whales taken by whalers who years earlier were operating at the same sites. Fish were commonly found in sperm whale stomachs taken in the Eastern GOA while squid was more common in whales taken in the BS and Western Aleutians (Okutani and Nemoto 1964). Depredating sperm whales appear to be selective in prey choice. For example, in Alaska bycatch is not regularly taken off of the lines, indicating that sperm whales might have the ability to select the type of fish they depredate (Straley 2005). Presumably, longliners have made it easier for sperm whales to forage by hauling their natural prey items closer to the surface. In general, lone males or small groups (2-7 individuals) participate in depredation activities (Purves et al. 2004, Hill and Mitchell 1998). However, the numbers may be larger at some sites and perhaps increasing. To date, all animals identified by eye (and by genetic sex determination in Alaska have been large sub-adults or adult males (Straley 2005).

Figure 22 Sperm whale sightings, 1958-1995.



The length of time from the onset of longline fishing in an area, to the first reports of depredation, to depredation being widespread has been reported. Examples can be drawn from Alaska where longlining began in the late 1800's, expanded to the GOA in 1982, and the first reported case of depredation occurred in1978 (T. O'Connell unpublished data). However, widespread reports of depredation did not occur until after 1997, after a transition from a "derby" style to IFQ fishing in 1995. Concomitantly, the

fishing season increased from 10 days to 8.5 months, overlapping with the summer months during which sperm whales presence in the GOA increases by a factor of two (Mellinger et al. 2004). Longline fishing operations appear to provide an easier foraging method for sperm whales presumably because the whales remove fish as the line is hauled reducing time at depth (Thode et al. 2004). Much of the documentation of sperm whale depredation includes unpublished, anecdotal reports.

Whale deterrent work in progress/ongoing acoustic research for avoiding whale depredation[12]

Prevention and mitigation is likely to be most successful when the costs of fishing are greater than the benefits, risks to sperm whales are high, the association between the fishing vessel and food can be broken, and/or the opportunity for interaction is reduced by separating fishing and whales in space and/or time. *Interesting exceptions to the rules – areas where there is longline fishing but no sperm whale depredation – includes the eastern AI and BS.*

Thode et al. (2007) report on the use of passive acoustic recorders attached to anchor lines. These systems indicate that cavitation arising from changes in ship propeller speeds is associated with interruptions in nearby sperm whale dive cycles and changes in acoustically derived positions. This conclusion has been tested by cycling a vessel engine and noting the arrival of whales by the vessel, even when the vessel is not next to fishing gear. No evidence of response from activation of ship hydraulics or fishing gear strum has been found to date.

In 2003 the Southeast Alaska Sperm Whale Avoidance Project (SEASWAP) was created to investigate this issue with the long-term goal of reducing depredation. A collaborative study between fishermen, scientists and managers, SEASWAP works with both the coastal fishing fleet and the federal sablefish survey to collect various quantitative data on longline depredation using the shape of the flukes as a unique identifier, SEASWAP found that at least 106 individual sperm whales have been involved in depredation. Bayesian mark-recapture analyses estimate at least 123 ([94-174]; 95% credible interval) depredating whales in the GOA study area.

In a second experiment, passive deterrent gear using small, acrylic beads attached near each hook were not effective. The SEASWAP team is working with Central Bering Sea Fisherman's Association and NOAA Bycatch Reduction Program. Investigations of active deterrents, including acoustic playbacks and bubblers are ongoing and continue further testing of decoy buoys.

3.4.1.2 Alternative 2

A quantitatively unknown, but positive, effect is expected from allowing the use of longline pot gear in the GOA sablefish IFQ fishery, when compared with the status quo. The following rationale for adopting Alternative 2 summarizes information and research that is described under Section 3.1.1.1.

Sperm whales and killer whales that depredate on longline fishing gear could be negatively impacted. Diet data suggests the sablefish naturally comprises a portion of the sperm whale diet in Alaska, whereas killer whales are not known to naturally forage for sablefish (likely due to the depth range of sablefish; Rice 1989). Removing hooked sablefish from longline gear does not represent natural foraging for either whale species. Similar to "trash bears," there are risks associated with modifying marine mammal foraging behavior towards unnaturally available (e.g. hooked sablefish) and unreliable prey resources (Roche et al. 2007). Killer whales in particular exist in highly complex social groupings, and the effects that the depredation behavior could have on natural killer whale social structure are unknown. This effect could be even more pronounced if certain pods or individuals specialize in the depredation behavior as a primary foraging strategy during certain parts of the year. For instance, using photo-identification, Tixier et al. (2010) demonstrated that four out of eleven pods (35 out of 97 individuals) were involved in over 80% of the documented interactions with longline fisheries in the Crozet Exclusive Economic Zone

[12] Source: 2008 SAFE Report sablefish chapter and SEASWAP http://www.seaswap.info/background/spermwhales.html

(EEZ), indicating a degree of specialization. Whales that specialize in the depredation behavior could be at greater risk of negative impacts associated with the unnatural foraging behavior. Under Alternative 2, there would be a reduced risk of modifying marine mammal foraging behavior towards an unnaturally available and unreliable prey resource (Roche et al. 2007),

Sperm whales and killer whales that depredate on longlining gear may be at greater risk of vessel strike and/or entanglement in fishing gear. Although cetacean entanglements in longline fishing gear are relatively rare, there are reports of sperm whales becoming entangled in longline fishing gear in Alaska (Hill 1999). The likelihood of killer whale entanglements in longline gear is very low; however, one female killer whale was incidentally captured in July 2004 off Brazil (Dalla Rosa and Sechi 2007). Neither sperm whales nor killer whales are known to depredate on pot fishing gear; thus, Alternative 2 could reduce the risk of marine mammal entanglements in fishing gear.

A controversial issue associated with whale depredation centers around the possibility that fishermen will act out against depredating sperm whales or killer whales. For instance, in the Crozet EEZ in the late 1990s and Prince William Sound in mid-1980s, depredating killer whales were photographed with bullet holes in their dorsal fins (Tixier unpublished., Matkin 1988). Additionally, there are anecdotal accounts of longline fishermen using "seal bombs" or other deterrents in an attempt to deter whales away from the fishing gear. The effects of potential fishermen's frustration and deterrent use are unknown; however, Alternative 2 could reduce the likelihood of any harmful measures being taken to deter or evade sperm whale or killer whale depredation.

Alternative 2 would address the purpose and need for the action, which stresses the need to:

1. Minimize fishery interactions with sperm whales in the Central and Eastern GOA, and killer whales in the Western GOA, and
2. Maximize the ability of sablefish quota share holders to harvest their sablefish IFQ by increasing catch per unit of effort and decreasing fishing costs.

There is no information available to suggest a temporal or seasonal shift in sablefish IFQ fishing would be expected to occur under Alternative 2. In fact, a return to traditional fishing patterns might be expected, as shifts in fishing patterns to avoid whales would be discontinued by those fishermen who switch to longline pots. If the sablefish IFQ fishery switches to longline pots, there will likely be decreased interactions between killer whales and sperm whales and fish sablefish fishery. This action would lead to a decrease in disturbances and likelihood of entanglements beyond those resulting from current avoidance techniques used by fishermen. Overall, Alternative 2 is expected to result in beneficial impacts on killer whales and sperm whales compared with the status quo.

3.5 Seabirds

Thirty-eight species of seabirds breed in Alaska. Breeding populations are estimated to contain 36 million individual birds in Alaska, and total population size (including sub-adults and non-breeders) is estimated to be approximately 30% higher. Five additional species that breed elsewhere but occur in Alaskan waters during the summer months contribute another 30 million birds.

Species nesting in Alaska

Tubenoses-Albatrosses and relatives: Northern Fulmar, Fork-tailed Storm-petrel, Leach's Storm-petrel

Kittiwakes and terns: Black-legged Kittiwake, Red-legged Kittiwake, Arctic Tern, Aleutian Tern

Pelicans and cormorants: Double-crested Cormorant, Brandt's Cormorant, Pelagic Cormorant, Red-faced Cormorant

Jaegers and gulls: Pomarine Jaeger, Parasitic Jaeger, Bonaparte's Gull, Mew Gull, Herring Gull, Glaucous-winged Gull, Glaucous Gull, Sabine's Gull

Auks: Common Murre, Thick-billed Murre, Black Guillemot, Pigeon Guillemot, Marbled Murrelet, Kittlitz's Murrelet, Ancient Murrelet, Cassin's Auklet, Parakeet Auklet, Least Auklet, Whiskered Auklet, Crested Auklet, Rhinoceros Auklet, Tufted Puffin, Horned Puffin

Species that visit Alaska waters

Tubenoses: Short-tailed Albatross, Black-footed Albatross, Laysan Albatross, Sooty Shearwater, Short-tailed Shearwater

Gulls: Ross's Gull, Ivory Gull

As noted in the PSEIS (NMFS 2004), seabird life history includes low reproductive rates, low adult mortality rates, long life span, and delayed sexual maturity. These traits make seabird populations extremely sensitive to changes in adult survival and less sensitive to fluctuations in reproductive effort. The problem with attributing population changes to specific impacts is that, because seabirds are long-lived animals, it may take years or decades before relatively small changes in survival rates result in observable impacts on the breeding population.

More information on seabirds in Alaska's EEZ may be found in several NMFS, Council, and USFWS documents:

- More information on the USFWS Migratory Bird Management program is at: http://alaska.fws.gov/mbsp/mbm/index.htm
- Section 3.7 of the PSEIS (NMFS 2004) provides background on seabirds in the action area and their interactions with the fisheries. This may be accessed at http://www.alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_7.pdf
- The annual Ecosystems Considerations chapter of the SAFE reports has a chapter on seabirds; the December 2013 chapter can be found here: http://www.afsc.noaa.gov/REFM/docs/2013/ecosystem.pdf .
- The Seabird Fishery Interaction Research webpage of the Alaska Fisheries Science Center: http://www.afsc.noaa.gov/refm/reem/Seabirds/Default.htm
- The NMFS Alaska Region's Seabird Incidental Take Reduction webpage: http://www.alaskafisheries.noaa.gov/protectedresources/seabirds.html
- The BSAI and GOA groundfish FMPs each contain an "Appendix I" dealing with marine mammal and seabird populations that interact with the fisheries. The FMPs may be accessed from the Council's home page at http://www.npfmc.org/fishery-management-plans/
- Washington Sea Grant has several publications on seabird takes, and technologies and practices for reducing them: http://www.wsg.washington.edu/publications/online/index.html
- The seabird component of the environment affected by the groundfish FMPs is described in detail in Section 3.7 of the PSEIS (NMFS 2004).

- Seabirds and fishery impacts are also described in Chapter 9 of the Alaska Groundfish Harvest Specifications EIS (NMFS 2007).

3.5.1 Effects on Seabirds

Table 10 explains the criteria used in this analysis to evaluate the significance of the effects of fisheries on seabird populations.

Table 10 Criteria used to determine significance of impacts on seabirds.

	Incidental take	Prey availability
Insignificant	No substantive change in takes of seabirds during the operation of fishing gear.	No substantive change in forage used by seabirds.
Adverse impact	Non-zero take of seabirds by fishing gear.	Reduction in forage fish populations, or the availability of forage fish, to seabird populations.
Beneficial impact	Decreased fishery interactions with fishing gear can be identified.	Availability of offal from fishing operations may provide additional, readily accessible, sources of food.
Significantly adverse impact	Trawl and hook-and-line take levels increase substantially from the baseline level, or level of take is likely to have population level impact on species.	Food availability decreased substantially from baseline such that seabird population level survival or reproduction success is likely to decrease.
Significantly beneficial impact	No threshold can be identified.	Food availability increased substantially from baseline such that seabird population level survival or reproduction success is likely to increase.
Unknown impacts	Insufficient information available on take rates or population levels.	Insufficient information available on abundance of key prey species or the scope of fishery impacts on prey.

3.5.1.1 Alternative 1

The current prohibition of the use of pot (single or longline) gear in the GOA is the status quo, or No Action, alternative. While not stated in the Council's problem statement, a continued prohibition on the use of pot longline gear in the GOA would not minimize potential fishery interactions with seabirds.

Fishing vessels in the GOA encounter seabirds (e.g. albatrosses, fulmars, gulls, shearwaters) during the course of fishing. Many seabird species are attracted to fishing vessels in order to forage on bait, offal, discards, and other prey made available by fishing operations. The sight and sound of swarming birds can attract other birds from many miles around. These interactions can result in direct mortality for seabirds if they become entangled in fishing gear or strike the vessel or fishing gear while flying. Interactions with longline fisheries are of particular concern, as seabirds are attracted to sinking baited hooks and can become hooked and drowned.

Seabirds are caught as bycatch in Alaskan commercial groundfish fisheries operating in federal waters of the U.S. Exclusive Economic Zone. Fisheries observers record seabird bycatch from their sample and other sources while on board these demersal longline, pot, pelagic trawl, and non-pelagic trawl vessels. The AFSC reports the estimates of total seabird bycatch from these fisheries each year. Estimates are based on two sources of information: 1) data provided by NMFS-certified fishery observers deployed to vessels and floating or shoreside processing plants, and 2) industry reports of catch and production. The 2007-12 seabird bycatch estimates presented here (Table 1) are produced from the NMFS Alaska Regional Office Catch Accounting System (CAS).

These estimates update those previously reported from 1993 to 2006. These numbers do not apply to gillnet, seine, troll, or halibut longline fisheries. Data collection on the Pacific halibut longline fishery

began in 2013 and will be summarized in the future. Figure 1 provides seabird bycatch in the groundfish fisheries for 1993 through 2012, using results from two analytical methods employed. The AFSC produced estimates from 1993 through 2006 and the CAS from 2007 through 2012.

The 2012 numbers for the combined groundfish fisheries (Table 1) are 40% below the rolling 5-year average of 8,295 for 2007-11. Albatross bycatch was reduced in 2012 by 27% compared to the previous 5 years, with the greatest decrease in Laysan (*Phoebastria immutabilis*) versus Black-footed (*P. nigripes*) Albatross (36% and 11% declines, respectively). Northern fulmar (*Fulmaris glacialis*) bycatch, down by 39% compared to the 5-year average and 52% from the year before, remained the highest proportion in the catch at 61%. Fulmar bycatch has ranged between 45% and 76% of the total seabird bycatch since 2007. Average annual mortality for fulmars since 2007 has been 4,586. However, when compared to estimates of total population size in Alaska of 1.4 million, this represents an annual 0.33% mortality due to fisheries. There is some concern that the mortality could be colony-specific, possibly leading to local depletions.

The demersal longline fishery in Alaska typically drives the overall estimated bycatch numbers and constitutes about 91% of seabird bycatch annually (but see comment regarding trawl estimates below). Bycatch in the longline fishery showed a marked decline beginning in 2002 (Fig. 1) due to the deployment of streamer lines as bird deterrents. Since then, annual bycatch has remained below 10,000 birds, dropping as low as 3,704 in 2010. Numbers increased to 8,914 in 2011, the second highest in the streamer line era, but fell back to 4,544 in 2012. The increased numbers in 2011 were due to a doubling of the gull (*Larus* spp.) numbers (1,084 to 2,206) and a 3-fold increase in fulmars, from 1,782 to 5,848. These species group numbers have decreased in 2012 as well, to 885 and 3,016 respectively. There are many factors that may influence annual variation in bycatch rates, including seabird distribution, population trends, prey supply, and fisheries activities. Work has continued on developing new and refining existing mitigation gear.

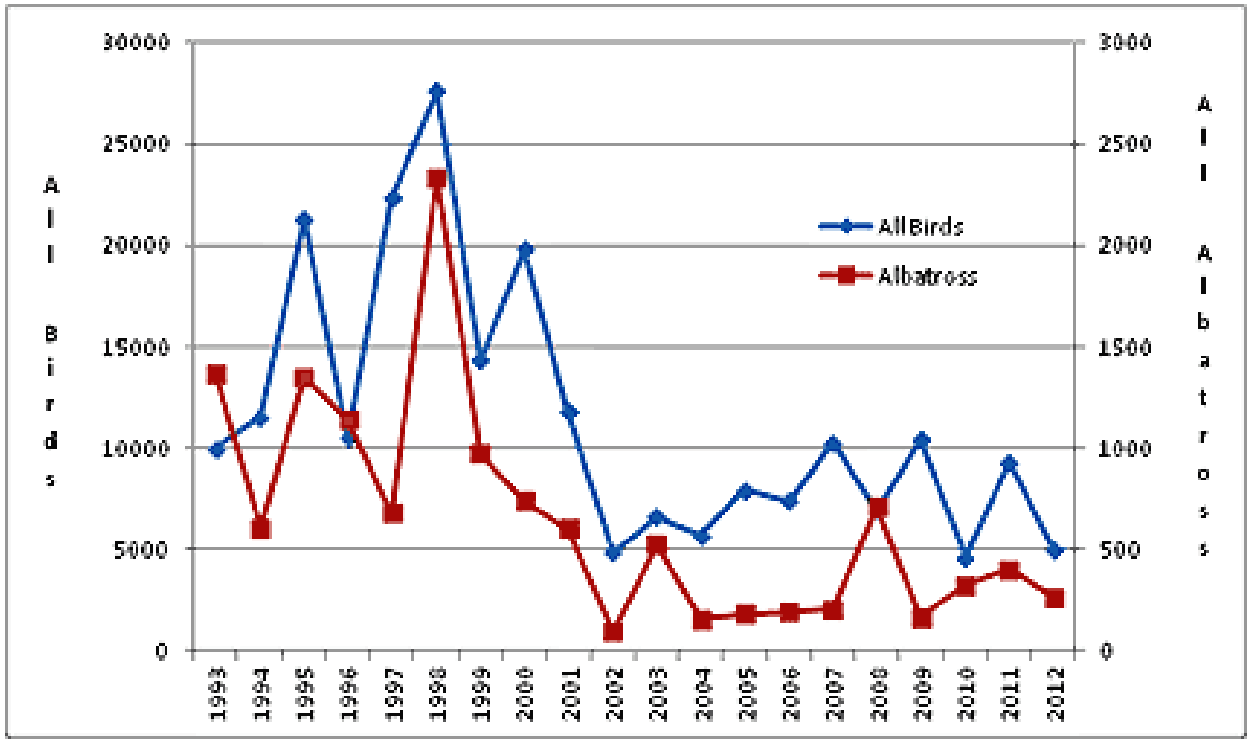
Albatross bycatch varied annually. The greatest numbers of albatross were caught in 2008. In 2012, 57.0% of albatross bycatch occurred in the Gulf of Alaska (GOA) (down from 87% in 2011). The GOA typically accounts for 10% to 20% of overall seabird bycatch. Only Laysan Albatross were taken in the Bering Sea-Aleutian Islands (BSAI), and all Black-footed Albatross were taken in the GOA (along with about 14 Laysan). While the estimated bycatch of Black-footed Albatross underwent a 4-fold increase in bycatch (44 to 206) between 2010 and 2011, the 2012 numbers are about 11% under the long-term average of 153 birds per year. Although the Black-footed Albatross is not endangered (like its relative, the Short-tailed Albatross), it was considered for listing as threatened and is currently a Bird of Conservation Concern by the U.S. Fish & Wildlife Service.

Of special concern is the endangered Short-tailed Albatross (Phoebastria albatrus). A biological opinion was published for the groundfish longline fishery in September 2003, which identified an expected, observed incidental take level of 4 Short-tailed Albatross in each 2-year period. Between 2003 and 2012, only two Short-tails were incidentally taken in 2010 and one bird was taken in 2011. Based on these two incidents, the projected takes were 15 and 5 birds, respectively. (No takes were reported in 2013.)

Table 11 Total estimated seabird bycatch in Alaskan federal groundfish fisheries, all gear types and Fishery Management Plan areas combined, 2007 through 2013. (Source: NMFS)

Species/Species Group	Year						
	2007	2008	2009	2010	2011	2012	2013
Unidentified Albatross	16	0	0	0	0	0	0
Short-tailed Albatross	0	0	0	15	5	0	0
Laysan Albatross	17	420	114	267	189	128	189
Black-footed Albatross	176	290	52	44	206	136	249
Northern Fulmar	4,581	3,426	7,921	2,357	6,214	3,016	3,277
Shearwater	3,602	1,214	622	647	199	510	191
Storm Petrel	1	44	0	0	0	0	0
Gull	1,309	1,472	1,296	1,141	2,208	885	556
Kittiwake	10	0	16	0	6	5	3
Murre	7	5	13	102	14	6	3
Puffin	0	0	0	5	0	0	0
Auklet	0	3	0	0	0	7	4
Other Alcid	0	0	105	0	0	0	0
Other Bird	0	0	136	0	0	0	0
Unidentified	509	40	166	18	259	284	267
Total	10,228	6,914	10,441	4,596	9,298	4,977	4,739

Figure 23 Seabird bycatch in Alaskan groundfish fisheries, all gear types combined, 1993 to 2012. Total estimated bird numbers are shown in the left-hand axis while estimated albatross numbers are shown in the right-hand axis



The longline fleet has traditionally been responsible for about 91% of the overall seabird bycatch in Alaska, as determined from the data sources noted above. However, standard fisheries observer sampling methods on trawl vessels do not account for additional mortalities from net entanglements, cable strikes, and other sources. Thus, the trawl estimates are biased low. For example, the 2010 estimate of trawl-related seabird mortality is 823, while the additional observed mortalities (not included in this estimate and not expanded to the fleet) were 112. Fisheries observers now record the additional mortalities they see on trawl vessels and the AFSC Seabird Program is seeking funds to support an analyst to work on how these additional numbers can be folded into an overall estimate. The challenge to further reduce seabird bycatch is great given the rare nature of the event. For example, in an analysis of 35,270 longline sets from 2004 to 2007, the most predominant species, Northern Fulmar, only occurred in 2.5% of all sets. Albatross, a focal species for conservation efforts, occurred in less than 0.1% of sets. However, given the vast size of the fishery, the total estimated bycatch can add up to hundreds of Albatross or thousands of Fulmars (Table 1).

The AFSC remains committed to work with the fishing industry, Washington Sea Grant, and others to meet the challenges of further reducing seabird bycatch. Seabird mitigation gear used on longline vessels can substantially reduce bycatch. Individual vessel performance varies, and further reduction of overall fleet averages may depend on targeted improved performance for a handful of vessels within the fleet. Additional methods, such as integrated weight longline gear, have been researched and shown to be effective. Continued collaboration with the longline industry will be important. Albatross bycatch in the Gulf of Alaska is generally higher than in other regions. With observer program restructuring and the deployment plan recommended by NMFS and approved by the North Pacific Fisheries Management Council, we will have a better sense of albatross bycatch issues within GOA-fisheries.

Bycatch avoidance:

The Alaska fishing industry and the Council have focused particular attention on conservation and protection of the short-tailed albatross, an endangered species listed under the U.S. Endangered Species Act. ‘Takes’ of four short-tailed albatrosses in groundfish longline fisheries, or two in the halibut hook-and-line fishery, within a two-year period could trigger re-initiation of a Section 7 consultation in these respective fisheries and may interrupt or even close the respective fishery pending completion of a new Section 7 consultation. Takes of only two short-tailed albatrosses over five years could disrupt or close the Alaskan trawl fisheries.

In 1996, the Council established mandatory seabird avoidance measures for the longline fisheries, and approved more stringent requirements in 2001 (Figure 24). Seabird deterrent devices such as buoy bags or streamer lines are required for most groundfish longline fishing vessels. The Council has encouraged fishing industry initiatives to conduct research on new seabird avoidance measures, including studies on the effectiveness of paired streamer lines and integrated weight ground lines, and the development of techniques for minimizing seabird strikes with trawl warps and sonar transducer cables.

These research efforts, which were largely prompted by voluntary action on the part of the longline sector of the industry, indicated that paired streamer lines were nearly 100 percent effective at eliminating the catch of albatrosses and other surface-feeding birds. The sablefish and Pacific cod longline fishing fleets adopted this new technology two years before it was required, resulting in an eight-fold decrease in seabird mortality.

Implemented in January 2008, the Council's action specified that the use of seabird avoidance measures would not be required in Prince William Sound, Cook Inlet, and inside waters in Southeast Alaska except in outer Chatham Strait, Dixon Entrance, and outer Cross Sound. The Council action also identified performance standards for small vessels (those greater than 26’ and less than or equal to 55’ length overall) fishing in outside waters, and modified how seabird deterrent devices be used by small vessels.

Figure 24 Seabird streamer lines required in North Pacific longline fisheries.

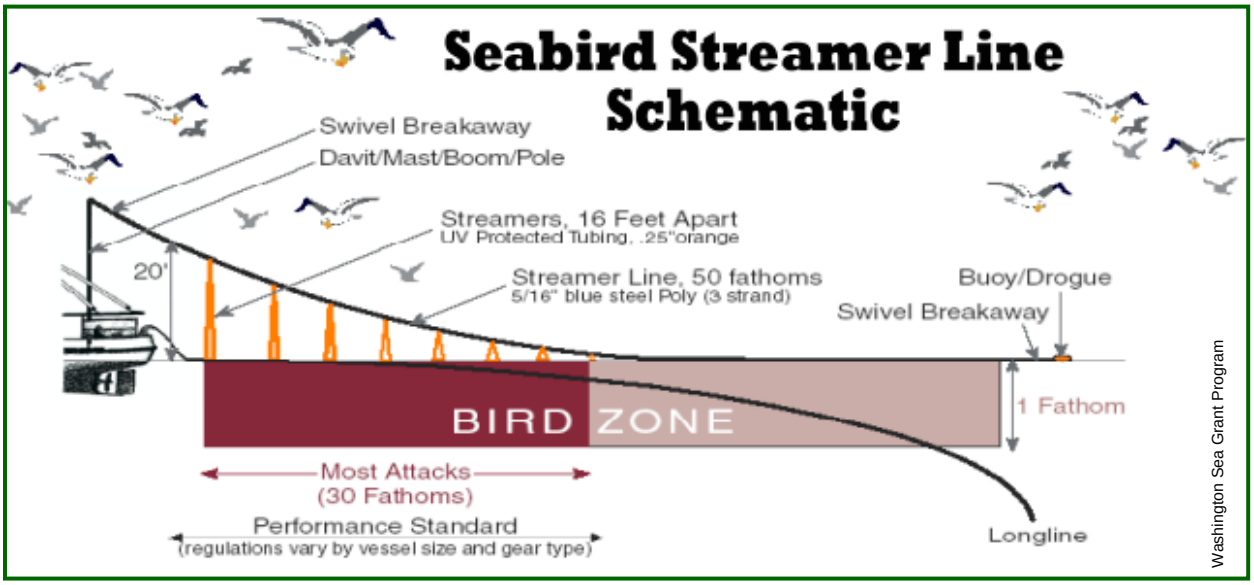
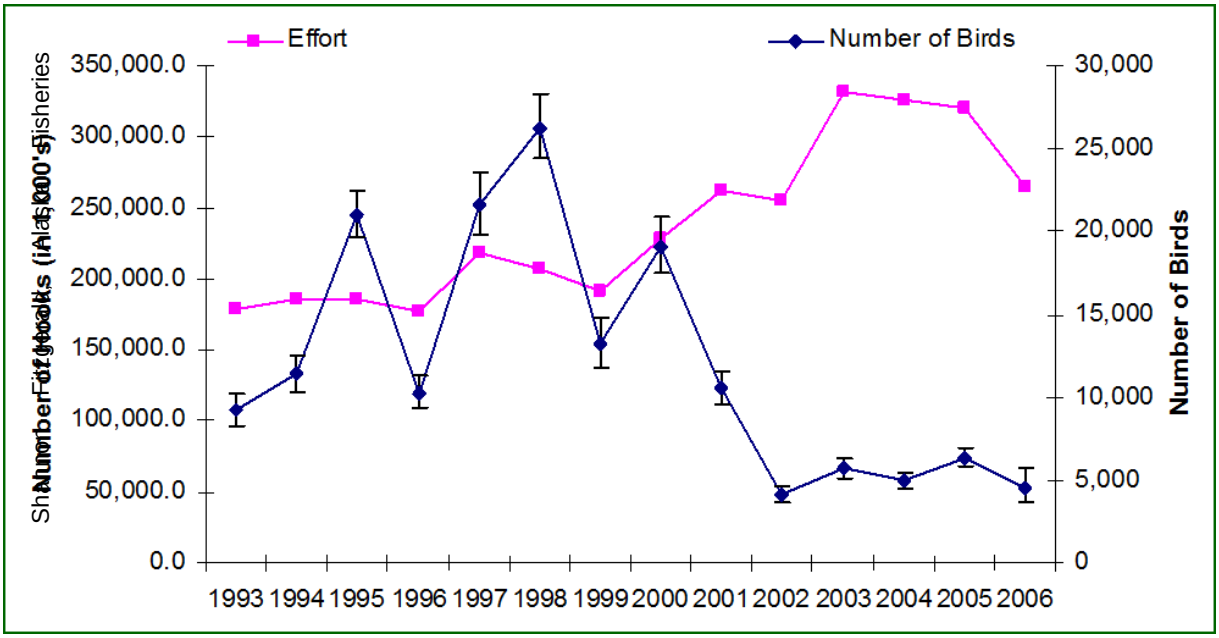


Figure 25 Number of hooks and number of seabirds, 1993 – 2006 (Source: NMFS)



3.5.1.2 Alternative 2

Alternative 2 would allow sablefish IFQ fishermen to choose between using hook-and-line gear and pot longline gear. A transition from hook-and-line gear to pot longline gear is expected to reduce seabird interactions and decrease the likelihood of incidental takes of seabirds, which is viewed as a beneficial outcome of the proposed action. These decreased fishery interactions likely result from decreased prey availability. While decreased prey availability may negatively impact seabirds in the short run because they must return to natural predatory behavior, it benefits their survival in the long run due to decreased opportunities for entanglements (potentially those resulting in injuries and drownings).

To provide a sense of this action's effect on seabirds, direct comparisons can be made for pot and HAL longline gear in specific fisheries and regions. Both (single and longline) pot gear and hook-and-line longline gear is allowed in the BS sablefish fishery. Pacific cod pot and HAL longline fisheries occur in the GOA. A comparison of seabird bycatch in these fisheries would ideally include some measure of the units of effort and an equivalency between hook-and-line fisheries versus pot fisheries. The AFSC is currently working on methods to report standardized effort in each fishery, although that information is not yet available for this analysis. Direct comparisons of species taken and overall numbers are available however. The numbers reported below were generated by the Catch Accounting System to report seabird bycatch from 2007 through 2013 (report in preparation).

A direct comparison of seabird bycatch in pot fisheries in two gear types in the BSAI sablefish fishery can be made. During 2007 through 2013 a total of 751 birds were taken in the sablefish HAL longline fishery, including 19 black-footed albatross and 376 Laysan albatross. During this time, albatross composed >50% of the overall bycatch. During the same time period, the pot fishery took 11 seabirds, including 6 Northern fulmars and 5 shearwater spp.

In the GOA a comparison of HAL and pot seabird bycatch for the Pacific cod fisheries found that from 2007 through 2013 the total estimated bycatch in the cod HAL fishery was 1,802 seabirds, including 27 albatross (9 black-footed and 18 Laysan). The highest proportion of seabird bycatch was Northern fulmar at 1,035 birds, or 57% of the total. The cod pot fishery estimate for this same time period was 458 birds including 60 gulls and 398 fulmars. No albatross were taken.

Note that seabird bycatch in pot fisheries includes either surface-feeding (gulls and Northern fulmars) or shallow-diving (shearwater) seabird species. These birds are not captured by pot gear while it is being actively fished. Information from observers supports the conjecture that these birds are getting into the pots before the gear is set, typically during inclement weather. Given the data available and the nature of the fishery, pot gear appears to pose no threat to albatross species.

During the 2007 through 2013 time period, seabird bycatch in the GOA sablefish HAL fishery totaled 5,313 birds, including 1,604 albatross (1,057 black-footed, 524 Laysan, and 23 unidentified). Northern fulmar were the predominant species (2,133; 40%) followed by gull spp. (1,381; 26%). If Alternative 2, and pot gear is allowed to be used for GOA sablefish, then there should be an overall reduction of seabird bycatch and especially a reduction in the numbers of albatross taken.

No substantive changes in prey availability or gear impact on benthic habitat used by seabirds for foraging have been identified under Alternative 2. There is no information available to suggest a temporal or seasonal shift in sablefish IFQ fishing would be expected to occur under Alternative 2. In fact, a return to traditional fishing patterns might be expected under Alternative 2, as shifts in fishing patterns to avoid seabirds would be expected to continue to occur under the status quo.

Overall, Alternative 2 is expected to result in beneficial impacts on seabirds compared to the status quo.

3.6 Cumulative Effects

NEPA requires an analysis of the potential cumulative effects of a proposed federal action and its alternatives. Cumulative effects are those combined effects on the quality of the human environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which federal or non-federal agency or person undertakes such other actions (40 CFR 1508.7, 1508.25(a) and 1508.25(c)). Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The concept behind cumulative effects analysis is to capture the total effects of many actions over time that would be missed if evaluating each action individually. Concurrently, the Council on Environmental Quality (CEQ) guidelines recognize that it is most practical to focus cumulative effects analysis on only

those effects that are truly meaningful. Based on the preceding analysis, the effects that are meaningful are potential effects on sablefish, halibut, GOA FMP groundfish species, marine mammals, and seabirds. The cumulative effects on the other resources have been analyzed in numerous documents and the impacts of this proposed action and alternatives on those resources is minimal, therefore there is no need to conduct an additional cumulative impacts analysis.

This section provides a review of the reasonably foreseeable future actions (RFFA) that may result in cumulative effects on sablefish, halibut, and other GOA FMP groundfish species. Actions are understood to be human actions (e.g., a proposed rule to designate northern right whale critical habitat in the Pacific Ocean), as distinguished from natural events (e.g., an ecological regime shift). CEQ regulations require consideration of actions, whether taken by a government or by private persons, that are reasonably foreseeable. This requirement is interpreted to indicate actions that are more than merely possible or speculative. In addition to these actions, this cumulative effects analysis includes climate change.

Actions are considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or NMFS's publication of a proposed rule. Actions only "under consideration" have not generally been included because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen. Identification of actions likely to impact a resource component within this action's area and time frame will allow the public and Council to make a reasoned choice among alternatives.

Three RFFAs are identified as likely to have an impact on a resource component within the considered action area and timeframe.

First, the Council is considering a regulatory amendment that would allow the retention of halibut IFQ in sablefish pot gear in halibut management area 4A (BS and AI areas). The Council will perform an initial review of alternatives for that action in February 2015. Based on the five most recent years of complete information, between 25 and 45 of the sablefish IFQ participants that would be affected by the action under consideration for the GOA also participate in sablefish IFQ or CDQ fishing in the sablefish management areas that overlap with halibut management area 4A. Allowing the retention of halibut in sablefish pots, as considered under Alternative 2, Element 4 of this action, could reduce halibut discards.

Second, the Council is currently reviewing a discussion paper on two proposals to amend the regulations that set vessel IFQ caps in the halibut and sablefish fisheries. One proposal pertains to vessel category A (freezer vessel) IFQ. The proposal asks for consideration of allowing vessels that *exclusively* fish category A IFQ to be allowed to fish above the vessel cap. The area scope of this potential action (GOA, BSAI, or all areas) has not yet been defined. The second vessel cap proposal seeks a "floor" on the annual vessel IFQ caps for halibut IFQ fishing in management areas 3 and 4. Vessel IFQ caps fluctuate each year in relation to the species TAC. As available biomass declines, so does the vessel cap. Alteration of vessel caps mainly affects the socioeconomic element of the fishery, as higher vessel caps would allow for the available biomass to be harvested by fewer vessels.

Third, the Council is in the midst of selecting a preferred alternative for an action that would lower the existing MRAs for skates in the GOA. The goal of that action is to avoid having to put skates on prohibited species status, requiring them to be discarded as the TAC approaches full attainment. The MRA level for GOA skates is currently 20% for all basis species. The Council is considering a range of alternatives that could potentially lower the MRA to 5%. This action could affect the amount of skates that are discarded in the hook-and-line IFQ fisheries. The action would not likely affect fishing with pot gear, where skate bycatch is very low.

Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the cumulative impacts of the proposed action are determined to be not significant.

3.7 NEPA Summary

One of the purposes of an environmental assessment is to provide the evidence and analysis necessary to decide whether an agency must prepare an environmental impact statement (EIS). The Finding of No Significant Impact (FONSI) is the decision maker's determination that the action will not result in significant impacts to the human environment, and therefore, further analysis in an EIS is not needed. The Council on Environmental Quality regulations at 40 CFR 1508.27 states that the significance of an action should be analyzed both in terms of "context" and "intensity." An action must be evaluated at different spatial scales and settings to determine the context of the action. Intensity is evaluated with respect to the nature of impacts and the resources or environmental components affected by the action. NOAA Administrative Order (NAO) 216-6 provides guidance on the National Environmental Policy Act (NEPA) specifically to line agencies within NOAA. It specifies the definition of significance in the fishery management context by listing criteria that should be used to test the significance of fishery management actions (NAO 216-6 §§ 6.01 and 6.02). These factors form the basis of the analysis presented in this Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis. The results of that analysis are summarized here for those criteria.

The context of the action is previously described in this EA, as well as in Sections 1 and 2 of this document.

Considerations to determine intensity of the impacts are set forth in 40 CFR 1508.27(b) and in the NAO 216-6, Section 6. Each consideration is addressed below in order as it appears in the NMFS Instruction 30-124-1 dated July 22, 2005, Guidelines for Preparation of a FONSI. The sections of the EA that address the considerations are identified.

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

   No, the proposed action is not expected to jeopardize any target species that may be affected by this action. The proposed action to allow longline pot gear in the GOA sablefish IFQ fishery is expected to benefit (1) killer whales, sperm whales, and seabirds due to decreased risks of entanglements and takes, and (2) sablefish and halibut due to decreased mortalities associated with depredation by whales on commercial HAL longline gear.

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

   No, the proposed action is not expected to jeopardize any non-target species that may be affected by this action. The proposed action is expected to benefit species such as rockfishes and grenadiers that are caught incidentally on commercial HAL longline gear, due to lower expected bycatch in pot gear.

3) *Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in the fishery management plans (FMPs)?*

   The proposed action is not expected to cause any damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs, given that

the action would allow the use of pot longline gear in the GOA to avoid the entanglement of killer whales, sperm whales, and seabirds that have been documented for HAL longline gear.

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

Public health and safety is not expected to be adversely affected by removing gear restrictions, as described under the proposed action. Pot longlining has not been shown to have any effects on public health and safety in general. While safety concerns related to carrying pot longline gear on small boats have been raised by the HAL longline fleet based in Sitka, Alaska, the use of pot longline gear would be voluntary, and not mandatory, under this action. Therefore, each captain can decide whether fishing conditions warrant the use of pot longline or hook-and-line longline gear in the sablefish IFQ fishery.

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

The proposed action is not expected to adversely affect endangered or threatened species, marine mammals, other non-target species, or their critical habitat. The proposed action is expected to provide additional protection to killer whales, sperm whales, and seabirds through increased use of gear that offers less risk of entanglements and takes. It is also expected that other protected marine mammals and seabirds, to the extent their distribution and abundance coincide with the geographic scope of the sablefish IFQ fishery, will benefit from the proposed use of pot longline gear. This gear is believed to have fewer interactions with marine mammals and seabirds than the HAL longline gear.

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

The proposed action is not expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.). However, the proposed action may be beneficial to marine mammals and seabirds that are potentially at risk of being adversely affected by hook-and-line fishing activity.

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

No significant social or economic impacts interrelated with natural or physical environmental effects are expected from this action. This action affects an unknown percentage of IFQ fishermen, because the percentage of fishermen that encounter marine mammals with HAL gear is unknown, and because the choice to switch to pot longline gear will be made voluntarily. The natural and physical environmental effects of the action consist of decreasing the risk of entanglement of whales and seabirds by limiting their exposure to hook-and-line longline gear. There are no known significant social or economic impacts associated with these effects, though there are measurable societal benefits attributable to preventing injury to whales and seabirds.

8) *Are the effects on the quality of the human environment likely to be highly controversial?*
The effects of removing a gear restriction on the human environment are not likely to be highly controversial. The impact of relieving the prohibition on pot gear in the GOA may be controversial to a small segment of the fishing community, but the overall effects on the human environment are not expected to be highly controversial. The proposed action is limited in time and geographic area, and expected to facilitate the coexistence of fishing activity with whales and seabirds. These factors restrict the scope of the effects on the human environment. In contrast, the potential effects of a failure to act, which could include further risk of injury or mortality to whales and seabirds, would be highly controversial with the environmental organization community and a sizeable segment of the public, should entanglements occur.

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

Removing a gear restriction will not impact park land, farmlands, wetlands, wild and scenic rivers, or ecologically critical areas, as these areas do not overlap with the GOA where the fishery deploying the gear occurs. As determined during the consultation process, this action will not impact essential fish habitat. Compliance with proposed restrictions on the use of longline pot gear is not likely to result in the permanent loss or destruction of, or impact to any historic or cultural resources or ecologically critical areas.

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

The effects on the human environment from the proposed action are not expected to be highly uncertain or involve unique or unknown risk. The pot longline restrictions are clearly detailed and were derived through discussions with the fishing community, and the Council.

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

The EA examines the cumulative effects of the proposed action on five valued ecosystem components with ecological, scientific, cultural, socio-economic, historical, or aesthetic significance in the affected environment. Based on the information presented, it does not appear that the proposed action will have significant impacts on society nor will it result in cumulatively significant impacts.

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

There is no evidence that the revision to gear restrictions will adversely affect entities listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural, or historic resources. Compliance with proposed provisions for the use of longline pot gear is not likely to result in the permanent loss or destruction of any resources.

13) *Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?*

There is no evidence that the proposed removal of a gear restriction will adversely affect entities listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural, or historic resources. Compliance with proposed provisions for the use of longline pot gear is not likely to result in the permanent loss or destruction of any resources.

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

These proposed removal of a gear restriction does not set a precedent for future actions with significant effects and does not represent a decision in principle about future considerations. The use of gear restrictions as a management tool has been found to be effective in other, similar circumstances and has been determined to be the most appropriate mechanism for the agency to meet its conservation objectives under the MSA, NEPA, ESA, and MMPA. Allowing longline pot gear in the GOA addresses the unique issue of HAL longline fisheries that coincide with the use of coastal habitats by whales and seabirds in a specific area of the GOA during specific times of the year. Thus, it is being considered to achieve a specific geographically-restricted, species-specific objective, and is therefore not expected to establish a precedent for future actions.

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

Allowing pot longline gear in the GOA will not result in a violation of a Federal, state or local law for environmental protection. In fact, removing a gear restriction would be expected to support Federal, state, and local laws for environmental protection because they are expected to achieve the agency's conservation objectives.

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

The proposed action is not reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species since the proposed action is to increase protection of whales and seabirds by allowing longline pot gear that would reduce the risk of their entanglement or take. Although the purpose and need for the proposed action is focused on the need to protect whales (and seabirds) in the GOA, beneficial effects on sablefish, halibut, rockfishes, and grenadiers also are expected. Thus, it is reasonable to expect that non-target species also may experience beneficial effects.

4 Regulatory Impact Review

This Regulatory Impact Review (RIR) examines the benefits and costs of a proposed regulatory amendment to allow the use of pot longline gear for the sablefish IFQ fishery in the GOA. The measures under consideration include: redefining legal gear to include pot longline gear, requiring retention of Pacific halibut if sufficient IFQs are held by fishermen to cover both the sablefish and halibut caught using pot longline gear, restrictions to limit the retention of halibut in sablefish IFQ pot longline gear to incidental catch only (e.g., MRA), and gear marking requirements.

The preparation of an RIR is required under Presidential Executive Order (E.O.) 12866 (58 FR 51735: October 4, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following Statement from the E.O.:

> *In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and Benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

E.O. 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." A "significant regulatory action" is one that is likely to:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

4.1 Statutory Authority

Under the Magnuson-Stevens Fishery and Conservation Act (Magnuson-Stevens Act) (16 USC 1801, *et seq*.), the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ). The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the regional fishery management councils. In the Alaska Region, the Council has the responsibility for preparing fishery management plans (FMPs) and FMP amendments for the marine fisheries that require conservation and management, and for submitting its recommendations to the Secretary. Upon approval by the Secretary, NMFS is charged with carrying out the federal mandates of the Department of Commerce with regard to marine and anadromous fish.

The sablefish IFQ fishery in the EEZ off Alaska subject to this action is managed under the FMP for Groundfish of the GOA. The proposed action under consideration would amend this FMP and Federal regulations at 50 CFR 679, and may also require amendments to IPHC regulations if the Council selects

Alternative 2, Element 4 as part of its preferred alternative. Actions taken to amend FMPs or implement other regulations governing these fisheries must meet the requirements of Federal law and regulations.

4.2 Purpose and Need for Action

The Council adopted the following purpose and need statement to originate this action in December 2013.

> *Interactions with sperm whales in the Central and Eastern Gulf, and killer whales in the Western Gulf affect the ability of sablefish quota share holders to harvest their sablefish IFQs by reducing catch per unit of effort and increasing fishing costs. Research into developing technological solutions to deter whales and changes in fishing strategies has not resolved the problem. Additional sablefish mortality associated with whale depredation is difficult to quantify, but increases total mortality and uncertainty in sablefish abundance indices. The use of pot gear for sablefish could reduce sperm whale and killer whale interactions with fishing gear in the Gulf of Alaska. The Council seeks to reduce the problems associated with whale depredation while minimizing gear conflicts that could result from allowing pot and longline gear to fish in the same regulatory areas.*

4.3 Alternatives

A revised set of alternatives, elements, and options for the proposed action is provided here. Section 2 provides the Council's list, as adopted in December 2013, along with a streamlined version of the Council's motion for analysis, as recommended by the analysts. No substantive changes have been made; changes reflect the incorporation of status quo options.

Alternative 1. No Action.

Revised Alternative 2. Allow the use of pot longline gear in the GOA sablefish IFQ fishery

Element 1. Limit of 0 to 400 pots (per vessel)

Element 2. Gear retrieval

Option 1. Require vessels to remove their pot gear when making a landing.

Suboption. Provide an exemption for vessels less than 60', 50', or 40'

Option 2. Require the location of pots left on the grounds or lost on the grounds to be submitted when landings are made.

Element 3. Gear specifications

Option 1. Require the use of neutrally buoyant groundline.

Option 2. Require both ends of the pot longline set to be marked

Element 4. Retention of incidentally caught halibut

Allow the retention of halibut caught incidentally in sablefish pots, provided the sablefish IFQ holder also holds sufficient halibut IFQ

Option 1. Allow the retention of halibut caught incidentally in sablefish pots up to an MRA percentage, provided the sablefish IFQ holder also holds sufficient halibut IFQ.

4.4 Methodology for analysis of impacts

The evaluation of impacts in this analysis is designed to meet the requirement of E.O. 12866, which dictates that an RIR evaluate the costs and benefits of the alternatives, to include both quantifiable and qualitative considerations. Additionally, the analysis should provide information for decision makers "to maximize net benefits (including potential economic, environment, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach." The costs and benefits of this action with respect to these attributes are described in the sections that follow, comparing the "no action" Alternative 1 with the action Alternative 2. The analysts then provide a qualitative assessment of the net benefit to the Nation of each alternative, using the no action alternative as the baseline.

This analysis was prepared using data from the NMFS Catch Accounting System (CAS) and Restricted Access Management Program databases, which are the best available data to estimate total catch in the GOA sablefish IFQ fisheries. Total catch estimates are generated from information provided through a variety of required industry reports of harvest and at-sea discards, and data collected through an extensive fishery observer program. In 2003, NMFS changed the methodologies used to determine catch estimates from the NMFS blend database (1995 through 2002) to the catch accounting system (2003 through present).

CAS was implemented to better meet the increasing information needs of fisheries scientists and managers. Currently, CAS relies on data derived from a mixture of production and observer reports as the basis of the total catch estimates. The 2003 modifications in catch estimation included providing more frequent data summaries at finer spatial and fleet resolution, and the increased use of observer data. Redesigned observer program data collections were implemented in 2008, and include recording sample-specific information in lieu of pooled information, increased use of systematic sampling over simple random and opportunistic sampling, and decreased reliance on observer computations. As a result of these modifications, NMFS is unable to recreate blend database estimates for total catch and retained catch after 2002. Therefore, NMFS is not able to reliably compare historical data from the blend database to the current catch accounting system.

This document focuses on data from the 2009 through 2013 fishing years (inclusive), as those five years represent the most recent range of data that was collected and reported in a generally consistent manner.

4.5 Description of GOA Sablefish Fisheries

This section provides background information on participation, vessel size, harvest, and revenues in sablefish fisheries. Most information is focused on the most recent five years of available data, but some longer term information is pulled from the sablefish chapter of the GOA SAFE Report (Hanselman et al. 2013). Most historical information describes the IFQ sablefish fishery in GOA management areas, as that is the area that would be regulated by this considered action. Limited information on other sablefish fisheries is presented to better describe dependency on the resource. Other sablefish fisheries include IFQ and CDQ fishing in the Bering Sea and Aleutian Islands areas (where pot gear is allowed), and retention of sablefish during trawl fishing.

4.5.1 Fishery History

The following summary of the GOA sablefish fishery is excerpted from the 2013 GOA SAFE Report, beginning at page 271.[13]

[13] (Hanselman et al., available at http://www.afsc.noaa.gov/REFM/Docs/2013/GOAsablefish.pdf).

4.5.1.1 Early U.S. fishery, 1957 and earlier

Sablefish have been exploited since the end of the 19th century by U.S. and Canadian fishermen. The North American fishery on sablefish developed as a secondary activity of the halibut fishery of the United States and Canada. Initial fishing grounds were off Washington and British Columbia and then spread to Oregon, California, and Alaska during the 1920's. Until 1957, the sablefish fishery was exclusively a U.S. and Canadian fishery, ranging from off northern California northward to Kodiak Island in the GOA; catches were relatively small, averaging 1,666 t from 1930 to 1957, and generally limited to areas near fishing ports.

4.5.1.2 Foreign fisheries, 1958 to 1987

Japanese longliners began operations in the eastern BS in 1958. The fishery expanded rapidly in this area and catches peaked at 25,989 t in 1962. As the fishing grounds in the eastern Bering were preempted by expanding Japanese trawl fisheries, the Japanese longline fleet expanded to the AI region and the GOA. In the GOA, sablefish catches increased rapidly as the Japanese longline fishery expanded, peaking at 36,776 t overall in 1972. Catches in the AI region remained at low levels with Japan harvesting the largest portion of the sablefish catch. Most sablefish harvests were taken from the eastern Being Sea until 1968, and then from the GOA until 1977. Heavy fishing by foreign vessels during the 1970's led to a substantial population decline and fishery regulations in Alaska, which sharply reduced catches. Catch in the late 1970's was restricted to about one-fifth of the peak catch in 1972, due to the passage of the Magnuson-Stevens Act (MSA).

Japanese trawlers caught sablefish mostly as bycatch in fisheries targeting other species. In the BS, the trawlers were mainly targeting rockfish, Greenland turbot, and Pacific cod. In the GOA, sablefish were mainly caught as bycatch in the directed Pacific Ocean perch fishery until 1972, when some vessels started targeting sablefish.

Other foreign nations besides Japan also caught sablefish. Substantial Soviet Union catches were reported from 1967 through 1973 in the BS. Substantial Korean catches were reported from 1974 through 1983 scattered throughout Alaska. Other countries reporting minor sablefish catches were Republic of Poland, Taiwan, Mexico, Bulgaria, Federal Republic of Germany, and Portugal. The Soviet gear was factory-type stern trawl and the Korean gears were longlines and pots.

4.5.1.3 Recent U.S. fishery, 1977 to present

The U.S. HAL longline fishery began expanding in 1982 in the GOA, and by 1988, the U.S. harvested nearly all sablefish taken in Alaska, excepting minor joint venture catches. Following domestication of the fishery, the previously year-round season in the GOA began to shorten in 1984 from 12 months in 1983 to 10 days in 1994, warranting the label "derby fishery".

In 1995, an IFQ program was implemented for hook-and-line vessels along with an 8-month season. The IFQ Program is a catch share fishery that issued quota shares to individuals based on sablefish and halibut landings made from 1988-1990. Since the implementation of IFQ's, the number of longline vessels with sablefish IFQ harvests has experienced a substantial anticipated decline from 616 in 1995 to 362 in 2011. This decrease was expected, as shareholders consolidated their holdings and fish from fewer vessels to reduce costs. The sablefish fishery has historically been a small boat fishery; the median vessel length in the 2011 fishery was 56 feet. In recent years, approximately 30% of vessels eligible to fish in the IFQ fishery participate in both the halibut and sablefish fisheries, and approximately 40% of vessels fish in more than one management area. The season dates have varied by several weeks since 1995, but the monthly pattern has been from March to November with the majority of landings occurring between May and June.

While pot fishing in the IFQ fishery is not allowed in the GOA, it is legal in the BSAI. In 2000, the pot fishery accounted for less than 10% of the fixed gear sablefish catch in those areas, but effort has

increased substantially in response to killer whale depredation. Since 2004, pot gear has accounted for over 50% of the BS fixed gear IFQ catch and up to 34% of the catch in the AI.

Sablefish are also caught incidentally during directed trawl fisheries for other species groups such as rockfish and deep water flatfish. Allocation of the sablefish TAC by gear group varies by management region and influences the amount of catch in each region. Five State of Alaska fisheries land sablefish outside of the IFQ program. The major State fisheries that encounter sablefish occur in the Prince William Sound, Chatham Strait, and Clarence Strait; the minor fisheries occur in the northern GOA and AI. The minor state fisheries were established by the State of Alaska in 1995, the same time as the Federal Government established the IFQ fishery, primarily to provide open-access fisheries to fishermen who could not participate in the IFQ fishery.

IFQ management has increased fishery catch rates and decreased the harvest of immature fish. Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced variable costs from eight to five percent of landed value, a savings averaging $3.1 million annually. Decreased harvest of immature fish improved the chance that individual fish will reproduce at least once. Thus, the stock can provide a greater yield at the same target fishing rate under the IFQ fishery selectivity.

Longline gear in Alaska is fished on-bottom. In the 1996 directed fishery for sablefish, average set length was 9 km and average hook spacing was 1.2 m. The gear is baited by hand or by machine, with smaller boats generally baiting by hand and larger boats generally baiting by machine. Circle hooks usually are used, except for modified J-hooks on some boats with machine baiters. The gear is usually deployed from the vessel stern with the vessel traveling at 5-7 knots. Some vessels attach weights to the longline, especially on rough or steep bottom, so that the longline stays in place on bottom.

Pot fishing for sablefish has increased in the BS and AI as a response to depredation of longline catches by killer whales (

Table 20 in Section 4.5.4). Pots are longlined with approximately 40-135 pots per set.

4.5.2 Vessel Counts and Vessel Size Groups

Across all areas (BSAI and GOA), 451 unique vessels have harvested sablefish IFQ since 2009 (Table 12). During the most recent five years of complete data, the GOA sablefish IFQ fishery has been prosecuted by over 400 vessels, the vast majority of which are shoreside delivering catcher vessels (Table 13). Sixteen unique CP vessels fished sablefish IFQ in the GOA since 2009.

A relatively small number of vessels have harvested sablefish IFQ with pot gear in the BS and AI areas. From 2009 through 2013, 15 unique vessels deployed sablefish pots for IFQ in the BS or AI. As many as 10 vessels did so in 2009, and as few as four did so in 2013. Use of pots was greater in the BS area (between four and nine vessels in a given year), compared to the AI area (between one and four vessels in a given year). Aside from two vessels of between 51' and 60' LOA that fished in the BS area in 2009, all sablefish IFQ fishing with pot gear occurred on vessels greater than 60' LOA. Instances of a vessel using both HAL and pot gear to fish sablefish IFQ during the same year were rare; three vessels used both gear types in 2011 (BS and AI), and two vessels used both gear types in 2012 (BS only).

Of the 404 CVs that fished GOA sablefish IFQ from 2009 through 2013, 38 fished Pacific cod with pot gear in the GOA, and 13 fished Pacific cod with pot gear in the BSAI. In all, 40 unique CVs that fished GOA sablefish IFQ from 2009 through 2013 are also using pots in another fishery. Of those 40 vessels, six are greater than 60' LOA, 32 are between 51' and 60' LOA, and two are between 41' and 50' LOA.

Table 12 Sablefish hook-and-line vessel participation, by area and year

YEAR	AREA	Vessel Count		
		CDQ	IFQ	TOTAL
2009	AI	6	31	33
	BS	5	32	34
	WG		61	61
	CG		176	176
	WY		115	115
	SE		208	208
2009 Total Vessels		10	350	354
2010	AI	5	37	37
	BS	1	36	37
	WG		65	65
	CG		172	172
	WY		116	116
	SE		213	213
2010 Total Vessels		5	360	360
2011	AI	8	34	36
	BS	2	42	44
	WG		64	64
	CG		171	171
	WY		112	112
	SE		203	203
2011 Total Vessels		10	353	354
2012	AI	5	27	29
	BS	1	35	36
	WG		62	62
	CG		178	178
	WY		113	113
	SE		201	201
2012 Total Vessels		6	349	351
2013	AI	5	27	27
	BS	1	29	30
	WG	1	55	56
	CG		170	170
	WY		109	109
	SE		183	183
2013 Total Vessels		6	320	321
TOTAL VESSELS		22	451	453

Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 13 GOA Sablefish IFQ vessel participation, by year and by harvest sector

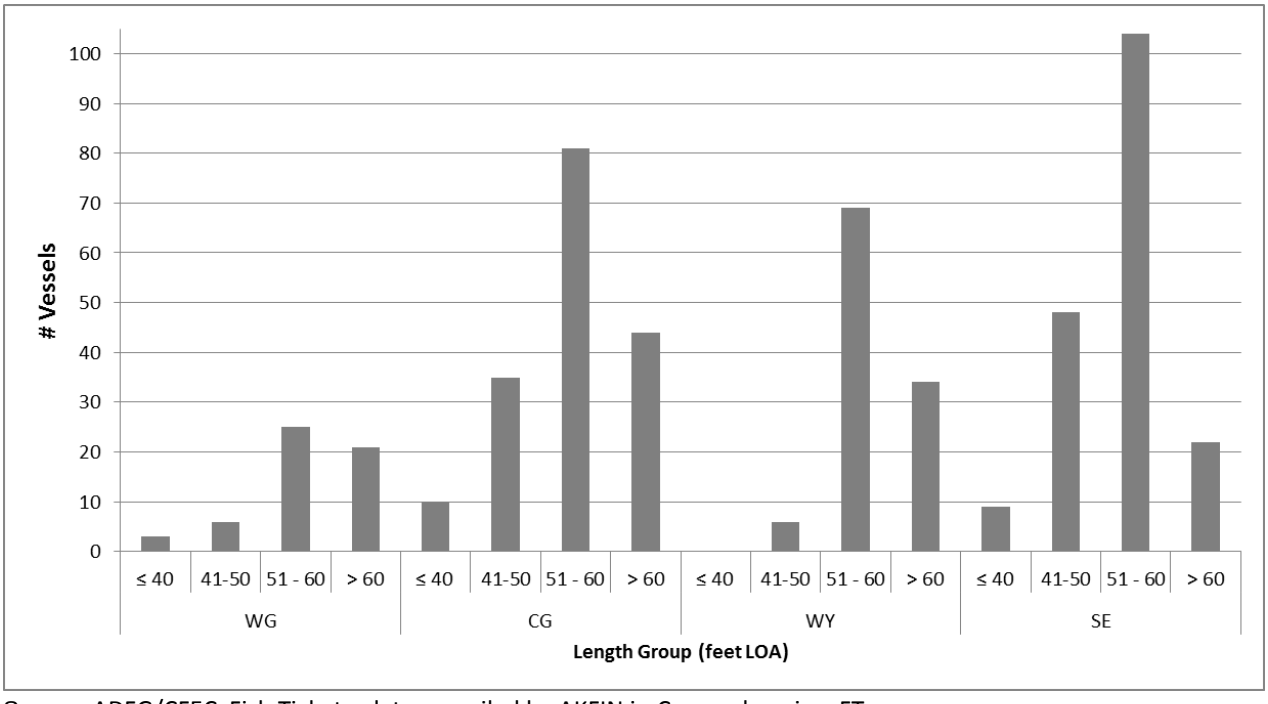
Year	Vessel Count	
	CV	CP
2009	323	11
2010	328	9
2011	320	8
2012	322	7
2013	304	5

Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Figure 26 shows the distribution of the vessel sizes used to harvest sablefish IFQ in 2013; size classes are delineated at 40', 50', and 60' LOA, since Alternative 2 of this action identifies those length groups for possible exemption from a requirement to remove pot gear from fishing grounds when making a landing. In each GOA management area, the largest proportion of sablefish IFQ vessels falls into the 51' to 60' LOA category. The Western GOA has a comparatively small fleet that consists mainly of vessels in the larger length categories. The Central GOA and Southeast Outside areas show the most participation by vessels 50' LOA or smaller. Table 14 shows the consistent distribution of vessel sizes harvesting sablefish IFQ in each GOA area over time. Both CPs and CVs are included in Table 14; only one CP (represented in each year of Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 13) was less than 60' LOA.

Figure 26 Size (MLOA) distribution of vessels harvesting sablefish IFQ (by area of catch), 2013



Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 14 Number of vessels by size category catching sablefish IFQ in each GOA management area, 2009 through 2013

LENGTH	AREA	YEAR	Vessel Count	LENGTH	AREA	YEAR	Vessel Count
≤ 40	WG	2009	2	**51 - 60**	WG	2009	30
		2010	2			2010	30
		2011	1			2011	30
		2012	2			2012	26
		2013	3			2013	25
	CG	2009	7		CG	2009	84
		2010	7			2010	86
		2011	8			2011	81
		2012	6			2012	87
		2013	10			2013	81
	WY	2009	-		WY	2009	70
		2010	-			2010	71
		2011	-			2011	69
		2012	-			2012	70
		2013	-			2013	69
	SE	2009	11		SE	2009	104
		2010	11			2010	109
		2011	10			2011	108
		2012	12			2012	112
		2013	9			2013	104
41 - 50	WG	2009	4	**> 60**	WG	2009	25
		2010	5			2010	28
		2011	7			2011	26
		2012	10			2012	24
		2013	6			2013	21
	CG	2009	29		CG	2009	56
		2010	27			2010	52
		2011	33			2011	49
		2012	36			2012	49
		2013	35			2013	44
	WY	2009	6		WY	2009	39
		2010	8			2010	37
		2011	6			2011	37
		2012	8			2012	35
		2013	6			2013	34
	SE	2009	61		SE	2009	32
		2010	64			2010	29
		2011	59			2011	26
		2012	52			2012	25
		2013	48			2013	22

Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

4.5.3 Homeports and Delivery Locations

Vessels that landed IFQ sablefish from 2009 through 2013 were homeported in 49 different communities, 30 of which are located in Alaska (homeport is self-reported to CFEC). Catcher vessels made shoreside deliveries to 29 communities, 27 of which are in Alaska. For both Table 15 and

Table 16, **asterisks** indicate that IFQ harvested by those vessels or delivered to those communities was entirely caught in the BSAI areas.

Roughly 95% of the vessels in the smaller length groups (less than or equal to 50' LOA) report their homeport in an Alaska community. Eighty-five percent of vessels in the 51' to 60' LOA group homeported in Alaska. By comparison, over half of the sablefish IFQ vessels that are greater than 60' LOA (54%) homeport outside of Alaska. The vast majority of sablefish IFQ deliveries were made to Alaska ports. Larger vessels were more likely to deliver to Bellingham, WA, Seattle, WA, or Warrenton, OR. However, since 2009 only 14 vessels made deliveries outside of Alaska, and zero vessels delivered exclusively to a non-Alaskan community.

Table 15 Homeport communities for vessels making sablefish IFQ landings, 2009 through 2013

AK (30)		WA (10)	OR (6)	CA (3)
Adak	Ketchikan	Anacortes	Astoria	Fort Bragg
Anchor Point	King Salmon	Everett	Brookings	San Francisco
Atka*	Kodiak	Gig Harbor	Newport	Ventura
Cordova	Nikolaevsk	Hat Island	Portland	
Craig	Pelican	Ilwaco	Reedsport	
Douglas	Petersburg	Mt. Vernon	Winchester Bay	
Dutch Harbor	Port Alexander	Port Angeles		
Egegik	Port Lions*	Port Orchard		
Elfin Cove	Sand Point	Port Townsend		
False Pass*	Seldovia	Seattle		
Gustavus	Seward			
Haines	Sitka			
Homer	St. Paul Island*			
Hoonah	Unalaska*			
Juneau	Wrangell			

* Vessels from these communities only harvested sablefish IFQ in BSAI
Source: NMFS Alaska Region RAM (Restricted Access Management) data provided by AKFIN

Table 16 Ports of delivery for sablefish IFQ, 2009 through 2013

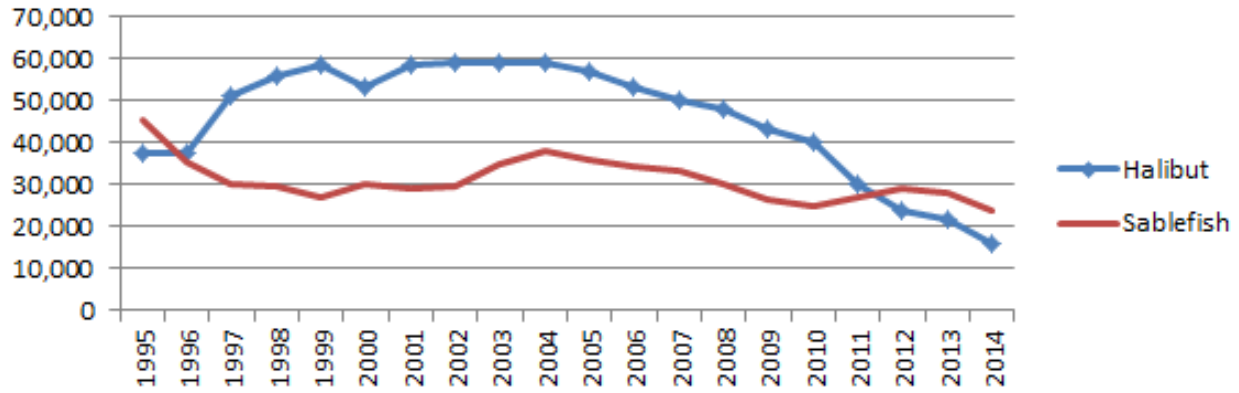
Adak*	King Cove
Akutan	Kodiak
Alitak	Petersburg
Atka*	Port Alexander
Bellingham (WA)	Sand Point
Cordova	Seattle (WA)*
Craig	Seward
Dutch/Unalaska	Sitka
Elfin Cove	St. Paul*
Excursion Inlet	Valdez
False Pass	Warrenton (OR)
Homer	Whittier
Hoonah	Wrangell
Juneau	Yakutat
Ketchikan	

* Deliveries to these communities consisted only of sablefish IFQ harvested in BSAI
Source: NMFS Alaska Region RAM (Restricted Access Management) data provided by AKFIN

4.5.4 Harvests

Figure 27 shows the fluctuation of IFQ TACs since 1995. Total annual IFQ TAC is the entire IFQ allocation for all areas. The vertical axis shows halibut TACs in thousands of net pounds (head off-gutted), and shows sablefish TACs in thousands of round pounds. Table 17 shows the allocation of available 2013 sablefish IFQ harvest by area; CDQ groups are allocated 20% of the BS and AI harvest. Figure 27 indicates that the sablefish IFQ TAC decreased from 2013 to 2014, to 23,679,609 pounds across all areas (20,103,747 pounds in GOA areas).

Figure 27 Annual IFQ TACS in thousands of pounds, 1995 through 2014



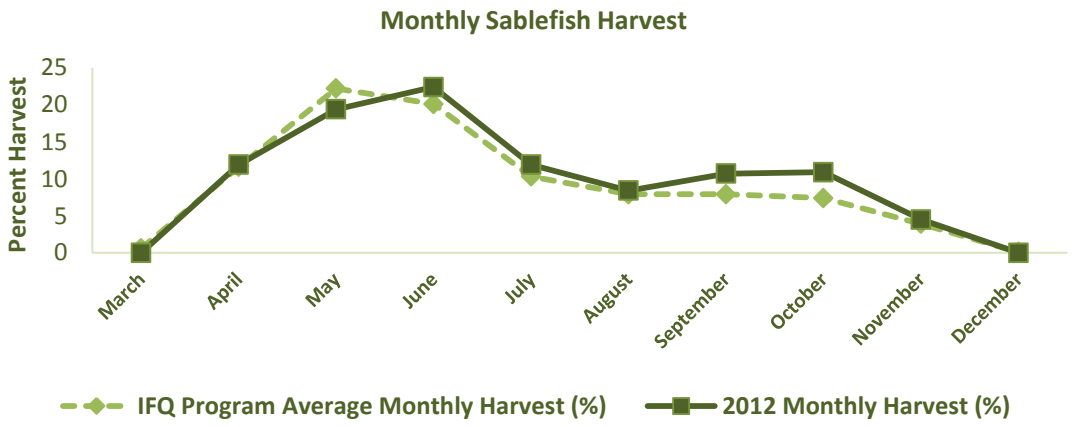
Source: NMFS RAM, Pacific Halibut-Sablefish IFQ Report, 2012 (NMFS, 2013).

Table 17 2013 allocation of sablefish TAC by area

2013 Sablefish IFQ Allocations							
Sablefish Area	Fixed Gear Allocation (round mt)	IFQ Percent	IFQ (round mt)	IFQ (round lbs.)	CDQ Percent	CDQ Round mt	CDQ (round lbs.)
CG	4,432	100	4,432	9,770,787			
SE	3,190	100	3,190	7,032,674			
WG	1,400	100	1,400	3,086,440			
WY	1,769	100	1,769	3,899,937			
All GOA	***10,791***		***10,791***	***23,789,839***			
AI	1,605	80	1,284	2,830,706	20	321	707,677
BS	790	80	632	1,393,307	20	158	348,327
All BSAI	***2,395***		***1,916***	***4,224,014***		***479***	***1,056,003***
TOTAL	***13,186***		***12,707***	***28,013,852***			

Source: NMFS RAM

Figure 28 2012 monthly sablefish harvest (%) compared to average monthly IFQ sablefish harvest (1995–2012)



Source: NMFS RAM, Pacific Halibut-Sablefish IFQ Report, 2012 (NMFS, 2013).

Figure 28 shows that the pattern and rate of IFQ sablefish harvest by month for the IFQ fishing years dating back to 1995. The monthly pattern has been consistent throughout the program, even though season dates have varied. Monthly harvest, as a percentage of the year's total annual catch, peaks in the spring and falls off during the summer months when many IFQ vessels are participating in directed salmon fisheries. Smaller vessels also tend to focus their halibut IFQ effort on the summer months.

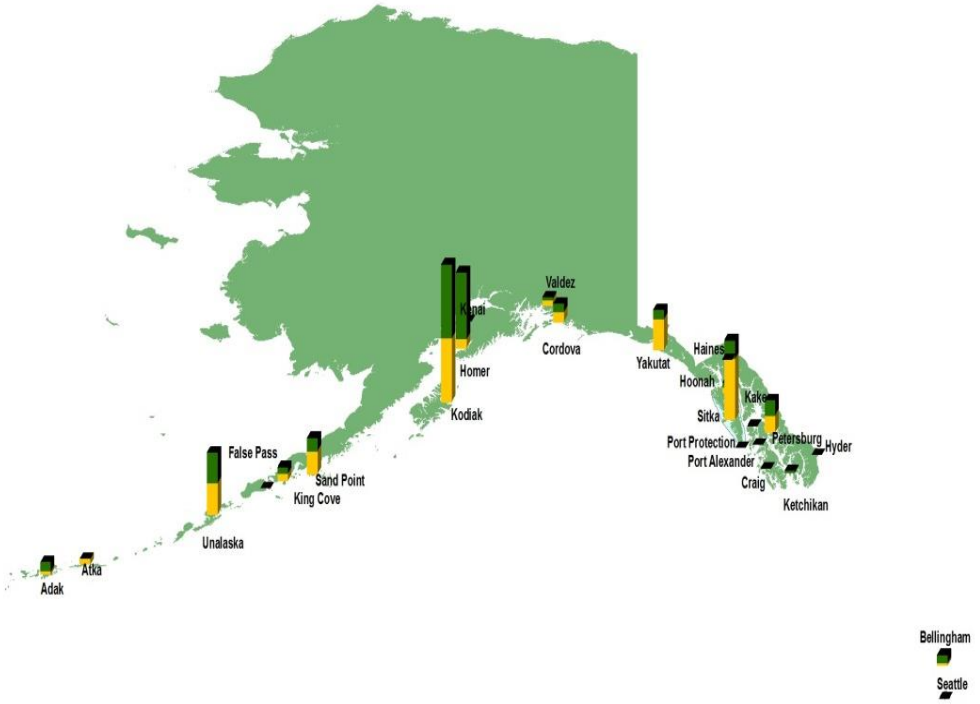
Table 18 shows the distribution of sablefish IFQ catch taken by CVs in GOA management areas and delivered to shoreside processing plants in different communities. Delivery ports are listed in descending order of aggregate sablefish receipts. The data in Table 18 aggregates the years 2009 through 2013. Over that period, the largest amount of GOA sablefish IFQ was caught in the Central GOA. Nearly half of the sablefish IFQ catch taken in the Western GOA was delivered to Sand Point. Around three-quarters of the sablefish IFQ catch taken in the Central GOA was delivered to either Seward or Kodiak. Over 60 percent of sablefish IFQ catch taken in West Yakutat district was delivered to either Yakutat or Seward. Roughly 56 percent of sablefish IFQ catch taken in Southeast was delivered to Sitka.

Table 18 Proportion of total CV GOA sablefish IFQ catch delivered to each community (by location of harvest activity), 2009 through 2013

	Area of Sablefish IFQ Catch				% GOA Total
Delivery Port	**WG**	**CG**	**WY**	**SE**	
SEWARD	0.01%	16.93%	4.01%	0.17%	21.12%
SITKA		0.21%	1.15%	17.30%	18.66%
KODIAK	1.42%	13.50%	1.23%	0.16%	16.32%
YAKUTAT	C	0.29%	7.01%	1.18%	*
SAND POINT	5.57%	0.83%			6.40%
JUNEAU		0.08%	0.48%	5.16%	5.72%
HOMER	0.32%	4.41%	0.21%		4.94%
CORDOVA	C	2.18%	2.62%	0.04%	*
PETERSBURG		0.04%	0.11%	4.20%	4.35%
KING COVE	2.24%	0.18%			2.42%
VALDEZ		1.43%	0.26%	C	*
HOONAH		C	0.23%	1.39%	*
AKUTAN	1.26%	0.04%			1.30%
WRANGELL		C	0.01%	0.66%	*
DUTCH/UNALASKA	0.53%	0.01%			0.54%
ALITAK	C	0.30%			*
KETCHIKAN			C	0.24%	*
BELLINGHAM		0.02%	0.08%	0.02%	0.12%
EXCURSION INLET			C	C	C
FALSE PASS	0.07%				0.07%
CRAIG				0.05%	0.05%
ELFIN COVE				C	C
PORT ALEXANDER				C	C
WARRENTON		C			C
WHITTIER		C			C
Total	11.45%	40.48%	17.45%	30.62%	100.00%

Note: 'C' indicates confidential data; * denotes data that is redacted in order to preserve confidentiality of other fields.

Figure 29 2012 landings for IFQ halibut and sablefish by port. (Green = halibut; Yellow = sablefish)



Source: NMFS RAM, Pacific Halibut-Sablefish IFQ Report, 2012 (NMFS, 2013).

Table 19 shows sablefish IFQ catch in round pounds, broken out by year (2009 through 2013), vessel size group, and area of catch. The vessel size groups are delineated at 40', 50', and 60' LOA, which are the considered break-points for exemptions from the gear retrieval element of Alternative 2 in the Council's motion. Vessels in the 51' to 60' LOA category recorded the largest amount of catch across all areas in each year. Vessels greater than 60' LOA landed the second most sablefish IFQ in each year; the amount of sablefish landed by those vessels was not far behind vessels in the 41' to 50' vessel size group despite the larger vessels being a small fleet in number of platforms (see Figure 26 and/or Table 14). Small vessels (less than or equal to 40' LOA) harvested a relatively small percentage of total annual catch; their participation as a percentage of a GOA area's annual catch was greatest in Southeast Alaska.

Table 19 Sablefish IFQ catch (pounds) by year, vessel size group, and area of catch (2009 through 2013)

Year	Length	BS	AI	WG	CG	WY	SE	Grand Total
2009	≤ 40	100,982		42,729	35,496		154,126	333,333
	41 - 50	31,324	5,194	68,163	440,738	60,243	1,205,072	1,810,734
	51 - 60	202,096	345,165	1,360,153	4,348,552	1,729,929	3,476,157	11,462,052
	> 60	1,152,643	1,307,444	1,357,435	3,903,284	1,615,284	1,226,152	10,562,242
2009 Total		**1,487,045**	**1,657,803**	**2,828,480**	**8,728,070**	**3,405,456**	**6,061,507**	**24,168,361**
2010	≤ 40	161,081		37,756	85,800	4,332	163,263	452,232
	41 - 50	28,114	9,114	59,273	431,196	127,176	1,203,052	1,857,925
	51 - 60	163,499	267,573	1,391,333	4,051,513	1,560,407	3,220,920	10,655,245
	> 60	729,053	1,137,744	1,282,284	3,352,194	1,401,524	1,059,299	8,962,098
2010 Total		**1,081,747**	**1,414,431**	**2,770,646**	**7,920,703**	**3,093,439**	**5,646,534**	**21,927,500**
2011	≤ 40	120,949		10,393	43,618		138,492	313,452
	41 - 50	42,931	1,498	120,701	436,912	149,146	1,397,692	2,148,880
	51 - 60	267,661	353,795	1,433,297	4,422,601	1,922,343	3,779,731	12,179,428
	> 60	622,319	1,328,680	1,183,365	3,363,243	1,753,184	1,118,347	9,369,138
2011 Total		**1,053,860**	**1,683,973**	**2,747,756**	**8,266,374**	**3,824,673**	**6,434,262**	**24,010,898**
2012	≤ 40	164,801	0	94,982	57,766	4,255	169,382	491,186
	41 - 50	48,098	10,904	251,112	605,413	149,160	1,425,042	2,489,729
	51 - 60	125,235	410,434	1,459,198	5,273,129	2,180,832	4,132,362	13,581,190
	> 60	721,489	1,384,166	1,000,176	3,818,963	1,899,159	1,139,230	9,963,183
2012 Total		**1,059,623**	**1,805,504**	**2,805,468**	**9,755,271**	**4,233,406**	**6,866,016**	**26,525,288**
2013	≤ 40	114,234		220,182	100,817	3,058	141,052	579,343
	41 - 50	41,434	6,322	145,444	630,198	128,472	1,442,541	2,394,411
	51 - 60	105,792	286,984	1,512,093	5,125,023	2,094,989	4,212,556	13,337,437
	> 60	536,458	1,317,433	969,220	3,580,459	1,664,395	1,068,250	9,136,215
2013 Total		**797,918**	**1,610,739**	**2,846,939**	**9,436,497**	**3,890,914**	**6,864,399**	**25,447,406**

Source: NMFS Alaska Region RAM (Restricted Access Management) data provided by AKFIN

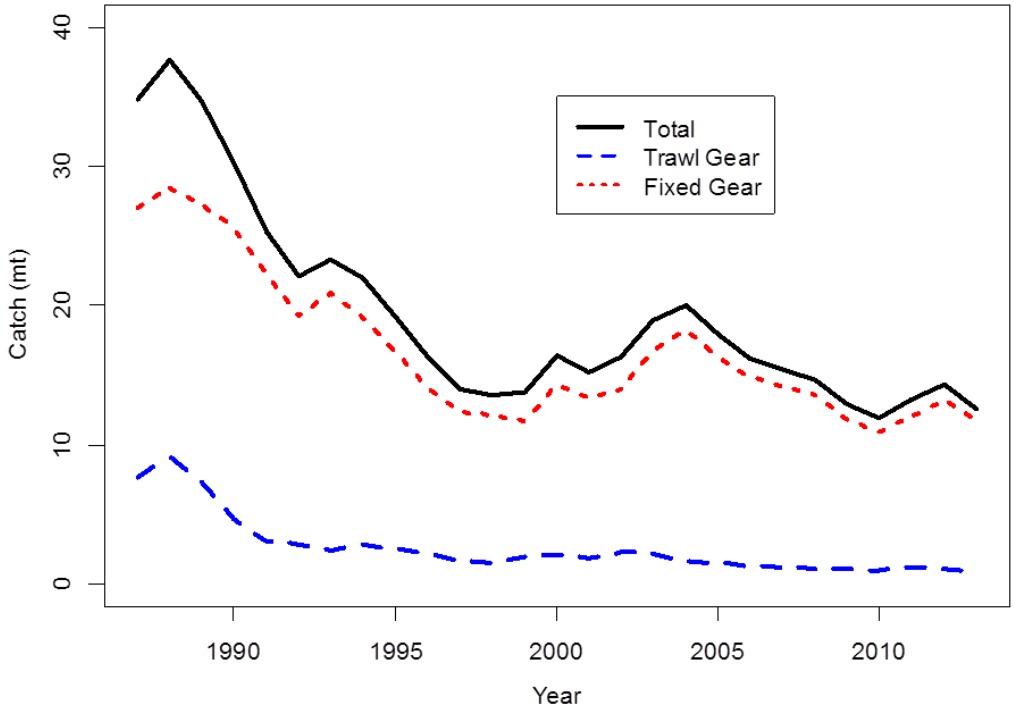
Figure 30 illustrates catch of sablefish by gear type for the GOA. The figure, taken from the 2013 GOA Groundfish SAFE Report (p.328) shows that fixed gear IFQ fishing makes up that majority of sablefish catch. A small portion of the overall GOA sablefish TAC is allocated to the trawl sector for incidental catch, which can be retained up to maximum retainable amounts (MRAs) as defined in regulation at Table 10 to Part 679.[14] Depending upon the basis species that is being targeted on a given trip, the MRA for sablefish in the GOA is 1% or 7%. The higher sablefish MRAs are set for directed fishing for flathead sole, rex sole, and rockfish.

[14] See "Gulf of Alaska Retainable Percentages" at http://alaskafisheries.noaa.gov/rr/tables/tabl10.pdf.

Table 20 provides sablefish catch information by gear type in the BS and AI areas. While not included in the regulated area for this action, BSAI gear information is included because it shows that pots can be a viable gear type for sablefish harvest. It should be noted, however, that BSAI fisheries may be prosecuted by larger vessels on average and that the bottom structure or target fishing depths may differ from some of the relevant GOA areas, particularly Southeast.

Table 20 contains all sablefish catch, and is not limited to IFQ fisheries. Since 2004, sablefish harvest with pot gear has overtaken longline (HAL) sablefish harvest in the BS, while HAL gear remains the predominant mode in AI. The same relationship between gear types holds true for BSAI sablefish harvests when looking only at IFQ catch. Five-year averages for 2009 through 2013 indicate that 87% of AI IFQ sablefish was taken with HAL gear, compared to 13% taken with pot gear. In the BS area, 35% of IFQ sablefish was taken with HAL gear and 65% was taken with pot gear. No table is shown in order to preserve confidentiality in the AI area where a confidential number of vessels fished pot gear in some years. It is not possible to differentiate between single and longline format pots in the BSAI data, as both are reported under the same gear code.

Figure 30 Sablefish catch by gear type (Figure 3.1 from the 2013 GOA Groundfish SAFE Report, p.328)



Source: Hanselman et al., in NPFMC 2013.

Table 20 Sablefish catch (mt) in the BS and AI areas by gear type. Both CDQ and non-CDQ catches are included. 2012 catch as of October 1, 2013

Aleutian Islands				
Year	Pot	Trawl	HAL Longline	Total
1991-1999	6	73	1,210	1,289
2000	103	33	913	1,049
2001	111	39	925	1,074
2002	105	39	975	1,119
2003	316	42	761	1,120
2004	384	32	539	955
2005	688	115	679	1,481
2006	458	60	614	1,132
2007	632	40	476	1,149
2008	177	76	647	900
2009	78	75	943	1,096
2010	59	74	943	1,076
2011	141	47	831	1019
2012	78	148	973	1,199
2013	12	52	764	828
Bering Sea				
1991-1999	5	189	539	733
2000	40	284	418	742
2001	106	353	405	864
2002	382	295	467	1,144
2003	355	231	413	999
2004	432	293	312	1,038
2005	590	273	202	1,064
2006	584	84	368	1,037
2007	878	92	203	1,173
2008	754	183	199	1,135
2009	557	93	240	891
2010	452	30	272	754
2011	405	44	246	695
2012	431	93	216	740
2013	331	130	139	600

Note: 1991 through 1999 catch shows an annual average.
Source: Table 3.2 in GOA Groundfish SAFE Report (p.310), Hanselman et al., in NPFMC 2013.

Figure 31 breaks down the 2013 harvest of sablefish IFQ by GOA CVs along several dimensions. Each of the five panels can be interpreted in the same manner. By way of example, the top panel for "All GOA" breaks down the total CV catch of GOA sablefish IFQ (in pounds) by placing each vessel into a quartile based on the portion of the total 2013 CV GOA sablefish IFQ taken by that vessel. Since 302 CVs recorded IFQ landings, roughly 75 vessels are in each quartile. The 75 vessels that caught the **least** sablefish are in **Quartile 1** (1^{st} to 25^{th} percentile). The 75 vessels that caught the **most** sablefish are in **Quartile 4** (76^{th} to 99^{th} percentile). Looking at Quartile 1, the length of each shaded bar (color coded by vessel length group) indicates the share of the total catch in that quartile taken by vessels in that length group, in aggregate. For example, around 30% of the catch taken by all Quartile 1 vessels (totaling 313,275 lbs.) was caught on vessels ≤ 40' LOA. Each shaded bar is labeled with the number of vessels in that size group that contributed to the catch in that quartile. In short, then length of the shaded bar should be read as 'pounds', and is not necessarily linked to the number of vessels labeled on the bar. The

graphical illustration in Figure 31 is intentionally coarse in order to preserve confidentiality where the activity of three or fewer vessels is represented by a shaded bar.

Figure 31 illustrates the following facts about GOA CV sablefish IFQ catch in 2013. Overall, vessel size and total harvest seem to be correlated, as small vessels are most represented in the lowest producing quartile (Quartile 1) and large vessels are most represented in the highest producing quartile (Quartile 4). That said, some smaller vessels were among the higher producing vessels in their area, and some large vessels produced in the lower quartile. Vessels in small size categories were more likely to be in the highest producing quartile in Southeast. Small vessel participation is most prevalent in Central GOA and Southeast. Vessels in the 51' to 60' LOA category account for the greatest amount of production, and tend to be the most numerous in each production quartile.

Figure 31 2013 GOA CV sablefish IFQ catch by harvest-per-vessel quartile, reporting the percentage of each catch quartile by vessel length group and the number of vessels of each length group in each quartile

≤ 40 ft | 41 - 50 ft | 51 - 60 ft | > 60 ft

All GOA	Cumulative Percent of Catch in Each Quartile				Total Catch (lbs.)
	0% - 25%	26% - 50%	51% - 75%	76% - 100%	
Quartile 1	19 vessels	35	15	7	313,275
Quartile 2	5	34	34	2	1,993,662
Quartile 3	19	48	8		5,207,044
Quartile 4	2	1	46	27	14,172,880

Western GOA	Cumulative Percent of Catch in Each Quartile				Total Catch (lbs.)
	0% - 25%	26% - 50%	51% - 75%	76% - 100%	
Quartile 1	1 ves.	3	5	4	104,055
Quartile 2	1	8	4		343,644
Quartile 3	2	6	5		645,834
Quartile 4	2	7	3		1,417,960

Central GOA	Cumulative Percent of Catch in Each Quartile				Total Catch (lbs.)
	0% - 25%	26% - 50%	51% - 75%	76% - 100%	
Quartile 1	10 vessels	14	10	7	88,770
Quartile 2	5	15	18	4	798,117
Quartile 3	3	31	8		2,552,812
Quartile 4	1	20	20		5,394,023

West Yakutat	Cumulative Percent of Catch in Each Quartile				Total Catch (lbs.)
	0% - 25%	26% - 50%	51% - 75%	76% - 100%	
Quartile 1	1	4 ves.	18	4	133,954
Quartile 2	23			4	450,002
Quartile 3	1	13	13		1,045,828
Quartile 4	1	14	11		2,074,832

Southeast	Cumulative Percent of Catch in Each Quartile				Total Catch (lbs.)
	0% - 25%	26% - 50%	51% - 75%	76% - 100%	
Quartile 1	8 vessels	25	12	1	348,316
Quartile 2	2	14	22	8	1,155,162
Quartile 3	1	11	28	6	2,098,076
Quartile 4	6	34	5		3,035,476

Source: NMFS Alaska Region RAM (Restricted Access Management) data provided by AKFIN

4.5.4.1 Catch Per Unit Effort

For the IFQ fisheries, catch per unit effort (CPUE) is a measure of target harvest in terms of gear deployed. CPUE is denominated in lbs./hook for HAL fishing and lbs./pot for pot fishing. CPUE is derived from observer and logbook data, and is reported in the GOA Groundfish SAFE. For HAL fishing, sablefish CPUE tends to be highest in the spring when the majority of effort occurs, around 0.8 or 0.9 lbs./hook. HAL CPUE in the summer shows greater annual fluctuation, but tends to track between spring and fall levels. HAL CPUE in the fall tends to be lower, and was most recently reported around 0.6 lbs./hook. All levels are estimated from page 277 in the 2013 GOA Groundfish SAFE (Hanselman et al., NPFMC, 2013). Table 3.9 (p.315) of the GOA Groundfish SAFE provides annual estimates and standard errors for HAL CPUE by area. Separate estimates are reported for observer data and for logbook data. Estimates derived from logbook data tend to be slightly higher. During the five year period from 2008 through 2012, observer data estimates of sablefish HAL CPUE were around 0.45 lbs./hook in WGOA, around 0.80 lbs./hook in CGOA, around 1.20 lbs./hook in WY, and around 1.00 lbs./hook in SE.

The most recent GOA Groundfish SAFE Report does not provide specific annual CPUE data for pot gear due to sparse and sometimes confidential data. The best available sablefish data are average catch rates for the BSAI during the 2006 through 2012 period, calculated based on either observer data or logbooks. For that period, the average CPUE for the BS area was around 19 lbs./pot (observer data) or 25 lbs./pot (logbook data). The average CPUE for the AI area was around 11 lbs./pot (observer data) or 26 lbs./pot (logbook data). The above estimates are taken from page 277 of the GOA Groundfish SAFE Report. These CPUE levels are not expected to be indicative of pot productivity in all GOA areas, as the BSAI likely differs in abundance, fishing depth, and environmental conditions.

4.5.4.2 Non-Target Catch in Sablefish Target Fisheries

Sablefish discards by target fisheries are available for hook-and-line gear and other gear combined (Table 21). From 1994 through 2004, discards averaged 1,357 t for the GOA and BSAI combined. Since then, discards have been lower, averaging 626 t from 2006 through 2011. The highest discard amounts occur in hook-and-line fisheries in the GOA.

Table 22 shows the bycatch of GOA FMP species in the GOA sablefish HAL target fishery. The largest bycatch is of rockfish species and halibut. Pacific cod, arrowtooth flounder, and skate species were also taken with HAL gear in notable amounts. While not a perfect analog, due to possible differences in the depth of fishing, Table 23 shows the bycatch of GOA FMP species taken with pot gear during GOA Pacific cod fishing. Note that bycatch of octopus and "other species"[15] are relatively higher, while bycatch of rockfish, skates, sharks, and halibut are either much lower or not reported at all.

Giant grenadiers make up the bulk of the non-target species bycatch, peaking at 9,315 t in 2007, but since decreasing with a 2011 catch of 6,652 t (

[15] "Other Species" includes different shark, squid, and sculpin species that are not captured in other AKFIN species groupings.

Table 24). Other non-target catches that have totals over a ton per year are corals, snails, sponges, sea stars, and miscellaneous fishes and crabs.

Prohibited species catches (PSC) in the targeted sablefish fisheries are dominated by halibut (1,060 t/year) and golden king crab (134,000 individuals/year). Halibut catches seem to be decreasing, while catches of golden king crab are highly variable from year to year, probably as a result of low sampling effort in BSAI sablefish pot fisheries.

Table 21 Discarded catches of sablefish (amount [t], percent of total catch, total catch [t]) by gear (H&L=hook & line, Other = Pot, trawl, and jig, combined for confidentiality) by FMP area for 2007-2012.

		BSAI			GOA			Combined		
Year	Gear	Discard	%Discard	Catch	Discard	%Discard	Catch	Discard	%Discard	Catch
2007	Total	70	3.0%	2,322	420	3.3%	12,693	490	3.3%	15,015
	H&L	16	2.3%	679	242	2.1%	11,586	258	2.1%	12,265
	Other	54	3.3%	1,643	178	16.1%	1,107	232	8.4%	2,749
2008	Total	98	4.8%	2,035	810	6.4%	12,591	908	6.2%	14,626
	H&L	92	10.9%	845	737	6.3%	11,727	829	6.6%	12,573
	Other	7	0.5%	1,190	72	8.4%	864	79	3.8%	2,053
2009	Total	26	1.3%	1,986	708	6.4%	10,994	733	5.6%	12,981
	H&L	18	1.5%	1,183	627	6.2%	10,106	645	5.7%	11,289
	Other	8	1.0%	803	81	9.1%	889	89	5.2%	1,692
2010	Total	42	2.3%	1,831	415	4.1%	10,089	457	3.8%	11,920
	H&L	34	2.8%	1,215	368	4.0%	9,188	402	3.9%	10,403
	Other	8	1.3%	616	48	5.3%	901	55	3.7%	1,517
2011	Total	24	1.4%	1,714	691	4.7%	14,580	715	4.4%	16,295
	H&L	16	1.5%	1,077	493	3.7%	13,315	509	3.5%	14,392
	Other	8	1.2%	637	198	15.6%	1,265	206	10.8%	1,902
2012	Total	23	1.2%	1,938	352	3.0%	11,914	375	2.7%	13,852
	H&L	12	1.0%	1,189	287	2.6%	11,054	299	2.4%	12,243
	Other	41	5.5%	749	65	7.6%	860	76	4.7%	1,610
2007-2012	Total	47	2.4%	1,971	566	4.7%	12,144	613	4.3%	14,115
Average	H&L	31	3.0%	1,031	459	4.1%	11,163	490	4.0%	12,194
	Other	21	2.2%	940	107	10.9%	981	123	6.4%	1,921

Source: NMFS Alaska Regional Office via AKFIN, November 6, 2013.

Table 22 Bycatch of FMP groundfish species in the GOA sablefish hook-and-line fishery, cumulative from 2008 through 2013

Species Name	Retained (mt)	Discarded (mt)
GOA Thornyhead Rockfish	2,040	793
Halibut	1,049	1,314
GOA Shortraker Rockfish	574	717
GOA Rougheye Rockfish	487	298
Pacific Cod	263	277
Arrowtooth Flounder	161	1,105
GOA Demersal Shelf Rockfish	63	3
Other Rockfish	59	137
GOA Skate, Longnose	38	778
GOA Skate, Other	29	795
GOA Shallow Water Flatfish	6	18
GOA Skate, Big	5	28
GOA Pelagic Shelf Rockfish	2	7
Pollock	1	9
GOA Deep Water Flatfish	1	46
GOA Dusky Rockfish	1	1
Shark	1	1,651
Other Species	< 1	289
Octopus	< 1	15
Pacific Ocean Perch	< 1	3
Northern Rockfish	< 1	< 1
Squid		< 1
Sculpin		47
GOA Rex Sole		< 1
Atka Mackerel		< 1
Flathead Sole		4

Source: NMFS AKRO Blend/Catch Accounting System via AKFIN.

Table 23 Bycatch of FMP groundfish species in the GOA Pacific cod pot fishery, cumulative from 2008 through 2013

Species Name	Retained (mt)	Discarded (mt)
Octopus	850	688
Other Species	750	534
Pollock	50	44
Sculpin	10	510
Atka Mackerel	2	117
GOA Skate, Other	2	
Squid	1	
Flathead Sole	< 1	< 1
GOA Skate, Big	< 1	< 1
GOA Shallow Water Flatfish	< 1	7
GOA Pelagic Shelf Rockfish	< 1	22
Arrowtooth Flounder	< 1	27
Other Rockfish	< 1	17
Shark	< 1	1
Pacific Ocean Perch	< 1	1
GOA Dusky Rockfish	< 1	10
Northern Rockfish	< 1	7
GOA Rougheye Rockfish	< 1	1
Sablefish	< 1	18
GOA Rex Sole	< 1	
GOA Deep Water Flatfish		< 1

Source: NMFS AKRO Blend/Catch Accounting System via AKFIN.

Table 24 Bycatch (t) of non-target species and HAPC biota in the targeted sablefish fishery, 2006 through 2011

	Estimated Catch (t)					
Group Name	2006	2007	2008	2009	2010	2011
Benthic urochordata	0.08	0.00	-	0.01	0.12	0.13
Birds	0.91	1.59	0.55	0.40	0.35	1.43
Bivalves	0	Conf.	-	0	0.00	0.06
Brittle star unidentified	0.05	0.10	0.06	0.33	0.10	0.38
Corals Bryozoans	1.57	0.16	1.56	1.62	2.45	4.90
Dark Rockfish	-	-	Conf.	0	Conf.	-
Eelpouts	1.30	2.26	9.04	1.76	1.34	0.54
Eulachon	-	0	Conf.	0	Conf.	-
Giant Grenadier	4,030	9,315	8,897	5,369	4,402	6,652
Greenlings	-	76	0.02	0.02	-	0
Grenadier	4,907	109	128	961	749	810
Hermit crab unidentified	0.05	0.05	0.07	0.09	0.19	0.21
Invertebrate unidentified	0.07	0.02	0.01	0.42	0.76	1.88
Misc. crabs	0.47	1.12	0.94	3.20	1.90	1.16
Misc. crustaceans	-	-	-	2	0.00	0.00
Misc. deep fish	0	0.00	-	0	-	0
Misc. fish	18.34	17.10	21.19	4.72	4.01	7.96
Misc. inverts (worms etc.)	0	Conf.	0	0.01	0.00	0.00
Other osmerids	-	-	Conf.	-	-	-
Pandalid shrimp	0	0.00	0.00	0.01	0.00	0.00
Polychaete unidentified	-	-	0	0.00	0.00	0.00
Scypho jellies	0.10	0.00	Conf.	0	0	1
Sea anemone unidentified	0.29	3.34	0.69	1.99	1.32	3.06
Sea pens whips	0.19	0.08	0.32	0.49	0.03	1.52
Sea star	5.23	35.29	1.56	2.45	2.53	3.24
Snails	9.41	8.09	6.43	11.22	11.56	19.70
Sponge unidentified	0.71	0.16	14.65	1.92	0.76	1.99
Urchins, dollars, cucumbers	0.15	0.14	0.48	1.03	0.55	0.24

Source: Hanselman et al., in NPFMC 2013.

Table 25 Prohibited Species Catch (PSC) estimates reported in tons for halibut and herring, thousands of animals for crab and salmon, by gear, year, and fisheries management plan (BSAI or GOA) area for the sablefish fishery. Other = Pot and trawl combined because of confidentiality.

	2008			2009			2010			2011			Average
	BSAI	GOA	Total	BSAI	GOA	Total	BSAI	GOA	Total	BSAI	GOA	Total	
Hook and Line Gear													
Bairdi Crab	0.00	0.01	0.01	0.03	0.24	0.28	0.00	0.07	0.07	0.00	0.00	0.00	0.09
Golden K. Crab	0.17	0.08	0.25	0.32	0.03	0.35	0.97	0.00	0.97	0.50	0.13	0.63	0.55
Halibut	151	953	1,104	186	1,023	1,209	220	760	980	135	813	948	1,060
Other Salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Crab	0.01	0.23	0.24	0.01	0.21	0.22	0.00	0.16	0.16	0.00	0.29	0.29	0.23
Red K. Crab	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.02	0.00	0.02	0.02
Other Gear													
Bairdi Crab	0.14	0.18	0.32	1.65	0.08	1.74	0.00	0.06	0.06	0.94	0.00	0.00	0.53
Golden K. Crab	182	0	182	139	0	139	26	0	26	191	0	191	134
Halibut	28	7	35	17	3	20	39	4	43	17	6	23	30
Herring	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Other Salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
Opilio Crab	0.25	0.00	0.25	0.01	0.10	0.11	2.15	0.03	2.18	0.33	0.00	0.33	0.72
Red K. Crab	0.42	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.41	0.21

Source: NMFS AKRO Blend/Catch Accounting System PSCNQ via AKFIN, October 12, 2012.

4.5.5 Gross Revenues and Dependency

The predominate wholesale product form for GOA sablefish is headed-and-gutted frozen fish (Economic SAFE, Figures 1.9, 1.10, and 1.11). The Economic SAFE reports species subindices for GOA ex-vessel prices and quantity (Economic SAFE, Figure 1.12). After declining since 2004, the GOA sablefish quantity index climbed back to 2008 levels from 2010 to 2012 and was level in 2013. The ex-vessel price index climbed steadily from 2004 through 2011, but has dropped sharply back to 2008 levels over the two most recent reported years. Still, the total sablefish value share of GOA ex-vessel markets remains around 50% of all groundfish species, trailed by Pacific cod and pollock. Rockfish, flatfish, and 'other' species make up smaller amounts of total ex-vessel values.

The draft of the forthcoming Economic SAFE includes the most recent available data on total ex-vessel value for sablefish HAL and trawl activity, but does not provide BSAI pot revenues due to confidentiality constraints. The report also does not estimate a value per pound, so reported ex-vessel revenues are a function of both markets and the amount of fish delivered. Nevertheless, total ex-vessel GOA sablefish HAL revenues climbed from around $79 million in 2009 to $125 million in 2011, before declining to $112 million in 2012 and further declining in 2013 (the final figure is not yet released for publication). Around 93% of ex-vessel HAL revenues accrued to the catcher vessel sector in the GOA. Total sablefish HAL ex-vessel revenues in the BSAI were lower – between $7 million and $12 million – and displayed a similar annual trend peaking in 2011. BSAI sablefish HAL ex-vessel revenues were more comparable between the CV and CP sectors, with the CV sector generating slightly more revenue in each year.[16]

Gear-specific average annual sablefish ex-vessel values paid to catcher vessels appear comparable across areas when decomposed to the GOA and BSAI levels. It is thus reasonable to presume that prices paid for pot-caught sablefish in the BSAI IFQ and CDQ fisheries are a decent indicator of what prices could be expected in a GOA pot fishery. Table 26 provides average annual sablefish ex-vessel price per pound by gear type, as provided by AKFIN and based on fish ticket data. Table 26 includes both GOA and BSAI data, and shows that HAL sablefish has fetched a higher price than fish caught with pot gear.[17] Ex-vessel prices for sablefish peaked for all gear types in 2011, and have declined since. That trend holds when looking at area-specific data, which is not shown in this document.

Table 26 Average ex-vessel value per pound of sablefish delivered, by gear type from 2009 through 2013 (includes GOA and BSAI management areas for HAL and trawl)

Year	HAL	Pot	Trawl
2009	3.11	2.84	2.05
2010	3.69	3.30	2.81
2011	4.94	4.56	4.03
2012	3.96	2.62	3.26
2013	2.79	2.47	2.34

ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

The catcher vessels that have landed IFQ sablefish between 2009 and 2013 tend to rely on GOA fixed gear activity for the majority of their gross revenues. Table 27 shows the distribution of fishing revenue

[16] Calculations are based on COAR data.
[17] A discussion paper from February 2014 that describes the GOA Pacific cod pot fishery showed that per pound ex-vessel values were lower for pot gear than for hook-and-line gear in that fishery as well. In that case, the difference was approximately three cents per pound. See Table 3-5 (p.10) of the GOA Pacific Cod Pot Sector Preliminary Data Review available as "GOA Pot Cod Participation Discussion Paper 2/14" under "Documents and Council Motions" at www.npfmc.org/goa-trawl-bycatch-management/.

sources for these vessels, broken out by vessel length group. In aggregate, GOA fishing for sablefish and halibut IFQ and fixed-gear Pacific cod accounts for 91% of the gross ex-vessel revenues for this fleet. Of note, vessels 50' LOA or less displayed very low participation in pot gear fishing for Pacific cod, which may indicate that these vessels would have to make a large investment to gear up and reconfigure their operations to fish sablefish with pots. Larger vessels in the IFQ fleet displayed a more even distribution of IFQ revenue between sablefish and halibut. The smallest vessel size group (≤ 40' LOA) derived the greatest proportion of their gross revenues from halibut. In aggregate, the recently active sablefish IFQ fleet derived 81% of gross ex-vessel revenues from fixed-gear groundfish and halibut fishing. Other fishing revenues would have been generated in fisheries for salmon, herring, or crab. The data in Table 27 comes from fish tickets, and gross revenue is estimated through AKFIN's algorithm.

The 16 CPs that were engaged in the sablefish IFQ fishery from 2009 through 2013 derived the majority of their total gross revenue from Pacific cod HAL fisheries in the BSAI. Looking at only GOA activity, though, these CPs generated significantly more revenue from sablefish IFQ fishing than from either halibut IFQ or Pacific cod HAL fishing. IFQ CPs did not fish with pot gear in any area.

Vessels that fish sablefish IFQ typically also fish halibut IFQ. Over the last five years, the number of vessels participating in both IFQ fisheries has been between 320 and 340.

Table 28 shows gross ex-vessel sablefish IFQ revenues for catcher vessels while fishing in GOA areas. These data pull only from those individuals who held a CFEC permit to target sablefish, so any revenue from the marketing of incidental sablefish catch in other fisheries is excluded. Vessels in the 51' to 60' LOA category consistently generated the greatest gross revenues of any length group.

Table 27 Distribution of gross ex-vessel revenues for catcher vessels that fished sablefish IFQ, by vessel size, 2009 through 2013

	≤ 40	**41 - 50**	**51 - 60**	**> 60**	**Aggregate**
GOA Sablefish IFQ	19%	32%	44%	42%	41%
GOA Halibut IFQ	63%	59%	42%	43%	45%
GOA PCod (HAL)	6%	6%	1%	1%	2%
GOA PCod (POT)		< 1%	4%	3%	3%
GOA Subtotal	*88%*	*97%*	*91%*	*89%*	*91%*
BSAI Sablefish IFQ	6%	1%	1%	1%	1%
BSAI Halibut IFQ	6%	2%	6%	9%	6%
BSAI PCod (HAL)	< 1%	1%	< 1%	< 1%	< 1%
BSAI PCod (POT)			2%	1%	1%
BSAI Subtotal	*12%*	*3%*	*9%*	*11%*	*9%*
% Total Gross Rev.	***83%***	***78%***	***75%***	***95%***	***81%***

Source: ADFG/CFEC Fish Tickets and AFSC Gross Revenue Procedure compiled by AKFIN

Table 28 Annual sablefish IFQ ex-vessel revenue for catcher vessels fishing in GOA areas, by vessel length group (2009 through 2013)

YEAR	LENGTH	Ex-Vessel Revenue ($)
2009	≤ 40	570,148
	41 - 50	5,191,084
	51 - 60	32,910,492
	> 60	19,935,603
2009 Total		58,607,327
2010	≤ 40	873,104
	41 - 50	5,976,389
	51 - 60	36,735,890
	> 60	22,382,223
2010 Total		65,967,607
2011	≤ 40	657,839
	41 - 50	9,249,456
	51 - 60	55,787,678
	> 60	31,349,786
2011 Total		97,044,759
2012	≤ 40	934,297
	41 - 50	8,876,651
	51 - 60	50,249,538
	> 60	27,874,942
2012 Total		87,935,428
2013	≤ 40	1,078,845
	41 - 50	5,822,278
	51 - 60	35,236,693
	> 60	17,940,027
2013 Total		60,077,843

Source: ADFG/CFEC Fish Tickets and AFSC Gross Revenue Procedure compiled by AKFIN

4.5.6 Individual Harvesters and Crew

Sablefish IFQ holdings consolidated rapidly after program implementation in 1995, resulting in greater per capita quota holdings distributed among fewer individuals. The rate of consolidation in the fishery has slowed, but further consolidation would be a threat to employment opportunities and the stability of communities that rely on a robust and diverse homeport fleet. Consolidation in the IFQ program is capped in regulation by QS use caps (limiting individual holdings of quota shares) and vessel IFQ caps (limiting the amount of sablefish that can be harvested by a given vessel in a year), however there is still room for consolidation between the present state of the fishery and the limits listed in Table 30.

Table 29 shows the number of unique sablefish IFQ holders in each management area for the first year of the program in 1995 and the current year, noting that some individuals hold QS in multiple areas. While the number of QS holders has decreased over the course of the program, average QS holdings per individual have increased (those figures are adjusted to IFQ pounds using the QS:IFQ ratios for 1995 and 2014). The fact that average QS and IFQ pounds are significantly higher than the median values indicates that individuals in the top percentiles of the ownership distribution hold large amounts relative to individuals in the middle and lower end of the population of QS holders.

Table 29 Sablefish quota share (QS) holdings and IFQ pounds, at initial issuance (1995) and in 2014

		Area					
	Year	WG	CG	WY	SE	BS	AI
QS Holders	1995	234	645	457	715	145	135
	2014	159	363	232	392	100	89
Avg. QS	1995	154,215	172,937	117,003	93,145	128,460	233,468
Units	2014	226,601	307,677	229,597	168,675	187,653	358,792
Median QS	1995	39,938	35,051	30,546	34,535	45,861	63,327
Units	2014	94,473	109,941	88,793	103,041	76,623	93,294
Avg. QS	1995	18,950	23,661	18,194	17,651	11,060	21,828
Pounds	2014	16,417	22,744	14,206	15,157	11,817	26,901
Median QS	1995	4,908	4,796	4,750	6,544	3,948	5,921
Pounds	2014	6,844	8,127	5,494	9,259	4,825	6,995

Source: NMFS RAM

Table 31 shows the distribution of individual QS holdings as reported by NMFS RAM for 2014.[18] Note that a non-trivial portion of individuals hold QS amounts that, when converted to annual IFQ pounds, would not be sufficient to support a viable operation. These QS holders are likely among those who stack multiple holdings on a single vessel, or "walk on" to another vessel where their IFQ can be fished along with other IFQ. The stacking of IFQ is evidenced by the fact that there are more QS holding individuals (shown in the highlighted row of Table 31) than there are active vessels in the fishery (see Table 12). While stacking of IFQ is permitted and can be essential to viable fishing of small holdings, actions that have the unintended consequence of promoting further stacking can create adverse socioeconomic impacts; this potential impact is discussed qualitatively in the analysis of impacts (Section 4.7).

Table 30 Sablefish quota share (QS) use caps, vessel IFQ caps, and annual TAC for 2013 and 2014

QS Use Caps (Ownership)	2013	2014	Units
1% of SE Quota Share Pool*	688,485	688,485	QS
1% of all sablefish QSP	3,229,721	3,229,721	QS

Vessel IFQ Caps	2013	2014	Units
1% of SE sablefish IFQ TAC	70,327	59,414	round lbs.
1% of all sablefish IFQ TAC	280,139	236,796	round lbs.

Annual Sablefish IFQ TAC	2013	2014	Units
Southeast	7,032,674	5,941,397	round lbs.
All Areas (includes BS & AI)	28,013,851	23,679,609	round lbs.

* Based on 1996 quota share pool
Source: NMFS RAM

[18] Sablefish IFQ QS is issued in three vessel categories (A, B, and C). Category A QS is for use on vessels that process at sea. Category B QS is for use on vessels that do not process at sea (CVs) and are greater than 60' LOA. Category C QS is for use on CVs that are 60' LOA or less.

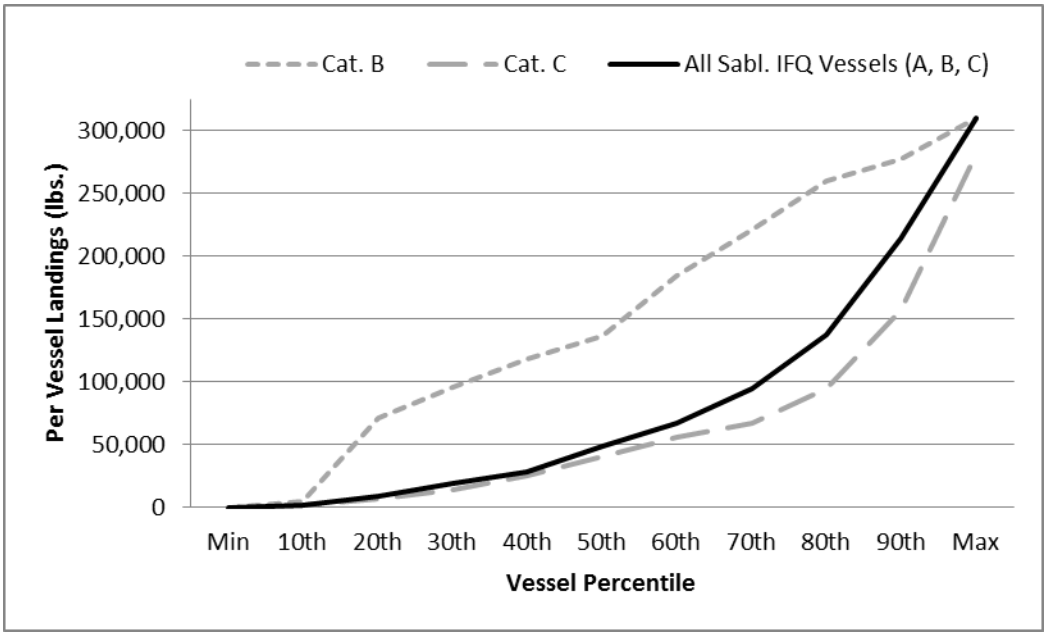
Table 31 2014 number of individuals holding GOA sablefish QS and QS ownership amounts (at selected percentiles) for each vessel category (A, B, C) in each GOA area. Holdings are **denominated in 2014 IFQ pounds**.

		WG			CG			WY			SE		
	Vessel Category	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
	# QS Holders	35	79	64	45	155	210	29	102	131	36	82	302
Percentile	10th	741	22	12	1,041	269	31	184	533	12	2,067	69	63
	20th	1,881	284	46	2,429	2,817	212	684	2,477	220	3,312	1,249	1,600
	30th	5,504	2,991	367	6,964	4,781	887	1,574	3,820	1,432	4,808	2,708	3,655
	40th	7,982	5,311	1,712	9,000	7,679	2,668	2,916	6,040	2,804	6,653	4,705	5,685
	50th	9,674	7,092	4,130	11,940	11,378	5,118	4,950	9,588	4,353	9,302	6,946	8,217
	60th	22,543	9,257	5,087	18,728	21,859	8,009	6,783	17,024	5,287	10,428	12,693	12,091
	70th	26,157	13,734	7,357	31,738	30,275	14,548	8,453	28,046	7,220	11,069	17,149	17,963
	80th	42,821	21,778	11,798	48,124	42,546	26,832	15,087	35,662	12,366	19,082	23,839	24,027
	90th	98,185	36,055	20,154	80,033	67,297	40,760	23,315	51,454	24,562	35,364	41,230	36,513
	Max	143,489	86,859	68,233	134,502	185,967	116,573	58,910	106,209	52,411	128,048	116,231	75,962

Source: NMFS RAM

Figure 32 illustrates the distribution of sablefish landings per vessel in 2013, for comparison to the vessel IFQ cap listed in Table 30, above. Landings are aggregated across all IFQ management areas (GOA and BSAI), since the larger of the two vessel caps is applied to landings in all areas. The figure suggests that while some vessels harvested up to the cap level[19], most could accommodate additional IFQ pounds leased from other QS holders or fished by a QS holder who "walks on" to another vessel instead of fishing from his or her own platform. Relatively fewer vessels fishing Category C QS were close to the cap level in 2013. Table 32 shows the IFQ landings (in round pounds) of vessels at each decile marker. Of the vessels whose landings ranked above the 90th percentile, three were CPs, 17 were CVs greater than 60' LOA, and 13 were CVs less than or equal to 60' LOA.

Figure 32 2013 per-vessel landings of sablefish IFQ (round lbs.) across all areas



Source: NMFS Alaska Region RAM (Restricted Access Management) data provided by AKFIN

[19] A small number of vessels fished above the vessel IFQ cap as a result of a grandfather provision for individuals whose initial QS allocations exceeded the established cap. Similar cases are also apparent when examining 2013 landings by vessel for the Southeast management area, where a separate vessel IFQ cap is also applied.

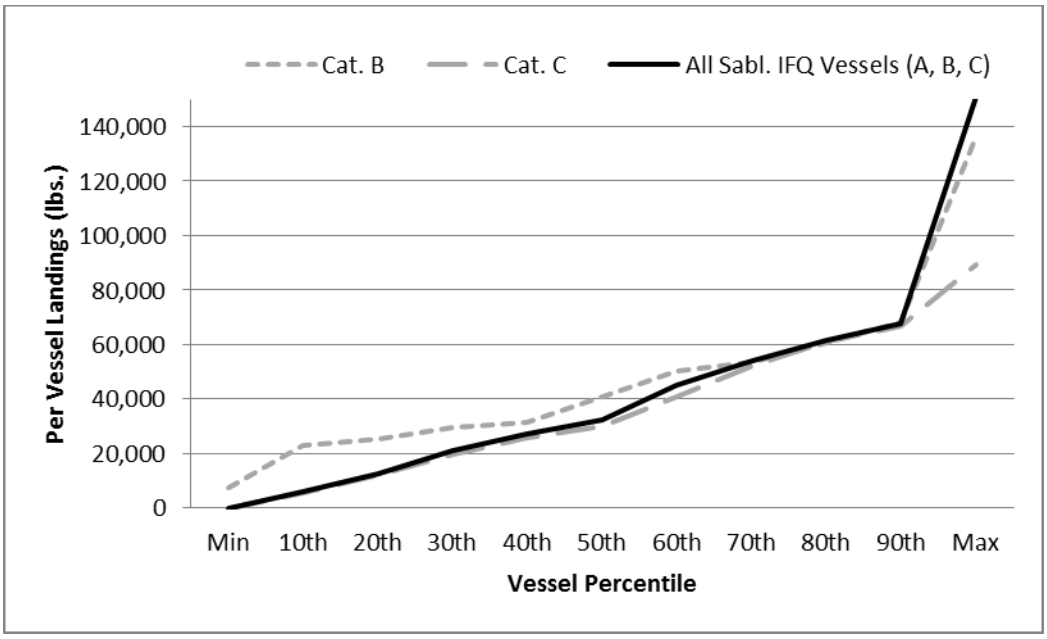
Table 32 2013 vessel counts and distribution of landings by vessel (2013 IFQ lbs.)

	Vessel Category (Vessel Group)	A (CP)	B (CV > 60' LOA)	C (CV ≤ 60' LOA)	All Vessels
	Vessel Count	7	53	268	328
Percentile	10th	Conf.	4,792	1,361	1,849
	20th	Conf.	70,729	7,374	8,493
	30th	Conf.	96,015	14,190	19,338
	40th	Conf.	118,566	25,399	28,597
	50th	Conf.	136,657	40,887	48,654
	60th	Conf.	184,623	56,036	66,745
	70th	Conf.	220,719	66,936	94,279
	80th	Conf.	260,362	94,685	137,204
	90th	Conf.	277,187	156,611	214,101

Source: NMFS Alaska Region RAM (Restricted Access Management) data provided by AKFIN

Figure 33 shows the distribution of 2013 sablefish IFQ catch in the Southeast management area, where a vessel IFQ cap of around 70,000 round lbs. applied. Vessels reporting catch above that cap were able to do so because of grandfather provisions based on the QS holders' initial program allocations. Category B and C vessels around the 80th percentile for 2013 landings recorded roughly 60,000 lbs. of SE sablefish catch, and vessels around the 90th percentile were just below the vessel cap. Of 186 total active SE vessels, only three fished Category A QS (processed at sea). Roughly 88% of SE sablefish IFQ vessels active in 2013 fished Category C QS.

Figure 33 2013 per-vessel landings of sablefish IFQ (round lbs.) in SE area



Source: NMFS Alaska Region RAM (Restricted Access Management) data provided by AKFIN

Eligibility to receive CV QS by transfer is generally restricted to those persons who received QS by initial issuance and those individuals who can demonstrate that they have served as a member of the harvesting crew in any U.S. fishery for at least 150 days. One exception to the eligibility criteria is eligible non-

profits representing GOA communities approved under community protection measures in the IFQ Program (Community Quota Entities). Non-initial recipients that meet the 150 days sea time requirement are designated as "IFQ Crewmembers" and, upon approval, NMFS/RAM issues them a Transfer Eligibility Certificate (TEC).

Table 33 displays the number of TECs issued, by residency, to IFQ crewmembers since the program began. The table also shows how many of those IFQ crewmembers were holding QS as of November 2014.

Table 33 Summary of Transfer Eligibility Certificate (TEC) issuance 1994–2014 and crewmembers holding QS at year-end 2012

Residency	Crewmember[a] TECs issued 1994 Nov. 2014	Crewmembers[a] holding QS/IFQ, Nov. 2014
Alaskan[b]	2,455	877
Non-Alaskan[b]	1,115	312
Total[c]	*3,570*	*1,189*

[a] An "IFQ Crewmember" is an individual who did not receive QS/IFQ by initial issuance but who applied for and was issued a TEC.
[b] "Alaskan" and "Non-Alaskan" are premised on the applicant's most recently self-reported address; NMFS/RAM makes no effort to verify a person's state of legal residence.
[c] Persons without known addresses are excluded from this table.
Source: http://www.alaskafisheries.noaa.gov/ram/daily/ifqcrew.pdf

The impacts section of this RIR will discuss whether or not the considered alternatives might affect the number of crew jobs available in the fishery. For background, the analysts looked at self-reported crew information found on ADF&G fish tickets during the most recent five years of complete data (2009 through 2013).[20] Table 34 shows average, minimum, and maximum crew sizes reported for fixed-gear vessels of different size groups that fished for Pacific cod in the GOA and BSAI areas. Pacific cod data was used in order to make a comparison between pot and hook-and-line CV operations in the GOA. No such comparison could be made for historical sablefish data, since no pot gear was used in the GOA. The table does not indicate a systematic difference in crew size for vessels using pot and HAL gear. Variance was greater in the underlying data for HAL crew sizes, but the number of observations was also greater.

Table 34 Crew size by vessel size group for GOA and BSAI fixed-gear cod catcher vessels, 2009 through 2013

	≤ 40						41 - 50						51 - 60						> 60					
	HAL			POT			HAL			POT			HAL			POT			HAL			POT		
Year	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
2009	3	1	4	3	3	4	3	1	9	3	2	4	4	2	7	4	1	6	5	2	6	5	3	7
2010	3	1	4	3	2	3	3	1	4	3	2	4	4	2	8	4	2	6	5	3	6	5	3	7
2011	3	1	4	3	2	4	3	1	5	3	2	5	4	2	6	4	1	6	6	3	7	5	3	7
2012	3	1	5	3	2	4	3	1	5	3	2	5	4	2	6	4	2	6	5	3	7	5	3	9
2013	3	1	4	3	2	5	3	1	5	3	2	5	4	1	6	4	1	6	5	3	7	5	3	8

Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

[20] Information on the number of crew operating a vessel is also collected by observers. Though it is self-reported, the analysts chose to use fish ticket data because observer coverage only covers a subset of the relevant IFQ fleet. AKFIN provided the fish ticket crew data, and advised that data quality should be considered sufficiently accurate, noting that in the BSAI crab fishery an EDR field for the number of crew had been removed from the final version of the form because that information was already provided on fish tickets.

4.5.7 Communities

One of the principal objectives for regulation of the sablefish IFQ fishery is to maintain the economic viability of small communities that are heavily dependent on fishing as a source of income.

In the 1980s, the domestic sablefish fishery, particularly in the Eastern GOA, had used traditional hook-and-line longline gear. Sablefish fishing constitutes an important groundfish fishery to the residents of Southeast Alaska. Sablefish is one of the major fisheries, aside from salmon and Pacific halibut, in both the harvesting and processing sectors, from which residents derive a substantial share of their income. The allowance of a new gear type triggers concern about potential adverse effects on small, reliant communities.

The Alaska Fisheries Science Center's Economic and Social Sciences Research Program has developed a set of fisheries engagement and reliance indices using fishery and secondary data for communities that are involved in commercial harvesting and processing of GOA IFQ sablefish (Kasperski and Himes-Cornell, 2014). AFSC's indices provide a novel way to measure both engagement in and reliance upon the GOA sablefish IFQ fishery, and are an improvement upon the simple reporting of QS ownership and deliveries by locality. Engagement represents the scale of the industry in the community, while reliance represents the importance of the industry in terms of engagement per resident.[21] Separating harvesting and processing indicators allows for the inclusion of communities that have a large number (or per capita share) of IFQ QS holders, but do not receive a large amount of GOA sablefish IFQ landings. Developing indices allows for the assimilation of large amounts of information from correlated variables, and is an alternative to the time-intensive and costly method of collecting primary data through in-person interviews.

Data were collected from state and federal sources for 261 communities throughout the U.S. and Canada, including 62 communities from Alaska, 95 from Washington, 34 from Oregon, 13 from California, 2 from Canada, 55 other communities in the U.S. Virgin Islands, Hawaii, and the continental U.S. Communities were selected for inclusion in the study population if commercial GOA sablefish IFQ landings were made in the community, if the owner of a vessel that fished in the GOA sablefish fishery resides in the community, or if a GOA sablefish IFQ QS holder resides in the community.

The commercial processing category includes the amount of commercial landings, commercial revenue, the number of delivering vessels, the number of individuals making deliveries, and the number of registered buyers in each community. The commercial harvesting category includes the amount of GOA sablefish IFQ QS held by residents, the number of QS holders, the number of vessels owned by residents that had commercial GOA sablefish IFQ landings, the number of residents that had commercial GOA sablefish IFQ deliveries, commercial landings by vessels owned by residents, and commercial revenue from vessels owned by residents in each community.

Communities are defined as being "not engaged" in the GOA sablefish IFQ fishery if they had only zero-values for the included variables, "moderately engaged" if they had an index score between -1/+1 standard deviation from the mean, and "highly engaged" if they had an index scores that is +1 standard deviation above the mean index score.

[21] The authors of the index study acknowledge that population size has a strong effect on indicators measuring fishery reliance.

Table 35 lists all communities that are defined as "high" engagement or reliance for either the processing or harvesting index.[22] Of the 261 communities included in AFSC's analysis, only Seward has a total index score of 4 (out of 4 possible). Kodiak, Petersburg, and Sitka have a total index score of 3. Eight communities have a total index score of 2. Twelve communities have a total index score of 1. The other 238 communities have a total index score of zero. The three communities with a total index score of 3 (Kodiak, Petersburg, and Sitka) all rank highly for commercial processing engagement, commercial harvesting engagement, and commercial harvesting reliance. Six communities rank highly in both commercial processing engagement and commercial harvesting engagement: Seward, Kodiak, Petersburg, Sitka, Homes, and Juneau. Three communities, Seward, Elfin Cove, and Port Alexander, all rank highly in both the commercial processing reliance and commercial harvesting reliance.

Appendix 4 contains maps showing community engagement and reliance upon the GOA sablefish IFQ fishery. That Appendix also contains a table showing the factors considered in each index, the relative weighting, and the amount of variance in the dependent engagement/reliance index captured in the included factors.

[22] Principal components analyses were conducted for each category to determine a community's relative engagement and relative reliance for each category. Principal components analysis, a variable reduction strategy, separates a large number of correlated variables into a set of fewer, linearly independent components. These components are used to create quantitative indices that bring together information from several variables that can help represent specific concepts of fisheries involvement. Four principal components analyses are included in this study to create four indices of fisheries involvement for each community: commercial processing engagement, commercial processing reliance, commercial harvesting engagement, and commercial harvesting reliance. All results presented involve a varimax rotation of the factor loadings, Kaiser normalization, keeping only the components with eigenvalues greater than 1, and have a theta reliability score above 0.95. Component scores for each community were created for each component of vulnerability using the regression method by summing the standardized coefficient score multiplied by the included variables (Kasperski and Himes-Cornell, 2014).

Table 35 Community engagement and reliance indices of fisheries involvement for all communities that are considered "high engagement/reliance" for at least one index

Community	Population	Commercial Processing Engagement	Commercial Harvesting Engagement	Commercial Processing Reliance	Commercial Harvesting Reliance	Total
Seward, Alaska	2,693	1	1	1	1	4
Kodiak, Alaska	6,130	1	1	0	1	3
Petersburg, Alaska	2,948	1	1	0	1	3
Sitka, Alaska	8,881	1	1	0	1	3
Elfin Cove, Alaska	20	0	0	1	1	2
Homer, Alaska	5,003	1	1	0	0	2
Hoonah, Alaska	760	1	0	1	0	2
Juneau, Alaska	31,275	1	1	0	0	2
King Cove, Alaska	938	1	0	1	0	2
Port Alexander, Alaska	52	0	0	1	1	2
Sand Point, Alaska	976	1	0	1	0	2
Yakutat, Alaska	662	1	0	1	0	2
Addy, Washington	268	0	0	0	1	1
Akhiok, Alaska	71	0	0	1	0	1
Bellingham, Washington	80,885	1	0	0	0	1
Chicken, Alaska	7	0	0	0	1	1
Cordova, Alaska	2,239	1	0	0	0	1
Unalaska, Alaska	4,376	1	0	0	0	1
Excursion Inlet, Alaska	12	0	0	1	0	1
False Pass, Alaska	35	0	0	1	0	1
Pelican, Alaska	88	0	0	0	1	1
Seattle, Washington	608,660	0	1	0	0	1
Seldovia, Alaska	255	0	0	0	1	1

Source: Kasperski & Himes-Cornell, 2014

4.6 Analysis of Impacts: Alternative 1, No Action (Status Quo)

Selecting the No Action Alternative would leave in place the gear restriction that prohibits the use of pot gear (in any format) to harvest sablefish IFQ in GOA management areas. Hook-and-line (HAL) longline would remain the only legal gear type for the GOA directed sablefish fishery.

Gear restrictions are currently used as a management tool in selected GOA areas. For example, pot gear (single and longline) is currently prohibited in the sablefish IFQ fishery in all GOA areas. Gear restrictions have been used to protect the directed fishery resource, to reduce the magnitude of incidental catch, and to disperse effort geographically.

As described in the analysis for Amendment 14 – which applied to only a portion of the entire GOA area that is considered in this action – gear conflicts between pot vessels and HAL vessels occurred in the mid-1980s. When longline gear, which is relatively lightweight, becomes entangled with heavier pot gear, the longline parts and causes the loss of some (or all) of the gear. Gear conflicts were considered likely occur between those two gear types in the Eastern GOA since sablefish fishing is spatially concentrated along the narrow shelf edge. The presence of just one or two pot vessels was anticipated to effectively preempt the grounds to HAL gear, forcing HAL fishermen to move in order to avoid gear loss. Pots lost or stored on fishing grounds were anticipated to contribute to this problem.[23]

The analysis for Amendment 14 noted a strong case for mitigating economic instability in Southeast Alaska communities that rely on the sablefish IFQ fishery. Prior to implementation of the pot prohibition in 1985, Southeast Alaska residents derived substantial income and employment in this fishery. While the fishery was also important to residents of other states, the catches of non-residents were at the level of one-fourth to one-third of the total sablefish harvest in 1984. Still, most non-resident longline fishermen delivered their catch for processing in Southeast Alaska. This is generally still true today.

In the 1980s, all of the pot gear sablefish catch in the EGOA was taken by non-residents. The Council considered and rejected alternatives that would have prohibited pots in each of the GOA subareas (east of 147° W. longitude, east of 159° W. longitude, and east of 170° W. longitude). That analysis noted that such a designation would have required vessels from out of state to travel farther to fish in the Central GOA and Western GOA than they if the Eastern GOA were available to them. The possibility of differences in catch rates between the areas, which could affect the cost of operation (positive or negative) of pot vessels, was noted.[24]

Ultimately, the Council's preferred alternative under Amendment 14 identified a HAL-only area east of 147° W. longitude, with 5 percent of OY reserved for a trawl bycatch. Area-by-area distributions of the OY in the Central GOA (147° to 159° W. longitude) and Western GOA (159° to 170° W. longitude) were allocated in the following percentages: 55 percent to HAL fleet, 25 percent to pot fleet, and 20 percent to trawl fleet. The sablefish pot fishery was phased out in the Central and Western GOA over one- and three-year periods, respectively. As the pot fisheries were phased out, that portion of available harvest was allocated to the HAL fleet.

[23] In speaking to participants engaged in the sablefish IFQ fishery in the SE management area of the GOA, the analysts were informed that removal of lost pot gear took years to complete following the implementation of Amendment 14. By contrast, members of the Sablefish Gear Committee commented that conflicts with lost and stored pot gear in the BS and AI areas have not been an onerous burden, perhaps because of the different physical nature of the fishing grounds in those areas, or because of the smaller number of vessels fishing in those areas. With caution, it is assumed that gear conflicts would be a greater impediment to fishing in the eastern areas of the GOA.

[24] The analysis for Amendment 14 was complicated by issues related to the Americanization of the sablefish fishery, and to overcapacity by an influx of new entrants to the fishery who were using new gear types in this fishery, leading to shorter seasons. The Council also considered and rejected designating pot only areas in the GOA and setting a ceiling on the number of vessels harvesting sablefish (by gear type) and a license limitation or comprehensive effort management program. Those issues were addressed separately under Amendment 23, which created the sablefish (and then the Pacific halibut) IFQ program.

Today, trawl gear is not permitted in the Eastern GOA (West Yakutat and Southeast Outside districts), and directed sablefish IFQ fishing is restricted to HAL longline gear. Trawl gear is permitted in the Central and Western GOA areas, but sablefish is not a directed trawl fishery (in other words, a portion of the GOA sablefish TAC is set aside for the trawl sector to take as incidental bycatch, and retention during a given trip is limited by an MRA).

HAL sablefish effort is limited by IFQ, derived annually from individual quota share (QS) holdings, and in most cases the IFQ holder must be on board the harvesting vessel. There are no limits on the amount of hooks that a vessel can deploy in a longline format. Halibut may be retained by HAL operators targeting sablefish, so long as they possess the halibut IFQs necessary to cover the catch, though the two species are typically found at different fishing depths. The amount of halibut retained in the GOA sablefish IFQ fishery (with HAL gear) during recent years is shown in Table 22.

4.6.1 Effects of Whale Depredation

Depredation on sablefish HAL sets is known to occur in the BSAI and GOA IFQ fisheries. Killer whale interactions are most common in the western parts of the GOA and the BSAI, while sperm whale interactions are most common in the central and eastern parts of the GOA. Section 3.4.1.1 provides the most recent available information on whale depredation in this fishery, and Figure 17 shows a map of depredation by the two predominant whale species on longline surveys. While depredation events are difficult to observe, fishery participants have testified that depredation continues to be a major cost to the sablefish IFQ fishery. Industry groups have made tested gear modifications to limit the impact of whale depredation on HAL catch per unit effort (CPUE), and have reported those efforts to the Sablefish Gear Committee. Nevertheless, depredation continues to be a challenge that can force fishermen to endure lost catch, spend time waiting out whales in the area before hauling gear, or spend time a fuel relocating to avoid whales (Peterson and Carothers, 2013). Measures taken to avoid depredation reduce fishing efficiency through variable operational costs (fuel, labor) and through the opportunity cost of time lost that would have been available for additional fishing effort or dedicated to other fishing and non-fishing activities. Fishermen operating in the Western GOA and the BSAI reported waiting on average at least 12 hours and/or steaming in excess of 25 nm to avoid depredating killer whales (*Ibid.*).

Because the sablefish IFQ fishery is quota-based, the key cost of depredation to fishermen is the cost of the additional time and bait required to catch the same amount of fish. Gear damage from depredation is also a direct cost. In a study conducted with six longline vessels operating in the Western GOA and BSAI areas during 2011 and 2012, killer whale depredation resulted in an estimated additional $980 per vessel-day for additional fuel, crew food and the opportunity cost of lost time. Based on data from the observed commercial fishery, the additional costs associated with catching the same amount of sablefish on killer whale depredated sets was estimated to be approximately $433 ± 147 per set for additional fuel alone (not including additional crew, bait or opportunity costs) (Peterson et al. 2013). The estimated reduction in CPUE for depredated sets in that area ranged between 35% to 69% for observed sets during the time period from 1998 through 2012 (Peterson et al. 2014). Estimated fuel costs associated with those sets were 82% higher. The study published in 2014 estimated opportunity costs of time lost to fishing at $522 per vessel-day[25].

4.6.2 Use of Pot Gear in BSAI Areas

Pot gear is currently permitted for the sablefish IFQ fishery in the BS and AI areas. Pots are typically deployed in a longline format, which reduces the likelihood of lost gear and is said to reduce the amount of fishing grounds preempted. Though it is not required under current regulation, it was reported by the Gear Committee and the USCG that marking both ends of the pot longline string is the prevailing industry

[25] This study also examined the impacts of killer whale depredation on trips targeting halibut and Greenland turbot.

practice. Use of neutrally buoyant groundline is also reported to be commonplace. Fishing gear is expensive to purchase and replace, so participants have an internal incentive to incur small additional costs in order to reduce the likelihood of gear conflicts, or increased chances of gear retrieval in the case of a hang-up. Moreover, fishermen often operate in proximity to one another over many fishing days and seasons, so avoidance of conflict between individuals has both a private and a social benefit. A study of pot use in all BSAI fisheries, covering 1999 through 2005, showed that soak times – the amount of time that gear is left baited on the grounds before retrieval – was typically on the order of one to three days. Ninety percent of pots were soaked for seven or fewer days (Figure 8).

Use of pot gear in areas where it is permitted has increased in recent years, at least in part due to depredation concerns (see

Table 20). In 2007, pot gear accounted for 81% of the BS fixed gear IFQ catch and 56% of the AI catch. Since then, the number of sets recorded in logbooks as having used pot gear has continued to increase in the BS and has remained consistent in the AI. The average number of pots used in each longline set was 78, though it is relevant to note that the vessels fishing in those areas are typically larger than the vessels that fish sablefish IFQ in some areas of the Eastern GOA.

4.6.3 Existing Management and Regulation Applicable to Pot Gear

Gear Retrieval and Gear Marking

Current (status quo) regulations allow for gear to be left on the fishing grounds. However, fish caught in that gear would be required to be discarded if the gear is hauled after the fishery has been changed to closed or non-retention status. Exemptions from any existing gear removal requirements on account of vessel safety concerns are already addressed in the GOA Groundfish FMP (Section 3.8.2.3 – Vessel Safety). The aforementioned requirement to discard fish if the status of the fishery has changed during the time of the issue may not apply in a vessel safety case. The status quo is reflected in the staff's suggested revision of Alternative 2 for this action, as described in Sections 2.2 and 4.3.

Buoys that mark fixed gear must display either the vessel's ADF&G number or the IFQ permit holder's FFP number.

Gear Storage

The State of Alaska has existing regulations that allow pot gear to be stored in state waters in the GOA area, though obviously those pots have not been used for sablefish IFQ fishing. The owner or operator of a vessel that is registered for a state-waters Pacific cod season may store pots in water less than a certain depth (typically 25 fathoms) in designated areas in Prince William Sound, Cook Inlet, Kodiak, Chignik, South Alaska Peninsula, and BSAI areas[26]. Permission to store pots in these areas only applies to a certain number of days before and after the opening/closure of a specified state-waters fishery. State of Alaska regulations do not permit pot storage in SE Alaska, and action by the Board of Fisheries would be required to allow it.

Vessel Safety

The following describes only a few of the existing safety measures that apply to commercial fishing vessels in the GOA, as informed by fishery representatives of the U.S. Coast Guard (USCG).

Commercial vessels that are greater than 79' LOA must have a "stability book", developed by a naval architect or another qualified individual, detailing the various loading conditions and capacities that pertain to that vessel. The USCG may conduct dockside exams to check that these larger vessels have documentation that stability tests were completed. Stability tests are reported to cost upwards of $5,000, and may vary depending upon the provider. Based on information reported in Section 4.5.2 of this analysis, most of the vessels that would be regulated by this considered action are below the size class that would require a stability report and instructions.

All commercial vessels are subject to stability standards stating that vessels may not have instability resulting from overloading, improper loading, or lack of freeboard. A vessel's voyage may be terminated if any of those improprieties are found, before or after leaving port. A vessel with less than 6' of freeboard amidships may be considered to be operating in an especially hazardous condition, and would not be allowed to leave port.

[26] See State of Alaska regulations at: 5 AAC 28.232, 28.332, 28.432, 28.532, 28.571, and 28.632.

4.7 Analysis of Impacts: Alternative 2

Alternative 2 would allow the use of pot gear in a longline format for sablefish IFQ fishing in the GOA. The use of pot longlines in the GOA sablefish IFQ fishery would be consistent with the allowance of pot gear in the BSAI sablefish IFQ fisheries.[27] The action alternative includes four elements. Elements 1 through 3 would further regulate the use of pot longline gear by limiting pots in number (pot limit), in operational manner (gear retrieval), or by requiring certain gear specifications (neutrally buoyant groundline, marking at both ends of a set). Element 4 would increase operational efficiency within the IFQ fishery by allowing sablefish pot fishermen to retain halibut, as they may when using HAL gear, subject to restriction.

The purpose and need statement for this action, provided in Section 4.2, outlines three first-order considerations for weighing the action alternative against the status quo (Alternative 1). First, the Council is seeking an alternative that would mitigate the reduced CPUE and increased fishing costs (direct and indirect) that are attributed in part to whale depredation off of HAL gear. Second, the Council acknowledges that depredation off of HAL gear constitutes unaccounted mortality in the sablefish stock. Mortality from whale depredation is a direct negative impact on the sablefish stock, but the inability to account for this mortality (assumed to be greater than natural sablefish mortality due to whale predation) increases uncertainty in the sablefish abundance indices that are critical to sound management. Third, the Council is seeking an alternative that would provide continued, equitable fishing opportunities for harvesters who do not choose to switch to pot gear, minimizing the likelihood and severity of excessive grounds preemption, gear conflicts, and consolidation in the GOA sablefish IFQ fleet.

Many GOA communities, especially those listed in Table 35 as highly engaged in or reliant upon the regulated fishery, depend upon the continued presence of a robust and diverse sablefish fleet. The list of highly engaged and reliant communities in Table 35 covers all four GOA areas that are potentially regulated by this action (Western GOA, Central GOA, West Yakutat, Southeast). Those communities are flagged for a variety of reasons, including the presence of sablefish processors, being home and service ports for sablefish harvesters, and being the residence where IFQ holders and crew members reside and contribute to the social and economic fabric of the community.

4.7.1 Effects of Allowing Pot gear

This subsection first considers the extent, if any, to which fishing for sablefish with pot longline gear in the GOA is inherently advantageous in an area where two gears (pot and HAL) are permitted. The following subsections discuss the manner in which the four Elements under Alternative 2 address the first order considerations for this action, as outlined in the Council's statement of purpose and need.

The state-waters AI sablefish fishery includes state waters of the BSAI and the western portion of the Western GOA. Longline pots are currently only permitted in the BSAI portion of state waters. Most state-waters sablefish participants are fishing IFQ or CDQ, so the State of Alaska would likely align its regulations with Federal regulations, as potentially modified by this action, to ensure that fishermen are not subject to conflicting regulations inside and outside of three nautical miles.

4.7.1.1 Benefits and Costs of Pot Gear

Overview

[27] Single pots are less used in the BSAI fisheries due to the increased likelihood of gear loss and the additional grounds preempted by their use. (Hanselman et al., 2013)

The Council and industry committees have noted potential benefits of pot gear for sablefish fishing that include: mitigation of marine mammal interactions, reduced bycatch of seabirds and other fish species, reduced overall halibut mortality, and better accounting of total sablefish fishing mortality.

The potential economic and social costs of allowing pot gear in areas where HAL gear is also used include: the capital cost of purchasing pot gear and/or re-tooling a vessel, increased preemption of fishing grounds, gear conflict potentially resulting in gear damage or loss, and competitive imbalance between users of different gear types.

In some aspects, the relative benefit of pot gear fishing as opposed to HAL gear is either unclear or is conditional on factors that are not forecasted in this analysis. Those external factors include the local biomass distribution of sablefish in the future, changes in future product markets, and the future behavior of marine mammals (particularly depredating whales). Based on available information, the analysts are not able to definitively state whether fishing with pot gear would generate a higher sablefish CPUE in the GOA (noting that CPUE is likely to differ across GOA subareas), whether pot fishing will increase or decrease per unit ex-vessel values for sablefish, or whether pot fishing will reduce expenditures on bait.

Benefits

Killer whales and sperm whales are known to depredate sablefish off of HAL gear in the GOA. Evidence of whale depredation is collected from longline surveys (Section 3.4.1.1, Figure 17) and from fishermen's reports and participation in academic studies (Peterson et al., 2013). Depredation imposes direct costs on fishermen by reducing the number of hooked sablefish that are brought on board, and by damaging fishing gear. Fishermen's response options to depredation impose opportunity costs, which are summarized above in Section 4.6.1. Catching sablefish in pot gear mitigates the ability of marine mammals to depredate hooked sablefish while the HAL gear is fishing or being hauled back, improving outcomes for fishermen.

To the extent whale depredation on sablefish is reduced, allowing the use of pot gear could allow managers to make more sablefish biomass available for fishing than they would have otherwise. Sablefish that are depredated off of fishing gear are not currently accounted in for in stock assessments, other than as a measure of uncertainty. (Note that the Groundfish Plan Team is developing methods to account for sperm whale depredation in GOA abundance estimates.) If pot effort increases in the GOA, managers may be able to reduce the uncertainty buffers in sablefish abundance indices, which could in turn mean that TACs are marginally higher.

Fishing with pot gear also reduces prey availability for seabirds, which would reduce seabird bycatch. Seabird bycatch could impose a constraint on the sablefish IFQ fleet, especially if it results in the take of ESA-listed short-tailed albatrosses. Reducing the likelihood of triggering a Section 7 consultation increases fishermen's security in their ability to prosecute the fishery in which they have invested and upon which they, and other stakeholders, depend.

Switching from HAL to pot gear is also expected to reduce the bycatch of certain other fish species, such as halibut, rockfish, skates, and grenadiers. Section 4.5.4.2 shows historical bycatch of GOA Groundfish FMP species when fishing with sablefish HAL gear, and bycatch of GOA groundfish species when fishing for Pacific cod with pot gear (a close, if imperfect, analog); that section also includes information on groundfish bycatch when fishing for sablefish IFQ with pot gear in the BSAI, where its use is permitted. Reducing the amount of groundfish bycatch taken by sablefish gear would increase CPUE (holding other factors equal), because every non-sablefish on a longline hook represents a lost opportunity to harvest a more valuable sablefish. That increase in CPUE would be additional to what might be expected from reducing the amount of whale depredation on HAL sets. Reducing bycatch of species that

are targeted in other fisheries has two other benefits. First, some fishermen who participate in the sablefish IFQ fishery might also participate in those other fisheries. Catching the groundfish on a targeted trip, as opposed to small amounts of bycatch, might result in a better ex-vessel price if the timing of the catch is more appropriate for available markets or if the ex-vessel buyer is set up to process more valuable product forms. Second, sablefish fishermen have a private incentive to control their groundfish bycatch, as poor bycatch performance or high discard rates could trigger future management actions that restrict their target fishery.

Halibut mortality from discards, when caught by HAL fishermen who do not possess the necessary IFQ, can reduce future stock abundance and harvestable biomass. Excessive mortality is a threat to fishermen who do hold IFQ, who would like to purchase it in the future, and to the communities that depend equally upon that fishery resource. If the Council does not select Element 4 under Alternative 2, all halibut caught in sablefish pots would be discarded. While this is a negative outcome, the Sablefish Gear Committee commented that total mortality from pot discards could still be marginally less than the unaccounted halibut mortality associated with depredation off of HAL gear. While the mortality rate for halibut that enter pots is comparatively high, fewer halibut are expected to be able to enter pot gear. If the Council does select Element 4 (discussed below in Section 4.7.1.5), then the action alternative would present an opportunity to reduce both unaccounted depredation mortality and reduce halibut discard mortality in the sablefish pot fishery.

Costs

Of the 404 catcher vessels that fished sablefish in the GOA between 2009 and 2013, only 40 deployed pot gear in another fishery (including the BSAI sablefish IFQ fishery, and Pacific cod fisheries in both the GAO and BSAI). Thirty-eight of those 40 vessels were greater than 50' LOA, and the other two were greater than 40' LOA. In order benefit from the option to use pot gear, and to provided external benefits through the use of pot gear (as described above), individual vessel owners will have to make substantial capital investments in new gear and vessel reconfiguration. This following information is a coarse picture of the potential costs associated with the optional gear transition, based largely on information reported by the Sablefish Gear Committee[28]. Participants' differing abilities to make such an investment is discussed below in Section 4.7.2.1.

The Sablefish Gear Committee estimated the total cost of a two-mile longline (buoyant groundline) pot string of 30 to 50 pots to be around $25,000 if purchased new. Other necessary gear includes an overhead hoist for lifting pots, large buoys and flagpoles, line anchors, line reels if line is not coiled on deck, and a hydraulic block or line hauler. HAL longliners may already own some of this gear; however, given the additional weight of pots compared to HAL gear, many vessels switching to pot gear would, at the least, need to upgrade their hydraulic system. Vessel modifications, such as a cut-out stern for pot launching, could cost upwards of $50,000. Vessels switching from HAL gear may also incur costs in the removal and storage of HAL gear. Noting the small amount of pot gear currently deployed in some GOA areas, it is reasonable to assume that many participants would be in the market for new (unused) gear. A comparable Committee estimate decomposed the $100,000 cost of a 150 pot string as follows: $35,000 for pots and shackles, $40,000 for the hauler and hydraulics, and $25,000 for groundline. A 150 pot string would be between six and 10 miles long, depending on configuration. Acknowledging that this provides only a rough estimate, a new pot longline set-up could cost around $12,000 to $16,000 per mile in gear, not including vessel modifications.

[28] This information was originally presented in the December 2013 expanded discussion paper on this action, available under Agenda Item D-2 at http://legistar2.granicus.com/npfmc/meetings/2013/12/875_A_North_Pacific_Council_13-12-09_Meeting_Agenda.pdf.

By comparison, the Gear Committee estimated that a string of HAL longline gear (150 skates of auto-line gear with swivels, plus anchors, buoys, and flag poles) would cost around $100,000 new. While gear configuration varies, the Gear Committee provided one estimate of length per HAL longline set at 3 miles, and 30 skates per set. Again noting the rough estimate, a new HAL longline set-up would cost around $7,000 per mile. Participants anecdotally reported that HAL set-ups for hand baited gear are likely to be shorter in length, which would affect the per-mile cost estimate.

Selecting Alternative 2 merely provides the option for participants to switch to pot longline gear, so individuals would face a private decision as to how the capital costs of a new configuration balance against the costs of depredation (e.g. additional fuel, bait, damaged gear, and time spent fishing for the same amount of sablefish IFQ), which are more difficult to quantify.

If the Council selects Alternative 2, it is highly likely that a portion of the existing sablefish IFQ fleet will continue to use HAL gear, due to cost constraints, vessel size constraints, or both. Perhaps the central challenge in making a policy decision to allow pot gear on grounds fished by HAL fishermen is the potential for grounds preemption and/or gear conflict. Grounds preemption occurs when a fisherman has already set marked gear in an area, preventing other participants from setting in the same area. Fishing grounds can be preempted for an extended period of time, especially when larger vessels haul and re-bait their sets in rotation until their fish hold is full and they return to port to make a delivery. Gear conflict occurs when multiple strings become entangled, either by setting across one another or by snagging on a buoy line. Introducing longline pot gear into a HAL area could increase the occurrence of HAL gear loss if the two gear types come into conflict, as the greater tension on pot lines and the greater girth of pot lines are likely to part the smaller and lighter HAL groundline. Gear loss is inevitable to a degree, but should not be exacerbated by management actions. Lost gear preempts grounds until it is removed, and the removal of lost pots from the sablefish derby days took many years of voluntary effort.

The threat, or cost, of grounds preemption and gear conflict is that vessels unable or choosing not to deploy pot longline gear face diminished fishing opportunities. In the case of a quota-based fishery, the impact would be manifested in additional operational costs, such as traveling farther or to less productive grounds in order to harvest their IFQ. These costs are assumed to be greater in an area where the sablefish fishing grounds (i.e. the shelf edge) are more narrow, concentrating gear into a smaller area. Distributional impacts on harvesters are further discussed in Section 4.7.2.1.

Though it is not proposed in the Council's current set of alternatives, stakeholders on the Gear Committee have raised the possibility of establishing different areas (defined by latitude and longitude) for pot and HAL gear. The fleet could consider the geographic separation of gear as a voluntary measure if the Council does not include that as an alternative. One reason to be cautious in creating gear sub-areas is that they would create even smaller spaces within which fishermen must interact, possible causing gear conflicts within a gear type. Furthermore, the task of deciding which area should be allocated to which gear type could be contentious, and would likely be at too fine a scale to analyze with the data available to the Council. Finally, area restrictions would require further analysis and Council action to redefine if the sablefish stock were to shift in such a significant way as to create inequity between gear types over the medium- to long-term.

The analysis for GOA Amendment 14 (1985), which removed pot gear from the GOA sablefish fishery, characterized gear conflict as an extra-market form of competition, where pot fishermen engaged in gear conflict as a means to impose costs on HAL fishermen. This is no longer an appropriate description of the social environment in the (now domestic) sablefish fishery. The number of sablefish IFQ permit holders and the total amount of gear have declined since the 1980s, as has the "footprint" of the fishery on the water. More importantly, the implementation of the IFQ program removed the derby nature of the

sablefish fishery, and provides a regulatory atmosphere in which privately negotiated agreements (and conflict mediations) are more achievable.

Aside from capital costs and interactions between gear types, allowing the use of pot longlines could have unintended, external effects on other fisheries that also experience interactions with marine mammals, or could. Reducing the prey availability of sablefish on HAL gear by converting a portion of the IFQ fleet to pot gear could drive increased whale depredation on the gear of other fishermen. Increased depredation on the HAL gear of participants within the regulated fishery is a conceivable outcome, and the equity issues are further discussed in Section 4.7.2.1. It is also conceivable that whales could shift their depredation to the GOA halibut IFQ fishery. Since depredation is only rarely accounted, information is not available to quantify the amount of existing sablefish depredation that might be shifted to the halibut fishery. While the magnitude of this effect is unknown, the potential for depredation to at least shift to sablefish IFQ fishermen who continue to use HAL gear is obvious enough that this is listed as a "cost", and not as an "unclear effect" (below).

Effects Unclear or Conditional

Fishing with pot gear is likely to reduce whale depredation when compared to fishing with HAL gear, as discussed above under "benefits". That supposition alone, however, is not sufficient to conclude that pot longline gear provides a higher CPUE than HAL gear. Comparing pots and HAL gear will always be an "apples to oranges" assessment, but the following information is provided to characterize the inherent catch rates for each gear type, to the extent practicable. To do so, the analysts make some assumptions about gear configuration, which is known to vary widely within each gear type, in order to normalize by the length of a fixed gear set – which is the unit of interest when discussing grounds preemption.

Based on the gear information described above (under "costs") and CPUE rate information provided in Section 4.5.4.1 the analysts conclude, for the sake of discussion, that inherent catch rates per mile of pot longline or HAL gear are equivalent within a margin of error. The Gear Committee stated that a "typical" HAL set with a total length of three miles would be made up of 30 skates. A skate is a length of groundline that has, on average, about 45 hooks on gangions. At 10 skates per mile, a two mile set would have 20 skates; and with 45 hooks on every skate the two mile set would have around 900 baited hooks. Estimated CPUE for HAL gear varies by time of year and by whether one is using observer or logbook data, neither of which provides a full census of HAL activity. Given the estimates in Section 4.5.4.1 (and graphed in Figure 5 in Section 3.1.1.2) the analysts take 0.8 lbs./hook as a reasonable average HAL CPUE, given that it is the mean for the spring when most GOA sablefish IFQ effort occurs and it is near the mean of the annual averages for each of the four GOA subareas. Therefore, with 900 baited hooks, a fisherman might expect around 720 round lbs. of sablefish. For longline pots, the Gear Committee stated that a two mile set would have between 30 and 50 pots. No sablefish CPUE estimate exists for pot gear in the GOA, since the gear is not allowed. However, CPUE estimates for longline pots in the BSAI range between 11 lbs./pot and 26 lbs/pot depending on the use of logbook or observer data (Section 4.5.4.1). Table 36 shows the a set of rough estimates for the amount of sablefish that might be expected from a two mile string of between 30 and 50 pots, ranging from 330 round lbs. to 1300 round lbs. Using BSAI CPUE estimates is troubling, but is the only available data. CPUE is anecdotally reported to be lower in the Western GOA and BSAI areas compared to the rest of the GOA; that suggestion is supported by reported longer soak times in the west. For the purposes of a rough estimate, it is not unreasonable to focus on the middle-to-high end of the inherent pot longline CPUE estimates in Table 36. The upper end of the estimates in the table are close enough to the rough estimate of inherent HAL sablefish CPUE (per two mile set) for one to presume that depredation, environmental factors (e.g. location, weather, bathymetry), and fishermen's skill are among the key determinants of difference in gear performance. It is safe to assume that these non-gear determinants vary across GOA subareas.

Table 36 Estimated CPUE for GOA pot longline set of two miles in length (round pounds of sablefish)

Pounds per pot	Pots per set: 30	Pots per set: 50
11	**330 lbs.**	**550 lbs.**
26	**780 lbs.**	**1300 lbs.**

Another effect of allowing pot longline gear that is CPUE-related, but the direction of which is unclear, is whether or not fishing with pots would shorten the length of fishing trips. Assuming that gear is required to be removed when making deliveries[29], one might assume that shorter trips lessen the negative impact of grounds preemption on other fishermen. While pot gear is likely to mitigate the CPUE-suppressing impact of whale depredation, the preceding discussion of inherent catch rates for the two gear types generally concludes that location and fishing skill are at least as important in determining the length of the trip. Perhaps the most important factor in determining the length of the trip and the grounds preempted is the size of the vessel. Vessel size influences (1) the amount of pots (strings) it can lay on the grounds, (2) the size of the fish hold, and (3) whether the vessel is subject to gear retrieval requirements under Alternative 2, Element 2. Holding vessel size equal, and temporarily granting the proposition that pot gear inherently catches sablefish faster, one should also consider that fishermen might choose to soak pot gear for longer periods of time than they would HAL gear. Pot gear often has escape corridors, and a fisherman might leave pots in the water longer so that smaller, less valuable fish swim out of the pots. Escapement of small sablefish is not a consideration when a HAL fisherman is soaking his or her gear. In sum, the replacement of HAL gear with pot gear does not have a clear diminishing effect on the length of time that grounds would be preempted.

Selecting Alternative 2 would not have a clear, significant impact on ex-vessel prices in the GOA sablefish IFQ fishery. On the surface, existing data seems to suggest that HAL-caught sablefish fetches a higher ex-vessel price than sablefish caught with pot gear (Table 26 in Section 4.5.5). However, the available data does not include pot-caught prices for sablefish in the GOA, since there are none. Footnote 17 references a February 2014 discussion paper covering data from GOA Pacific cod fisheries, where pot prices were much closer to those for HAL-caught cod. It is premature to say that the market for pot-caught sablefish would not change with experience and improved information on quality. Fishermen have speculated, anecdotally, on both sides of the futures for pot-caught sablefish ex-vessel value. Some suggest that pot-caught sablefish might be higher quality because they are less exposed to sand fleas before the gear is hauled. Others think that pot-caught sablefish might endure more chafing in the pot gear, which could reduce quality. This analysis has also provided information suggesting that pot-caught sablefish are of a generally similar size to those caught with HAL gear (Figure 6, Section 3.1.1). In sum, it is more likely that prices for sablefish caught with pot gear will be influenced by fishermen's choices about bleeding and fish handling. Moreover, perceptions of quality may change over time with the evolution of fishermen's best practices, and with marketing.

The analysts have not obtained any published data that could indicate whether or not sablefish pot longline fishing would require more or less expenditures on bait than fishing with HAL gear. HAL gear has a small amount of bait on each of many hooks, while pot gear would have a larger amount of bait in

[29] The considered gear retrieval requirement is further discussed in Section 4.7.1.3.

bags placed in each pot. Some fishermen fill a pots spaced at intervals with a large amount of bait; these are called "bait bombs". Assuming that area-specific data were available to define the amount of each gear that would need to be set in order to have the identical *expected* sablefish catch, this analysis must assume that the amount of bait required for that gear would be similar. If this is indeed the case, then the effect of whale depredation (and of higher bycatch of other groundfish species) on HAL gear hooks would be to unbalance that assumption of equal bait costs. However, data to support the conjecture that pot gear would reduce bait costs are not available.

In a vacuum, the efficacy of HAL gear and pot gear in the GOA sablefish fishery is assumed to be similar. Given the reported negative impacts of whale depredation, pot gear would appear to be cost-saving (ignoring the required capital investment to reconfigure a sablefish HAL vessel). However, available data is not sufficient to state that pot gear would generate higher gross revenues, or that fishing with pots would reduce the amount of time spent on fishing grounds. Thus, the benefits of pot gear are largely predicated on the potential to reduce the opportunity costs associated with whale depredation.

4.7.1.2 Effects of a Pot Limit, Element 1

Element 1 would establish a limit on the total number of pots that a GOA sablefish vessel could fish. The maximum limit under consideration is 400 pots per vessel. The analysts assume that the Council's intent is to limit the number of pots that a vessel could fish on a given trip, and that the pots could be divided into separate sets (or strings) at the discretion of the captain.

A pot limit could have the effect of capping the total amount of fishing grounds preempted by a vessel at given time. A pot limit could also be viewed as a measure to equalize effort between vessels converting to pot gear and those continuing to fish with HAL gear. However, as noted above in Section 4.7.1.1, pot vessels can rotate sets until their fish hold (or other storage area) is full, and the superiority of pot gear in terms of CPUE is not strongly established in this analysis. As a result, the analysts approach Element 1 as a measure primarily meant to limit a vessels "footprint" on the fishing grounds. It should be noted that vessels using HAL gear are not limited in the amount of gear that they can deploy.

Vessels that carry more pots to the fishing grounds could preempt a larger area, with the impact of the preemption being a function of the amount of time the vessel is able to stay at sea before returning to port to make a delivery. That amount of time would be bounded by either the size of the fish hold or the length of time after catch for which the operator can maintain product quality. The vessels that would benefit most from a high pot limit are those that could stay on the grounds for the longest period of time, such as the 58' "limit seiners" that already fish pots in the Central and Western GOA. Vessels in that size class (and larger) are likely to have the capacity to carry up to the limit in pots, and are likely to have fish holds with refrigerated sea water (RSW) systems.

The amount of grounds preempted would be a simple function of the number of pots allowed to be fished during a trip. The Sablefish Gear Committee commented that "up to 300 pots would give fishermen enough flexibility to operate as efficiently as possible without occupying too much of the fishing grounds," but no rationale was provided for that statement.[30] If the pot limit is meant to balance the amount of grounds preempted by pot and HAL gear, then other information provided by the Gear Committee could be informative. The December 2013 discussion paper on this action notes that 180 pots would be equivalent to a HAL longline set. Accepting the Committee's estimate that pots are set roughly 50 fathoms apart (300 feet), 180 pots would cover roughly 10 miles. A separate comment in the same discussion paper estimated that six 2-mile pot longline strings would cover similar grounds as a HAL

[30] See the December 2013 expanded discussion paper on this action, available under Agenda Item D-2 at http://legistar2.granicus.com/npfmc/meetings/2013/12/875_A_North_Pacific_Council_13-12-09_Meeting_Agenda.pdf.

longliner. That paper estimated that strings are made up of 30 to 50 pots, which would place the number of pots fished on 12 total miles (six strings) between 180 and 300 pots.

Pot limits could also be viewed as a measure to promote vessel safety. Section 4.6.3 covers existing regulations pertaining to vessel safety, and reflects that vessels less than 80' LOA are able to operate without documentation of loading instructions (a "stability book") developed by a naval architect. Rather, the capability of the vessel to operate with a loaded deck is at the discretion of the operator, so long as the vessel has a minimum amount of freeboard (six feet). A single pot limit that applies to all GOA sablefish IFQ vessels is not likely to be an effective safety measure, as a number of pots that is safe for one vessel to carry could be too much for another.

Pot limits would not likely affect the amount of lost fishing gear, in the long term. Element 1 does not limit an operator's ability to replace lost gear, so limiting the amount of pots that could be deployed during any one trip would not affect the amount of pots that might be lost and replaced over time.

Pot limits would not likely reduce the incentive for vessel consolidation in the fishery, if consolidation is caused by elements of this or another management action. Consolidation would occur as IFQ holders stack their fishing privileges on a single vessel. As interpreted, pot limits would not affect the number of trips that a vessel could make during the sablefish IFQ season. While making additional trips increases variable costs for the vessel, it might still be more cost effective than incurring the fixed costs of fishing on two separate platforms.

Some stakeholders have commented that limiting the number of pots that can be fished in a given string might reduce the severity of gear conflicts (entanglements) that occur in the fishery. A smaller number of pots in a longline string would exert less tension on a HAL string that is entangled with a pot longline during retrieval. Regulating the number of pots that can be on one string for this purpose is, in a sense, seeking to solve a problem after it has already occurred. No data is available to assess the maximum number of pots in longline format that could be hauled up by a HAL vessel without parting the HAL groundline. Given the tools available to the Council, the best way to mitigate the negative effects of gear conflict could be to select elements that minimize the likelihood of gear conflicts in the first place. Those elements would include the required reporting of gear left (or lost) on fishing grounds (Element 2, Option 2), and the required marking of pot longline sets at both ends (Element 3, Option 2).

Management and enforcement issues associate with Element 1 are discussed in Section 4.8.2.1.

4.7.1.3 Effects of a Gear Retrieval Requirement, Element 2

Element 2 would require GOA sablefish IFQ vessels to remove their pot gear from the fishing grounds when making a landing. The location of those pot strings, or any lost gear, would have to be submitted when the landing is made. Vessels below a certain size could be exempted from the requirement to remove gear from the fishing grounds during a landing. The Council could choose to apply that exemption to vessels less than 60', 50', or 40' LOA. It is also assumed that any gear remaining on the fishing grounds when the season is closed would have to be discarded upon retrieval.

Gear left on grounds preempts those fishing areas, making them unavailable to other users. Exempting vessels of a certain size class from retrieval requirements might allow smaller vessels to fish fewer pots in rotation, making them competitive with vessels that can safely carry more pots. However, those exempted vessels could effectively preempt productive grounds for an unlimited amount of time over the course of multiple trips. Exempted vessels would have an advantage over both non-exempt pot vessels and HAL vessels, for which there are no retrieval exemptions. Table 14 shows the number of sablefish IFQ vessels

active in each GOA area for each year from 2009 through 2013. The number of potentially exempt small vessels is greatest in the SE and Central GOA areas.

Unattended gear could create a safety hazard or a risk of gear conflict, if not well marked. In November 2014 the Pacific Fishery Management Council (PFMC) received public comment letters from limited entry sablefish pot vessels using HAL gear in the Point Conception (California) area stating that sablefish IFQ vessels were entering their traditional fishing grounds, laying pots, and going out of VHF radio range to make deliveries. Submitters of public comment cited instances when gear was left on grounds for extended periods of time while the vessel that deployed the gear stayed in port for mechanical work. Limited entry sablefish stakeholders asked for PFMC consideration of how to mitigate the risks to vessels, crew, and gear posed by poorly marked and unattended gear.[31] It would be up to the Council to determine if the options available under Element 3 (marking sets on both ends) satisfy the need to mitigate safety hazards. Though not part of the Council's current range of alternatives, limiting the amount of time that vessels may leave gear unattended could marginally reduce the incidence of conflicts. Such a limit might require further exemptions for vessels that left gear unattended due to mechanical issues that prevented the vessel from retrieving the gear.

The Council may wish to consider whether gear allowed to be left on the fishing grounds could be restricted to certain "gear storage" areas that could be defined by latitude and longitude. Under that approach, exempt vessels could not leave their gear baited and actively fishing while making a delivery. Storage corridors would allow smaller vessels to move equivalent amounts of pot gear near to the fishing grounds in a manner that does not jeopardize vessel safety. Defining storage areas would likely reduce gear conflict in areas that are heavily trafficked by vessels that are actively fishing. Several GOA pot gear storage areas are currently defined in Alaska state-waters (see Section 4.6.3), though they are intended for use in the state Pacific cod fisheries for short periods before and after the season opening and closing dates. Existing storage areas are close enough to port that the Sablefish Gear Committee said that operators would derive very little benefit from storing their gear so far from sablefish fishing grounds.

Despite the challenges mentioned above, allowing smaller vessels to leave pot gear on the grounds could help those vessels remain competitive if fishing with pot gear emerges as the only viable way to fish GOA sablefish in the presence of whale depredation. Small vessels could potentially move gear onto the fishing grounds in multiple trips (subject to any pot limits established under Element 1). Alternatively, small vessel operators have suggested to the analysts that they are interested in contracting with larger vessels for assistance in moving pots onto the fishing grounds. This is not part of the Council's present range of alternatives, and could add to the duties required to monitor and enforce any vessel pot limits that are established through this action.

Another option raised by stakeholders, but not included in the current range of alternatives, is to allow small, capacity-limited vessels to "share" gear. This approach might reduce the incentive for vessels to transport more gear than is safe, and would have a mitigating effect on the amount of grounds preempted per vessel. The primary challenge with gear sharing would be in enforcement. The analysts would look to enforcement agencies to weigh in on whether or not vessels could be allowed to share gear – transported to the grounds in a collective effort, and fished in rotation – if buoy markers were switched out to reflect the ADF&G number (or FFP number) of the party responsible for that gear at any given time.

Under Element 2, Option 2, the Council's motion is not specific as to whom the location of gear left on grounds would have to be reported. Several options are discussed in the management and enforcement section for Element 2 (Section 4.8.2.2). While the reporting of gear left on grounds would be useful to

[31] PFMC November 2014 Briefing Book, Agenda Item B.1.c, Supplemental Public Comment. Available at: http://www.pcouncil.org/resources/archives/briefing-books/november-2014-briefing-book/#openNov2014.

fishermen, and would impose a negligible cost on harvester stakeholders, it would be very costly for NMFS OLE to confirm the accuracy of what is reported, and impossible to disseminate that information to other fishermen without violating confidentiality restrictions.

4.7.1.4 Effects of Gear Specifications, Element 3

Element 3 includes two gear specifications (options) that would be required for all vessels fishing GOA sablefish IFQ with pot longline gear: (1) use of neutrally buoyant groundline would be required, and (2) both ends of the pot longline would have to be marked.

Fishermen would have a private incentive to comply with either of these two options, as gear is expensive and fishermen would want to avoid the gear loss and gear conflict that they are designed to avoid. Option 1 would make pot longline groundline less likely to hang up on bottom features, and Option 2 would help other fishermen in the area avoid gear that is already set on the grounds.

Both of these gear specifications are said to be part of current industry best practices in pot fisheries, though not required. Neutrally buoyant groundline might be more expensive to purchase, but could prevent a more costly gear loss event. Neutrally buoyant groundline is also thicker, and may require operators reconfiguring their vessels to fish pot longline gear to acquire larger bins to store coils. Items used to mark the ends of pot longline sets would also increase initial set-up costs (e.g. radar reflectors, flag poles), but would also decrease the likelihood of entanglements that could damage gear or cause the loss of fish in the pots.

As written, Element three would affect all groundfish pot fishing in the GOA, since there is currently no specific definition of a "sablefish pot" in regulation. If it is not the Council's intent to change the specifications for pot gear in other fisheries, sablefish pots could be defined in the regulatory amendments that would stem from this action. The analysts assume that neutrally buoyant groundline could be used for pot longline fishing in fisheries other than the GOA sablefish fishery. If that is not the case, then this gear requirement could impose additional costs on operators who intend to maintain other pot longline operations, as they would have to reconfigure their vessels in order to switch targets.

Management and enforcement issues associate with Element 3 are discussed in Section 4.8.2.3.

4.7.1.5 Effects of Allowing Retention of Incidentally Caught Halibut, Element 4

Element 4 would allow the retention of halibut that are caught incidentally in GOA sablefish pots, provided that the sablefish IFQ holder also holds sufficient halibut IFQ. Staff has suggested an option for Element 4 that would limit the retention of halibut in sablefish pots to an amount limited by an MRA. The purpose of that option is to ensure the *incidental* nature of halibut catch in sablefish pots.

Incidence of halibut in sablefish pots tends to be low in areas where pot gear is allowed, such as Canada[32] and the area where the BSAI overlaps with halibut management Area 4A (see Table 5 in Section 3.2.1.2). This is likely due to the different depths at which sablefish and halibut are typically found. Halibut are most likely to be found in sablefish pots in late spring (April through June). By weight, halibut in sablefish pots varied between 6% and 17% of the amount of sablefish in those pots.

Selecting Element 4 would create efficiencies in the harvest of the IFQ fisheries, and is not expected to drive consolidation since it would contribute to the overall profitability of sablefish IFQ trips, regardless

[32] Information provided by the Canadian Sablefish Association, cited in the December 2013 expanded discussion paper on this action, available under Agenda Item D-2 at http://legistar2.granicus.com/npfmc/meetings/2013/12/875_A_North_Pacific_Council_13-12-09_Meeting_Agenda.pdf.

of vessel size. Selecting Option 1 (the inclusion of an MRA for halibut) would limit the potential efficiency of jointly harvesting sablefish and halibut, but is likely necessary to adhere to the Council's intent in keeping the pot longline fishery directed towards sablefish. The foregone efficiency is expected to be small, given the relatively low amount of halibut expected to be found in sablefish pots.

Halibut mortality in sablefish pot gear may be higher than that of halibut caught on HAL gear[33]. Halibut caught on sablefish HAL gear in the GOA may be retained, provided that the sablefish IFQ holder has the necessary halibut IFQ. If that is not the case, halibut are discarded and mortality rates are comparatively low. Selecting Alternative 2 without Element 4 could lead to discarded halibut deadloss which adversely impacts the future harvestable halibut biomass and the stakeholders in the halibut IFQ fishery, many of whom – especially the smaller sablefish vessel operators – are also sablefish IFQ participants (see Table 27).

Selecting Alternative 2, with or without Element 4, could benefit the stakeholders in the halibut IFQ fishery. Introduction of pot longline gear in the sablefish IFQ fishery would displace some HAL effort, reducing the number of halibut that are depredated by whales off of HAL gear and thereby reducing the amount of unaccounted halibut mortality.

Management and enforcement issues associate with Element 4 are discussed in Section 4.8.2.4.

4.7.2 Impacts Across Stakeholder Groups

The section assesses whether the ability to use pot gear, and any related benefit, is equitable across participants in the relevant GOA areas. Any differential impacts of allowing pot longline gear are considered in relation to their impact across harvester, processor, and community stakeholder groups.

4.7.2.1 Impacts on Harvesters

One of the Council's overarching objectives for this action, as outlined in the purpose and need statement, is to minimize gear conflicts between pot longline and the traditional HAL gear operators in the GOA sablefish IFQ fishery. In other words, the Council is seeking to maintain historical fishing opportunities for those participants who choose not to (or are not able to) convert to pot gear in attempting to mitigate the impact of whale depredation.

It is possible that many GOA sablefish QS holders would not be able to take advantage of the opportunity to use pot longline gear, either because their vessels are too small to fish pot gear safely or practicably, or because they cannot afford cost of acquiring pot gear and reconfiguring their boat. As noted above, the cost of re-tooling for an industry-standard longline pot operation can run well over $100,000. Peterson and Carothers (2013) surveyed over 150 sablefish longliners, and found that operators of vessels greater than 60' LOA were most likely to agree that the transition to pot gear is a feasible option for their business. Respondents who did not feel that conversion to pot gear was a realistic depredation response tended to be operators of small vessels fishing out of Southeast Alaska. In the Canadian sablefish pot fishery, vessels range between 55' and 95' LOA; all vessels that fish sablefish pots in the BSAI areas are greater than 50' LOA (all but two are greater than 60' LOA); and the majority of the vessels that participate in the Western GOA and West Yakutat sablefish IFQ HAL fishery are greater than 50' LOA.

Vessels facing the significant initial investment of gearing up for pot longline fishing may differ in their access to capital. Vessel owners would face a private business decision on whether or not to finance new

[33] Section 4.7.1.5 summarizes the Sablefish Gear Committee's discussion of halibut bycatch in sablefish pots, noting that the longer soak time for pot gear compared to HAL gear could be associated with higher mortality rates.

gear or vessel work. The GOA sablefish IFQ fleet tends to also fish for halibut IFQ, fixed gear Pacific cod, and state-managed fisheries (particularly directed salmon fisheries). Obviously, vessel owners with higher fishing revenues or greater capital assets would find it easier to secure financing. IFQ crewmen who own sablefish QS, but not a vessel, may find it more difficult to step up to vessel ownership if jumping up all the way to a vessel capable of fishing pots becomes the only viable way to fish sablefish IFQ in the GOA.

Vessels that already fish pots in other fisheries, such as the Pacific cod fishery and the BSAI sablefish pot fishery, would face much lower conversion costs than the small boat fleet. On an area basis, the Southeast Alaska fleet would likely face the longest build-up period in establishing pot gear operations. In the meantime, vessels that are already capable of fishing pot longlines and that own or purchase sablefish IFQ for that area could impact the existing SE HAL fleet by preempting grounds, and potentially concentrating whale depredation onto what non-pot vessels remain in the fishery.

Larger vessels can safely carry more pots, meaning that they have a competitive advantage and would also impose costs on smaller vessels by preempting more of the sablefish fishing grounds. However, the advantage of large vessels may not be so straight forward. The Sablefish Gear Committee noted that some of these vessels – noting the 58' "limit seiners" that participate in the Western GOA – might have vessel stability issues if they are carrying pots on deck without having their fish hold full of water ("tanked"). Some operators reported that they would not be tanked, ideally, when fishing sablefish IFQ because a profitable trip in the Western GOA requires five to seven days of fishing, and sablefish need to be dressed and iced instead of stored in refrigerated sea water in order to maintain quality over that period of time. In other words, large vessels that would appear to have more pot capacity may also derive safety and operational benefits from the ability to store pots on the fishing grounds. If gear is allowed to be left on the fishing grounds while making a delivery (Element 2), it is possible that operators of vessels that can haul pots but would struggle to transport a large enough set of gear might contract with another boat – a larger vessel or a tender – to move pots onto the fishing grounds. Such voluntary transactions could be mutually beneficial, but have not been discussed in previous papers on this considered action.

If fishing sablefish IFQ with pot gear emerges as a dominant strategy, perhaps concentrating depredation by whale populations onto remaining HAL gear, direct costs and opportunity costs for non-pot participants could increase relative to the status quo. In the extreme, fishing with HAL gear could become less profitable. If operating margins for non-pot participants fall below the profitability line, vessel owners could choose to forgo the cost of operating their own vessel and "walk on" to vessels able to fish pot gear, thus reducing the number of active vessels in the fleet. Operators unable to convert to pot gear might choose to sell their QS, which could also lead to consolidation in the fleet.

Fleet consolidation would be the most imminent threat to the number of available crew jobs. Pot operations do not seem to have inherently more or less crew on board than do HAL vessels. Table 34 in Section 4.5.6 showed that crew size on pot and HAL boats in the BSAI and GOA Pacific cod fisheries – a close analog in terms of vessel operation – was roughly similar within each vessel size class.

Presuming that the conversion of some of the GOA sablefish fleet to pot longline gear reduces unaccounted whale depredation, and consequently reduces uncertainty in sablefish stock abundance indices, future TAC levels may increase. Transfer prices for the QS that underlie annual sablefish IFQ are based on perception of the future harvest opportunities in the fishery, so higher TACs could have a positive effect on QS value. Current QS holders would benefit from the enhanced value of their tradable asset, though individuals looking to purchase QS on the transfer market – such as new entrants, holders of small QS amounts, or crew members – might encounter higher barriers to entry.

4.7.2.2 Impacts on Processors

Because the GOA sablefish fishery is an area-based IFQ fishery that is typically fully harvested, the gear used to make the catch should not affect the total amount of deliveries to processors in each area. There is some potential for the redistribution of catch if larger vessels that are more suitable for pot longline fishing experienced improved outcomes to such an extent that smaller HAL operations "walk on" to other vessels or sell their QS to operators who deliver to a different plant in the same management area. However, such outcomes are only likely if the introduction of pot gear adversely impacts the HAL fleet to the most extreme extent imaginable. The more likely distributive impacts of Alternative 2 relate to grounds preemption and the potential for concentrated depredation on the remaining HAL gear in the fishery; neither of those outcomes would be expected to impact processors.

Sablefish caught with pot gear are not expected to be larger or smaller, on the whole, than those caught with HAL gear. As a result, processors would not likely have to alter their mix of product forms to suit a different average sized fish.

The impact of a shift to pot longline gear on delivered sablefish quality is not clear, based on available information. It is assumed that ex-vessel prices (per round pound) would remain similar to status quo levels, at least in the near-term. The best available information on ex-vessel prices by gear type, which obviously does not include pot-caught GOA sablefish, indicates that average prices paid to pot fishermen are somewhat lower than those paid to HAL fishermen. A shift to more pot catch could increase margins for processing plants if the difference in wholesale revenues generated by each gear type were similar. (Information on sablefish wholesale revenues by gear type in the BSAI could be included in the next iteration of this analysis).

Finally, if reduced unaccounted whale depredation mortality decreases due to the use of pot gear, processors would benefit from increased TACs in the same manner as harvesters. However, marginal returns may be diminishing with increased sablefish production. Nominal average annual ex-vessel prices for sablefish in all areas have been in decline since their peak in 2011. Ex-vessel prices have many determinant factors in addition to the quantity supplied to the market. Nevertheless, one might conclude that demand for sablefish on the world market is not ever-expanding.

4.7.2.3 Impacts on Communities

Potential impacts on communities follow the same logic as those described for processors. The likely first-order distributive impacts of Alternative 2 relate to grounds preemption and competitive advantages that might be gained by vessel owners who are more able to use pot gear in a fishery affected by whale depredation. Consolidation in the fishery or redistribution of landings is only likely if vessels using pot gear become more effective than vessels using HAL gear to an extreme degree, such that QS holders sell out of the fishery or choose to walk on to vessel with pot gear instead of fishing from their own HAL platform.

If fleet consolidation were to occur, communities that rank highly in processor reliance but not in processor engagement (i.e. the community receives a small amount of deliveries, but that activity makes up a significant portion of the community's economic activity) would be among the most at risk. Those communities include Elfin Cove, Port Alexander, Akhiok, Excursion Inlet, and False Pass (Table 35). The sablefish IFQ fishery is not a derby, and delivery requirements are not part of the IFQ Program, so the risk of losing deliveries to a small community has been present since the outset of the Program, and conversion to pot gear is not one of the most likely factors to alter delivery patterns that have persisted for almost 20 years.

GOA communities with shipyard operations might benefit from the removal of pot gear restrictions, as vessels may need to be re-fitted or modified in order to carry, launch, and haul longline pots.

4.7.3 Impacts on Tax Revenues

Some municipalities levy taxes on fish first landed at processing plants located in their community. According to the State of Alaska's Department of Commerce[34], seven GOA municipalities or boroughs levy a raw fish tax or a severance tax on the extraction of natural resources: False Pass, King Cove, Sand Point, Unalaska, Yakutat, Aleutians East Borough, and Kodiak Island Borough. The factors that might drive the redistribution of landings across GOA communities, described above in the summary of Impacts on Processors, could impact these communities in the form of foregone tax revenue, in addition to impacts on employment and the social makeup of the community. Ten GOA communities are rated as "highly reliant" on commercial sablefish processing (Table 35), and thus would be reliant on the tax base generated by landings at those facilities. King Cove, Sand Point, False Pass, and Yakutat are among those reliant communities, as is Akhiok which is in the Kodiak Island Borough.

The State of Alaska also levies raw fish taxes. Some of those revenues may go back into communities through State expenditures. There are three fisheries taxes that are levied on groundfish catch by the State of Alaska. The descriptions of the state taxes were taken from the Alaska Department of Revenue Tax Division website[35], and are provided below.

1) A **Fisheries Business Tax** is levied on persons who process or export fisheries resources from Alaska. The tax is based on the price paid to commercial fishermen, or fair market value when there is not an arms-length transaction. Fisheries business tax is collected primarily from licensed processors and persons who export fish from Alaska. Shore-based processors are assessed at a rate of 3%, and floating processors are assessed at a rate of 5% of the ex-vessel price paid to fishermen.

2) A **Fishery Resource Landing Tax** is levied on fishery resources processed outside the 3-mile limit and first landed in Alaska or any processed fishery resource subject to sec. 210(f) of the American Fisheries Act. The tax is based on the unprocessed value of the resource, which is determined by multiplying a statewide average price (determined by the Alaska Department of Fish and Game data) by the unprocessed weight. The Fishery Resource Landing Tax is collected primarily from factory trawlers and floating processors which process fishery resources outside of the state's 3-mile limit and bring their products into Alaska for transshipment. The Fishery Resource Landing Tax is also levied at a rate of 3% of ex-vessel value.

3) A **Seafood Marketing Assessment** is levied at a rate of 0.5% of the value of seafood processed products first landed in, or exported from Alaska. The Seafood Marketing Assessment is based upon the first wholesale value of seafood products, regardless of whether the products were processed at sea or on shore.

Because the total amount of sablefish IFQ harvested under Alternative 2 is not expected to differ from the status quo, the amount of State tax revenues derived from the fishery should not be impacted by the Council's selection of the action alternative. Within Alaska, the location of the first landing would not alter the amount of tax revenue collected, so any distributional impacts of the action would not change the total amount. If the use of pot longline gear reduces the uncertainty in sablefish abundance indices caused by unaccounted whale depredation, and if that in turn leads to higher TACs, then Alternative 2 could have the medium- to long-term effect of increasing State tax revenues.

[34] http://www.commerce.state.ak.us/dca/osa/pub/12Taxable.pdf
[35] http://www.tax.alaska.gov/programs/programs/index.aspx?60620

Alternative 2 is not expected to cause a greater percentage of GOA sablefish IFQ to be landed outside of Alaska. Section 4.5.3 notes that landings outside of Alaska have typically been made by larger vessels, which, as a class, might benefit from the ability to use pot gear. However, interstate deliveries made by those larger vessels have historically accounted for only a small portion of their total annual deliveries. Dating back to 2009, no vessels active in this fishery have delivered solely outside of Alaska, and there is no clear reason that switching from HAL to pot gear would change their business patterns.

4.8 Management and Enforcement Considerations

This section reviews the existing monitoring and enforcement of the sablefish IFQ fishery in the GOA, and evaluates issues with management, monitoring and enforcement of the proposed action alternative to allow the use of pot longline gear in the GOA sablefish IFQ fishery. References to the elements and options under the action alternative (Alternative 2) relate to the recommended staff revisions to the set of alternatives listed in the Council's December 2013 motion, which are listed and described in Sections 2 and 4.3. Alternative 2 includes four elements: (1) pot limits; (2) gear retrieval; (3) gear specification; and (4) retention of incidentally caught halibut. Elements 1 through 3 have additional options.

4.8.1 Alternative 1, No Action (Status Quo)

Currently, NMFS interfaces with the GOA hook-and-line (HAL) IFQ fishery for sablefish through three programs: (1) Inseason Management receives daily fishing reports from the fleet and monitors sablefish harvests; (2) the North Pacific Groundfish and Halibut Fisheries Observer Program (Observer Program) monitors and samples the harvest of GOA sablefish fishery participants with observer coverage; and (3) the Office of Law Enforcement (OLE) monitors the fleet and enforces NMFS regulations.

NMFS Inseason Management monitors HAL sablefish IFQ fisheries in several ways. NMFS requires logbooks to be completed by vessels with a Federal Fisheries Permit (FFP) that are greater than or equal to 60' (18.3 m) length overall (LOA). Therefore only a portion of the vessels in the GOA sablefish IFQ fishery fleet are required to submit logbook information. NMFS logbooks serve as a record of the location fished, the amount of gear set, and the harvest and discard of target and some non-target species by set. Catcher-processors that fish sablefish IFQ and have a Pacific cod endorsement are also required to report electronically. NMFS Inseason Management also monitors the sablefish fishery using landing report information (a.k.a "fish ticket") reported by the processing plant when a vessel delivers its catch. Fish tickets provide information about the gear type used, the area fished, and the amount of target and non-target species delivered. All GOA processors that take deliveries from IFQ fishing vessels are required to submit landing reports via eLandings. Both fish tickets and logbooks are considered self-reported or industry-reported information.

The Observer Program has the authority to place an observer aboard vessels participating in the GOA sablefish IFQ fishery. The vessels participating in this fishery now fall into the trip-selection pool, but in 2013 and 2014 they were in the partial coverage category (either trip or vessel selection), and prior to 2013 they were not observed. In 2015, NMFS proposes two trip-section strata that will affect the sablefish IFQ fishery:

- Small vessel trip-selection: This pool is comprised of catcher vessels that are fishing HAL or pot gear and are greater than or equal to 40' but less than 57.5' LOA. The vessels in this stratum were in the "vessel-selection" pool in the 2013 and 2014 Annual Deployment Plans (ADP).
- Large vessel trip-selection: This pool comprises three classes of vessels: (1) all catcher vessels fishing trawl gear, (2) catcher vessels fishing hook-and-line or pot gear that are also greater than or equal to 57.5' LOA, and (3) catcher-processor vessels exempted from full coverage

requirements. The vessels in this stratum were termed the "trip-selection" pool in the 2013 and 2014 ADPs.

Selection probabilities will be 12 percent for small vessel trip-selection stratum and 24 percent for large vessel trip-selection stratum. NMFS will grant a conditional release in 2015 to a vessel in the small vessel trip-selection stratum under two scenarios: (1) the vessel does not have sufficient life-raft capacity to accommodate an observer, and (2) the vessel is selected for a third consecutive trip with observer coverage (NMFS, 2014). Catcher vessels participating in the sablefish IFQ fishery range from less than 35' to greater than 60'.

Observers record a vessel's total fishing effort (time gear was fished, location fished, and amount of gear fished), which is obtained directly from the captain's logbook. If a logbook is not required, then the observer obtains this information by asking for assistance from the captain. Regardless of the data source, observers spot check the effort information they are provided against their own observations. Observers collect species composition information from a random sample of the sets. They also collect length, sex, and age structure information from various target and non-target species. When halibut are encountered in the sampled set, the observer completes halibut injury assessments from a random subset. Information from observed vessels is used to extrapolate catch and effort information to the unobserved portion of the fleet. Observers report potential violations to observer program staff; those observations are then shared with the appropriate agency (OLE) for review. Observers are also trained to inform the captain of the vessel of any potential violations that they witnessed, if it appropriate to do so.

OLE monitors the sablefish IFQ fishery on a regular basis, conducts random dock side inspections in ports throughout the GOA, and enforces NMFS regulations. OLE does not have the vessel or fiscal resources to provide personnel to conduct at-sea inspections. OLE uses logbook information during vessel inspections to verify landings. OLE may make random spot checks of the gear, but this would be done dockside and not while the vessel is actively fishing. Given OLE resources and other priorities, a relatively small number of vessels are checked for gear specification. OLE also conducts limited monitoring and enforcement activities through at-sea boarding in coordination with the U.S. Coast Guard and Alaska Wildlife Troopers.

4.8.2 Alternative 2

If the proposed action alternative (Alternative 2) to allow the use of pot longline gear in the GOA sablefish IFQ fishery is recommended by the Council, then management, monitoring and enforcement of the fishery would be conducted by Inseason Management, the Observer Program and OLE as is currently done in the HAL fishery for sablefish in the GOA. However, none of the methods described under the status quo (Section 4.8.1), either independently or in combination, could be used to fully monitor and enforce the 4 elements proposed under Alternative 2 – pot limits, gear retrieval, gear specifications, and retention of incidentally caught halibut. The pot longline sablefish fishery could not be fully monitored for the following reasons: (1) inseason logbook information is only required on catcher-processor vessels and catcher vessels greater than 60', and (2) only those vessels selected to be observed on a trip would have observer coverage.

Neither OLE nor the Observer Program has the resources to expand duties to fully monitor the proposed gear limitation elements under Alternative 2. However, a few OLE monitoring procedures and Observer Program data collection tasks that are already conducted could be extended to the GOA sablefish pot longline fishery in order to inform limited aspects of the action alternative elements. Accommodating new observer duties is only possible if the duty closely aligns with existing protocol, because observer time is fully committed to performing duties in support of existing program goals and regulations. Additional

duties, such as those that would be necessary to fully monitor Elements 1 through 4 of the action alternative, cannot be performed using current resources.

4.8.2.1 Pot Limits

Element 1 would limit the number of pots that a vessel fishing in a GOA sablefish pot longline fishery could deploy on the fishing grounds during each fishing trip (see regulations at §679.2 for the definition of fishing trip). This element includes a no limit (status quo) option, and an option to limit the number of pots that can be longlined during a trip to a specific number no greater than 400 pots. Since the sablefish IFQ fishery is a catch share fishery, the effect of a pot limit would be decreased pace in the fishery. Pot limits, as defined in this action for the sablefish IFQ fishery, would control the level of fishing effort that a vessel could exert during the period of time between setting available gear and a landing. The principle purpose of a pot limit in a sablefish pot longline fishery would be to minimize gear conflict that can occur when the fishing grounds are preempted by dispersal of one gear type to the exclusion of the same or another gear type. A pot limit may also increase vessel safety by restricting the number of pots a vessel can carry at one time; however, pot limits do not substitute for USCG stability tests and load limits, the requirements for which are described in Section 4.6.3.

Full monitoring of a sablefish trip pot limit would require a pre-departure gear inspection to verify that the total number of pots a vessel transports for deployment during a trip is less than or equal to the pot limit. Vessels that choose to transport multiple loads of pots, such as a small vessel interested in deploying a large number of pots, would require multiple inspections to track the total number of pots transported for deployment during a fishing trip. OLE does not have the enforcement personnel or resources to conduct dockside inspections in all GOA ports prior to each vessel's departure, and cannot commit to performing dockside inspections in any particular port. Additionally, the Observer Program does not have the expertise to conduct inspections on fishing gear. Therefore, determining the number of pots that a vessel transports for deployment is limited to existing program resources.

An alternative method to determine the number of pots that a vessel has deployed on a fishing trip is to require vessels to self-report this information in a logbook. A data field could be added to a vessel's NMFS logbook to allow the captain to record the total number of pots onboard a vessel before fishing commenced. This information could be randomly checked by NMFS OLE or the USCG, during vessel inspections. Verification of a captain's logbook record of the total number of pots onboard would be necessary for enforcement of regulatory violations. Currently, vessels less than or equal to 60' are not required to use logbooks. Requiring industry to report pot usage would mean all vessels in the sablefish pot longline fishery would be required to use logbooks.

Another method to determine the number of pots a vessel has deployed on a fishing trip is to require pot tags similar to the Alaska Department of Fish and Game's (ADF&G) system of tagging pots in various crab fisheries throughout the state. OLE has indicated that a pot limit could be enforced most economically and efficiently using a pot tag system. Such a system would require a uniquely identified tag to be permanently affixed to each pot, and a logbook on every vessel to enter the tag numbers. This would allow at-sea enforcement and post-trip verification of the number of pots fished. Verification of pot tags could be accomplished periodically during dockside inspections by OLE personnel and during at-sea inspections by OLE and U.S. Coast Guard personnel. If a tag or pot is lost or damaged, the permit holder claiming the lost gear would have to file an affidavit to receive a replacement tag. At this time, NMFS does not have the resources to implement a pot tag system in a sablefish pot longline fishery.

Monitoring pot longline gear limits on the fishing grounds is problematic for OLE because they do not have a vessel capable of operating at sea. No agencies in the State of Alaska have the ability to pull pot longline gear on the fishing grounds, therefore a vessel's pot count would have to be visually inspected

throughout the process of deploying or retrieving the pot longline gear. Visually verifying a vessel's compliance with a pot limit on the fishing grounds would have to rely on at-sea inspections by OLE in coordination with personnel from enforcement agencies other than NMFS OLE, such as the Alaska Wildlife Troopers or the U.S. Coast Guard.

Observers verify the amount of gear deployed on some but not all sets, to their best of their ability. These observations, in conjunction with the vessel logbook and/or captain's assistance, are used to estimate catch per unit of effort. Observer monitoring of a trip pot limit on the fishing grounds would only be possible during the first deployment of gear, assuming all pot longline sets are deployed sequentially and the observer has safe access to monitor the setting of the gear (i.e. unobstructed view of the deck and pot launching area). Even if these conditions are met, relying on the observer to complete this task may not be realistic on all observed trips. Once the cycle of gear deployment and retrieval begins, there is no certain way to count the total number of pots because some pot sets may be rotated more often than others. Assuming all pot sets are fished, an observer may be able to estimate the total number of pots by obtaining an estimate of the number of pots fished per unit of time and expanding that estimate by the time it takes to pull a full complement of pot sets. This assumes the retrieval time for all pots is consistent and is not significantly altered by catch rates, sea conditions or equipment malfunctions. Counting pots at other times is not feasible because an observer is tasked with higher priority Observer Program duties.

4.8.2.2 Gear Retrieval

Element 2 of this action would impact the retrieval of gear in a GOA sablefish IFQ pot longline fishery. Two options and a sub-option are proposed for this element. Option 1 would require pot longline gear to be removed from the fishing grounds at the time of landing. A sub-option to Option 1 would provide an exemption to Option 1 that allows vessels less than a specific size (40', 50', or 60') to leave pot longline gear on the fishing grounds between landings, and presumably until the end of the fishing season. Option 2 would require that the location of pots left on the fishing grounds or lost on the fishing grounds be submitted at the time of landing.

Option 1 would require each vessel to remove all of their pot longline gear from the fishing grounds before they go to port to make a landing. Sub-option 1 would exempt vessels of a specific size from retrieving their pot longline gear at the time they make a landing. Option 1 and the sub-option are not enforceable because neither OLE officers nor observers can monitor the status of all pots associated with a vessel at all times. To do so would require determination of how many pots were onboard the vessel when it originally left port, whether or not the vessel picked up additional pots or offloaded pots in another location, and whether or not all the pots were removed from the fishing grounds. Additionally, it would be difficult to verify that valid safety issues existed to require vessels to leave gear on the grounds. It is also important to note that vessels have different loading capacities, and what may be considered safe for one vessel may not be safe for another.

Coupling a requirement for pot tags with a requirement for logbooks in the sablefish pot longline fishery could allow for some degree of enforcement of Element 2, Option 1. Tagged pots set and retrieved would need to be entered into the NMFS logbook to create a permanent record of pot activity. To determine compliance with gear removal from the fishing grounds, OLE personnel would conduct dockside inspections to compare the logbook record of pot tags to the presence of tagged pots on board a vessel at the time of landing. As noted above, NMFS does not have the resources to implement a pot tag system at this time.

Option 2 would require that the location of pot longline gear left on the fishing grounds or lost on the fishing grounds be submitted at the time of landing. NMFS acknowledges that information on where gear is left or lost is important to the fishing fleet and could help prevent one fisherman's gear from becoming

entangled in another fisherman's gear. However, if this information is reported to NMFS on the logbook or in a landing report (fish ticket) then it would be considered confidential and not available to other fishermen. NMFS does not have the resources to disseminate it in a non-confidential format. OLE could confirm receipt of this information, but would not be able to verify that gear was left on the fishing grounds, or the location of that gear. In addition, OLE cannot enforce a requirement to report the loss of gear because there is no way to verify that fishing gear is lost.

An alternative would be to develop new recordkeeping and reporting and a new gear tracking database which would require extensive investment. Implementing a gear tracking system using Automatic Identification Systems to locate pot longline gear that is fishing or lost is beyond the scope of NMFS current resources in Alaska. NMFS suggests that other funding, data collection, and management agencies be considered for these tasks, such as Sea Grant, Alaska Ocean Observation System, or Pacific States Marine Fisheries Commission.

4.8.2.3 Gear Specification

Element 3 of this action would require that gear be specified for a GOA sablefish IFQ pot longline, or that specified pot longline gear requirements for sablefish be applied to all groundfish pot gear in all areas. NMFS recommends a separate action be initiated if the Council chooses to apply new pot longline gear requirements to all groundfish pot gear in all areas.

Option 1 would require the use of neutrally buoyant groundline in a pot longline set, which is believed to be the current industry standard. Option 2 would require both ends of a pot longline set to be marked.

Monitoring and enforcement of Option 1 could be verified at the time of a pre-departure gear inspection. However, OLE does not have the enforcement personnel or resources to conduct regular dockside inspections prior to vessel departure. OLE could inspect groundline at the time of landing in port. Any pot longline gear not meeting specifications would expose the vessel operator to a possible civil penalty. If OLE personnel were accompanying another enforcement agency during an at-sea vessel inspection and the vessel had pot longline gear on board, OLE could evaluate construction of the groundline at that time. Otherwise verifying the construction of the groundline on the fishing grounds is not possible because enforcement agencies in Alaska do not have a vessel capable of pulling pot longline gear. While observers are present on the fishing grounds, they are not trained to identify and report groundline construction and doing so would be beyond the scope of current observer duties. In addition, the pot longline fishery for sablefish in the GOA is not subject to 100 percent coverage.

Monitoring and enforcement of Option 2, to mark both ends of a pot longline set, cannot be enforced prior to fishing, or dockside, because the number of sets of pot longline gear and thus the number of gear identifiers is unknown until the gear is deployed on the fishing grounds. Monitoring and enforcement of marking both ends of a set could be minimally accomplished by requiring set start and finish positions be recorded in a mandatory logbook. Monitoring and enforcement of the number of gear identifiers could be best achieved on the fishing grounds through direct observation of the gear being deployed. Pot longline gear should have a specific buoy or marking requirement that is distinct from hook-and-line gear, so that enforcement agency personnel on vessels or aircraft could readily identify which gear is pot longline gear. OLE does not have the personnel or resources on the fishing grounds to observe or verify gear identifiers on both ends of a pot longline set. Observers would not be able to monitor a vessel's gear identifiers because once fishing begins they are occupied with sampling and data collection duties. Additionally, as noted above, observers are not deployed on all vessels. Therefore, monitoring and enforcement of markers at both ends of a pot longline set is not feasible.

Gear specifications may be useful to the fishing fleet, and NMFS encourages the use of gear construction that enhances the safety as well as the reliable retrieval of gear. So while these requirements may not be enforceable, the requirements may be beneficial to the fishing fleet as a whole.

4.8.2.4 Retention of Incidentally Caught Halibut

Element 4 of the action alternative would impact the retention of halibut in a GOA sablefish IFQ pot longline fishery. Element 4 would allow halibut that are incidentally caught in pot longline gear to be retained while directed fishing for sablefish in the GOA, provided the sablefish IFQ permit holder also holds sufficient halibut IFQ. The Council did not identify a limit on halibut IFQ retention to *incidental* amounts as an option for analysis under Alternative 2, Element 4, but the Council tentatively proposed a maximum retainable amount (MRA) for halibut in the sablefish IFQ pot longline fishery in Area 4A under a similar action in the Bering Sea. Therefore, the analysts have incorporated into this analysis an MRA for halibut in the GOA sablefish IFQ pot longline fishery. An MRA suboption would allow halibut to be retained in a GOA pot longline directed fishery for sablefish up to an MRA percentage, provided the sablefish IFQ holder also holds sufficient halibut IFQ. Incidental catch of halibut by the vessel in excess of an MRA percentage would have to be discarded even if the IFQ permit holder onboard the vessel holds halibut IFQ in excess of the MRA.

If the Council recommends allowing retention of halibut in a sablefish IFQ fishery using pot longline gear, NMFS would require that sufficient halibut IFQ are held by permit holders on a vessel to cover the halibut harvested, and that the halibut retained are legal size. Currently, legal size incidentally caught halibut are required to be retained in the GOA hook-and-line sablefish fishery if any permit holder on the vessel has unharvested halibut IFQ. The procedures NMFS uses to verify that sufficient halibut IFQ are held by a permit holder onboard a HAL vessel fishing sablefish could be used for a pot longline vessel. Since IFQ are specific to regulatory area and vessel size category, the amount of halibut retained and landed is crosschecked against the IFQ permit database to verify the permit holder's IFQ balance is sufficient for that area and vessel size category. In addition, OLE can reference information in NMFS logbooks and IPHC logbooks at the time of landing. The mandatory logbooks on vessels greater than 60' in the HAL sablefish fishery require the weight and disposition of incidentally caught halibut and the permit number of a person onboard who holds the IFQ. IPHC regulations (Section 16) also require any vessel greater than 26' that is retaining commercially harvested halibut to keep an IPHC approved logbook and to log their halibut harvests.

As with Element 4, the option to allow halibut to be retained up to an MRA percentage on a vessel in a sablefish IFQ pot longline fishery would require that sufficient halibut IFQ are held by sablefish IFQ permit holders on the vessel for the area fished and for the vessel size category being fished, and that the retained halibut is legal size. Incidental catch of halibut by the vessel in excess of an MRA percentage would have to be discarded even if the permit holder onboard the vessel holds halibut IFQ in excess of the MRA.

An MRA would deter directed pot longline effort on halibut. To use a halibut MRA as a regulatory disincentive in the sablefish pot longline fishery, the MRA would have to apply GOA-wide. OLE has identified MRAs as an enforceable management tool. GOA data are lacking to determine the intrinsic rate of halibut harvest in a sablefish pot longline fishery that can be used to set a halibut MRA.

To account for halibut IFQ harvests under an MRA, halibut retention has to be calculated on a trip-basis by management area and by vessel size category. To calculate the trip specific percentage of halibut retained (retained species) in the directed species catch of sablefish (basis species) for comparison to an MRA, the amount of retained halibut is divided by the amount of sablefish. Since sablefish IFQ is also accounted specifically by management area and vessel size category, the amount of sablefish to use as a

basis species could be either GOA-wide, specific to management area, or specific to management area and vessel size category. A decision on the amount of basis species to use in calculating a halibut MRA percentage for each trip is complicated by the different management areas and vessel size categories used to allocate sablefish and halibut IFQ. For example, if an MRA for pot-longline-caught halibut is set at 20% GOA-wide and a vessel fishing in the Southeast sablefish management area has retained 1,000 pounds of sablefish, then the vessel would be able to retain a total of 200 pounds of halibut. However, the Southeast sablefish management area includes halibut management Area 2C and part of halibut management area 3A. As a result, the vessel could retain a total of 200 pounds of halibut counted against either Area 2C or Area 3A, or a combination of both areas, if and only if the IFQ permit holder(s) on board have sufficient halibut IFQ for the halibut management area(s) and vessel class they are fishing.

As noted above, under Element 4 or an MRA suboption, NMFS would also require that the lengths of halibut retained onboard a vessel be verified to ensure that they are at or above the commercial size limit. Observers collect data on retained halibut such as number, length, and viability. However, observers would not be onboard all vessels fishing. Thus, retention of legal sized halibut could only be verified on a portion of the vessels fishing.

Verifying logbook data and enforcing retention and size limit requirements could only be accomplished through OLE dockside inspections at the time of landing. OLE currently completes dockside inspections of the hook-and-line sablefish IFQ fishery, and anticipates this practice could be continued for pot longline gear vessels in a GOA sablefish IFQ fishery.

4.8.3 Regulations Governing the Use of Gear in the GOA Sablefish Fishery

NMFS recognizes that several changes to regulations would be necessary to incorporate the action alternative into the existing management process. The following paragraphs note sections of the regulations that would need to be changed if a pot longline sablefish fishery were to be implemented in the GOA. Other regulations would need to be developed to address elements of Alternative 2, and are not included at this time.

While there are pot longline fisheries for sablefish in federal and State waters, there are currently no pot limits, gear retrieval requirements, or groundline specifications in these fisheries. Existing NMFS and ADF&G regulations have similar descriptions of pot gear configuration and buoy marking requirements. NMFS revised the identification marking requirements for fishing gear marker buoys used in federal waters off Alaska on April 3, 2014 (79 FR 18655).

To allow pot longline gear fishing for sablefish in the GOA, NMFS recommends the definition of "Fixed gear" be changed in Federal regulations. The term "Authorized fishing gear" currently includes the terms "Fixed gear" and "Pot gear". While pot gear includes pot longline and single pot-and-line gear, it is not used in reference to sablefish or halibut IFQ fisheries. The term "Fixed gear" is used throughout the IFQ regulations and, for sablefish harvested from any GOA reporting area, means all longline gear. For purposes of determining initial IFQ allocation, "Fixed gear" included all pot gear used to make a legal landing. Therefore, the term "Fixed gear" references pot gear only for initial allocation purposes. To implement this action, the term would need to be updated to include pot longline gear. In addition, NMFS anticipates several other changes would need to be made to the Federal regulations, such as removing a gear limitations on sablefish harvest (§679.24(c) and §679.42(b)), and specifying a code for pot longline gear (Table 15 to Part 679).

If IFQ halibut were incidentally retained in a GOA pot longline fishery for sablefish, then the current NMFS and IPHC definition (§679.2 and §300.61) of "IFQ halibut" would need to be changed to recognize that pot longline gear can be used to harvest IFQ halibut. Currently, NMFS and IPHC define

"IFQ halibut" as any halibut that is harvested with setline or other hook-and-line gear while commercial fishing in any IFQ regulatory area, where "Setline gear" means one or more stationary, buoyed, and anchored lines with hooks attached. In addition, Section 19 Fishing Gear, of the Pacific Halibut Fishery Regulations (IPHC annual management measures) would need to be revised to allow persons to fish and possess halibut taken with pot longline gear. Additional revisions to these regulations may be necessary to describe the incidental commercial halibut fishery during a sablefish IFQ pot longline fishery.

4.9 Summation of the Alternatives with Respect to Net Benefit to the Nation

Two general outcomes are possible under the proposed action, each of which would have different net benefit impacts.

The first possible outcome is that HAL gear remains the only legal gear for the harvest of GOA sablefish IFQ. Net benefits would not change from the status quo under this outcome. The IFQ fishery would continue to operate in its current manner: whale depredation would continue to impose direct and opportunity costs on IFQ fishermen, and HAL bycatch of other groundfish species and seabirds would be unchanged from their present rates.

The second possible outcome is that longline pot gear would be permitted in the GOA sablefish IFQ fishery, but would not be required. Given the diversity in the size of the vessels and the resources of the vessel owners in the fleet, it is likely that the fishery will be prosecuted with two different gear types deployed in the same management areas.

The likely benefits of replacing some HAL effort with longline pot effort are aligned with the Council's purpose and need for this action. Specifically, reducing the amount of prey availability for marine mammals and seabirds (sablefish and other groundfish hooked on HAL gear) should reduce interactions with fishing gear. Marine mammals and seabirds would experience a marginal benefit, in which the Council has expressed an interest, and those sablefish IFQ harvesters who use pot longline gear will have mitigated the depredation events that depress their CPUE. Bycatch of other groundfish species that are commonly taken with HAL gear but encountered less often with pot gear (e.g. halibut, rockfish, and skates) would decrease in the aggregate. More of those bycatch species would be available to other directed fisheries, benefitting sablefish IFQ participants who are active in those fisheries, as well as other stakeholder groups. The amount of sablefish that are depredated off of HAL gear without being accounted in stock abundance indices would decrease as less HAL gear is deployed, thereby improving stock management and potentially leading to greater harvestable biomass in future time periods.

Participants who are not able to fish longline pot gear on their vessels – due to either financial or operational constraints – would not experience the same benefit of reduced whale depredation. In fact, it is possible that they would experience greater rates of depredation as the sablefish hooked on HAL gear becomes concentrated on fewer vessels in a given area. Therefore, some distributional impacts are likely to result from the action alternative; those impacts are likely to affect smaller vessels in the sablefish IFQ fleet. Furthermore, allowing two gear types in the same areas could increase the likelihood of gear conflicts in which HAL gear is at risk of damage or loss. The action alternative includes elements and options meant to enhance the ability of smaller vessels to fish with pot longline gear (exemption from gear retrieval requirements), and also includes new gear specifications that are intended to mitigate the negative impacts of gear conflict on HAL vessels. Voluntary industry cooperation will be key to avoiding gear conflicts.

Because pot longline fishing for sablefish has not been permitted in the GOA during the existing IFQ management regime, the analysis lacks some information that would allow for a definitive assessment of whether or not pot fishing will actually generate greater net benefits. GOA data on sablefish catch rates with longline pot gear, and ex-vessel prices for pot-caught sablefish are not available. On the other hand, it is known that fitting a vessel with longline pot gear will be costly. Lacking that information, it is not clear that investments in setting up a pot longline operation will return a net benefit in the form of reduced gear damage and reduced opportunity costs incurred when avoiding whale depredation.

Based on the analysis and criteria under E.O. 12866, there may likely be some distributional impacts among the various participants affected. Precisely what, when, and how great these impacts might be is an empirical question. The qualitative benefits of reduced whale and seabird interactions are likely to be achieved under the action alternative. The balance of benefits between pot longline and HAL sablefish fishermen is, at this point, less obvious due to limited data.

5 Initial Regulatory Flexibility Analysis

5.1 Introduction

This Initial Regulatory Flexibility Analysis (IRFA) addresses the statutory requirements of the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (5 U.S.C. 601-612). This IRFA evaluates the potential adverse economic impacts on small entities directly regulated by the proposed action.

The RFA, first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a federal regulation. Major goals of the RFA are: (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require that agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities.

The RFA emphasizes predicting significant adverse economic impacts on small entities as a group distinct from other entities, and on the consideration of alternatives that may minimize adverse economic impacts, while still achieving the stated objective of the action. When an agency publishes a proposed rule, it must either 'certify' that the action will not have a significant adverse economic impact on a substantial number of small entities, and support that certification with the 'factual basis' upon which the decision is based; or it must prepare and make available for public review an IRFA. When an agency publishes a final rule, it must prepare a Final Regulatory Flexibility Analysis, unless, based on public comment, it chooses to certify the action.

In determining the scope, or 'universe', of the entities to be considered in an IRFA, NMFS generally includes only those entities that are directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis.

5.2 IRFA Requirements

Until the North Pacific Fishery Management Council (Council) makes a final decision on a preferred alternative, a definitive assessment of the proposed management alternatives cannot be conducted. In order to allow the agency to make a certification decision, or to satisfy the requirements of an IRFA of the preferred alternative, this section addresses the requirements for an IRFA. Under 5 U.S.C., section 603(b) of the RFA, each IRFA is required to contain:

- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and the legal basis for, the proposed rule;
- A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate);
- A description of the projected reporting, record keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant federal rules that may duplicate, overlap, or conflict with the proposed rule;
- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the proposed action, consistent with applicable statutes, and that would minimize any significant

economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:

1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
3. The use of performance rather than design standards;
4. An exemption from coverage of the rule, or any part thereof, for such small entities.

In preparing an IRFA, an agency may provide either a quantifiable or numerical description of the effects of a proposed action (and alternatives to the proposed action), or more general descriptive statements, if quantification is not practicable or reliable.

5.3 Definition of a Small Entity

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a 'small business' as having the same meaning as 'small business concern', which is defined under Section 3 of the Small Business Act (SBA). 'Small business' or 'small business concern' includes any firm that is independently owned and operated and not dominant in its field of operation. The SBA has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor…A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the firm is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the United States, including fish harvesting and fish processing businesses. Effective July 22, 2013, a business involved in *finfish harvesting* is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual gross receipts not in excess of $19.0 million for all its affiliated operations worldwide. A business involved in *shellfish harvesting* is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual gross receipts not in excess of $5.0 million for all its affiliated operations worldwide. A *seafood processor* is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business that *both harvests and processes* fish (i.e., a catcher/processor) is a small business if it meets the criteria for the applicable fish harvesting operation (i.e., finfish or shellfish). A wholesale business servicing the fishing industry is a small business if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established "principles of affiliation" to determine whether a business concern is "independently owned and operated." In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family

members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern's size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when (1) a person is an affiliate of a concern if the person owns or controls, or has the power to control 50 percent or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) if two or more persons each owns, controls or has the power to control less than 50 percent of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors, or general partners, controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint venturers if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small organizations. The RFA defines "small organizations" as any not-for-profit enterprise that is independently owned and operated, and is not dominant in its field.

Small governmental jurisdictions. The RFA defines "small governmental jurisdictions" as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

5.4 Reason for Considering the Proposed Action

The Council adopted the following purpose and need statement to originate this action in December 2013.

> *Interactions with sperm whales in the Central and Eastern Gulf, and killer whales in the Western Gulf affect the ability of sablefish quota share holders to harvest their sablefish IFQs by reducing catch per unit of effort and increasing fishing costs. Research into developing technological solutions to deter whales and changes in fishing strategies has not resolved the problem. Additional sablefish mortality associated with whale depredation is difficult to quantify, but increases total mortality and uncertainty in sablefish abundance indices. The use of pot gear for sablefish could reduce sperm whale and killer whale interactions with fishing gear in the Gulf of Alaska. The Council seeks to reduce the problems associated with whale depredation while minimizing gear conflicts that could result from allowing pot and longline gear to fish in the same regulatory areas.*

The action is proposed to minimize fishery interaction with marine mammals and seabirds and adverse impacts on the sablefish IFQ fleet and Pacific halibut IFQ fleet from depredation by sperm whales (*Physeter macrocephalus*) and killer whale (*Orcinus orca*). Depredation has negative consequences for the sablefish IFQ fleet through reduced catch rates and increased operating costs. Depredation also has negative consequences for the whales through increased risk of vessel strike, gear entanglement, fisherman aggression, and altered foraging strategies. An additional management concern stems from the impact that whale depredation may have on the accuracy of fish stock abundance indices.

5.5 Objectives of Proposed Action and its Legal Basis

Under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Secretary of Commerce (NMFS Alaska Regional Office) and the North Pacific Fishery Management Council have the responsibility to prepare fishery management plans and associated regulations for the marine resources found to require conservation and management. NMFS is charged with carrying out the Federal mandates of the Department of Commerce with regard to marine fish, including the publication of Federal regulations. The Alaska Regional Office of NMFS and Alaska Fisheries Science Center research, draft, and support the management actions recommended by the Council. The GOA groundfish fisheries are managed under the Fishery Management Plan for Groundfish of the GOA management area. The proposed action represents an amendment, as required, to the fishery management plan, as well as amendments to associated Federal regulations.

Principal objectives of the FMP amendment and associated changes in regulations include the minimization of gear interaction with marine mammals and seabirds, improved operating efficiency for the sablefish IFQ fleet, and improved reliability in stock assessment information. Minimization of gear interaction with marine mammals and seabirds is required by the Marine Mammal Protection Act and the Endangered Species Act. Minimizing or reducing depredation off of longline gear is likely to increase groundfish catch per unit of fishing effort, which would be consistent with the consideration of efficiency required under National Standard 5 of the Magnuson-Stevens Act. Mortality from whale depredation is difficult to account for in stock assessment, so reducing depredation would be consistent with National Standard 2 of the Magnuson-Stevens Act.

5.6 Number and Description of Directly Regulated Small Entities

To be completed.

5.7 Recordkeeping and Reporting Requirements

To be completed.

5.8 Federal Rules that may Duplicate, Overlap, or Conflict with Proposed Action

To be completed.

5.9 Description of Significant Alternatives to the Proposed Action that Minimize Economic Impacts on Small Entities

To be completed.

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IFQ Implementation Committee
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Appendix 1. Halibut occurrence in sablefish IFQ pot fisheries by month.

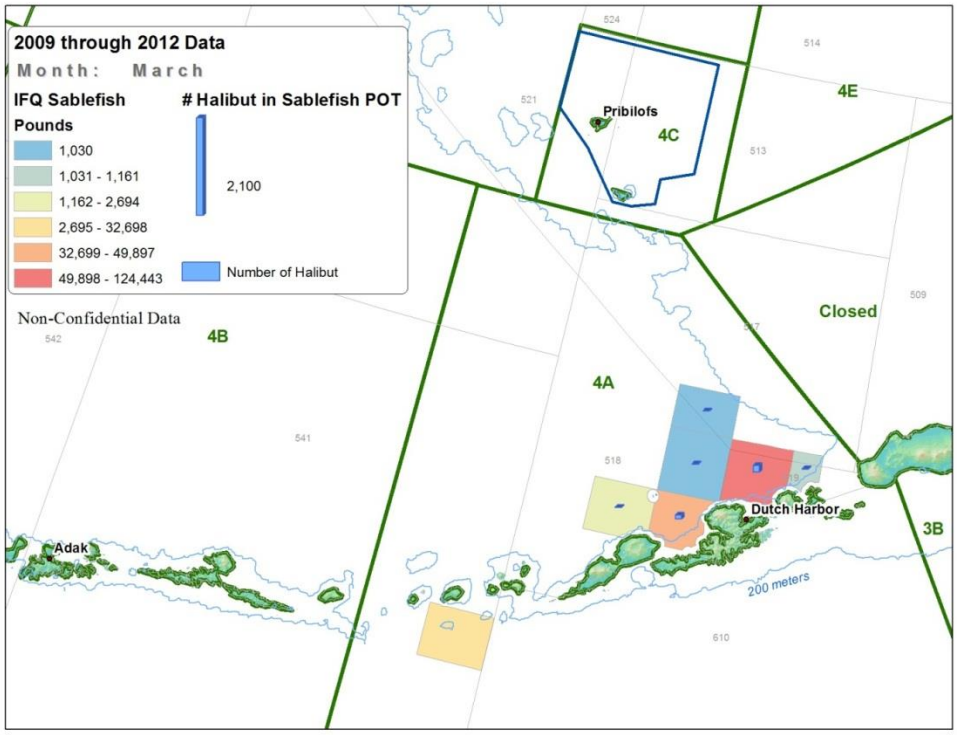


Figure 34 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.

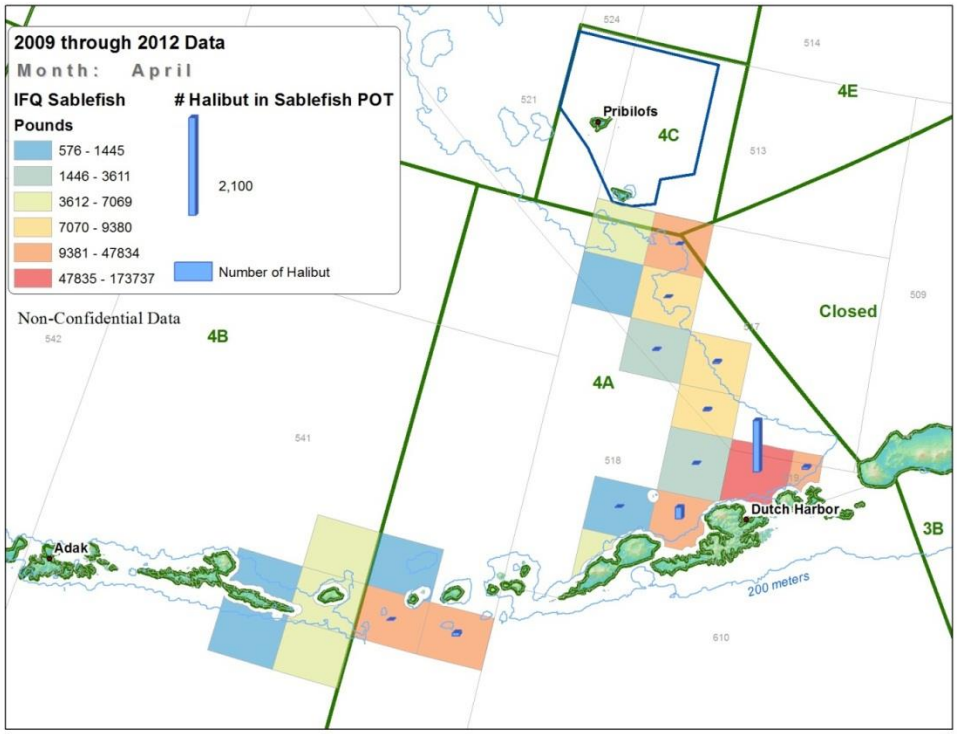


Figure 35 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.

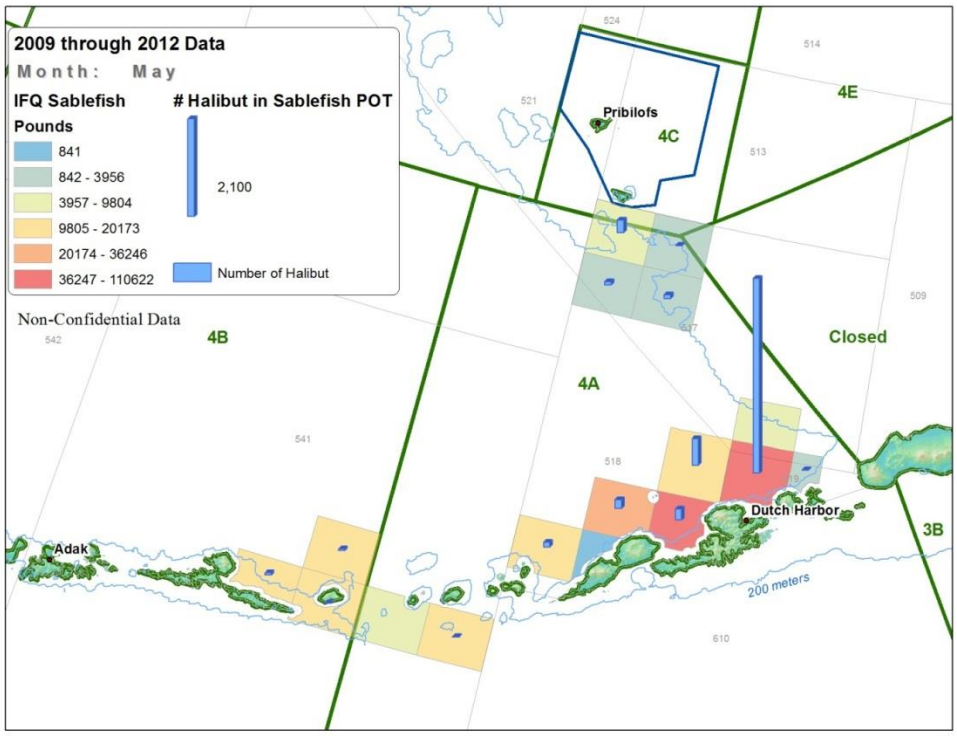


Figure 36 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.

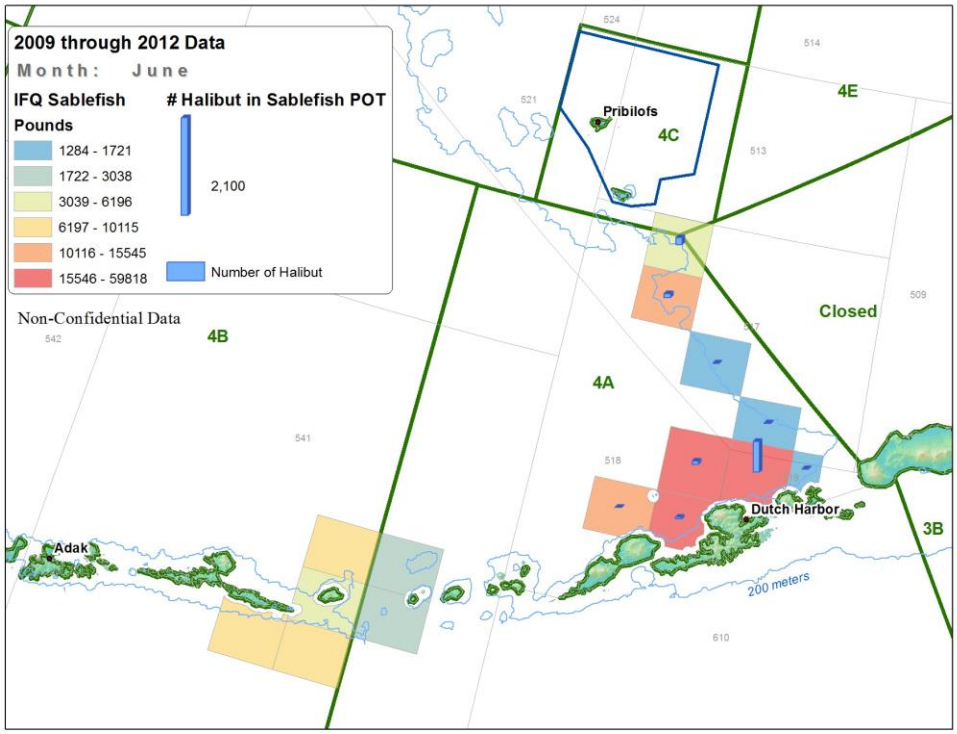


Figure 37 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.

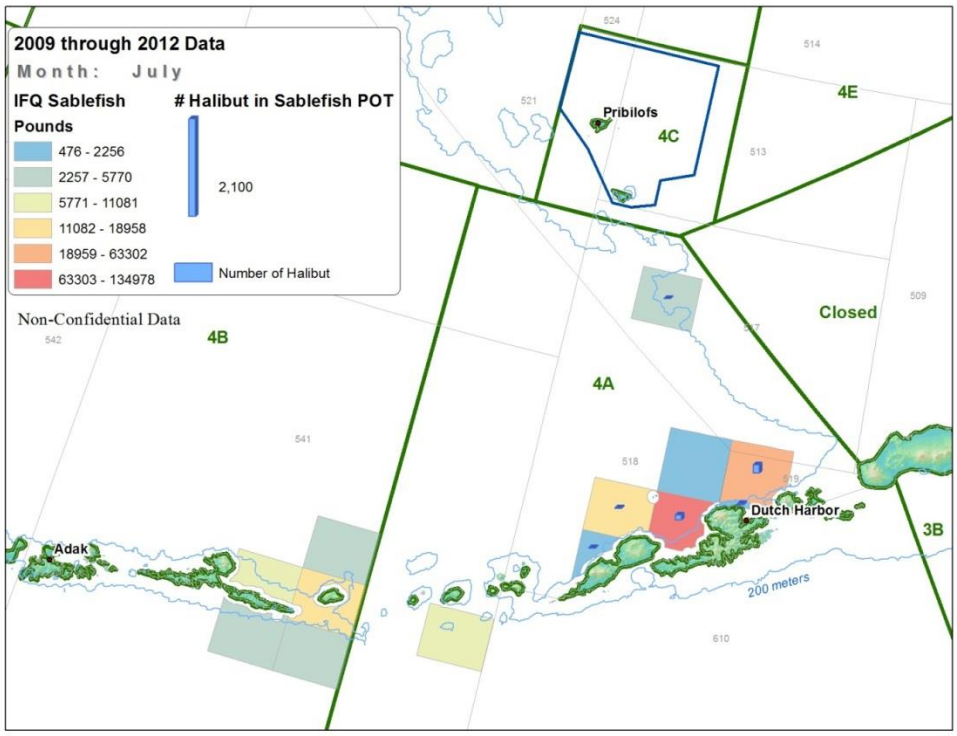


Figure 38 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.

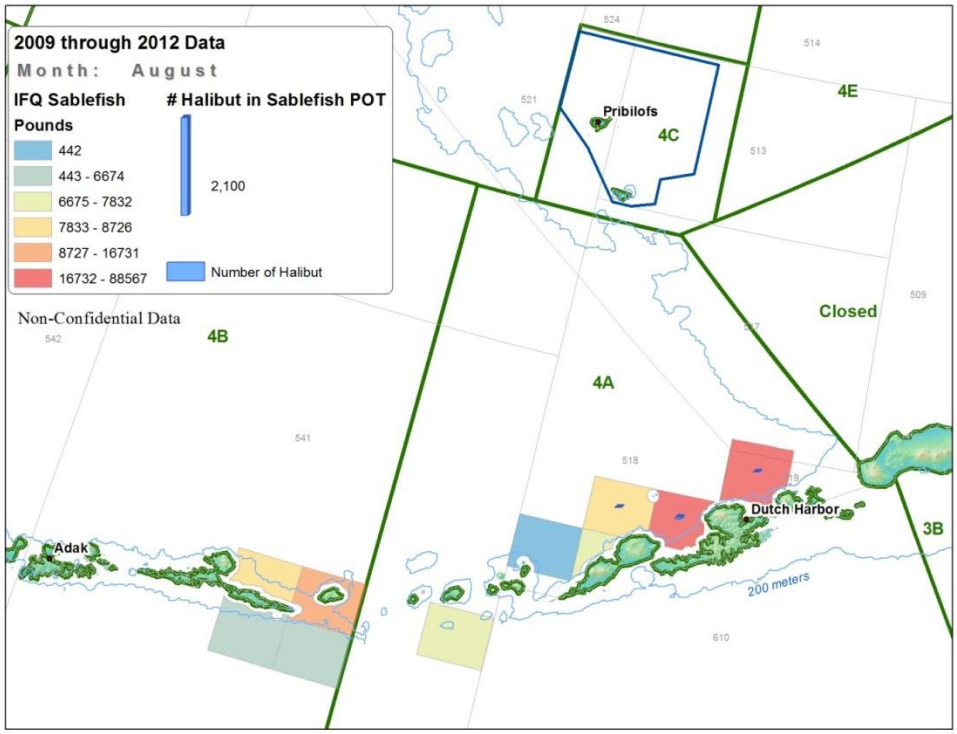


Figure 39 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.

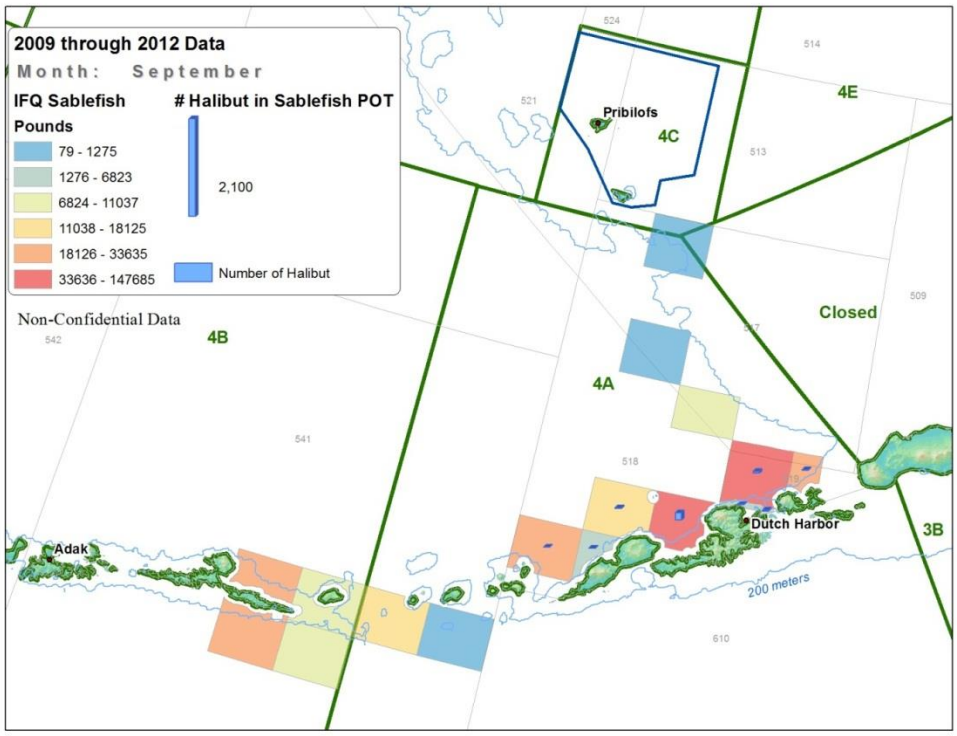


Figure 40 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.

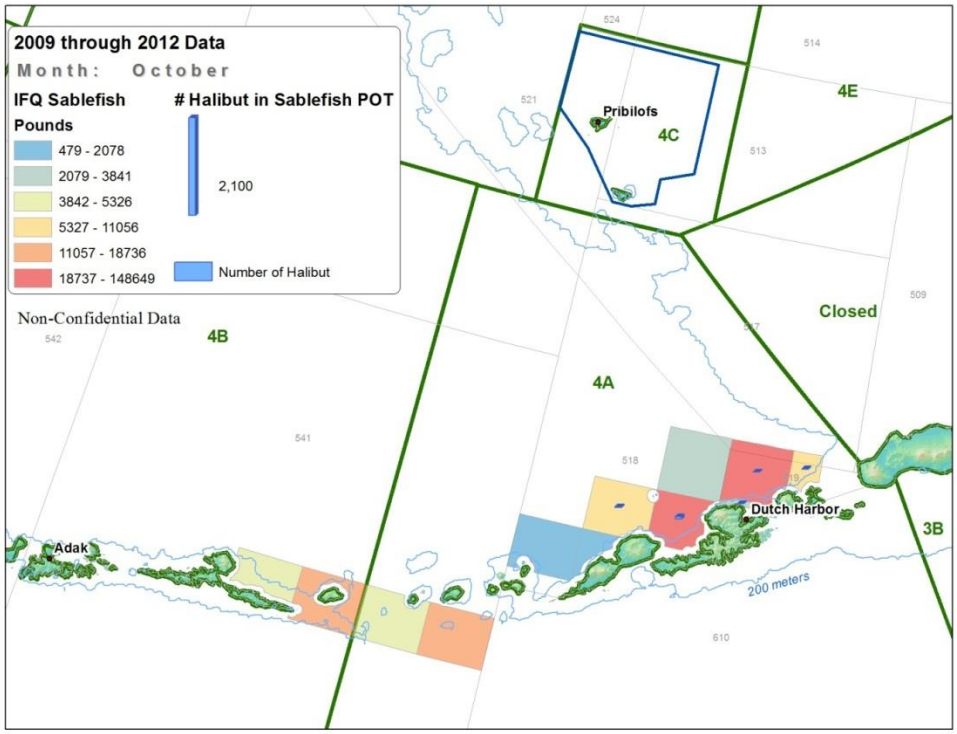
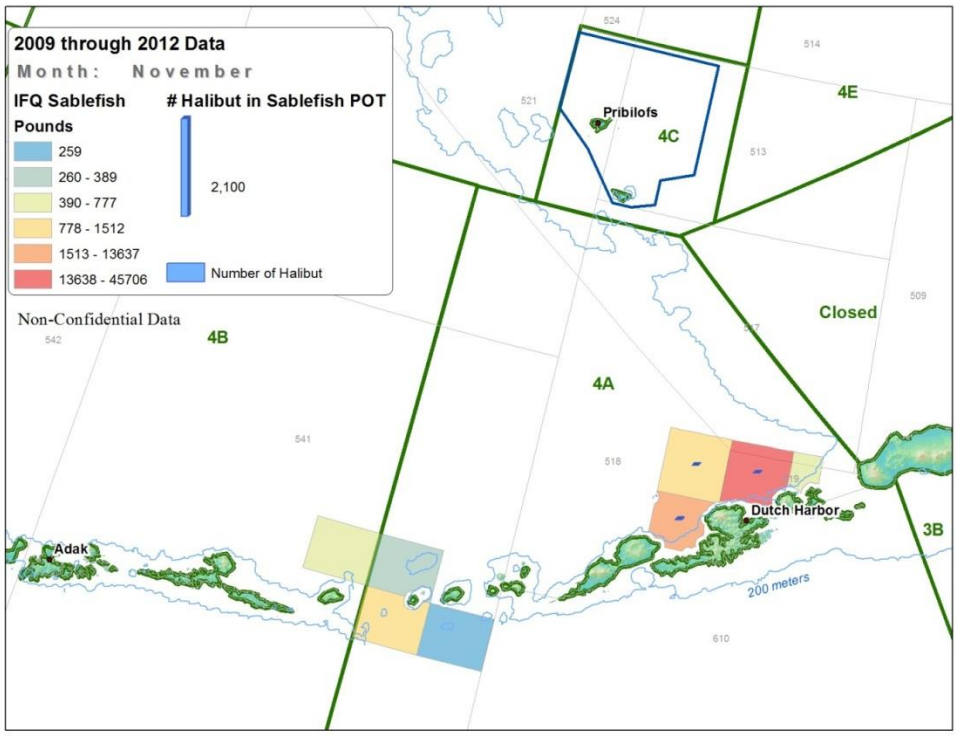


Figure 41 Number of total halibut (summed over 2009-2012) caught incidentally in IFQ sablefish fishery in pot gear by month.



Appendix 2. Draft proposed FMP amendment language

In Table ES-2:

Authorized Gear	Gear types authorized by the FMP are trawls, hook-and-line , pots, jigs, and other gear as defined in regulations. Sablefish: Legal gear for taking sablefish in the GOA is hook and line **and longline pots for the Fixed Gear Sablefish Fishery,** and trawl gear. Flatfish: For vessels using non-pelagic trawl gear, elevating devices on the sweeps are required when directed fishing for flatfish species in the Central GOA Regulatory Area.

3.2.3.4.3.3 Allocations by Gear Type and Sector

3.2.3.4.3.3.1 Sablefish

In the Eastern regulatory area, from 1986 forward, vessels using hook-and-line **and longline pot** gear shall be permitted to take up to 95 percent of the TAC for sablefish. Vessels using trawl gear shall be permitted to harvest up to 5 percent of the TAC for sablefish.

In the Central and Western regulatory areas, from 1987 and 1989 forward (respectively), vessels using hook-and-line **and longline pot** gear shall be permitted to take up to 80 percent of the sablefish TAC, and vessels using trawl gear shall be permitted to take up to 20 percent of the TAC.

3.4.2 Target Fishery Specific

3.4.2.1 Sablefish

Legal gear for the taking of sablefish in any regulatory area of the GOA are trawls, and hook-and-line **longlines and longline pots for the IFQ fishery**.

3.7.1.1 Definitions

Fixed Gear is defined to include all hook-and-line and pot longline ~~fishing~~ gears~~(longlines, jigs, handlines, troll gear, and pot gear). For purposes of initial allocation, legal pot gear will be counted.~~

3.7.1.7 General Provisions

2. Quota shares and IFQs arising from those quota shares may not be applied to: 1) trawl-caught sablefish; or 2) sablefish harvested using **single** pots in the GOA."

4.1.2.3 Sablefish, paragraph 3 in the GOA Groundfish FMP states:

"~~Longlined~~ **Single** pots are not a legal gear type for sablefish in the GOA."

Appendix 3. Draft proposed regulatory amendment language

The following regulatory language is provided for the Council's reference: The language for Section 679.2 shows a draft of regulatory language as it could be amended if the Council selects the action alternative (Alternative 2). The language for Section 679.24 shows the regulatory language as it currently exists. Proposed revisions that would apply if Alternative 2 is selected have not yet been provided.

___

Section 679.2 of Federal regulations defines Authorized Fishing Gear for fixed gear sablefish as follows.

(4) *Fixed gear* means:

(i) For sablefish harvested from any GOA reporting area, all longline gear and pot longline gear.

(ii) For sablefish harvested from any BSAI reporting area, all hook-and-line gear and all pot gear.

(iii) For halibut harvested from any IFQ regulatory area, all fishing gear comprised of lines with hooks attached, including one or more stationary, buoyed, and anchored lines with hooks attached

Unrevised Section 679.24 (c) defines Gear restrictions for sablefish as follows.

(c) Gear restrictions for sablefish

(1) Gear allocations.

Gear allocations of sablefish TAC are set out under § 679.20.

(2) Eastern GOA regulatory area

(i) General.

(A) No person may use any gear other than hook-and-line and trawl gear when fishing for sablefish in the Eastern GOA regulatory area.

(B) No person may use any gear other than hook-and-line gear to engage in directed fishing for sablefish.

(ii) Sablefish as prohibited species

(A) Trawl gear. When operators of vessels using trawl gear have harvested 5 percent of the TAC for sablefish in the Eastern GOA regulatory area during any year, further trawl catches of sablefish must be treated as prohibited species as provided by § 679.21(b).

(B) Other gear. Operators of vessels using gear types other than those specified in paragraph (c)(2)(i) of this section in the Eastern GOA regulatory area must treat any catch of sablefish as a prohibited species as provided by § 679.21(b).

(3) Central and Western GOA regulatory areas; sablefish as prohibited species.

Operators of vessels using gear types other than hook-and-line and trawl gear in the Central and Western GOA regulatory areas must treat any catch of sablefish in these areas as a prohibited species as provided by § 679.21(b).

(4) BSAI.

Operators of vessels using gear types other than hook-and-line , longline pot, pot-and-line, or trawl gear in the BSAI must treat sablefish as a prohibited species as provided by § 679.21(b).

Appendix 4. Maps and Additional Methodology for Community Engagement and Reliance Indices

The following information is provided by Alaska Fisheries Science Center (Kasperski and Himes-Cornell, 2014). This information pertains to the background section on communities involved in the GOA sablefish IFQ fishery (Section 4.5.7).

Table 37 Fisheries involvement indices with factor loadings and total variance explained

Commercial Processing Engagement	Rotated Factor Loading	Total Variance Explained
Commercial pounds landed in the community	0.980	87%
Commercial revenue landed in the community	0.976	
Number of delivering vessels	0.986	
Number of delivering individuals	0.975	
Number of registered buyers	0.707	
Commercial Processing Reliance		
Commercial pounds landed in the community per capita	0.963	90%
Commercial revenue landed in the community per capita	0.955	
Number of delivering vessels per capita	0.994	
Number of delivering individuals per capita	0.980	
Number of registered buyers per capita	0.849	
Commercial Harvesting Engagement		
Quota Share held be residents	0.940	84%
Number of Quota Share holders	0.944	
Number of vessels owned by residents	0.963	
Number of delivering residents	0.960	
Commercial landings by vessels owned by residents	0.964	
Commercial revenue from vessels owned by residents	0.962	
Commercial Harvesting Reliance		
Quota Share held be residents per capita	0.912	91%
Number of Quota Share holders per capita	0.708	
Number of vessels owned by residents per capita	0.959	
Number of delivering residents per capita	0.950	
Commercial landings by vessels owned by residents per capita	0.962	
Commercial revenue from vessels owned by residents per capita	0.966	

Figure 42 Distribution of commercial GOA sablefish IFQ processing engagement for 62 Alaska communities. All communities that are considered “high engagement” are labeled in red, with the exception of Bellingham, WA, which also ranks as highly engaged but is not shown on the figure.

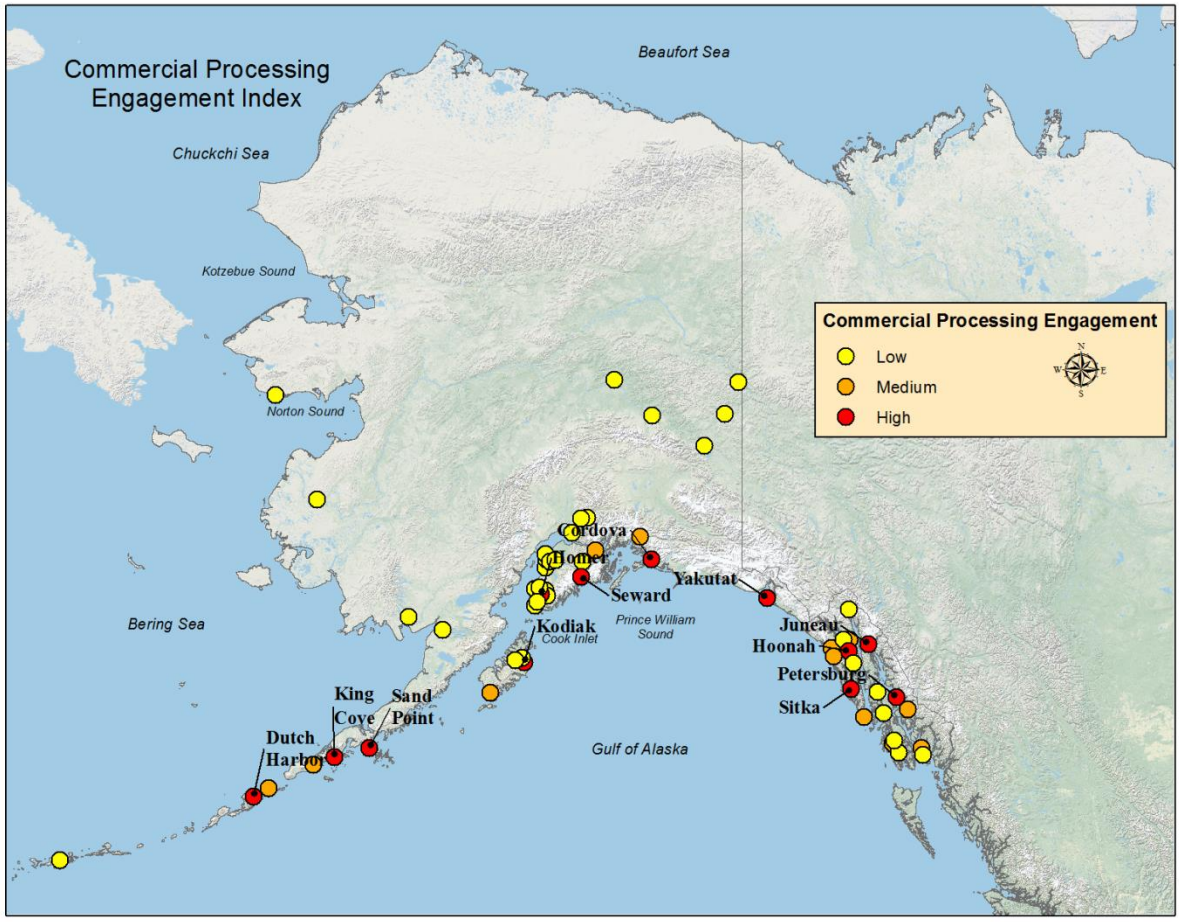


Figure 43 Distribution of commercial GOA sablefish IFQ processing reliance for 62 Alaska communities. All communities that are considered “high reliance” are labeled in red

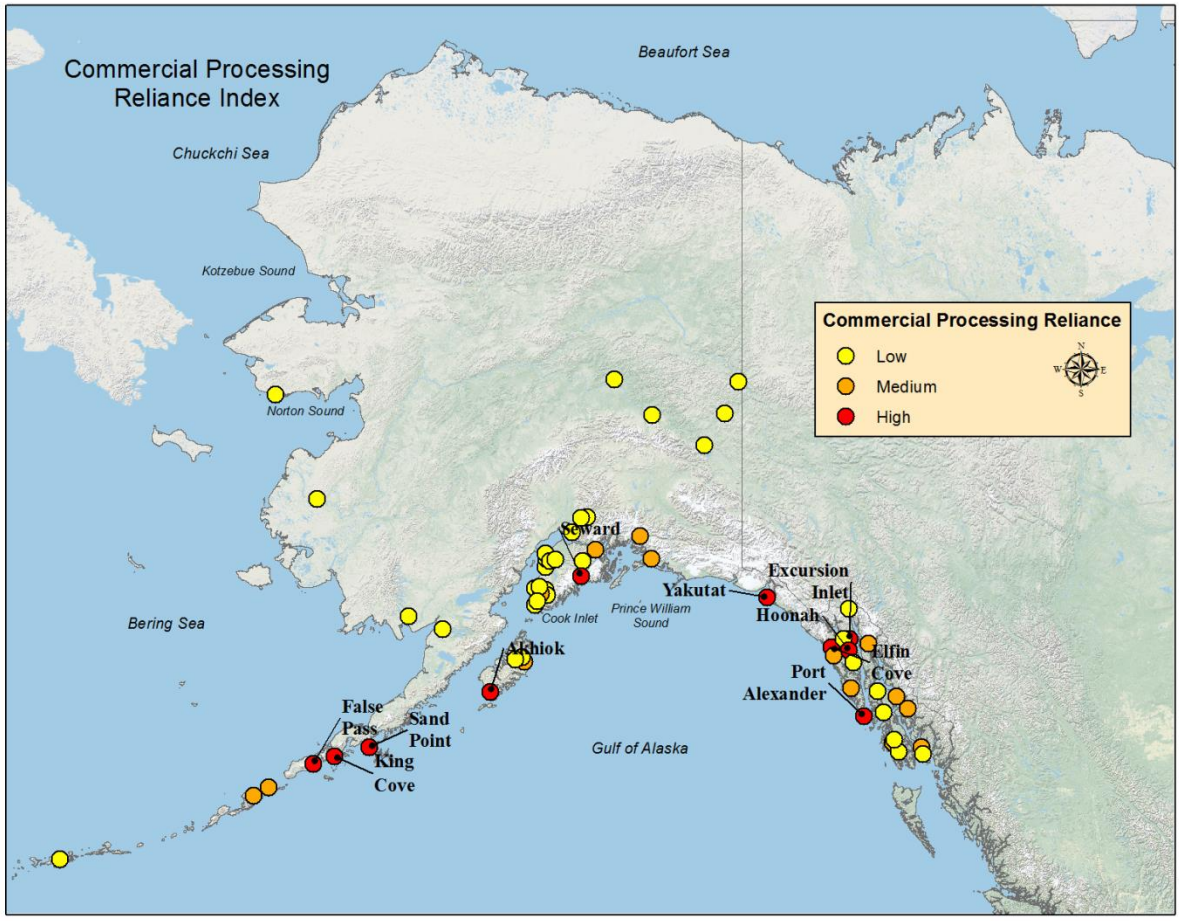


Figure 44 Distribution of commercial GOA sablefish IFQ harvesting engagement for 62 Alaska communities. All communities that are considered “high engagement” are labeled in red, with the exception of Seattle, WA, which also ranks as “high engagement” but is not shown on the figure.

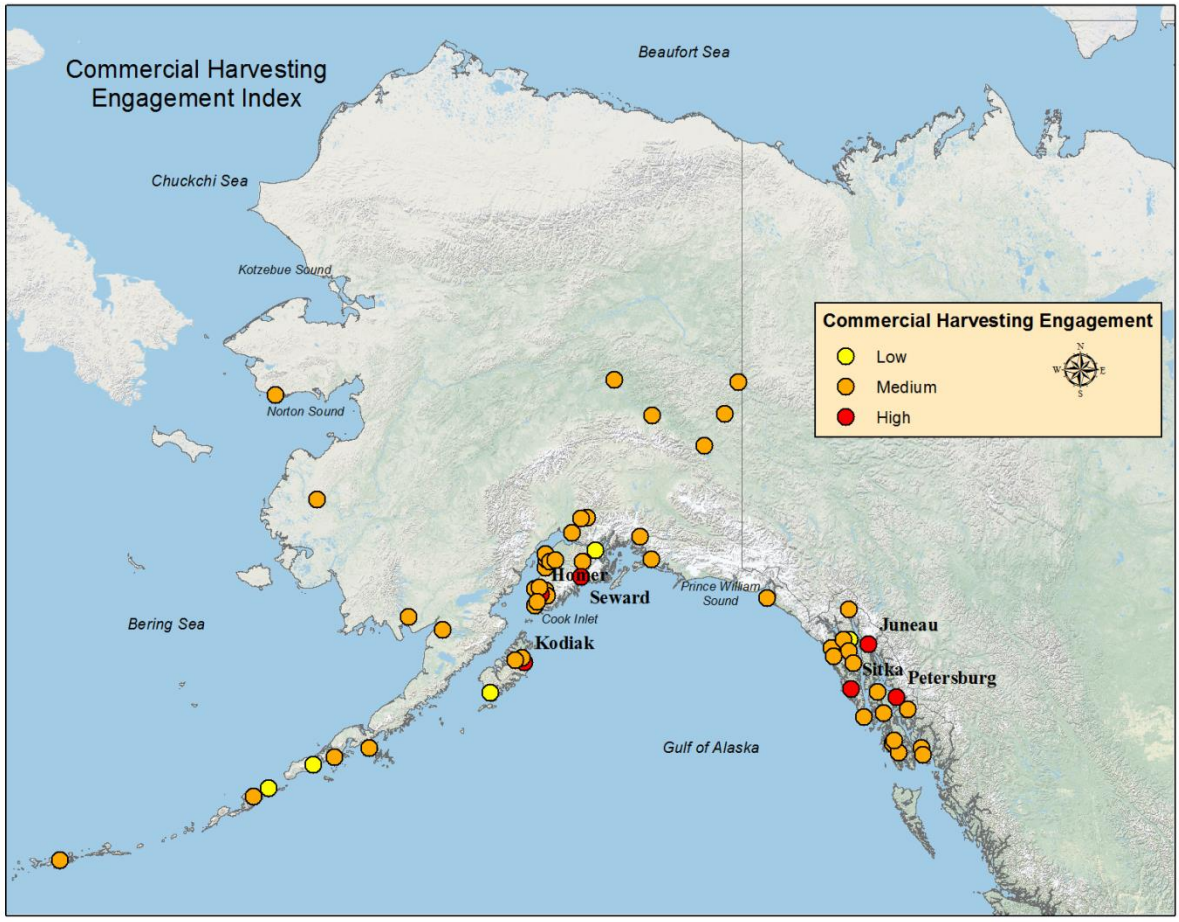


Figure 45 Distribution of commercial GOA sablefish IFQ harvesting reliance for 62 Alaska communities. All communities that are considered “high reliance” are labeled in red, with the exception of Addy, WA, which also ranks as “highly reliant” but is not shown on the figure.