

FINAL

Environmental Assessment/ Regulatory Impact Review

Amendment 118 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands and Federal regulations implementing the sablefish and Pacific halibut fisheries off Alaska

Authorize the Retention of Halibut in Pot Gear in the BSAI

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Abstract: This document analyzes proposed management measures that would apply exclusively to the halibut (*Hippoglossus stenolepis*) and sablefish (*Anoplopoma fimbria*) individual fishing quota (IFQ) and Community Development Quota (CDQ) fishery participants in the Bering Sea and Aleutian Islands (BSAI). The management measures under consideration would authorize retention of legal-size halibut in pot gear in the BSAI, provided the operator holds sufficient halibut IFQ or CDQ for that IFQ regulatory area. The purpose of this action is to allow for more efficient harvest of the halibut resource by decreasing the wastage of legal-size halibut discarded in the existing BSAI sablefish pot fishery, and to potentially reduce whale depredation of halibut from hook-and-line gear. This action also would make minor administrative revisions to Vessel Monitoring System (VMS) regulations that apply to vessels in the BSAI and Gulf of Alaska (GOA). The purpose of these revisions is to remove requirements that are no longer necessary, reduce reporting burdens, and provide regulatory clarity for vessels in the BSAI and GOA.

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List of Acronyms and Abbreviations

ABC	acceptable biological catch
ADF&G	Alaska Department of Fish and Game
AFSC	Alaska Fisheries Science Center
AKFIN	Alaska Fisheries Information Network
BCBS	Bering-Chukchi-Beaufort Sea
BSAI	Bering Sea and Aleutian Islands
CAS	Catch Accounting System
CDQ	community development quota
Council	North Pacific Fishery Management Council
CP	catcher/processor
CV	catcher vessel
DFL	daily fishing logbook
DPS	distinct population segment
E.O.	Executive Order
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FMP	fishery management plan
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	foot or feet
GOA	Gulf of Alaska
HAL	hook-and-line
IFQ	individual fishing quota
IRFA	initial regulatory flexibility analysis
lb	pound(s)
IPHC	International Pacific Halibut Commission
LOA	length overall
m	meter or meters
MMPA	Marine Mammal Protection Act

MRA	maximum retainable amount
MSA	Magnuson-Stevens Fishery Conservation and Management Act
mt	metric ton
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NEPA	National Environmental Policy Act
NPFMC	North Pacific Fishery Management Council
Observer Program	North Pacific Groundfish and Halibut Observer Program
OLE	Office of Law Enforcement
PBR	potential biological removal
PIBKC	Pribilof Islands blue king crab
PIHCZ	Pribilof Islands Habitat Conservation Zone
PPA	preliminary preferred alternative
PRA	Paperwork Reduction Act
PSC	prohibited species catch
PSEIS	Programmatic Supplemental Environmental Impact Statement
QS	quota share
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future action
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SAR	stock assessment report
Secretary	Secretary of Commerce
TAC	total allowable catch
U.S.	United States
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	vessel monitoring system

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Executive Summary

This document analyzes proposed management measures that would apply exclusively to the commercial halibut (*Hippoglossus stenolepis*) and sablefish (*Anoplopoma fimbria*) individual fishing quota (IFQ) and Community Development Quota (CDQ) fisheries in the Bering Sea and Aleutian Islands (BSAI). The measure under consideration would authorize (and require) retention of legal-size halibut in pot gear in the BSAI, provided the operator holds sufficient halibut IFQ or CDQ for the corresponding International Pacific Halibut Commission (IPHC) regulatory area. The purpose of this action is to allow for more efficient harvest of the halibut resource by decreasing the wastage of legal-size halibut discarded in the BSAI sablefish pot fishery, and to allow for the possibility of reduced whale depredation of halibut off of hook-and-line gear.

Currently, pot gear is not authorized as a legal gear type for the retention of halibut in the BSAI; thus, it is required to be discarded when caught in sablefish pots. This has led to halibut quota holders essentially “fishing twice”- catching halibut once in their sablefish pots, discarding the halibut (as required by regulation) which is sometimes immediately preyed upon by killer whales, and then deploying hook-and-line (HAL, also called longline) gear to harvest their halibut quota using legal gear. Furthermore, testimony from fishery participants and scientific surveys have identified killer whale depredation of HAL gear as a serious issue, as fishery participants are forced to spend more time and money to catch their halibut quota. This generates both conservation and socioeconomic concerns, as it impedes efficient use of the halibut resource.

In addition, this document analyzes NMFS’s recommendations to make minor administrative revisions to Vessel Monitoring System (VMS) regulations that apply to vessels in the BSAI and Gulf of Alaska (GOA). NMFS recommends to remove VMS requirements that are no longer necessary, which will reduce reporting burdens, and to make other minor revisions to provide regulatory clarity for vessels in the BSAI and GOA.

Purpose and Need

In April 2018, the Council adopted a purpose and need statement and suite of alternatives for initial review. In June 2018, the Council updated the purpose and need statement (below) to include a statement regarding NMFS’s authority over the halibut fisheries.

Interactions with whales throughout the Bering Sea and Aleutian Islands affect the ability of sablefish and halibut QS holders to harvest their IFQ by reducing catch per unit of effort and increasing fishing costs. Whale depredation is increasing for vessels fishing halibut IFQ with longline gear, and for halibut discarded when using pot gear to fish sablefish IFQ in the BSAI. The purpose of this action is to address whale depredation on discarded halibut and to allow for more efficient harvest of halibut in areas with whale depredation. Research into developing technological solutions to deter whales and changes in fishing strategies has not resolved this problem. The problem may be addressed by revisions to current regulations that authorize pot gear as legal gear to retain halibut in the BSAI. Allowing retention of halibut caught in pot gear in the BSAI could address the negative impacts of whale depredation on QS holders. This action seeks to reduce the problems associated with whale depredation, including unobserved halibut mortality, while minimizing gear conflicts. In the event that there is conservation concern for a shellfish or groundfish species, NMFS would have the authority to close the directed longline and pot halibut fisheries in both the BSAI and the Gulf of Alaska.

Alternatives

The Council adopted the following revised alternatives, elements, and options for analysis in June 2018. The preferred alternative, chosen at the October 2018 meeting, is shown in **bold** type.

Alternative 1: No action (status quo).

Alternative 2 (Preferred): Allow retention of legal-sized halibut in single or longline pot gear used to fish for halibut or sablefish IFQ/CDQ in the BSAI provided the IFQ/CDQ holder holds sufficient halibut IFQ/CDQ for that IFQ regulatory area. The Pribilof Islands Habitat Conservation Zone will be closed to all fishing with pot gear.

Element 1: Gear retrieval

Option 1: No gear tending requirements (status quo)

Option 2: A vessel cannot leave gear on the grounds untended for more than (sub-options 5-10 days)

Element 2: Limit of a 9-inch maximum width of tunnel opening does not apply when vessel has unfished halibut IFQ/CDQ onboard.

Element 3: All vessels using pot gear to fish IFQ/CDQ are required to use logbooks and VMS.

Element 4: Require escape mechanisms in the mesh panels of pots.

Option 1: No escape mechanism requirement for crab (status quo)

Option 2: Require escape mechanism for crab

Element 5: Establish regulations that would allow NMFS to close IFQ fishing for halibut if an OFL is approached for a groundfish or shellfish species consistent with regulations in place for groundfish.

The Council requests that NMFS include IFQ pot gear effort in its annual inseason management report to the Council. The Council intends to review the effects of allowing retention of halibut in pot gear three years after implementation.

To the extent practicable, the Council recommends that halibut fishermen in the BSAI interested in using pot gear under this action consult with crab fishery participants on appropriate crab escape mechanisms to minimize crab bycatch.

History of the Proposed Action

In **June 2017**, the Council received a public comment letter describing a worsening situation of whale depredation of BSAI HAL gear. This prompted the Council to request a discussion paper illustrating the Council's action and coordination with IPHC if the intent of an action is to allow (1) retention of incidentally caught halibut in pot gear in the sablefish IFQ fishery, or (2) a directed BSAI halibut IFQ pot fishery. When staff produced this discussion paper in **October 2017**, it described the management authority, how a future amendment might occur, and some of the nuanced regulatory language that makes it difficult to open access for the "targeting" of halibut versus the "incidental" catch of halibut IFQ. At

this meeting, the Council adopted a purpose and need statement, a set of alternatives, and requested an initial review analysis. The Council reviewed that initial review analysis in **April 2018**.

At the **April 2018** meeting, in response to public testimony and partially due to recent IPHC recent action, the Council requested that scope of the action be expanded in such a way that the opportunity to retain halibut in pots need not be linked to the requirement to also possess sablefish IFQ. In addition, some of the elements were amended and new elements were introduced. The second initial review analysis, reviewed at the **June 2018** meeting, considered the expanded scope of possible impacts from a targeted halibut pot fishery in the BSAI, and the additional elements proposed. In June, the Council identified its preliminary preferred alternative (PPA) and released the draft for public review pending a few additions and edits to the analysis.

The analysis went through public review at the **October 2018** meeting, where the Council reviewed the analysis and identified its preferred alternative (above).

Following Council final action, NMFS reviewed the preferred alternative and determined that additional regulatory components were necessary to implement Amendment 118, including a requirement that vessels report specific information on pot gear deployed, lost, and left on the fishing grounds on the prior notice of landing (PNOL). The preferred alternative includes NMFS's additional recommendations to implement Amendment 118.

In addition, NMFS is proposing revisions to the Vessel Monitoring System (VMS) regulations that govern vessels in both the BSAI and GOA. The preferred alternative includes NMFS's proposed revisions to the VMS regulations that include removal of certain VMS reporting requirements that are no longer necessary and other minor administrative changes.

Scope of Expected Change Under Proposed Action

The Council's motion states that halibut retention would be allowed in "pot gear used to fish for halibut or sablefish IFQ/CDQ." Under this action, the opportunity to retain halibut in pot gear is specific to the IFQ fishery. The scope of this action would not allow for the retention of halibut IFQ or CDQ in other directed pot fisheries, such as those for groundfish (other than sablefish) or shellfish. An IFQ permit holder would not be required *nor* permitted to retain halibut on a pot fishing trip while directed fishing in other pot fisheries (such as Pacific cod or crab), even if they hold available IFQ.

The potential pool of participants is limited when the ability to retain halibut in pot gear in the BSAI means participants must have access to the appropriate halibut IFQ or CDQ as well as a vessel that can safely deploy and retrieve pot gear in the BSAI. The harvesters most likely to use this new gear type for halibut are Area 4 halibut quota holders that already have access to the necessary gear and a vessel that can deploy, haul, and store pot gear.

The extent of impacts depends on the magnitude of the shift, in terms of the amount of halibut harvested with pot gear, the number of vessels shifting gear types, and the extent to which the fishery changes (e.g., designing new pot gear and moving to new fishing grounds versus retaining halibut incidentally in the existing sablefish fishery). Section 4.7.2.1 describes the expectations for the magnitude of change under the proposed action.

It is difficult to accurately estimate the specific number of vessel operators that would switch to pot gear from hook-and-line gear under this proposed action. Whale depredation is increasing for hook-and-line fishermen, which would be a reasonable justification for switching to pot gear to target halibut. The average number of vessels over 50 ft LOA active in the hook-and-line halibut IFQ/CDQ fishery is 64. However, vessels wanting to switch to pot gear from HAL would face several barriers to entry (described

in Section 4.7.2.1.1). Thus, while there is uncertainty in the number of vessels that may switch to pot gear, the analysts expect it to be substantially less than the average 64 vessels greater than or equal to 50 ft LOA that typically fish in the BSAI with HAL gear. This expected shift in effort from the halibut HAL fishery to a targeted halibut pot fishery frames the analysis of environmental impacts in the EA and the RIR.

Comparison of Alternatives and Impacts

The following table summarizes the expected environmental and socio-economic impacts of the proposed action. The preferred alternative selected by the Council is shown in **bold**.

Table ES-1 Summary of alternatives and major impacts

		Alt 1	Alternative 2 (Preferred)
		No action: status quo	<p>Allow retention of legal-sized halibut in single or longline pot gear used to fish for halibut or sablefish IFQ/ CDQ in the BSAI provided the IFQ/ CDQ holder holds sufficient halibut IFQ/ CDQ for that regulatory area. Close the PIHCZ to all fishing with pot gear.</p> <p>Element 1: Gear retrieval Option 1: No gear tending requirements (status quo) Option 2: A vessel cannot leave gear on the grounds untended for more than (sub-options 5-10 days)</p> <p>Element 2: Tunnel opening size</p> <p>Element 3: Monitoring</p> <p>Element 4: Escapement mechanism Option 1: No escape mechanism requirement for crab (status quo) Option 2: Require escape mechanism for crab</p> <p>Element 5: Fishery closures if necessary due to approaching an OFL</p>
Environmental Impacts			
Halibut		<ul style="list-style-type: none"> Wastage of legal-size halibut caught in pot gear discarded by those with quota available 	<ul style="list-style-type: none"> Decrease in wastage, as legal-sized halibut caught in pot gear would be retained by those with quota Decrease in mortality due to whale depredation on HAL gear if there is a shift from HAL to pot gear Changes in size selectivity, as pot gear may catch smaller halibut depending on tunnel opening Changes in fishing footprint if pots are set in areas better suited for halibut, but previously off-limits due to high whale presence Magnitude of all impacts depends on number of vessels and level of harvest that switch to pot gear. Possible cumulative impacts with halibut abundance-based management for the BSAI fisheries that use halibut prohibited species catch
Marine Mammals		<ul style="list-style-type: none"> Interactions with resident killer whales could continue if halibut effort remains status quo 	<ul style="list-style-type: none"> Possible decrease in prey for killer whales; however, this does not represent a natural foraging behavior and is not expected to negatively affect the population. Possible decrease in interactions with resident killer whales and HAL fishery if halibut effort shifts from HAL to pot gear. Number of vertical lines in the water may influence risk of gear entanglement issues. Gear left in the water when fishing is done could increase the whale entanglement risk
Pribilof Islands blue king crab		No change	<ul style="list-style-type: none"> Additional pot fishing within the PIBKC stock boundary could create a concern for the PIBKC, which is overfished. Changes in the size of the tunnel opening could increase crab bycatch of PIBKC (Element 2)

	Alt 1	Alternative 2 (Preferred)
Environmental Impacts		
Sablefish	No change	<ul style="list-style-type: none"> •No expectation that the fishery will change in location, timing, or harvest methods •Minimal changes in amount of sablefish harvested (as IFQ/ CDQ is not fully harvested) or potential for some shift from harvest with HAL gear to pots, if economies of scale allow for mixed trips •Possible changes in sablefish size selectivity due to changes in tunnel opening (Element 2)
Incidental catch	No change	<ul style="list-style-type: none"> •With a shift of halibut IFQ/ CDQ from HAL to pot gear, there could be a shift in the magnitude, the size selectivity, and species composition of observed bycatch. •More pot bycatch (crab, flounder, grenadier, snails); less HAL bycatch (skates, rockfish, sculpin, Pacific cod) •Changes in the tunnel openings could lead to changes in the amount and size of bycatch (Element 2).
Seabirds	No change	<ul style="list-style-type: none"> •As HAL typically has more interactions with seabirds than pot gear, small potential to minimize gear interactions if there is some level of shift in effort from HAL to pots gear.
Social and Economic Impacts		
Distributional impacts on harvesters	No change	<ul style="list-style-type: none"> •Greater flexibility and efficiency for halibut QS holders to fish opportunistically with pot gear •Decrease in variable costs incurred to avoid whales •Possible private costs to convert and purchase gear •Uncertain level of negative impacts to certain harvesters from gear conflicts or grounds preemption; participants likely to fish where larger halibut HAL vessels have fished •Uncertainty with the magnitude of halibut IFQ/ CDQ holders that may shift gear types; expected to be a low number in the near-term •Possible negative economic impacts from the <i>requirement</i> to retain and deliver legal-sized halibut might affect sablefish pot harvesters with halibut IFQ •Increased monitoring and recordkeeping and reporting (new VMS and recordkeeping and reporting requirements) may increase the costs to prosecute fishery, in particular for vessels that currently fish BSAI sablefish with pot gear. •NMFS's recommendations to revise certain VMS regulations would remove reporting requirements and may reduce costs to prosecute the sablefish and halibut IFQ and CDQ fisheries in the BSAI and GOA.
Processor impacts and value of fisheries	No change	<ul style="list-style-type: none"> •Possible changes in the distribution of halibut landings, however, given the limited number processors in the BSAI and expected range of participants, redistribution of landings is expected to be minimal. •Value of landed halibut is expected to remain relatively consistent with HAL prices, depending on factors like the size of the gear, soak time (sand fleas), and if there is a change in delivery locations.

	Alt 1	Alternative 2 (Preferred)
	Social and Economic Impacts	
Distributional impacts on communities	No change	<ul style="list-style-type: none"> •Change likely limited due to expected number of participants and scope of expected redistribution in halibut landings •Distributional impacts through the communities associated with QS holders, vessel owners, crew, and secondary service providers affected by this action
Other halibut users	No change	<ul style="list-style-type: none"> •Reduction of unobserved halibut mortality from whale depredation and more efficient use of the resource •Reduction in regulatory discards •Impact to other users expected to be minimal.

1 Introduction

This document analyzes proposed management measures that would apply exclusively to the commercial halibut (*Hippoglossus stenolepis*) and sablefish (*Anoplopoma fimbria*) individual fishing quota (IFQ) and Community Development Quota (CDQ) fisheries in the Bering Sea and Aleutian Islands (BSAI). The measure under consideration would allow (and require) retention of legal-size halibut in pot gear in the BSAI, provided the operator holds sufficient halibut IFQ or CDQ for that International Pacific Halibut Commission (IPHC) regulatory area. The purpose of this action is to allow for more efficient harvest of the halibut resource by decreasing the wastage of legal-size halibut discarded in the BSAI sablefish pot fishery, and to allow for the possibility of reduced whale depredation of halibut off of hook-and-line (HAL) gear. Finally, this document analyzes NMFS's recommendations to make minor administrative revisions to Vessel Monitoring System (VMS) regulations that apply to vessels in the BSAI and Gulf of Alaska (GOA). The purpose of these revisions is to remove VMS requirements that are no longer necessary, which will reduce reporting burdens, and to make other minor revisions to provide regulatory clarity for vessels in the BSAI and GOA.

This document also analyzes NMFS's recommendations to make minor administrative revisions to Vessel Monitoring System (VMS) regulations that apply to vessels in numerous fisheries the BSAI and Gulf of Alaska (GOA). The purpose of these revisions is to remove VMS requirements that are no longer necessary, which will reduce reporting burdens, and to make other minor revisions to provide regulatory clarity for vessels in the BSAI and GOA.

This document is an Environmental Assessment/ Regulatory Impact Review (EA/RIR). An EA/RIR provides the assessments of the environmental impacts of an action and its reasonable alternatives (the EA) and the social and economic benefits and costs of the action alternatives, as well as their distribution (the RIR). This EA/RIR addresses the statutory requirements of the Magnuson Stevens Fishery Conservation and Management Act, the National Environmental Policy Act, and Presidential Executive Order 12866. An EA/RIR 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

In April 2018, the Council adopted a purpose and need statement and suite of alternatives for initial review. In June 2018, the Council updated the purpose and need statement (below) to include the last sentence regarding National Marine Fisheries Service (NMFS) authority over the halibut fisheries.

Interactions with whales throughout the Bering Sea and Aleutian Islands affect the ability of sablefish and halibut QS holders to harvest their IFQ by reducing catch per unit of effort and increasing fishing costs. Whale depredation is increasing for vessels fishing halibut IFQ with longline gear, and for halibut discarded when using pot gear to fish sablefish IFQ in the BSAI. The purpose of this action is to address whale depredation on discarded halibut and to allow for more efficient harvest of halibut in areas with whale depredation. Research into developing technological solutions to deter whales and changes in fishing strategies has not resolved this problem. The problem may be addressed by revisions to current regulations that authorize pot gear as legal gear to retain halibut in the BSAI. Allowing retention of halibut caught in pot gear in the BSAI could address the negative impacts of whale depredation on QS holders. This action seeks to reduce the problems associated with whale depredation, including unobserved halibut mortality, while minimizing gear conflicts. In the event that there is conservation concern for a shellfish or groundfish species, NMFS would have the authority to close the directed longline and pot halibut fisheries in both the BSAI and the Gulf of Alaska.

1.2 History of Related Action

The Council has discussed actions related to the current proposal in the past. Previous actions involved proposals to allow halibut retention in sablefish pot gear; however, only one other action suggested halibut retention in pot gear for the whole BSAI, and no other proposal presented an explicit intent to allow targeting of halibut IFQ with pot gear.

The issue of halibut retention in sablefish pots in the BSAI was first presented to the Council in 2009, when a request to allow retention in Area 4A was forwarded from the IPHC. At that time, the use of pots for sablefish fishing was only allowed in the BSAI, and retention of halibut caught in pot gear was not allowed in any of the Alaska region's state or federal waters. The Council and its IFQ Implementation Committee reviewed a staff discussion paper in December 2012, at which point the Council identified four additional topics to be explored before it would consider a recommendation that the IPHC amend its regulations to allow halibut retention in sablefish pots (NPFMC 2012). Those topics were addressed in an April 2013 discussion paper; they included the spatial and temporal overlap of halibut longline and sablefish pot fishing effort, the need for gear retrieval and gear specification regulations, information on the physical condition of halibut incidentally caught in sablefish pots, and a review of lessons learned from allowing halibut retention in sablefish pots on the west coast (Areas 2A and 2B) (NPFMC 2013).

At that point, the Council and IPHC exchanged letters in September 2013 and February 2014, when the Council recommended halibut retention and the IPHC supported further analysis that included measures to limit retention to only incidental amounts; this correspondence is detailed in Section 2.1 of an April 2015 Council discussion paper with the letters themselves in that appendix (NPFMC 2015a). The IPHC determination at the time was that retention in Area 4A should be contingent on management measures to cap incidental catch (e.g., maximum retainable amounts (MRA)). This determination was presented to the Council as a policy choice guided by a desire to preserve the hook-and-line characteristic of the existing IFQ halibut fleet. The IPHC did not oppose retention from a biological perspective, but had some concerns about gear conflict and potential disadvantage to vessels that were too small or otherwise unable to switch from longline to pot gear.

The discussion paper the Council produced in April 2015 on Area 4A retention (NPFMC 2015a) scoped alternatives, including ones that would limit the amount of halibut that could be retained. Upon review, the Council tabled further consideration for the following reasons: (1) the Council did not feel that it had sufficient data on which to base an MRA; (2) only a small number of vessels were active in the Area 4A sablefish pot fishery, and those vessels were not requesting urgent action on retention at the time; (3) the Council was simultaneously working towards an action to allow longline sablefish pots in the GOA with an option to allow retention of incidentally caught halibut (NPFMC 2016a; Am. 101), and the Council did not want to push for the IPHC to allow retention in 4A without first knowing how coordination on the GOA action would resolve. The last point reflects the Council's wish not to create a "patchwork" of retention regulations across areas, with retention allowed in Area 4A but not in the GOA.

Ironically, that patchwork did emerge, but with retention allowed in the GOA and not the BSAI. The Council finalized GOA Am. 101 with a provision to allow incidentally caught halibut but took no action in Area 4A (or the rest of Area 4 that overlaps the BSAI groundfish management area). In November 2015, the Council wrote a letter to the IPHC requesting an amendment to make pot gear legal gear for halibut in IPHC areas overlapping the GOA.¹ The Council did not define "incidental," but in its letter assured the IPHC that it would monitor the amount and size of halibut caught in GOA sablefish pots so that it would be equipped with the information necessary to limit retention should it become an issue for

¹ <http://npfmc.legistar.com/gateway.aspx?M=F&ID=8bc9eb92-da18-4e5d-883d-10b8f8014428.pdf>

the IPHC in the future. The Council also provided a December 2015 discussion paper that summarizes the entire process dating back to 2009 and catalogues all associated correspondence.²

The IPHC responded favorably to the Council's request and, at its January 2016 Annual Meeting, took action to make longline pot gear legal for halibut retention in all areas off Alaska provided such retention was authorized by NMFS. Specifically, IPHC regulation added exception (b) to (1) and (2) of Section 19 of the regulations in 2016 (underlined for emphasis):

19. Fishing Gear

(1) No person shall fish for halibut using any gear other than hook and line gear,

(a) except that vessels licensed to catch sablefish in Area 2B using sablefish trap gear as defined in the Condition of Sablefish Licence can retain halibut caught as bycatch under regulations promulgated by DFO; or

(b) except that a person may retain halibut taken with longline pot gear in the sablefish IFQ fishery if such retention is authorized by NMFS regulations published at 50 CFR Part 679.

(2) No person shall possess halibut taken with any gear other than hook and line gear,

(a) except that vessels licensed to catch sablefish in Area 2B using sablefish trap gear as defined by the Condition of Licence can retain halibut caught as bycatch under regulations promulgated by DFO; or

(b) except that a person may possess halibut taken with longline pot gear in the sablefish IFQ fishery if such possession is authorized by NMFS regulations published at 50 CFR Part 679. ...

This action reflected the IPHC's acceptance of the Council's good-faith commitment to monitor the incidental nature of halibut bycatch and take action in the future if necessary. Just as importantly, it was also an acknowledgement of the worsening challenge of whale depredation and its effect on both the resource and the halibut and sablefish longline fleets. However, because the Council and NMFS had tabled the retention action in the BSAI/Area 4A overlap, the IPHC's sweeping regulation change created a new round of mismatched retention regulations.

1.2.1 BSAI Halibut in Sablefish Pots

In June 2017, the Council received a public comment letter describing a worsening situation of whale depredation of BSAI longline gear.³ This prompted the Council to request a discussion paper illustrating the Council's action and coordination with IPHC if the intent of an action is to allow (1) retention of incidentally caught halibut in pot gear in the sablefish IFQ fishery, or (2) a directed BSAI halibut IFQ pot fishery. When staff produced this discussion paper in October 2017, it described the management authority, how a future amendment might occur, and some of the nuanced regulatory language that makes it difficult to open access for the "targeting" of halibut versus the "incidental" catch of halibut IFQ (NPFMC 2017a). At the October 2017 meeting, the Council adopted a purpose and need statement that would have allowed halibut retention incidental to the sablefish pot fishery, by linking the ability to retain

² <http://npfmc.legistar.com/gateway.aspx?M=F&ID=7d531a12-e2df-4f1c-b22f-29df93f5422a.pdf>

³ <http://npfmc.legistar.com/gateway.aspx?M=F&ID=9aa7f499-9b0c-4eb9-9685-ecc126cab44d.pdf>

halibut in pots to the requirement to possess both halibut as well as sablefish IFQ. The Council also developed a set of alternatives and requested an initial review analysis (see Section 1.2.3).

1.2.2 Action by the IPHC

At its annual meeting in January 2018, the IPHC received a proposal⁴ to amend its regulations to allow the retention of halibut in pot gear in the BSAI. This proposal highlighted two key changes. The first is for the IPHC to permit the use of single pots as well as longline pot gear for the harvest of halibut quota. The proposal says, “for some smaller vessels that might fish for sablefish and retain halibut, longline pot gear is too large and heavy, while single pot gear is more usable.” The second proposed change would separate the ability to harvest halibut in pot gear in the BSAI from the sablefish fishery, by excluding the texts that states, “*in the sablefish IFQ fishery*”. The present analysis (Alternative 2) considers allowing the retention of halibut in pots used in the IFQ sablefish or halibut fishery (the latter of which does not yet exist in the BSAI), as discussed in Section 2.2). The proposal submitted to the IPHC requests the ability to use pot gear to fish for halibut in the BSAI, regardless of the sablefish quota held.

The IPHC Secretariat supported the regulatory proposal, stating that the primary concern was that any Pacific halibut caught in pots on the trip are tracked and reported. The IPHC adopted the Secretariat’s suggested regulatory text for 2018 regulations.⁵ Since the IPHC regulatory text continues to reference NMFS regulations, retention of halibut in BSAI pot gear will be prohibited unless the NMFS regulations are modified. Thus, if this action results in an amendment to the US Federal regulations, and the IPHC had not changed their regulations as of 2018, IFQ/ CDQ holders would not be permitted to use pot gear to retain halibut in the BSAI. Because the IPHC already took action, once NMFS amends the Federal regulations, no further changes to IPHC regulations are required for halibut harvesters to use pot gear in the BSAI. Prior to implementation, NMFS would inform the IPHC of this and the implications for halibut fishing in the BSAI.

1.2.3 BSAI Halibut in Pots

In April 2018, the Council reviewed the initial review analysis on halibut retention in sablefish pots that was requested in October 2017. In response to public testimony and partially due to the IPHC’s recent action, the Council requested that scope of the action be expanded in such a way that the opportunity to retain halibut in pots need not be linked to the requirement to also possess sablefish quota. The new set of alternatives and elements addressed both stakeholders’ comments that they planned to target halibut with pot gear, as well as the desire of HAL halibut fishermen (who may not possess sablefish quota) to switch to pot gear due to worsening whale depredation problems on HAL gear.

In June 2018, the Council reviewed the second initial analysis, on halibut in pots in the BSAI. This analysis addressed the Council’s requests to further examine the following: (1) whether additional regulations are required to define or account for IFQ/CDQ halibut and sablefish fishing with pot gear; (2) the need and potential options for escapement mechanisms and gear modifications for pots intended to be used to fish halibut IFQ/CDQ; (3) potential gear conflicts from the use, storage, retrieval, or loss of IFQ/CDQ halibut and sablefish pots and potential management measures to reduce gear conflict; (4) potential implications of allowing retention of IFQ/CDQ halibut and sablefish by vessels directed fishing for Pacific cod, crab, or other groundfish species; and (5) the potential scope of closure areas for pot gear (e.g., the Pribilof Islands Habitat Conservation Zone) that may be required to minimize the risk of

⁴ See proposal: <https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-propc13.pdf>

⁵ See IPHC Secretariat comments: <https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-23.pdf>

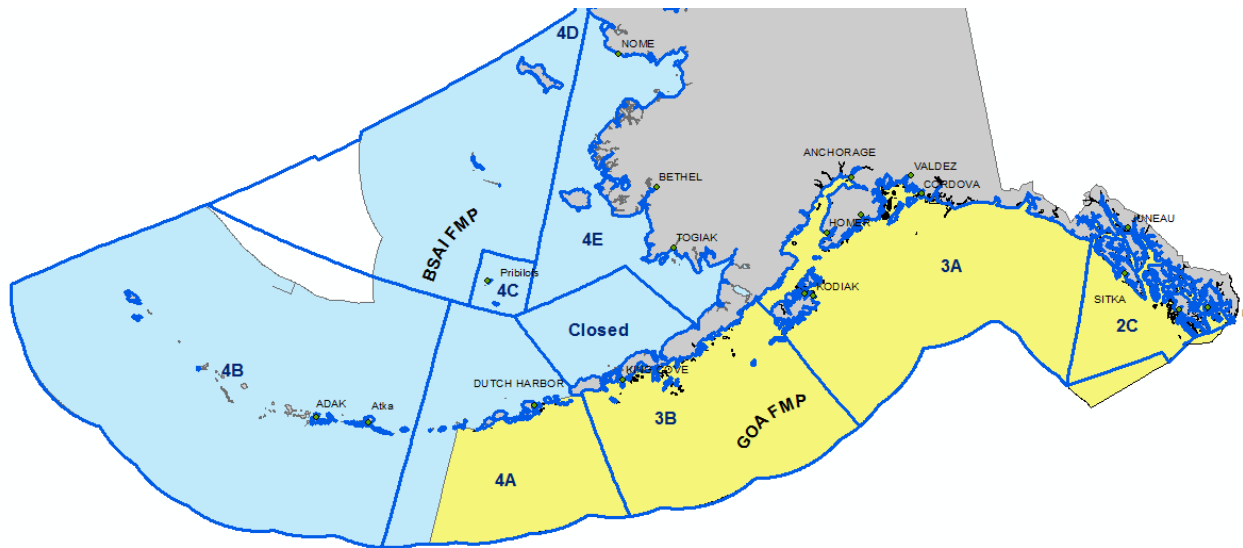
overfishing Pribilof Islands Blue King Crab. The Council identified its preliminary preferred alternative and released the draft for public review pending a few additions and edits to the analysis.

The analysis went through public review at the October 2018 meeting, where the Council reviewed the analysis, identified its preferred alternative, and released the analysis for secretarial review.

1.3 Description of Management Area

Figure 1 shows an overlay of the NMFS groundfish management areas that are referred to in Federal regulations and the Council’s FMPs, and the IPHC regulatory areas for waters off Alaska. Halibut retention in sablefish pots is currently permitted in the GOA, but not the BSAI. The proposed action suggests halibut retention in pot gear would only be permitted in the BSAI. Note that IPHC Area 4A encompasses parts of both the BSAI and GOA. **The Council has clarified that this action would apply to the region of Area 4A that overlaps with the BSAI.** At the June Council meeting, the Council noted the potential need for outreach efforts regarding the overlapping regions and details on where new regulations would apply.

Figure 1 Overlay of Federal groundfish Fishery Management Plan (FMP) areas with IPHC regulatory areas.



Note: BSAI is blue and GOA is yellow.

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 proposed action alternative was designed to accomplish the stated purpose and need for the action (Section 1.1). The proposed action alternative was designed to allow for more efficient harvest of the halibut resource by decreasing the wastage of legal-size halibut discarded in the BSAI sablefish pot fishery, and to allow for the possibility of reduced whale depredation of halibut off of hook-and-line (HAL) gear, by allowing operators that hold halibut quota the opportunity to retain halibut in pot gear.

In October 2018, the Council adopted the following preferred alternatives, elements, and options (shown in **bold**) to allow halibut retention in pot gear in the BSAI.

Alternative 1: No action (status quo).

Alternative 2 (Preferred): Allow retention of legal-sized halibut in single or longline pot gear used to fish for halibut or sablefish IFQ/CDQ in the BSAI provided the IFQ/CDQ holder holds sufficient halibut IFQ/CDQ for that IFQ regulatory area. The Pribilof Islands Habitat Conservation Zone will be closed to all fishing with pot gear.

Element 1: Gear retrieval

Option 1: No gear tending requirements (Preferred option, status quo)

Option 2: A vessel cannot leave gear on the grounds untended for more than (sub-options 5-10 days)

Element 2: Limit of a 9-inch maximum width of tunnel opening does not apply when vessel has unfished halibut IFQ/CDQ onboard.

Element 3: All vessels using pot gear to fish IFQ/CDQ are required to use logbooks and VMS.

Element 4: Require escape mechanisms in the mesh panels of pots.

Option 1: No escape mechanism requirement for crab (Preferred option, status quo)

Option 2: Require escape mechanism for crab

Element 5: Establish regulations that would allow NMFS to close IFQ fishing for halibut if an OFL is approached for a groundfish or shellfish species consistent with regulations in place for groundfish.

The Council requests that NMFS include BSAI IFQ pot gear effort in its annual inseason management report to the Council. The Council intends to review the effects of allowing retention of halibut in pot gear three years after implementation.

To the extent practicable, the Council recommends that halibut fishermen in the BSAI interested in using pot gear under this action consult with crab fishery participants on appropriate crab escape mechanisms to minimize crab bycatch.

2.1 Alternative 1, No Action

Under regulatory status quo, U.S. Federal regulations authorize all pot gear (i.e., longline pots and single pots) for sablefish harvest from any BSAI reporting area (§679.2). However, the only authorized fishing gear for halibut harvested from any IFQ regulatory area includes "...fishing gear composed of lines with hooks attached, including one or more stationary, buoyed, and anchored lines with hooks attached" (§679.2). The Federal regulations go on to make an exception for halibut harvested using all longline pot gear in any GOA reporting area. There is no such exception for pot gear in the BSAI (or IFQ regulatory Area 4). Thus, under status quo, all halibut caught while fishing for sablefish with pot gear in the BSAI must be discarded.

In the sablefish HAL fishery, participants who also hold halibut quota are required to retain halibut that are 32 inches or greater in length (legal-size) harvested in the sablefish IFQ fishery, provided they have remaining halibut quota. This regulation was implemented with the IFQ Program in 1995 and is intended to promote full utilization of halibut by reducing discards of halibut caught incidentally in the sablefish IFQ fishery.

2.2 Alternative 2 (Preferred), Allow Halibut Retention in Pot Gear in the BSAI

The preferred alternative would allow and require the retention of legal-size halibut in single or longline pot gear used to fish sablefish or halibut in the BSAI, provided adequate IFQ or CDQ (also jointly referred to as "quota" in this document) is available for harvest. The quota used to account for the harvested halibut would need to correspond to the appropriate IFQ regulatory area. The rationale for choosing those elements and options, and rationale for the options not selected, is described in more detail in Section 2.5.

Halibut retention would only be permitted/ required in the BSAI, which is different from halibut Area 4 (see Figure 1). **The action only applies to the section of Area 4A that is in the BSAI.**

The Council intends to limit increased pot gear within the stock boundary area to avoid groundfish fishery and area closures that could be triggered by approaching an OFL for the PIBKC. Since the majority of the PIBKC stock is distributed within the PIHCZ, **the preferred alternative includes closing the PIHCZ to all fishing with pot gear.**

IFQ Fishing Versus Directed Fishing for Other Species

The preferred alternative would provide halibut quota holders the opportunity to use pot gear on a trip solely intended to harvest halibut, or on a mixed trip in which both halibut and sablefish are the intended target, provided the vessel has quota for the appropriate areas for both species. Based on Federal regulations at Section 679.7(f) (11), IFQ permit holders are prohibited from discarding halibut or sablefish caught with fixed gear for which they hold halibut or sablefish IFQ. Therefore, this alternative would also *require* those who are fishing sablefish in the BSAI with pot gear to retain legal-size incidentally-caught halibut for which they have the necessary quota.

While necessary to the discussion in this analysis, the terms "incidental," "targeted," and "directed" are not used in the Federal regulations for the halibut IFQ fishery. Halibut is an IFQ species and retention of legal-size fish is both allowed and required by those who hold the appropriate IFQ and are using legal gear. When IFQ is not onboard, halibut is a prohibited species and must be discarded. Regulations do not refer to incidentally caught, or "non-targeted," halibut but the terminology persists in discussion of the retention topic.

Directed fishing is defined in regulations in §697.2 as: “... *Unless indicated otherwise, any fishing activity that results in the retention of an amount of a species or species group on board a vessel that is greater than the maximum retainable amount for that species or species group as calculated under §679.20.*”

Directed fishing in a Federal groundfish fishery means that NMFS Catch Accounting System assigns a “trip target” after the fact, based on the preponderance of the delivered catch. Unlike Federal groundfish fisheries, vessels fishing in IFQ fisheries are not directed fishing and do not have a target; rather, they simply fish and retain fish for which they are using legal gear and possess the necessary quota to cover their catch.

The Council’s motion states that halibut retention would be allowed in “pot gear used to fish for halibut or sablefish IFQ/CDQ.” **The scope of this action would not allow for the retention of halibut IFQ or CDQ in other directed pot fisheries, such as those for groundfish (other than sablefish) or shellfish. An IFQ permit holder would not be required *nor* permitted to retain halibut on a pot fishing trip while directed fishing in other pot fisheries (such as Pacific cod or crab), even if they hold available IFQ.**

Under this action, the regulations would retain the requirement for the discard of halibut in the BSAI while directed fishing for shellfish or groundfish (with the exception of sablefish) with pot gear. Section 4.7.1 of the analysis describes the potential economic and environmental implications of allowing and requiring retention of IFQ/CDQ halibut and sablefish by vessels directed fishing for Pacific cod, crab, or other groundfish species.

Elements Under Alternative 2 and Points for Clarification

Element 1 addresses whether to add gear retrieval requirements to the BSAI halibut and sablefish pot fisheries. Option 1 under Element 1, the Preferred option, is status quo for the BSAI sablefish pot fishery: no gear tending requirements. Option 2 would require removing pot gear from the fishing grounds after five to ten days (sub-options). Section 4.7.3 further describes this element, and Section 4.7.9 highlights some the enforcement challenges associated with this type of regulation.

Element 2 (part of the preferred alternative) would exempt vessels that are fishing halibut or sablefish IFQ/CDQ from the requirement to have a tunnel opening no wider and no taller than 9 inches when the vessel has unfished halibut IFQ/CDQ onboard and the vessel is required to retain halibut. This requirement is also referred to as a “halibut excluder” in this document, as any increase in the size of this opening is expected to allow more halibut to be caught. Section 4.7.4.2 describes this element.

Element 3 (part of the preferred alternative) describes monitoring requirements for vessels using pot gear to fish IFQ, including the requirements to use logbooks and VMS in Section 4.7.5. There are several types of logbooks, including a Daily Fishing Logbook (DFL) required by NMFS (§679.5) and an IPHC logbook. The Council’s intent for this element is to require all vessels fishing sablefish or halibut IFQ/CDQ with pot gear to complete the DFL. Note that all these vessels will already be completing an IPHC logbook in addition to a DFL, if 26 ft length overall (LOA) or greater. Section 4.7.5.1 explains the qualification criteria for each. Another part of the preferred alternative includes NMFS’s recommendation to require vessels using pot gear to report on the prior notice of landing all pot gear deployed, lost, and left on the fishing grounds (§679.5).

Element 4 would require an escapement mechanism for crabs in the mesh panels of pots. The Council had several options for addressing this element. The Council could have 1) taken no action, 2) identified specifications for certain escapement rings/ slots and/ or mesh size based on those employed by ADF&G in the BSAI crab fisheries or other sources, or 3) established a policy statement about the importance of

some type of escapement mechanism in the gear design and reevaluate at 3-year review of the program (preferred option). Further discussion of this element is in Section 4.7.4.3.

Element 5 (part of the preferred alternative) would involve establishing regulations that allow NMFS to close IFQ and CDQ commercial fishing for halibut if an overfishing limit is approached, consistent with current regulations in place for groundfish. This element, further described in Section 4.7.6, will necessitate communication with the IPHC and authority is provided through the Halibut Act, as described in Section 6.

The motion also included a request that NMFS would include pot gear effort and catch of IFQ species in its annual management report to the Council and a policy statement that the Council intends to review the effects of allowing retention of halibut in pot gear three years after implementation. The three-year timeline for the review is intended to provide enough time for new entrants to the halibut pot fishery to adjust to a new gear type while also allowing management adjustments to respond to any unintended consequences of this new gear type. Section 4.7.7 describes the potential topics for review, as well as the options that were weighed in determining appropriate time to review the action.

Finally, the preferred alternative includes NMFS’s recommendation to modify VMS regulations to remove two reporting requirements for vessels in the BSAI and GOA and to make other minor revisions for clarity.

2.3 Comparison of Current and Proposed Regulations

For reference, Table 1 provides a comparison of the relevant regulations in the GOA sablefish pot fishery, the status quo regulations of the BSAI sablefish pot fishery (Alt. 1), and the proposed regulatory changes under the preferred alternative and elements allowing retention of halibut in BSAI pot gear (Alt. 2).

Table 1 Comparison of GOA, BSAI, and Proposed Regulations

<i>Note: this document is not comprehensive for all regulations but includes those which are relevant to this action.</i>	Current BSAI sablefish pot fishery (Alt 1, No action)	Preferred Alternative (Alt 2, allow halibut retention in BSAI pots)	Current GOA sablefish pot fishery
Alternative: Halibut retention in pots	<ul style="list-style-type: none"> Retention of halibut in pots is allowed by IPHC, but defers to NMFS regulations No retention of halibut in pots allowed by NMFS 	<p>Allow (require) retention of legal-size halibut in pot gear, if operator holds appropriate quota, unless directed fishing for shellfish or other groundfish.</p> <p>The Pribilof Islands Habitat Conservation Zone will be closed to all fishing with pot gear.</p>	<p>Vessel operators must retain legal-size halibut (32 inches or greater) caught in longline pot gear while fishing sablefish IFQ if an IFQ permit holder on board the vessel has unused halibut IFQ for the appropriate IFQ regulatory area and vessel category.</p>

<p><i>Note: this document is not comprehensive for all regulations but includes those which are relevant to this action.</i></p>	<p>Current BSAI sablefish pot fishery (Alt 1, No action)</p>	<p>Preferred Alternative (Alt 2, allow halibut retention in BSAI pots)</p>	<p>Current GOA sablefish pot fishery</p>
<p>Element 1: Gear tending/retrieval requirements</p>	<ul style="list-style-type: none"> No gear tending requirements 	<p>Option 1: No gear tending requirements (status quo)</p> <p>Option 2: A vessel cannot leave gear on grounds untended for more than (sub-options) 5-10 days.</p>	<p>§679.42(l)(5)(iii) establishes gear retrieval requirements by area that require gear to be redeployed within a certain amount of time after being deployed (SEO CPs 5 days; WY/CGOA CV/CPs 5 days; WGOA CV/CPs 7 days). SEO CVs must remove the gear from the fishing grounds when making a sablefish landing.</p>
<p>Element 2: Tunnel opening</p>	<p>Each pot must be equipped with rigid tunnel openings that are no wider than 9 inches and no higher than 9 inches, or soft tunnel openings with dimensions that are no wider than 9 inches.</p>	<p>Limit of 9-inch maximum width of tunnel opening does not apply when vessel has unfished halibut IFQ/CDQ onboard</p>	<p>Each pot must be equipped with rigid tunnel openings that are no wider than 9 inches and no higher than 9 inches, or soft tunnel openings no wider than 9 inches.</p>
<p>Element 3: Recordkeeping and reporting & VMS <u>See Table 42 for detailed logbook requirements</u></p>	<ul style="list-style-type: none"> All CPs (any length) and all CVs 60ft and greater with a FFP using HAL or pot gear to harvest sablefish are required to maintain a logbook. CVs less than 60 ft using pot gear to harvest groundfish must use logbooks. All vessels must possess a transmitting VMS while fishing for IFQ sablefish. Must comply with VMS requirements at §679.28(f)(3), (f)(4), and (f)(5). Operator must receive a VMS confirmation number at least 72 hours prior to fishing for IFQ sablefish in BSAI. Regulations for VMS vary for CDQ. 	<p>Continue with BSAI status quo- update regulatory language to the following:</p> <ul style="list-style-type: none"> Vessels using pot gear to fish IFQ & CDQ halibut and sablefish must use logbooks and possess a transmitting VMS transmitter. Must comply with VMS requirements at §679.28(f)(3), (f)(4), and (f)(5). Vessels using pot gear to fish IFQ and CDQ halibut and sablefish must report additional information on pot gear on the prior notice of landing, pursuant to §679.5. 	<ul style="list-style-type: none"> All vessels using pot gear to fish IFQ are required to use daily fishing logbooks (DFLs) & VMS. Operator must possess a transmitting VMS transmitter while fishing for sablefish. The operator must comply with VMS requirements at §679.28(f)(3), (f)(4), and (f)(5). Operator must receive a VMS confirmation number at least 72 hours prior to using longline pot gear to fish for IFQ sablefish. Vessel operators must complete a longline and pot gear DFL or Daily Cumulative Production Logbook (DCPL) as specified in §679.5(c).
<p>Element 4 Escapement mechanism</p>	<p>No requirement</p>	<p>Option 1: No escape mechanism requirement for crab (status quo)</p> <p>Option 2: Require escape mechanism for crab</p>	<p>No requirement</p>

<p><i>Note: this document is not comprehensive for all regulations but includes those which are relevant to this action.</i></p>	<p>Current BSAI sablefish pot fishery (Alt 1, No action)</p>	<p>Preferred Alternative (Alt 2, allow halibut retention in BSAI pots)</p>	<p>Current GOA sablefish pot fishery</p>
<p>Element 5 Authority to close IFQ fishing for halibut</p>	<p>No current federal regulations granting NMFS authority to close halibut fishery if an overfishing limit is approached.</p>	<p>Establish regulations that would allow NMFS to close IFQ fishing for halibut if an overfishing limit is approached for groundfish or shellfish, consistent with regulations in place for groundfish.</p>	
<p>NMFS Recommendation to Revise VMS Regulations in BSAI and GOA</p>	<ul style="list-style-type: none"> • Operator must receive a VMS confirmation number at least 72 hours prior to fishing for IFQ sablefish in BSAI (§679.42(k)). • Operator must check in by fax to register a new VMS unit with NMFS OLE (§679.28(f)(4)(ii)). 	<p>Remove requirement for operators in the BSAI and GOA to receive a VMS confirmation number at least 72 hours prior to fishing for IFQ sablefish. Remove requirement for operators in the BSAI and GOA to check in by fax to register a new VMS unit.</p>	<ul style="list-style-type: none"> • Operator must receive a VMS confirmation number at least 72 hours prior to using longline pot gear to fish for IFQ sablefish (§679.42(k)). • Operator must check in by fax to register a new VMS unit with NMFS OLE (§679.28(f)(4)(ii)).

2.4 Regulatory Amendments Necessary for Proposed Action

IPHC Regulations

Alternative 2 would allow and require retention of legal-size halibut in single or longline pot gear used to fish for halibut or sablefish IFQ/CDQ in the BSAI, provided the operator also holds sufficient halibut quota for that IPHC regulatory area. Note that the IPHC has already taken complementary action amending its 2018 regulations to allow for the retention, as well as the possession, of halibut taken with longline or single pot gear *if such retention is authorized by NMFS regulations published at 50 CFR Part 679* (emphasis added). This broad action taken by the IPHC means that if Federal regulations are changed, no changes to IPHC regulations would be necessary for halibut harvesters to use pot gear. NMFS will update the IPHC prior to implementation of any Federal amendments.

U.S. Federal Regulations

Several changes in regulations are necessary to incorporate the preferred alternative into the existing management process. Additional Federal regulations that are not in conflict with approved IPHC regulations may be recommended by the Council and implemented by the Secretary. An action to allow halibut retention in BSAI pot gear will require an amendment to U.S. Federal regulations. Regulations will need to be revised in several places under §679 to implement this action.

To prohibit all pot fishing in the PIHCZ, NMFS will change regulations at §679.22(a)(6). This action would revise regulations at §679.5 to require all vessels, including vessels less than 60 ft LOA, using pot gear in BSAI IFQ fisheries to report information on fishery participation in logbooks, forms, and eLandings. NMFS currently requires vessels in the BSAI to have an operating VMS on board the vessel

while participating in the sablefish IFQ fishery at § 679.28. This action would revise regulations to extend this requirement to all vessels using pot gear in the halibut and sablefish IFQ fisheries. Element 5 would require additional federal regulations in order to authorize NMFS to close halibut IFQ fishing if an OFL for groundfish or shellfish is approached. NMFS notes that the draft regulations included in this analysis were to assist the Council in developing a preferred alternative and that proposed regulation changes may evolve during the rulemaking process.

BSAI Groundfish Fishery Management Plan

Closing the Pribilof Islands Habitat Conservation Zone (PIHCZ) to all pot fishing (per NMFS' recommendation; including sablefish and halibut), requires an amendment to the BSAI Groundfish Fishery Management Plan (FMP). Action under the preferred alternative (Alternative 2) would not require any further amendments to the BSAI Groundfish FMP.

Alaska Department of Fish and Game Regulations

The State sablefish guideline harvest level (GHL) fishery in the Aleutian Islands allows sablefish to be harvested with pot gear, however current Alaska Department of Fish and Game (ADF&G) regulations prevent halibut to be taken or possessed for commercial use in a way that is inconsistent with IPHC regulation (5 AAC 28.092). State regulations also describe allowable gear types for harvesting halibut in the commercial fishery as hand troll, mechanical jigging machines, dinglebar troll gear, and longline (AAC 28.051). Even though State regulations do not appear to allow for directed halibut fishing with pots, Federal law allowing for directed halibut fishing with pots will supersede any inconsistent state regulation, even in State waters. This is true for halibut because it is governed by an international treaty. However, it will be within the purview of the Alaska Board of Fisheries to align State regulations with Federal regulations. There is no State waters sablefish fishery in the Bering Sea.

2.5 Council's Preferred Alternative

The Council took final action and selected its preferred alternative at its October 2018 meeting. The text selected from the analyzed action alternative (Alternative 2) is included in this document at Sections 2 and 4.3. This section summarizes the Council's rationale for its recommendation of the preferred alternative as compared to the no action alternative (Alternative 1), and parts of Alternative 2 that were not included in the preferred alternative.

In taking final action, the Council noted the extent to which whale depredation is a significant problem to longline (HAL) efforts in the BSAI. Fishery interactions with killer whales throughout the Bering Sea and Aleutian Islands impede the ability of sablefish and halibut IFQ holders to harvest their IFQ by reducing catch per unit effort and increasing fishing costs. As pot fishing is an alternative fishing method with minimal whale depredation, the Council recommended approval of a directed halibut pot fishery in the BSAI, with a preferred set of elements that balance conservation with fishery efficiency. As its preferred alternative, the Council recommended to allow (and require) retention of legal-sized halibut in single or longline pot gear used to fish for halibut or sablefish IFQ/CDQ in the BSAI provided the IFQ/CDQ holder holds sufficient halibut IFQ/CDQ for that IFQ regulatory area. Additionally, the Pribilof Islands Habitat Conservation Zone will be closed to all fishing with pot gear. Under this action, the Council intends to reduce both costs and halibut wastage related to whale depredation for IFQ fishermen in the BSAI.

During deliberation, the Council noted that scientific information specifically on killer whale depredation in the BSAI is lacking, and that the frequency and intensity of whale depredation in the Bering Sea was explained in more detail through public testimony and input from stakeholders. Reports and observations

state severity of whale depredation off of HAL gear has increased to the point that it significantly alters fishing operations. The Council recognized the importance of allowing gear switching as management adapts to changes in the ecosystem and fishery conditions, and cited how in this regard, the preferred alternative addresses National Standard 6. The existing management regime for the fishery allows for new management measures that, to a degree, may rely upon coordination and cooperation within the fleet and with other fleets.

Gear conflicts/grounds preemption

The Council chose to not to adopt gear tending requirements (Element 1) at final action.

The Council received and considered testimony related to the potential for gear conflicts and grounds preemption. Several stakeholders requested the gear retrieval requirements under Element 1 to further minimize the likelihood of gear conflicts and grounds preemption primarily between vessels using pot gear and those who continue to use hook-and-line gear. Testimony voiced concern that devoid of gear retrieval requirements, HAL fishermen in the BSAI could face similar gear conflicts and grounds preemption as the fishery participants in the GOA. Some of these comments addressed how halibut fishing grounds are spread out over a larger area than the sablefish fishery, and that allowing fishery participants to target halibut (in addition to sablefish) with pots would significantly increase the grounds area where pot gear is deployed. Stakeholders also voiced frustrations with gear conflicts and grounds preemption in the BSAI under the existing sablefish pot fishery.

Pot gear is a new gear type for targeting halibut. It is not possible to determine with certainty the extent to which gear conflicts and grounds preemption might occur under the preferred alternative because it is unknown how many vessel operators will begin to use pot gear to target halibut in the BSAI. However, the Council noted that both the analysis and information from fishery participants expect a limited number of vessels will begin fishing for halibut using pots at least over the next several years after implementation of the action. In addition, under the preferred alternative, the PIHCZ would be closed to all pot gear to protect the overfished blue king crab stock. This area is also the fishing grounds for smaller HAL vessels; therefore, these gear types would not be occurring in the same area. This would eliminate the potential for gear conflicts and grounds preemption in that area. In response to concerns around the existing sablefish pot fishery, the Council noted that these concerns had not previously come before the Council, and that it is not clear there has been a substantial concern surrounding this issue prior to this action.

The Council's decision to not include gear retrieval requirements as part of its preferred alternative was also influenced by testimony from a representative of the existing sablefish pot fishery. This stakeholder described how a gear retrieval requirement would negatively impact fishermen in the existing sablefish pot fishery, and also noted current efforts in the fleet to prevent gear conflicts through cooperation amongst vessels. Section 4.7.3.3 discusses the potential impacts of gear retrieval requirements on the existing sablefish pot fishery in the BSAI. The sablefish IFQ fishery is an under-utilized fishery, which has left between 33 to 66% of the TAC unharvested in recent years. Gear retrieval requirements would likely impose significant economic costs on the fleet, impeding the ability of the sablefish pot fishery to harvest its quota. An additional gear retrieval requirement may be the factor that makes it uneconomical for some vessels to continue harvesting. The Council identified the need to weigh the uncertain benefits of regulating gear retrieval with the expected costs to existing fishermen in the BSAI.

The Council also heard testimony on why those interested in using pot gear to harvest halibut will likely tend their gear, considering safety at sea, quality of the product, and economic efficiency of operations. Most current sablefish pot fishermen do not soak their pots more than 3-5 days for some of these reasons. Similarly, there is a private incentive for those who begin to use halibut pots to soak for an even shorter

soak time. Those who are expected to enter the halibut pot fishery within the next few years expressed that they are also unlikely to store halibut pots in the water over the winter. The Council also recognized the role that the fleet will play in cooperating to minimize gear conflict and grounds preemption.

After reviewing analysis and hearing public testimony, the Council determined the likelihood of gear conflicts and grounds preemption was low under the preferred alternative. The Council considered impacts to the existing sablefish pot fishery in its recommendation to not include a gear retrieval requirement in the preferred alternative. USCG comments reiterated that gear tending and gear removal requirements are difficult to enforce and may be a danger to fishermen in the event of weather or hardship. The Council cited that because gear retrieval requirements would both impact the fishery's ability to achieve optimum yield as well as pose significant costs on the fleet and potentially increase safety hazards in the fishery, the proposed gear retrieval requirements would conflict with National Standards 1, 7, and 10.

The Council also stated in its rationale that testimony at the 3-year review will be important in order to identify whether these concerns have come to fruition, and to investigate appropriate management measures in response, if necessary. Council members expressed a desire to not overburden the existing fishery with restriction regulations until more is known about how a halibut pot fishery will develop, and that management deficiencies would be apparent through input from fishery participants. Planning a three-year review puts people on notice that this action will be reviewed, and if there are negative gear interactions between HAL and pot fisheries the Council intends to address them at that time, or sooner if necessary.

Tunnel opening

The Council recommended Element 2 - creating an exemption to the limit of a 9-inch maximum width of tunnel opening does not apply when vessel has unfished halibut IFQ/CDQ onboard- with the understanding that if this element were not adopted, the extent to which halibut quota holders in the BSAI could target halibut with pot gear would be greatly reduced. While the size selectivity and catch compensation is expected to change with a tunnel opening greater than 9-inches, the Council requested the fleet consult with the crab industry participants on appropriate escape mechanisms to minimize crab bycatch (see discussion of bycatch below).

Adoption of this element is expected to allow for greater flexibility for IFQ/CDQ participants to use their quota opportunistically and minimize variable costs. As described in Section 4.7.1, the ability to participate in a mixed-trip, harvesting both halibut and sablefish quota, may make this opportunity more viable for some sablefish quota holders, and could improve efficiencies in fishing for halibut (National Standard 1). This Element responds directly to the Council's purpose and need.

VMS and monitoring

In developing this action, the Council discussed the need for VMS and monitoring in a halibut pot fishery. The Council's recommendation of Element 3- requiring all vessels using pot gear to fish IFQ/CDQ to use Daily Fishing Logbooks and VMS (described in Section 4.7.5)- reflects the Council's interest in maintaining consistency in monitoring fishery behavior. These requirements would be consistent with the regulations in the GOA under Amendment 101. VMS would aid in enforcing the pot gear closure in the PIHCZ, which would reduce concerns about overfishing of PIBKC. Because pot fishing could still occur outside the PIHCZ but within the PIBKC stock boundary, the Council also highlighted the need for careful monitoring of pot fishing occurring in this area as it relates to crab bycatch. The Council would like to review spatial data on pot fishing effort in its three-year review. This could identify overlaps in

effort of small IFQ vessels versus pot vessels. Furthermore, the Council took the opportunity to encourage adoption of electronic monitoring by vessels intending to enter the halibut pot fishery.

Bycatch reduction

The Council articulated that consideration of PSC and other bycatch is of particular importance in the development of a new gear type. Public testimony and Council deliberation highlighted the issue of crab bycatch and that pot gear is an effective gear type at catching crab. Any increase in fishing with pot gear is likely to increase bycatch of crab. This is particularly a concern for PIBKC, which is an overfished stock. The Council noted the need to both minimize PSC in a halibut pot fishery, as well as increase potential for escape and survival of crabs that make their way into pots intended to catch halibut.

Part of the preferred alternative is the closure of the PIHCZ to all fishing with pot gear. The Council's inclusion of this as part of the preferred alternative reflects the concern over bycatch of PIBKC, which is an overfished stock. Concern of incidental catch of PIBKC is highlighted in the analysis in Section 0, and was raised in both public testimony and Council discussion. If use of pot gear in the PIBKC stock boundary increases, it could result in increased incidental catch of PIBKC. While closing the PIHCZ to pot gear would prevent catch of PIBKC in pot gear in that area, the PIHCZ encompasses only a portion of the stock boundary, which could leave a portion of the stock vulnerable to being caught incidentally in pot gear in areas where it is legal.

Due to the potential for PSC of PIBKC outside the PIHCZ, and as a precautionary approach to other potential bycatch issues, the Council recommended Element 5. Element 5 would establish regulations that would allow NMFS to close IFQ fishing for halibut if an OFL is approached for a groundfish or shellfish species consistent with regulations in place for groundfish. NMFS inseason management currently manages both groundfish catch by pot gear vessels and incidental catch of non-target species in these fisheries, however, NMFS does not currently have federal regulations authorizing closures to the halibut IFQ fishery to prevent overfishing of groundfish or shellfish. The Council determined that all fisheries should share in the conservation burden and crab stocks should not be negatively impacted by a potential increase in pot fishing activity. Due to the concern over PIBKC, and the recent overfished status determination for SMBKC, NMFS and the Council noted the importance of proactively mitigating fishing pressure if the OFL of another species is approached. The details of current authority and what authority NMFS would have under the preferred alternative is explained in further detail in Section 4.7.6.

The Council did not recommend Element 4- escape mechanisms as part of its preferred alternative. Despite the desire to reduce bycatch, at this time the preferred specification of these mechanisms is unknown. The Council acknowledged the iterative nature of developing a new gear type for halibut in the BSAI and did not want to prevent innovation through strict specifications. Not defining specific dimensions of escapement rings or slots at this time will allow the fleet the flexibility to test different gear specifications to minimize bycatch most effectively. Section 4.7.4.3 describes the variety of gear specifications that could be altered to allow escape of certain species or sizes of fish or shellfish, however currently gear manufacturers and those who plan to harvest halibut in pot gear are still in the experimentation stage of gear development. Industry-led innovation could be more responsive than regulations to address the range of bycatch issues that may be experienced with a new gear type.

The Council would like to review the levels of bycatch and possible need for gear modifications in three years to determine if crab PSC or other bycatch issues should be addressed within regulations. As a policy statement, the Council encouraged the IFQ holders who elect to use pot gear to fish for halibut to consult with crab industry participants towards industry-based standards for escape mechanisms for crab.

Additionally, the Council noted that several of the other measures within the preferred alternative are included to mitigate concerns related to crab bycatch. These include the following:

- VMS and monitoring requirements for vessels using pot gear to fish for IFQ halibut under this action (described above)
- In addition to closing the PIHCZ, the IPHC has a halibut closed area in the BSAI which is also known to be an area of high king crab concentration. This area is closed to all halibut fishing, which will not change under this action.

The Council concluded that the combination of the above management measures and industry-based efforts to reduce bycatch would be more effective than a regulatory-defined escape mechanism at this time. Development of escape mechanism specifications and patterns in PSC and other bycatch will be included in the three-year review.

Three-year review

As mentioned, much of the Council's rationale for the preferred alternative is driven by the three-year review of this action. With a three-year review, the fleet will have time to begin adopting pots as a new gear type and the fishery could begin to develop. A review would allow time for the Council to begin to evaluate how the fishery has emerged and to evaluate where management measures have initially been successful or how the Council could respond to any issues that have arisen as a result of this action. Section 4.7.7 describes some of the potential topics that could be addressed in a three-year review of the action.

The Council pointed out that a three-year timeline may not lend itself to a large amount of fishery data due to observer coverage rates and entry to the fishery may be slow due to the challenges of adopting new gear. However, a three-year review would allow time to collect some data on the fishery without leaving developments and patterns in the fishery (crab PSC, other bycatch issues, overlap in gears) unevaluated for too long. In Amendment 101, the Council also chose a three-year review to allow some development of the sablefish pot fishery. In the GOA, adoption of the new gear type for sablefish has been relatively slow to adapt.

The Council encouraged electronic monitoring to be adopted by new entrants as a means of gaining more catch and bycatch data for review. Again, the Council reiterated that concerns having to do with the new fishery can still be brought to the Council at any time and reviewed as the Council chooses. By committing to a three-year review, the Council has signaled that the development of this fishery will be monitored. During deliberation, the Council noted that its three-year review will track negative impacts on other fisheries and/or communities, if any.

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 in Section 2. This chapter addresses the probable environmental impacts of the proposed action and alternatives. A list of agencies and persons consulted is included in Section 7.

This chapter evaluates the direct, indirect, and cumulative impacts of the alternatives and options on the various resource components. The socio-economic impacts of this action are described in detail in the Regulatory Impact Review (RIR) of this analysis (Section 4).

Recent information necessary to understand the affected environment for each resource component is summarized in the relevant section. For each resource component, the analysis identifies the potential impacts of each alternative. If significant impacts are likely to occur, preparation of an Environmental Impact Statement (EIS) is required. Although an EA should 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).

An environmental assessment must consider cumulative effects when determining whether an action significantly affects environmental quality. The Council on Environmental Quality (CEQ) regulations for implementing NEPA define 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 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 CEQ guidelines recognize that it is most practical to focus cumulative effects analysis on only those effects that are truly meaningful.

3.1 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, 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.

Environmental Assessment/Regulatory Impact Review for Amendment 101 to the FMP for Groundfish of the GOA: Allow the use of pot longline gear in the GOA sablefish IFQ fishery (NMFS 2015).

The Amendment 101 EA analyzed proposed management measures that would allow a new gear type to harvest sablefish in the GOA. The Amendment 101 summarizes the evaluations rendered for fisheries, marine resources, and ecosystem components and is referenced in this EA. This document is available from:

<https://alaskafisheries.noaa.gov/sites/default/files/analyses/goa101earir.pdf>

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.⁶ 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 Management Act. 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. This document is available from:

<https://alaskafisheries.noaa.gov/sites/default/files/gf-harvest-specs-finaleis07.pdf>.

Annual Supplemental Information Reports for the EIS are available from:

<https://alaskafisheries.noaa.gov/fisheries/groundfish-harvest-specs-eis>.

Assessment of the Sablefish Stock in Alaska (Hanselman et al. 2017) in Stock Assessment and Fishery Evaluation (SAFE) Report for the Groundfish Resources of the Bering Sea/ Aleutian Islands Regions (NPFMC 2017b).

Annual SAFE reports review recent research and provide estimates of the biomass, stock status, and other biological parameters for each stock. The SAFE report includes the acceptable biological catch (ABC) recommendation that is considered by the Council for use 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:

<https://www.afsc.noaa.gov/REFM/Docs/2017/BSAISablefish.pdf>

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 Bering Sea/Aleutian Islands (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:

<https://alaskafisheries.noaa.gov/fisheries/groundfish-seis>.

Report of Assessment and Research Activities (RARA; IPHC 2017).

The RARA includes information on fishery removals (including commercial, sport, bycatch, and personal use and subsistence), surveys, population assessments, and biological and ecosystem research for Pacific halibut. The RARA also includes the annual research plan for the following year. This document is

⁶ 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.

available from: <https://iphc.int/library/documents/report-of-research-assessment-and-research-activities-rara/report-of-assessment-and-research-activities-2017>.

3.2 Analytical Method

This EA uses Table 2 to demonstrate the components of the human environment and whether the proposed action or its elements and options may be expected to have an impact on each component. The proposed action is to allow retention of legal-size halibut in pot gear provided the vessel operator has sufficient halibut IFQ or CDQ. Extensive environmental analysis on all resource components is not needed in this document because the proposed action is not anticipated to have environmental impacts on all resource components. If there is a potential the proposed action may have an effect on the components of the human environment, that effect is examined more thoroughly in this section.

Table 2 Resource components potentially affected by the alternatives

Alternatives	Potentially affected component								
	Pacific Halibut	Marine Mammals	Pribilof Islands Blue King Crab	Sablefish	Incidental Catch	Seabirds	Other Ecosystem Components	Essential Fish Habitat	Socio-economic
Alt 1: No Action	Y	Y	N	N	N	Y	N	N	Y
Alt 2: Halibut retention in pot gear	Y	Y	Y	Y	Y	Y	N	N	Y

N = Not likely to adversely effect (ESA), no effects more than minimal or not temporary (EFH)
 Y = an impact is possible if each alternative is implemented.

Under Alternative 2 (the preferred alternative and associated elements), IFQ/ CDQ participants that have access to halibut quota for the appropriate IPHC regulatory area would be able to use a new gear type to harvest their halibut allocation. Particularly as the Area 4 halibut IFQ and CDQ is nearly fully prosecuted each year (see Figure 24 and Figure 26 in Section 4.5.2.1), this would constitute a shift from traditional hook-and-line halibut fishing to fishing for halibut with pot gear.

As demonstrated in Table 2, the action has the potential to impact seven components of the human environment: Pacific halibut, marine mammals, Pribilof Islands blue king crab, sablefish, the incidental catch in the halibut and sablefish fisheries, and seabirds. There are also expected to be socio-economic impacts. Potential effects of the preferred alternative on the resource components may be caused by:

- (1) decreased wastage (i.e. regulatory discards) of legal-size halibut in the sablefish pot fishery for those participants with both the appropriate halibut and sablefish quota;
- (2) decreased halibut mortality due to whale depredation in the HAL fishery;
- (3) changes in the size selectivity of halibut IFQ/ CDQ;
- (4) possible changes in the footprint of the halibut fishery;
- (5) increased risk of Pribilof Islands blue king crab (PIBKC) bycatch and the possibility of PIBKC approaching its Overfishing Limit (OFL);

- (6) new gear type, possibly paired with a shift in the footprint of the fishery may also affect species, size composition, and magnitude of incidental catch;
- (7) decreased killer whale interactions with HAL gear, but possibly increased with pot gear;
- (8) increased sablefish harvest if this makes it economical for quota holders to harvest both; and
- (9) decreased interactions with seabirds.

The socioeconomic environment may be affected by increased efficiency in harvesting halibut IFQ (e.g., catch per unit effort, reduced fuel/bait costs, reduced opportunity costs) if the opportunity is taken, but it 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 extent of impacts depends on the magnitude of this shift in effort, in terms of the amount of halibut harvested with pot gear, the number of vessels shifting gear types, and the extent to which the fishery changes (e.g., designing new pot gear and moving to new fishing grounds versus retaining halibut incidentally in the existing sablefish fishery). Section 4.7.2.1 describes the expected magnitude of change under the proposed action. It is difficult to accurately estimate the specific number of vessel operators that would switch to pot gear from HAL gear under this proposed action. Whale depredation is increasing for HAL fishermen, which would be a reasonable justification for switching to pot gear to target halibut. The average number of vessels over 50 ft LOA active in the HAL halibut IFQ/CDQ fishery is 64. However, vessels wanting to switch to pot gear from HAL would face several barriers to entry (described in Section 4.7.2.1.1). Thus, while there is uncertainty in the number of vessels that may switch to pot gear, the analysts expect it to be substantially less than the average 64 vessels greater than or equal to 50 ft LOA that typically fish in the BSAI with HAL gear. **This expected magnitude of effort shifting from the halibut HAL fishery to a targeted halibut pot fishery framed the analysis of environmental impacts for this action.**

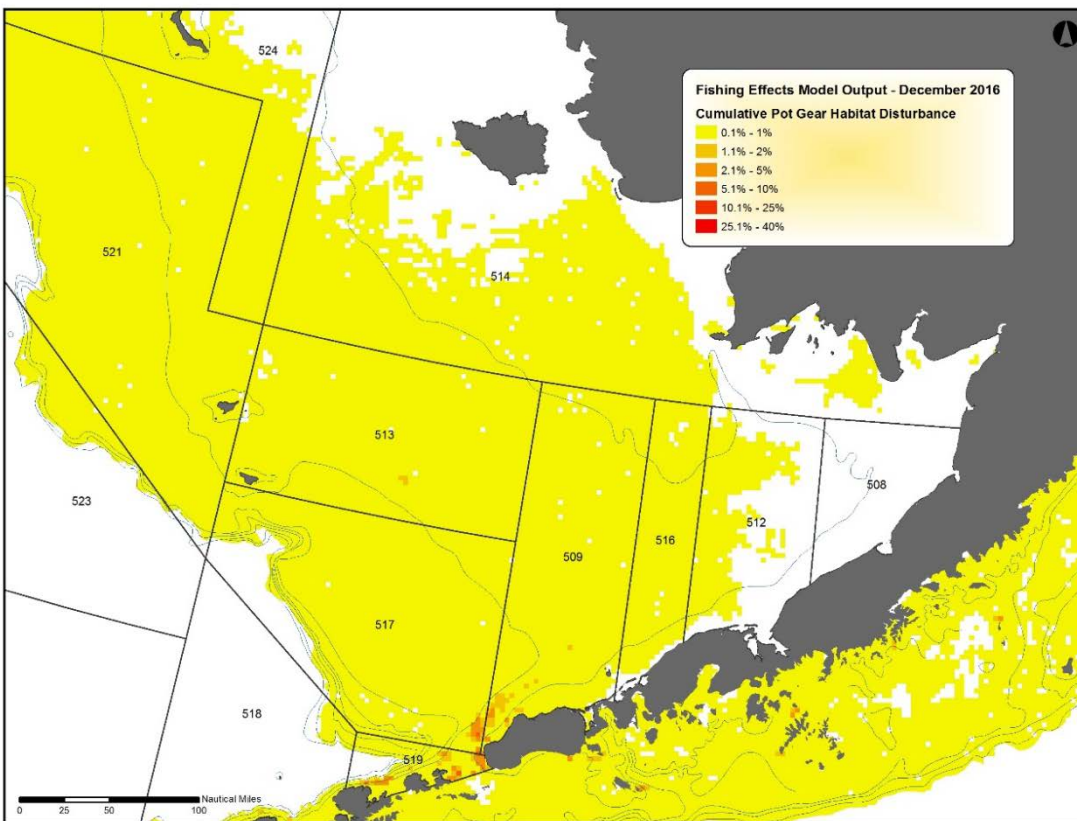
No increase in halibut catches would be expected to occur, as this fishery is managed under a fully prosecuted quota system; effectively capped through corresponding quota. Additionally, there is nothing in this analysis to indicate there would be a seasonal shift in halibut harvest. Thus, *de minimis* effects are expected on other components of the ecosystem, except halibut and king crab, which are described in the following sections of the EA. **No significant effects are presumed for these other ecosystem components because current or proposed fishing regulations, harvest limits, and habitat protections as described in previous NEPA documents (Section 3.1) would not be changed by either of the alternatives.**

Any increase in pot fishing is not likely to disturb deep sea corals or sponges, particularly due to the low concentrations of deep-sea corals (Goddard et al. 2016; MacLean, Rooper & Sigler 2017). Rooper, Etnoyer, Stierhoff, & Olson (2017) demonstrated that removals of deep-sea corals by pot fishing accounted for a negligible amount of coral bycatch and only 1 mt of sponge removal during the same time period. Corals in the Aleutian Islands are already protected as they are designated as Aleutian Islands Coral Habitat Protection Areas. These current habitat protections would not be changed by either alternative. In 2017, after reviewing the best available scientific information, the Council concluded that there is no scientific evidence to suggest that deep-sea corals in the Eastern Bering Sea slope or canyons are at risk from commercial fisheries under the current management structure (MacLean, Rooper & Sigler 2017).

No effects **more than minimal or not temporary** were found for Essential Fish Habitat (EFH) from commercial fishing activity (pelagic and non-pelagic trawl, pot, and longline gears) on species in the BSAI, including sablefish or cod pot fishing activity (NPFMC 2017e). EFH provisions in FMPs must be reviewed every 5 years and revised, if necessary (NMFS AKR 2005). The most recent year that an EFH

Review was completed for BSAI groundfish was in 2016 (NPFMC 2016b). Figure 2 shows the cumulative habitat disturbed 2003-2016 by pot gear in the Bering Sea. It is generally less than 1% other than in some areas of 517/519/509, where fishing effects from most bottom contact gears are higher. Even with all gear types included in habitat disturbance, there were no cases in the AI, BS, or GOA where any stock assessment author found there would be a more than minimal or not temporary effect to their species. Pot and longline gears tend to have the least effect on habitat due to the smaller footprint of the gears.⁷ Given the minimal increase in pot gear effort expected from this action and the best available information, it is unlikely that this action would have significant impacts on EFH beyond the status quo. There are no protection measures that prohibit the use of pot gear in any of the Habitat Areas of Particular Concern (HAPC) in the Bering Sea.⁸

Figure 2 Cumulative EFH disturbed by pot gear in BSAI (2003-2016)



Source: NMFS Habitat Conservation Division.

3.3 Cumulative Effects Analysis

This EA analyzes the cumulative effects of each alternative and the effects of past, present, and reasonably foreseeable future actions (RFFA).

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

⁷ Personal communication with John Olson, NMFS Habitat Conservation Division.

⁸ Maps of the HAPC and their fishery management applications are available at: https://alaskafisheries.noaa.gov/sites/default/files/hapc_ak.pdf.

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.

Actions are understood to be human actions (e.g., a designation of 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, which are reasonably foreseeable. This requirement is interpreted to indicate actions that are more than merely possible or speculative. In addition to these actions, the cumulative effects analysis includes the effects of climate change.

Based on the analysis, the only resource with potentially meaningful cumulative effects is halibut. The RFFA relevant to halibut cumulative effects is the proposal to link BSAI PSC limits to data on halibut abundance. See Section 3.4.6.3 for further details on this action and potential cumulative effects on the halibut resource. 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.

Each section below provides a review of relevant past, present, and RFFAs that may result in cumulative effects on the resource components analyzed in this document. A complete review of the past, present, and RFFAs are described in the prior NEPA documents incorporated by reference and the supplemental information report (SIR) NMFS prepares to annually review of the latest information since the completion of the Alaska Groundfish Harvest Specifications EIS (NMFS 2007a). SIRs have been developed since 2007 and are available on the NMFS Alaska Region website. Each SIR describes changes to the groundfish fisheries and harvest specifications process, new information about environmental components that may be impacted by the groundfish fisheries, and new circumstances, including present and reasonably foreseeable future actions, to determine whether a supplemental EIS should be prepared (40 CFR 1502.9(c)(1)).

3.4 Pacific Halibut

3.4.1 Biology

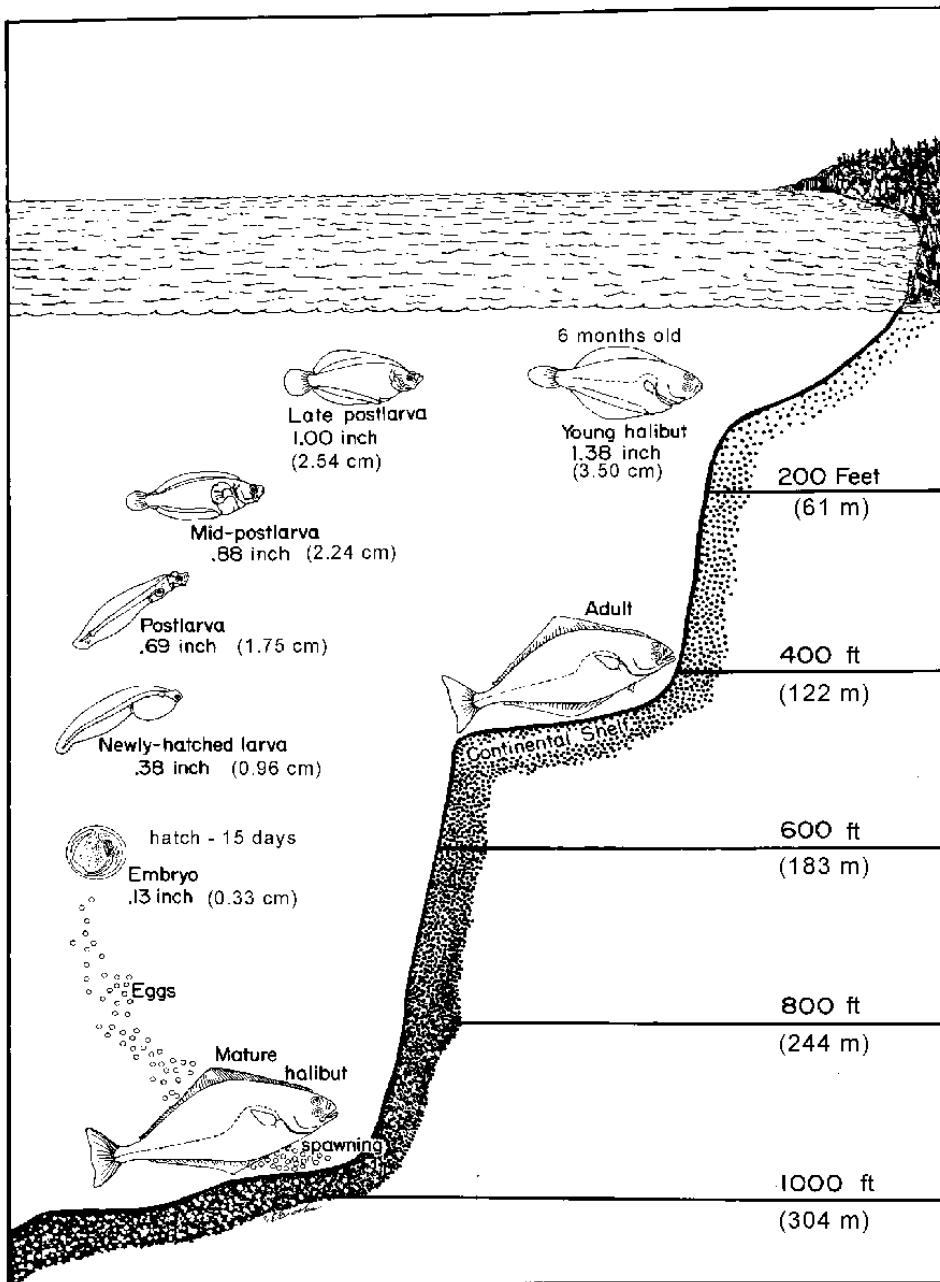
Pacific halibut (*Hippoglossus stenolepis*) is one of the largest species of fish in the world, with individuals growing up to 8ft in length and over 500 pounds (Keith et al. 2014). The range of Pacific halibut that the IPhC manages covers the continental shelf from northern California to the Aleutian Islands and throughout the Bering Sea (Figure 1). Pacific halibut are also found along the western north Pacific continental shelf of Russia and Japan (ibid.).

The depth range for halibut is up to 250 fathoms (457m) for most of the year and up to 500 fathoms (914m) during the winter spawning months. During the winter (November through March), the eggs are released, move up in the water column, and are caught by ocean currents. 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. Prevailing currents carry the eggs north and west. By the age of 6 months, young halibut settle to the bottom in shallow nearshore areas such as bays and inlets. Tagging studies indicate that young halibut can make extensive movements, often counter to the currents that carried them away from the spawning grounds (Sadorus et al. 2015). Adults also make extensive movements within and among years, documented at over 1,000 miles for some fish (Webster et al. 2013). Most male halibut are sexually mature by about 8 years of age, while half of the females are mature by about age 11.6 (Clark and Hare 2006). At this age, females are generally large enough to meet the minimum size limit currently established for the commercial fishery of 32 inches; for males it takes several more years due to slower

dimorphic growth. 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.

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 (Keith et al. 2014). Figure 3 provides a representation of the halibut life cycle.

Figure 3 Life cycle of Pacific halibut



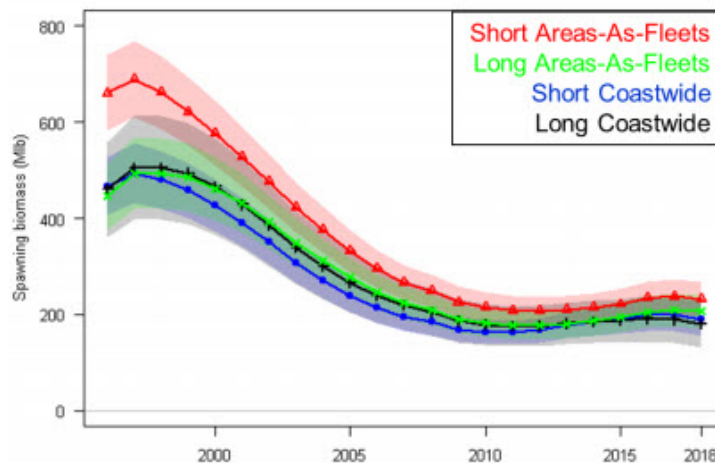
Source: (Keith et al. 2014)

3.4.2 Biomass and Abundance

The IPHC assesses the coastwide biomass of halibut, including fish that are accessible in the IPHC setline survey and to the directed halibut fisheries (generally fish over 26 inches; O26). The IPHC estimates the distribution of the coastwide stock based on survey catch rate among IPHC management areas using information from its annual setline survey. Because the IPHC setline survey does not extend throughout the Bering Sea, IPHC staff use the eastern Bering Sea trawl and other surveys to extrapolate the IPHC setline results across Area 4CDE.

The IPHC uses an ensemble approach to its coastwide stock assessment for the Pacific halibut stock, described in its assessment (IPHC 2018a). In this approach, multiple models are included in the estimation of management quantities, and uncertainty about these quantities. For 2017, these included two coastwide models and two areas-as-fleets models, in each case one using more comprehensive data available only since 1996, and the other using the full historical record (Figure 4). The results of the 2017 assessment indicate that the stock declined continuously from the late 1990s to around 2010 (IPHC 2018a).

Figure 4 Spawning biomass estimated from four models included in 2017 stock assessment ensemble



Source: (IPHC 2018a)

Notes: Series indicate the maximum likelihood estimates, shaded intervals indicate approximate 95% confidence intervals

In general, recruitment has decreased substantially since the highs of the 1980s. A range of factors affect recruitment of new fish into the population. As noted in IPHC 2018a:

Based on the two long time-series models, average Pacific halibut recruitment is estimated to be higher (41 and 76% for the coastwide and AAF models respectively) during favorable Pacific Decadal Oscillation (PDO) regimes, a widely used indicator of productivity in the north Pacific. Historically, these regimes included positive conditions prior to 1947, poor conditions from 1947-77, positive conditions from 1978-2006, and poor conditions from 2007-13. Annual averages from 2014 through October 2016 have been positive; however, many other environmental indicators, current and temperature patterns have been anomalous relative to historical periods. Further, observed declines in Pacific cod (*Gadus macrocephalus*) in the Gulf of Alaska, seabird mortality events and other conditions suggest that historical patterns of productivity related to the PDO may not be relevant to the most recent few years. Pacific halibut recruitment estimates show the largest recent cohorts in 1999 and 2005. Cohorts from 2006 through 2013 are estimated to be smaller than those from 1999-2005. This indicates a high probability of decline in both the stock

and fishery yield as recent recruitments become increasingly important to the age range over which much of the harvest and spawning takes place.

As described by the IPHC (2018b), although there has been a very strong trend of declining weight-at-age coastwide in recent decades, there are marked differences in the magnitude of this decline among regulatory areas. The coastwide trend is driven largely by trends in Area 3, where the bulk of the commercially available biomass occurs. Overall, while there have been weight-at-age declines in Area 4 (corresponding to the BSAI), they have not been as steep as in, for example, Area 3A (IPHC 2018b). There do not appear to be consistent or strong trends from 2010 to 2017 in the area-specific data (IPHC 2018b).

The best available scientific information suggests that over the foreseeable future (2018–2021) the halibut resource is projected to decline. The 2018 stock assessment provides additional detail on the potential trends in the halibut stock, uncertainties in the assessment, and additional factors that may impact the overall stock status and harvestable surplus of abundance of halibut (IPHC 2018c).

3.4.3 Removals

Figure 5 shows that during the periods of high removal, the majority of the mortality on the halibut stock has been due to commercial catch. In 2017, the two top sources of removals in Area 4 were commercial harvests (including discard mortality in the commercial fishery, i.e., “wastage”), which comprised 55% of the removals, and commercial groundfish fishery bycatch (referred to as prohibited species catch, or PSC, in fisheries off Alaska) which accounted for 44% of removals.

Figure 5 Annual sources of mortality of halibut in regulatory Areas 4A, 4B, 4CDE and Area 4 combined

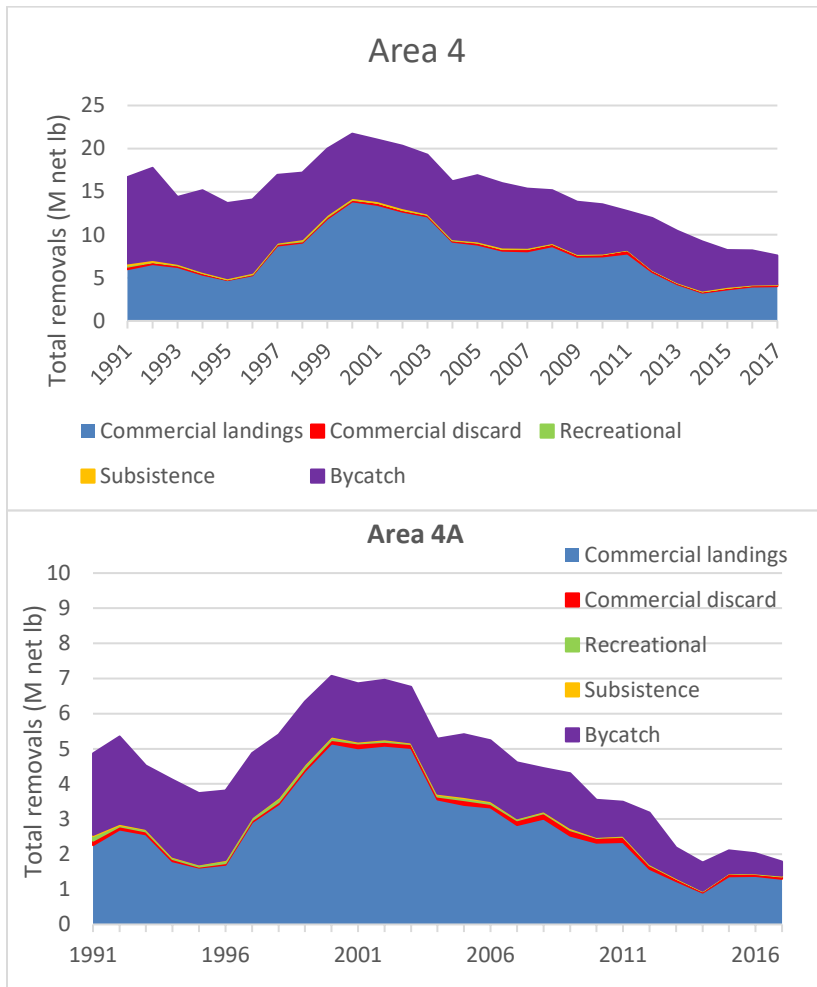
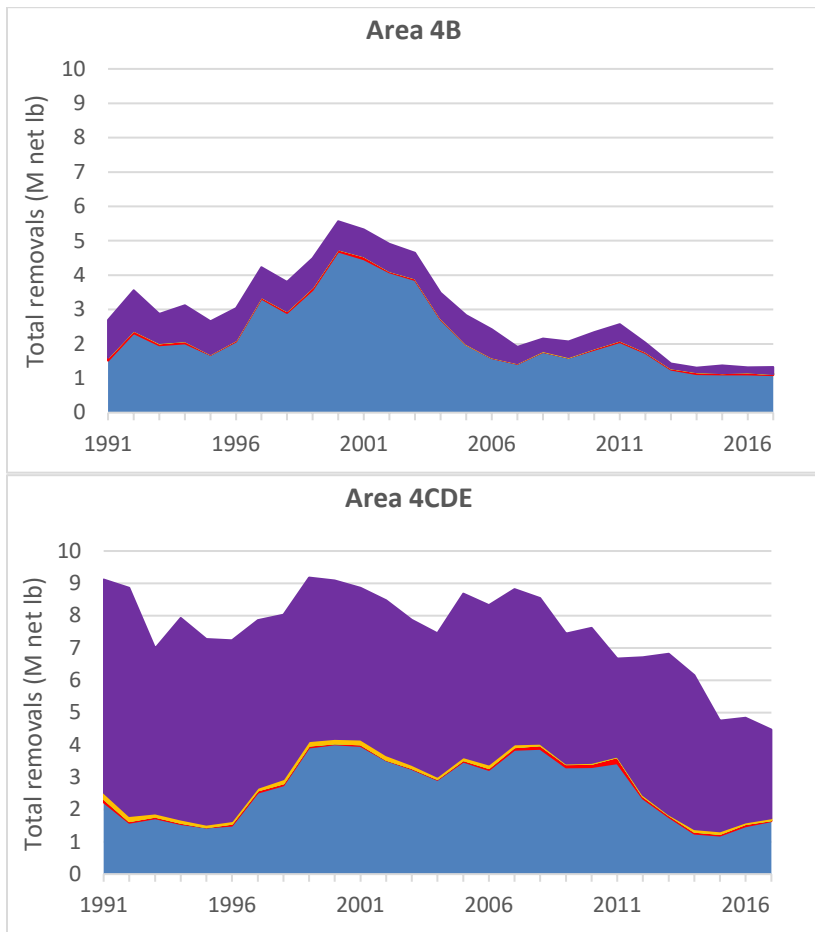


Figure 5 (cont.)



Source: (IPHC 2018a)

Note: the y-axes differ in scale

3.4.4 Status of the Stock

Since 2014, there is no information to suggest that halibut is subject to “overfishing,” as that term is commonly applied to stocks managed under the Magnuson-Stevens Act. The Halibut Act does not define “overfishing” or require that an overfishing limit be defined. However, the halibut stock is currently managed in a manner that is not likely to result in a chronic long-term decline in the halibut resource coastwide due to fishing mortality from all sources of removals.

For more information on the status of the halibut stock, including fishing intensity relative to the spawning potential ratio, see IPHC (2018c) and Hicks and Stewart (2017).

3.4.5 Fishery

The commercial halibut fisheries are prosecuted with stationary groundlines (longlines), 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-lb 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-ft to 4-ft long gangions spaced at 10-ft to 20-ft intervals. Some vessels use stuck gear (not snap on) with 12-inch to 16-inch gangions spaced at 10-ft to 20-ft intervals. Other vessels use combination gear (used to target both halibut and sablefish) with shorter gangions, shorter hook spacing

(4 ft to 6 ft), and smaller hooks (13/0–15/0). Automatic baiting machines are used on many of the larger vessels. An average set consists of 10 to 20 skates of groundline, with each skate 100 to 150 fathoms long. 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 ft high) typically marks the end of a set (“bag and flag” set-up).

To make a set, the first anchor is dropped and the vessel 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 generally left to fish for five hours to 12 hours, depending upon the catch rates. There are no restrictions on soak time for HAL gear, so there is variation among sets. 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 in the AI shelf area as demonstrated in Figure 19. 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 and around St. Matthew’s Island. Although there have been anecdotal reports of halibut as deep as 550 fathoms (personal communication, I. Stewart 2018), they are most often caught much shallower. Generally, halibut are caught between 25m and 900m (Webster et al. 2015).

3.4.6 Effects of the Alternatives

The effects of the use of current and proposed gear in the halibut IFQ and CDQ in the BSAI fishery are addressed here. This section considers whether the impacts on the halibut stock are likely to be significant. The effect of the commercial and other fisheries capturing halibut on the halibut stock is assessed annually, and reported for the IPHC’s Interim and Annual Meetings, with the most recent summary in January 2018 (IPHC 2018d). The halibut stock is neither overfished nor subject to overfishing (Stewart et al. 2018). Biomass levels are projected to decrease in the near future due to lower recent recruitment and continued low size-at-age (ibid.). However, it is estimated that the halibut fishery under the status quo level of fishing intensity is sustainable. Under either alternative, IPHC harvest strategy policy will continue to account for all sources of mortality; for this reason, impacts to the halibut stock are not expected to be significant.

3.4.6.1 Alternative 1

Under the no action alternative, Federal regulation governing authorized fishing gear for halibut IFQ (at §679.2) would continue to only include HAL fishing gear in BSAI (as further described in Section 1.3). A continued prohibition on halibut retention in BSAI pot gear would maintain similar levels of discard mortality of halibut, as legal and sublegal-size halibut would continue to be required to be discarded in the sablefish pot fishery. Mortality associated with these discards may occur both from the handling and discard process and also from whale depredation. Additionally, in the HAL halibut IFQ/CDQ fisheries, hooked fish could continue to be preyed upon by whales.

While some studies have been done (see Section 3.5.2), halibut mortality from both types of whale depredation is difficult to observe and account for in total halibut removals. The incidental mortality of halibut due to whale depredation is not explicitly accounted for in stock assessment models because a time series of total annual whale depredation does not exist. The stock assessment model implicitly represents whale depredation losses as a reduction in the overall stock productivity (i.e., recruitment strengths and mortality rates). For example, increasing trends in whale depredation rates would be reflected as a decreasing trend in stock productivity.

Under Alternative 1 there may continue to be some changes in the spatial and/ or temporal distribution of fishing effort in the halibut IFQ/ CDQ HAL fishery in a continued effort to avoid whale depredation. For both the sablefish and halibut IFQ/ CDQ fisheries, fishing behavior has changed, and may continue to change to avoid whale depredation. Numerous techniques have been used including dropping gear to “wait the whales out,” moving to different fishing grounds, setting decoy sets to distract the whales, or leaving and returning later. Fishing behavior could continue to adjust to whale depredation, and while this may lead to slight changes in the spatial / temporal distribution of the fishery, these changes are not likely to have any significant effect on the halibut resource. Under Alternative 1, no changes from the status quo would be expected to occur in terms of the size selectivity of the gear, the bycatch in the sablefish or halibut IFQ/ CDQ fisheries, prey availability for sablefish, or the overall stock biomass.

Taking no action would not address the stated purpose and need for the action. The Council has identified the need to reduce the problems associated with whale depredation while minimizing gear conflicts and the amount of unaccounted mortality occurring due to whale depredation.

3.4.6.2 Alternative 2

There are a few types of potential impacts to the halibut resource that are important to consider in regard to allowing halibut fishing with pot gear in the BSAI.

Halibut Biomass

The IPHC does not recognize any conservation concerns related to this proposed action that would be expected to influence the sustainability or health of the stock. Area 4 halibut fisheries have generally been fully prosecuted (as demonstrated in Figure 24 and Figure 26 in Section 4.5.2.1); therefore, it is not expected that this action would increase the overall harvest of halibut. In fact, there are two ways this action may lead to some level of reduction in overall halibut mortality. This includes: (1) a possible reduction in halibut mortality from whales preying on halibut in the HAL fishery corresponding with the proportion of halibut IFQ/ CDQ shifting to pot gear, and (2) a possible reduction in halibut wastage (i.e., fish that are discarded for regulatory reasons) from the sablefish pot fishery.

As described more in Section 3.5.2, it is understood that whales (in particular, resident killer whales in the BSAI) prey on halibut in the HAL halibut IFQ/CDQ fishery in Area 4. Halibut and sablefish (as well as turbot) that are captured on hooks that lie on the bottom of the ocean floor are vulnerable to whale depredation. Whales can completely remove or damage the halibut or sablefish before it is retrieved. Some depredation is obvious, such as when a crew retrieves a longline with hooks that contain only lips or torn, punctured fish remnants. Whales can also be observed pulling halibut from longline gear as it is nearing the surface. In addition, some of this depredation of HAL gear may go unobserved, and thus this source of removals is not directly included in the halibut stock assessment. Pot gear is an effective gear at minimizing depredation because whales cannot remove or damage sablefish or halibut enclosed in a pot when the gear is soaking. Thus, there may be some level of decreased halibut mortality as some harvest of halibut IFQ/ CDQ shifts to pot gear, concurrent with the sablefish IFQ/ CDQ fishery, and whales are not able to depredate on these halibut.

Another possible benefit to the halibut resource includes a decrease in wastage of halibut from sablefish pot gear by individuals that have access to quota for both species. Although PSC rates are low, all halibut (both legal and sublegal-size) caught in sablefish pot gear must be discarded, regardless of quota. Prey is not as accessible to whales in pot gear as it is in HAL gear, nor should use of pot gear interfere with the harvest of targeted species, but participants have noted whales preying on halibut discarded from pot gear

(written public comment, J. Herbert 2008).⁹ Whale depredation can increase post-release/discard mortality rates beyond what it is due to damage to fish through pot soaking and the normal discard process. It is difficult for observers to account for whale depredation of discarded halibut, thus retention of halibut could reduce a source of unobserved halibut mortality. If a vessel had available halibut IFQ or CDQ, the vessel would be required to retain legal-size halibut caught incidentally in sablefish pots, which may reduce aggregate halibut mortality.

It is expected that the quantity of halibut likely to be landed using pots is likely to be small relative to the overall removals from the stock, particularly in the short term and would not include a demographic component (size or age) not already experiencing mortality in either non-halibut target fisheries or recreational fisheries. Further, the IPHC's stock assessment allows for time-varying selectivity in the directed halibut fisheries, such that potential changes in size or age of halibut captured would be included in the estimates of fishing intensity (SPR), and therefore explicitly accounted for in the annual catch limit setting process (personal communication, I. Stewart 2018).

The use of pot gear could provide benefits to halibut biomass in terms of its ability to selectively avoid capturing the larger breeding female halibut. Depending on the configuration of the pot, this gear type could create a natural maximum size limit to the fish harvested. A gear manufacturing representative suggested a sock tunnel opening that could target up to an 80 lb. halibut may be ideal (personal communication, L. Nylander 2018). Leaving the larger breeding females in the water could provide resource conservation benefits; however, given the relative magnitude of expected pot removal relative to the amount and size spectrum of removals from other sources, any potential benefit would likely be *de minimis*.

At the 2018 IPHC meeting, the Commission adopted the text proposed from the Secretariat¹⁰ in response to a stakeholder proposal,¹¹ which proposed a modification to the IPHC Regulations to allow retention of Pacific halibut taken in long-line or single pot gear in the directed Pacific halibut fishery off Alaska, where such gear is permitted by domestic regulation. The IPHC Secretariat supported the regulatory proposal, stating that the primary concern was that any Pacific halibut caught in pots on the trip are tracked and reported. Biological sampling of halibut landings would be anticipated to be conducted without regard to gear, such that these data would continue to inform stock assessments.

The IPHC had previously been reluctant to consider a targeted effort of halibut fishing with pot gear. In the past it has had concerns about preserving the traditional HAL characteristics of the IFQ halibut fleet. The IPHC was worried about gear conflict and potential disadvantage to vessels that were too small or otherwise unable to switch from longline to pot gear. Given the increasing testimony on the effects on socio-economic challenges related to halibut mortality due to whale depredation, the IPHC has revised its stance on the use of pot gear in the halibut fishery.

Size Selectivity

Other impacts that might occur include possible changes to the size of retained halibut IFQ/ CDQ due to the size selectivity of the new gear type. Compared to HAL gear, it would be expected that pot gear would catch smaller fish on average.

⁹ <https://www.npfmc.org/wp-content/PDFdocuments/halibut/Hebert2008.pdf>

¹⁰ IPHC-2018-AM094-23 at: <https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-23.pdf>

¹¹ IPHC-2018-AM094-PropC13: at <https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-propc13.pdf>

The Council requested information on the size of halibut that are taken as bycatch in pot gear. Alaska Fisheries Information Network (AKFIN) provided observer data on sampled halibut taken in both pot and HAL gear for all Alaska Federal groundfish management areas from 2008 through August 16, 2017. Table 3 shows the number of halibut taken as bycatch in the BSAI sablefish and Pacific cod fixed-gear fisheries that were sampled by fishery observers during the 2008 through 2016 period.¹² The BS and AI areas are combined in the table because only 3,300 of the roughly 120,000 samples were taken from the AI. The minimum legal size for commercially caught halibut is 32 inches, per IPHC regulations at Section 14(1)(a). Table 3 shows that, overall, a higher percentage of halibut taken in the Pacific cod fisheries were of sublegal-size compared to the sablefish fisheries. For sablefish, the percentage of sublegal halibut was greater for pot gear than for HAL gear.

For comparison, observers sampled 9,000 halibut in GOA catcher vessel fixed-gear fisheries from 2008 through 2016, 94% of which occurred in the Central or Western GOA. The only pot gear groundfish fishery in the GOA during those years was for Pacific cod, and 83% of those halibut were of sublegal-size (4,100 out of 4,950). The GOA HAL fisheries for sablefish and Pacific cod yielded 4,050 halibut samples—1,522 in the sablefish HAL fishery and 2,538 in the Pacific cod HAL fishery. Sampled halibut bycatch in the GOA sablefish HAL fishery was 47% sublegal, while sampled bycatch in the GOA Pacific cod HAL fishery was 72% sublegal.

These data reflect the current requirement for a 9-inch maximum tunnel width. These data may be reflective of what would be encountered in a pot fishery for halibut; however, allowing a larger tunnel opening (Element 2) could increase the fraction of larger (i.e., > the minimum size limit) halibut captured in pots.

Table 3 Number of halibut (#fish) by size (cm) sampled by observers in BSAI sablefish and Pacific cod fixed-gear fisheries, 2008 - 2016

Target	Length (cm)	CV		CP		Grand Total
		POT	HAL	POT	HAL	
Sablefish	<81	638	8	25	15	686
	81-110	480	15	76	54	625
	111-140	25	2	5	19	51
	141-170		2		5	7
Sablefish Total		1,143	27	106	93	1,369
% Sub-legal		56%	30%	24%	16%	50%
PCod	<81	3,045	18	2,192	100,702	105,957
	81-110	143	1	210	11,561	11,915
	111-140	6		3	413	422
	141-170	1			56	57
	171-200				3	3
PCod Total		3,195	19	2,405	112,735	118,354
% Sub-legal		95%	95%	91%	89%	90%

Source: NMFS AFSC Observer Program, data compiled by AKFIN in Comprehensive_NORPAC.
Note: >81cm represents legal-size halibut (red line)

Note that under the Council’s current motion, a review of the effects of allowing retention of halibut in pot gear is called for after three years of implementation. Thus, an evaluation of the implications of changes in size selectivity on IPHC harvest policy and fishery yield could be evaluated at that point.

¹² Partial-year data from 2017 is omitted from the table as it only included 11 samples from the sablefish fishery and 18 samples from the CV sector overall (sablefish and Pacific cod).

Fishing Footprint and Seasons

Another potential change based on Alternative 2 is the possibility that fishing footprint for the harvest of halibut IFQ/ CDQ may change. Halibut fishery participants have stated that one of the primary strategies to minimize killer whale predation on HAL gear is to move into areas that are not known for as high a presence of fish-eating killer whales. For instance, testifiers have commented that grounds near the Pribilof Islands as well as St Matthew Island typical allow for productive HAL fishing due to a lower whale presence. St Matthew Island in particular has recently seen a large proportional increase in landings (IPHC 2017 Interim Meeting presentations), possibly due to the persistent whale depredation in other areas. Other areas (e.g., areas along the 4D shelf edge) have been noted by participants to be known for their concentration of halibut, but that also have a high presence of fish-eating whales that has prevented successful HAL fishing in the past.

Public testimony from halibut fishery participants has suggested that halibut quota holders would likely try to use pot gear in the AI, potentially outside of Dutch Harbor, near Akutan and the Islands of Four Mountains. Testifiers also expect halibut quota holders to use pot gear along the Area 4D continental shelf edge up towards the Russian border. Some participants believe this area to hold a high concentration of halibut, but participants have also emphasized the difficulty in prosecuting this area with HAL gear due to a high presence of resident killer whales (personal communication, R. Hanson 2018; J. Kauffman 2018). Participants have suggested that the ability to use pot gear and fish among the whales in Area 4D more successfully, might relieve some of the fishing pressure and potential for localized effects around St. Matthew Island (personal communication, R. Hanson 2018). Thus, a return to traditional fishing patterns might be expected, as spatial shifts in fishing patterns to avoid whales may be discontinued by those who switch to pot gear.

Some halibut quota may be harvested from areas where sablefish pot fishing typically occurs if retained incidentally to sablefish IFQ/ CDQ fishing or on the same trip but at different depths. Based on the scale of these maps, the typical halibut fishing grounds and sablefish fishing grounds do not differ drastically; fishing pressure for both species occurs in waters near Unalaska, throughout the Aleutians over to Atka, and up the shelf edge toward the Pribilof Islands. However, the locations can be different as these fisheries are typically prosecuted at different depths; halibut are typically shallower, but between 25m and 900m, whereas sablefish are typically harvested between 300m and 800m.

No information in this analysis suggests that a temporal or seasonal shift in sablefish or halibut IFQ fishing is expected to occur under Alternative 2.

Level of Change

The magnitude of the marginal impacts resulting from Alternative 2, depends on the level of halibut IFQ/ CDQ caught and retained in pots, the number of vessels shifting gear types, and the extent to which fishing effort changes due to this new opportunity.

For instance, if pots continue have a 9-inch tunnel opening and quota holders only retain halibut IFQ/ CDQ incidentally caught in the BSAI sablefish pot fishery, effects to any environmental components listed in the environmental scan (Section 3.2), may be minimal. Given the differences in typical fishing depths between the halibut and sablefish fishing, the presence of the 9-inch excluder, and past data on halibut bycatch in sablefish pots, we would expect the catch of halibut in sablefish pots to be low when the operator is specifically targeting sablefish IFQ or CDQ.

Table 4 demonstrates low halibut bycatch in the current sablefish pot fishery in the BSAI. This table shows the average amount of halibut bycatch in each of eight fishery/area/gear combinations between

2013 and 2016. The table includes a ratio of the average round weight halibut bycatch to the average round weight of groundfish catch.¹³

Table 4 shows that halibut bycatch ratios do not differ substantially by area (BS vs. AI). The ratio is higher for the sablefish fishery relative to Pacific cod, and for HAL gear relative to pot gear. The figures in the table are an average across the 2013 to 2016 period, but annual bycatch ratios within each combination did show several outlier years (though the year itself was not consistent). In the BSAI sablefish pot fishery, the proportion of halibut to groundfish weight was highest in 2013 at about 5%, and lowest in 2016 at 0.4%. The BSAI sablefish HAL fishery had an outlier year in 2015 in which the proportion of halibut to groundfish weight reached 36%, indicating a substantial amount of mixed fishing occurring.

Table 4 Average halibut bycatch and halibut to groundfish ratio in BSAI fixed gear fisheries, 2013- 2016

Target	Area	POT			HAL		
		Halibut Bycatch Wt.	Groundfish Basis Wt.	Ratio	Halibut Bycatch Wt.	Groundfish Basis Wt.	Ratio
Sablefish	BS	5	172	0.028	4	52	0.086
	AI	2	65	0.028	27	401	0.068
BSAI Sablefish average		3	119	0.028	16	226	0.070
PCod	BS	35	39,564	0.001	4,032	159,902	0.025
	AI	1	3,567	0.000	59	2,099	0.028
BSAI Pcod average		23	27,565	0.001	2,046	81,000	0.025
Average for sablefish and Pcod		12	11,881	0.001	1,031	40,613	0.025

Source: NMFS Alaska Region Catch Accounting System, data compiled by AKFIN in Comprehensive_PSC
 Notes: Halibut bycatch is round mt, not mortality. Ratio of halibut to groundfish is round mt

In addition, data from the first year of the GOA sablefish pot fishery (2017) may be informative in understanding levels of halibut IFQ caught in sablefish pot gear incidentally. Section 4.5.3.3 includes information on this fishery. In 2017, 22 vessels participated in sablefish pot fishing in the GOA and 14 of these vessels also retained halibut. By vessel, their retention ranged from 0.2% to 43.3% of the sablefish catch by weight, or 3% overall for vessels that reported both sablefish and halibut (see Figure 33).

If this opportunity in the BSAI manifests more as an effort to target halibut (i.e. pots have a tunnel opening greater than 9-inches), greater impacts may be experienced as fishing behavior changes to allow for a mixed target trip or a halibut-centric fishing trip with pot gear. Pot vessels moving to fishing depths more suitable for halibut and/or deploying different types of pots better designed for catching halibut could lead to a greater degree of change in the factors described above. For instance, these changes could lead to a reduction in mortality of halibut due to regulatory discards, reduction in whale depredation, possible changes in size selectivity, fishing footprint, and bycatch composition (discussed more in Section 3.8). If the retention of halibut in pot gear in the BSAI manifests as more of a mixed or targeted fishery, an overall greater amount of halibut may be landed with pot gear.

¹³ Halibut bycatch is listed in (mt) of round weight recorded as opposed to estimated bycatch mortality. Estimated mortality is used for things like debiting bycatch against a PSC limit and is calculated by multiplying the round weight of bycatch by a discard mortality rate (DMR) that represents kilograms of halibut killed. This analysis lists round weight of bycatch. Bycatch weight is a better analogue for the amount of halibut that could have been retained under the considered action.

Section 4.7.2.1 describes the expected “new entrants” to this proposed fishery, the individual costs and benefits that would be weighed before a halibut quota holder switched gear types, and the expectations around the magnitude of change. For individuals that have experienced significant costs from whale depredation, who have access to halibut quota as well as the pot gear and vessel that can safely harvest store, set, and haul pots in the BSAI, this opportunity may be worthwhile. Additionally, operators that can combine halibut pot fishing opportunistically with sablefish pot fishing trips, may be able to minimize variable costs of a trip (e.g. fuel, provisions, and labor costs). Halibut quota holders that operate larger vessels and have also experienced significant costs from whale depredation, may also consider purchasing gear and reconfiguring their vessels to accommodate pot fishing. These private decisions will depend on the individual’s assessment of their own potential benefits from switching gear types. The circumstantial nature of these private decisions means that there is uncertainty in the magnitude of change.

Under Alternative 2, it is likely that much of the existing halibut IFQ/ CDQ fleet will continue to use HAL gear. Factors such as 1) safety and logistical challenges in storing, deploying, and hauling pot gear on smaller vessels, 2) the costs associated with obtaining gear and retooling a vessel to be able to fish with pot gear, 2) the uncertain CPUE, which may be higher for HAL gear when whales are not present, and 3) the fact that some vessels in some areas do not experience the same costs from whale depredation means that the scope of change is expected to be somewhat limited.

Thus, this action is expected to provide some beneficial effects to the halibut resource, some uncertainties, but likely not a large degree of change overall. It may work towards the Council’s purpose and need statement of reducing the problems associated with whale depredation while minimizing gear conflicts and reducing the amount of unaccounted mortality occurring due to whale depredation and regulatory discards, as well as providing fishermen with additional flexibility to continue to fully utilize halibut IFQ/CDQ in the presence of whales.

3.4.6.3 Cumulative Effects on Pacific Halibut

One RFFA is identified as having a possible impact on the target species within the action area.

In addition to being harvested in the commercial, recreational, and subsistence fisheries, halibut are also incidentally taken as bycatch (Prohibited Species Catch; PSC) in groundfish fisheries. The Council is considering linking BSAI PSC limits to data on halibut abundance consistent with responsive management that varies with their abundance. The Council wishes to limit total halibut mortality to the extent practical while providing an opportunity for the directed halibut fishery and conserving spawning stock biomass, particularly at low levels of abundance. The Council recognizes that potential abundance-based halibut PSC limits currently under evaluation may increase and decrease with changes in halibut abundance. Note that this issue is still in a developmental stage in the Council process; thus, not as far along as RFFAs typically discussed in an EA. However, the scope of this action and the level of effort involved in this possible change warrants inclusion in a discussion of cumulative impacts to halibut.

This possible future action could change the way the halibut resource is allocated to some users in the BSAI, which in turn could affect the total catch limits in the commercial halibut IFQ/ CDQ fishery (in an increasing or decreasing way). The Council’s action could mean more or less halibut is available to commercial quota holders each year based on the new allocation methods. While it is not expected that a large portion of the Area 4 halibut IFQ/ CDQ will be shifted to be harvested in pot gear, given the barriers to entry described in Section 4.7; when combined with a possible halibut abundance-based PSC management action, there may be a cumulative shift in the gear responsible for total halibut removals.

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.

3.5 Marine Mammals

3.5.1 Status of Marine Mammals in BSAI

Alaska supports one of the richest assemblages of marine mammals in the world. Twenty-two species are present from the *Carnivora*, *superfamilies Pinnipedia* (seals, sea lions, and walrus), *Ursoidea* (polar bears), and *Musteloidea* (sea otters), and from the order *Artiodactyla*, *infraorder 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, including inshore waters (Muto et al. 2017; Lowry et al. 1982). NMFS maintains management authority for all marine mammal species in Alaska, while the U.S. Fish and Wildlife Service (USFWS) is the designated management authority for northern polar bears, Pacific walrus, and northern sea otter.

The Marine Mammal Protection Act (MMPA) was enacted in 1972 to address mortality and serious injury (M/SI) of marine mammals incidental to commercial fishing operations. The 1994 MMPA Amendments established a requirement for fisheries to reduce incidental M/SI of marine mammals to insignificant levels approaching a zero rate, commonly referred to as the Zero Mortality Rate Goal (ZMRG). ZMRG is considered met for a marine mammal stock when the M/SI level from all commercial fisheries is 10% (or below) of the Potential Biological Removal level (PBR) of that marine mammal stock (69 FR 43338, July 20, 2004). The level of serious injury and mortality (but not non-serious injury) that result from fisheries interactions is compared to the overall population level and the PBR for each marine mammal stock to evaluate whether the serious injury/mortality will have a deleterious effect at a population (stock) level. Likewise, the Endangered Species Act (ESA) was enacted with two major goals: (1) Protect endangered species at risk of extinction and threatened species that are likely to be at risk of extinction in the near future and pursue their recovery; and (2) Conserve candidate species and species-of-concern so that listing under the ESA is not necessary.

Under the MMPA a “population stock” is the fundamental unit of legally-mandated conservation and is defined as “a group of marine mammals of the same species or smaller taxa in a common spatial arrangement, which interbreed when mature.” Stocks are identified in a manner consistent with the management goals of the MMPA which include (1) preventing stocks from diminishing such that they cease to be a significant functioning element in the ecosystem of which they are a part or below their optimum sustainable population keeping the carrying capacity of the habitat in mind; and (2) maintaining the health and stability of the marine ecosystem. Therefore, a stock is also recognized as being a management unit that identifies a demographically isolated biological population. While many types of information can be used to identify stocks of a species, it is recognized that some identified stocks may fall short of that threshold due to a lack of information.

The stock status and fishery interaction information is available in the Marine Mammal Stock Assessment Reports (SARs), which are published annually for all stocks that occur in state and federal waters of the Alaska region (NMFS 2017, Muto et al. 2017). Individual SARs provide information on each stock’s geographic distribution, population estimates, population trends, and estimates of the potential biological removal (PBR) levels for each stock. The SARs identify sources of human-caused mortality, including serious injury and mortality in commercial fishery operations, by fishery, and whether the PBR has been exceeded. The SARs also include the stock’s ESA listing status and MMPA depleted and strategic designations. Strategic stock SARs are updated annually, and SARs for non-strategic stocks are updated every three years or when significant new information becomes available.

Under the ESA species, subspecies, and distinct population segments (DPS) are eligible for listing as a threatened or endangered species. The ESA defines a “species” as “any subspecies of fish or wildlife or plants, and any DPS of any species of vertebrate fish or wildlife which interbreeds when mature” (16 U.S.C. 1532(16)). The joint USFWS /NMFS DPS policy (61 FR 4722; February 7, 1996) establishes specific criteria that must be met for a population or group of populations to be considered a DPS, including: (1) The population segment must be discrete in relation to the remainder of the species (or subspecies) to which it belongs; and (2) the population segment must be significant to the remainder of the species (or subspecies) to which it belongs.

A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions: (1) it is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors; or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA. Significance determinations are made using available scientific evidence of the population’s biological and ecological importance to the taxon to which it belongs. This may include, but is not limited to, one or more of the following: (1) persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; (2) evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon; (3) evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; or (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. It is important to note that the MMPA stock designations and ESA DPS designations for a given species do not necessarily overlap due to differences in the defining criteria for each.

The Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement (PSEIS) (NMFS 2004) provides descriptions of the range, habitat, and diet for marine mammals found in waters off Alaska. The 2015 PSEIS Supplemental Information Report (NMFS 2015) provides updates on changes to marine mammal stock or species-related management and status, as well as new information regarding impacts on marine mammal stocks and new methods to assess impacts. These sources are incorporated by reference in Section 3.1.

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 2017 Supplemental Information Report (SIR).¹⁴ These documents are incorporated by reference (Section 3.1). Each year, NMFS publishes a Human-Caused Mortality and Injury of NMFS-Managed Marine Mammal Stocks Technical Memorandum, which includes marine mammal interactions with all types of fisheries; it is not limited to commercial fishery interactions.¹⁵ The data from this report are then summarized by stock in the SARs and then used in the annual List of Fisheries (LOF) analyses.¹⁶ The LOF analyzes serious injury and mortality of marine mammals in fisheries by stock and by individual commercial fisheries. Through the annual List of Fisheries analysis, the level of serious injury and mortality (but not non-serious injury)

¹⁴ The SIRs are available at <https://alaskafisheries.noaa.gov/fisheries/groundfish-harvest-specs-eis>. The 2017 report is available at: https://alaskafisheries.noaa.gov/sites/default/files/bsai_goa_sir_2017.pdf

¹⁵ Human-Caused Mortality and Injury of NMFS-Managed Alaska Marine Mammal Stocks Technical Memorandums used in this analysis can be found at:

<https://www.afsc.noaa.gov/publications/AFSC-TM/NOAA-TM-AFSC-354.pdf>

<https://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-315.pdf>

<https://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-300.pdf>

¹⁶ The List of Fisheries is available at http://www.nmfs.noaa.gov/pr/interactions/fisheries/2017_list_of_fisheries_lof.html

that resulted from incidental take in commercial fisheries for each marine mammal stock is compared to the stock's PBR to evaluate whether the potential for a deleterious effect at a population (stock) level.

Marine mammal bycatch data from the Alaska groundfish fisheries from 1998- 2004 is provided in a 2006 NOAA Technical Memorandum (Perez 2006). This document also describes the nature of marine mammal bycatch in the fisheries, the methods used to document marine mammal interactions with fishing gear and the methods used to extrapolate the fishery observer data to the entire fishery.

A number of conservation concerns and/or management determinations may be related to marine mammals and the potential impacts of fishing. For individual species, these concerns or determinations may include—

- Protection under the ESA:
 - listed as endangered or threatened
 - placed on NMFS' list of "species of concern" or designated as a "candidate species" for ESA listings;
- Protection under the MMPA:
 - designated as a depleted or strategic stock;
 - focus of a Take Reduction Plan;
- Other:
 - declining or depressed populations in a manner of concern to State or Federal agencies;
 - large bycatch or other mortality related to fishing activities; or
 - vulnerability to direct or indirect adverse effects from some fishing activities.

Marine mammal stocks, including those currently listed as endangered or threatened under the ESA, that are present in the BSAI are listed in Table 5 and Table 6.

Table 5 Marine mammals known to occur in the Aleutian Islands subarea

Infraorder or Superfamily	Species	MMPA Stock	ESA or MMPA Status	ZMRG Status (all fisheries)
Pinnipedia	Steller sea lion (<i>Eumatopias jubatus</i>)	Western U.S	Endangered, Depleted, Strategic	Not Met
	Northern fur seal (<i>Callorhinus ursinus</i>)	Eastern Pacific	Depleted, Strategic	Met
	Harbor seal (<i>Phoca vitulina</i>)	Aleutian Islands	None	Unknown
	Ribbon seal (<i>Phoca fasciata</i>)	Alaska	None	Met
	Northern elephant seal (<i>Mirounga angustirostris</i>)	California***	None	Met
Cetacea	Killer whale (<i>Orcinus orca</i>)	Eastern North Pacific Alaska Resident	None	Met
		Eastern North Pacific GOA, Aleutian Islands, and Bering Sea transient	None	Met
		Offshore***	None	Unknown*
	Pacific White-sided dolphin (<i>Lagenorhynchus obliquidens</i>)	North Pacific	None	Unknown*
	Harbor porpoise (<i>Phocoena phoecena</i>)	Bering Sea	Strategic	Unknown*
	Dall's porpoise (<i>Phocoenoides dalli</i>)	Alaska	None	Unknown
	Sperm whale (<i>Physeter macrocephalus</i>)	North Pacific	Endangered, Depleted, Strategic	Unknown
	Baird's beaked whale (<i>Berardius bairdii</i>)	Alaska	None	Unknown*
	Cuvier's beaked whale (<i>Ziphius cavirostris</i>)	Alaska	None	Unknown*
	Stejneger's beaked whale (<i>Mesoplodon stejnegeri</i>)	Alaska	None	Unknown*
	Gray whale (<i>Eschrichtius robustus</i>) ***	Eastern North Pacific***	None	Met
	Humpback whale (<i>Megaptera novaeangliae</i>) †	Western North Pacific‡	Endangered, Depleted, Strategic	Not Met
		Central North Pacific ‡‡	Mexico DPS-Threatened, Depleted, Strategic Hawaii DPS - None	Not Met
	Fin whale (<i>Balaenoptera physalus</i>)	Northeast Pacific	Endangered, Depleted, Strategic	Unknown*
	Minke whale (<i>Balaenoptera acutorostrata</i>)	Alaska	None	Unknown*
	North Pacific right whale (<i>Eubalaena japonica</i>)	Eastern North Pacific	Endangered, Depleted, Strategic	Met
Blue whale (<i>Balaenoptera musculus</i>)	Eastern North Pacific***	Endangered, Depleted, Strategic	Met	
Sei whale (<i>Balaenoptera borealis</i>)	Eastern North Pacific***	Endangered, Depleted, Strategic	Met	
Mustelidae	Northern sea otter (<i>Enhydra lutris</i>)	Southwest Alaska	None	Unknown**

Sources: Muto et al. 2017; List of Fisheries for 2017 (January 12, 2017 82 FR 3655).

*Unknown due to unknown abundance estimate and PBR.

** Unknown due to inadequate observer coverage;

*** This stock is found in the Pacific, rather than in the Alaska, SAR.

† On September 8, 2016, NMFS published a final decision revising the status of humpback whales under the ESA (81 FR 62260), effective October 11, 2016. In the 2016 decision, NMFS recognized the existence of 14 DPSs, classified several as endangered and one as threatened, and determined that the remaining DPSs do not warrant protection under the ESA. Three DPSs of humpback whales occur in waters off the coast of Alaska: the Asia/2nd Western North Pacific (WNP) DPS, which is endangered, the Mexico DPS, which is threatened, and the Hawaii DPS, which is not protected under the ESA. Whales from these three DPSs overlap to some extent on feeding grounds off Alaska. As of October 2016, the MMPA stock designations of humpback whales found in Alaska have not been updated to reflect the newly designated DPSs.

‡ Corresponds to the new Asia/ 2nd WDPS (endangered)

‡‡ Includes the newly classified Mexico DPS (threatened) and Hawaii DPS (not protected under the ESA).

Table 6 Marine mammals known to occur in the Bering Sea

Infraorder or Superfamily	Species	MMPA Stock	ESA or MMPA Status	ZMRG Status (all fisheries)
Pinnipedia	Steller sea lion (<i>Eumatopias jubatus</i>)	Western U.S	Endangered, Depleted, Strategic	Not Met
	Northern fur seal (<i>Callorhinus ursinus</i>)	Eastern Pacific	Depleted, Strategic	Met
	Harbor seal (<i>Phoca vitulina</i>)	Pribilof Islands	None	Unknown**
		Bristol Bay	None	Unknown**
	Ribbon seal (<i>Phoca fasciata</i>)	Alaska	None	Met
	Bearded seal (<i>Erignathus barbatus nauticus</i>)	Alaska	Threatened, depleted, strategic©	Unknown*
	Spotted seal (<i>Phoca largha</i>)	Alaska	None#	Met
Ringed seal (<i>Phoca hispida</i>)	Alaska	Threatened¥	Unknown*	
Pacific Walrus (<i>Odobenus rosmarus divergens</i>)	Alaska	Strategic§	Met	
Cetacea	Killer whale (<i>Orcinus orca</i>)	Eastern North Pacific Alaska Resident	None	Met
		Eastern North Pacific GOA, Aleutian Islands, and Bering Sea transient	None	Met
		Offshore***	None	Unknown*
	Pacific White-sided dolphin (<i>Lagenorhynchus obliquidens</i>)	North Pacific	None	Unknown*
	Harbor porpoise (<i>Phocoena phocena</i>)	Bering Sea	Strategic	Unknown*
	Dall's porpoise (<i>Phocoenoides dalli</i>)	Alaska	None	Unknown*
	Beluga whale (<i>Delphinapterus leucas</i>)	Beaufort Sea	None	Met
		Eastern Chukchi Sea	None	Met
		Eastern Bering Sea	None	Unknown*
		Bristol Bay		Unknown**
	Baird's beaked whale (<i>Berardius bairdii</i>)	Alaska	None	Unknown*
	Stejneger's beaked whale (<i>Mesoplodon stejnegeri</i>)	Alaska	None	Unknown*
	Sperm whale (<i>Physeter macrocephalus</i>)	North Pacific	Endangered, Depleted, Strategic	Unknown*
	Bowhead whale (<i>Balaena mysticetus</i>)	Western Arctic (Also known as Bering-Chukchi-Beaufort stock)	Endangered, Depleted, Strategic	Met
	Humpback whale (<i>Megaptera novaeangliae</i>) †	Western North Pacific ‡	Endangered, Depleted, Strategic	Not Met
		Central North Pacific ††	Threatened, Depleted, Strategic ††	Not Met
Fin whale (<i>Balaenoptera physalus</i>)	Northeast Pacific	Endangered, Depleted, Strategic	Unknown*	
Minke whale (<i>Balaenoptera acutorostrata</i>)	Alaska	None	Unknown*	
North Pacific right whale (<i>Eubalaena japonica</i>)	Eastern North Pacific	Endangered, Depleted, Strategic	Met****	
Blue whale (<i>Balaenoptera musculus</i>)	Eastern North Pacific***	Endangered, Depleted, Strategic	Met	
Mustelidae	Northern sea otter (<i>Enhydra lutris</i>)	Southwest Alaska	Threatened, Depleted, Strategic	Met
Ursoidea	Polar Bear (<i>Ursus maritimus</i>)	Chukchi/Bering Sea	Threatened, Depleted, Strategic	Met

Sources: Muto et al. 2017; List of Fisheries for 2017 (January 12, 2017 82 FR 3655).

* Unknown due to unknown abundance estimate and PBR.

** Unknown due to inadequate observer coverage or unreliable SI/M estimate.

*** This stock is found in the Pacific, rather than in the Alaska, SAR.

**** The PBR for the North Pacific right whale is calculated but considered unreliable. However, there are no known fishery-related SI/M.

† On September 8, 2016, NMFS published a final decision revising the status of humpback whales under the ESA (81 FR 62260), effective October 11, 2016. In the 2016 decision, NMFS recognized the existence of 14 DPSs, classified several as endangered and one as threatened, and determined that the remaining DPSs do not warrant protection under the ESA. Three DPSs of humpback whales occur in waters off the coast of Alaska: the Asia/2nd Western North Pacific (WNP) DPS, which is endangered, the Mexico DPS, which is threatened, and the Hawaii DPS, which is not protected under the ESA. Whales from these three DPSs overlap to some extent on feeding grounds off

Alaska. As of October 2016, the MMPA stock designations of humpback whales found in Alaska have not been updated to reflect the newly-designated DPSs.

‡ Corresponds to the new Asia/ 2nd WDPS (endangered).

‡‡ Includes the Mexico (threatened) and Hawaii DPSs (not protected under the ESA).

Spotted seals: Three DPSs are identified, but only the Bering DPS occurs in US waters. Therefore, the Alaska stock identified under the MMPA SAR consists entirely of the Bering DPS.

© Bearded seals: Two DPSs are identified for this subspecies, but only the Beringia DPS occurs in US waters. Therefore, the Alaska stock identified under the MMPA SAR consists entirely of the Beringia DPS. The Beringia DPS was listed as threatened under the ESA in December 2012.

¥ Ringed seals were listed as threatened under the ESA in December 2012.

§ Walrus – A petition to list walrus under the ESA was determined to be warranted, but precluded by higher priorities (76 FR 7634, February 10, 2011). The USFWS was under court order to make a decision on the listing by 2017. Pursuant to that court order, the USFWS published on October 5, 2017, a finding that listing of the walrus as endangered or threatened was not warranted (82 FR 46618). The USFWS's 2017 finding is subject to ongoing litigation.

3.5.1.1 Existing Marine Mammal Protection Measures in the Alaska Groundfish Fisheries

Direct and indirect interactions between marine mammals and fishing vessels may occur due to temporal and spatial overlap in marine mammal occurrence and commercial fishing activities, as well as overlap between the size and species of fish harvested that are also important marine mammal prey. The BSAI and GOA groundfish FMPs contain measures to protect marine mammals from potential effects of fishing, and several species are the subjects of continuing research and monitoring to further define the nature and extent of fishery impacts on them.

Marine mammal entanglements generally occur when whales encounter vertical lines that extend from a pot or trap or string of traps set on the ocean bottom to a buoy at the surface (sometimes referred to as “float lines”), or when marine mammals interact with a net. The likelihood of entanglement in any one vertical line is the same, regardless of whether the line is part of a HAL longline or attached to a pot. However, due to the weight of pots, lines with pots attached are potentially more likely to lead to serious injury or mortality as they make it more difficult for an entangled animal to swim/feed/breathe than a non-weighted, single line (Andersen et al. 2007). Large whales, including North Atlantic right whales, humpback whales, fin whales, and grey whales, are particularly susceptible to becoming entangled in trap or pot gear due to spatial overlap with fisheries and their feeding behavior. Baleen whale entanglements in fishing gear generally involve humpback whales, though incidental take of other baleen whale species have occurred. Overall, fewer killer, sperm, or other toothed whales have been entangled in all gear types, including pot gear. The amount of slack line used and the profile of the lines in the water column can influence the potential for entanglement. Generally, lines that remain relatively tight are less likely to lead to entanglement as opposed to lines that create larger profiles in the water if they are relatively loose and/or winding around in loops.

Of the species listed under the ESA and present in the BSAI, 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 2010). Stocks designated as depleted or strategic under the MMPA, but not listed as threatened or endangered under the ESA, that may be vulnerable to being adversely affected by commercial fishing, include northern fur seals and harbor porpoises.

The following paragraphs describe the reasoning behind which species were not expected to be affected by the alternatives and therefore were not analyzed. **Not all species listed in Table 5 and Table 6 are likely to be affected by this action, and any potential impacts that do occur are expected to be minimal due to the small predicted shift in effort from the HAL to the pot fishery.** Many of these species do not generally overlap with the action area or the fishery, or they are not known to directly interact with pot gear. Additionally, the effects of this action expected on certain marine mammal species from Table 5 and Table 6 have been considered in previous NEPA analyses, which are outlined here.

NMFS has completed ESA section 7 consultations for the Federal BSAI and GOA groundfish fisheries for all ESA-listed species, either individually or in groups. The last programmatic ESA section 7 consultation on the effects of the groundfish fisheries, as authorized by the BSAI groundfish FMP, was initiated in 2006 (NMFS 2006a) and completed in 2010 (NMFS 2010). On June 21, 2006, NMFS Alaska Region Protected Resources Division agreed with the determination by the Sustainable Fisheries Division that the groundfish fisheries were not likely to adversely affect the following listed marine mammal species or designated critical habitat: blue whale, right whale or designated right whale critical habitat, sei whale, or fin whale (NMFS 2006a). Additionally, the general habitat and ranges of blue and sei whales is not likely to overlap with areas where BSAI sablefish pots are deployed or where halibut pots would likely be deployed, and therefore would not be expected to be affected by this action.

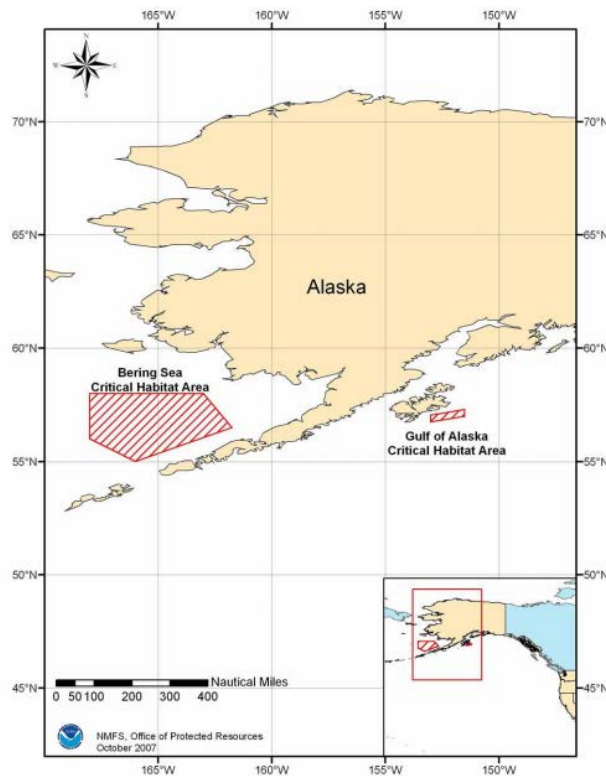
The 2010 biological opinion (NMFS 2010), which subsequently included fin whales, concluded that the BSAI and GOA groundfish fisheries were not likely to jeopardize the continued existence of the eastern DPS of Steller sea lion, humpback whales, sperm whales or fin whales. However, the 2010 biological opinion also concluded that NMFS could not ensure that the BSAI and GOA groundfish fisheries were not likely to jeopardize the continued existence of the Steller sea lion western DPS (WDPS) or adversely modify its designated critical habitat. Additional protection measures to conserve prey for Steller sea lions in the western and central Aleutian Islands and ensure that the fisheries were not likely to jeopardize the continued existence of the Steller sea lion WDPS or adversely modify its designated critical habitat were implemented in the fisheries in 2011 (76 FR 2027, January 12, 2011) and amended again in 2015 (79 FR 70286, November 25, 2014) following the completion of a biological opinion on 2015 management measures (NMFS 2014).

The USFWS listed the southwest Alaska DPS of the northern sea otter (northern sea otter SWDPS) as threatened under the ESA in 2005. In 2013, NMFS and the USFWS consulted on the effects of the BSAI and GOA groundfish fisheries on the northern sea otter SWDPS and determined that the BSAI and GOA groundfish fisheries were not likely to adversely affect the endangered southwest Alaska DPS of the northern sea otter or designated critical habitat (NMFS Alaska Region 2013).

Although some northern fur seals are caught incidental to commercial fisheries, the number is low compared to the PBR. Based on currently available data, the minimum estimate of the mean annual U.S. commercial fishery related mortality and serious injury rate for this stock (3.5 fur seals) is less than 10% of the calculated PBR (10% of PBR = 1,140) and is therefore considered to be insignificant and approaching a zero mortality and serious injury rate. The total estimated annual level of human-caused mortality and serious injury (437 fur seals) does not exceed the PBR (11,405) for this stock (Muto et al. 2017). This action is not likely to adversely affect the Eastern Pacific stock of northern fur seals.

NMFS designated critical habitat for the North Pacific right whale on April 8, 2008 (73 FR 19000; Figure 6) and concluded on April 30, 2008 (NMFS 2008) that the fisheries in the BSAI and GOA were not likely to adversely affect the right whale or critical habitat. NMFS reached this conclusion because the density of fishing effort in the areas comprising North Pacific right whale critical habitat is low compared with regions outside Alaska where right whale interactions have occurred, the low numbers of right whales in Alaska, and that most of the right whales appear to migrate from Alaska waters seasonally (though a few may come early or stay late or even over-winter) (NMFS 2017, Muto et al. 2017).

Figure 6 North Pacific Right Whale Critical Habitat



At its April 2018 meeting, the Council voiced a question regarding bowhead whale entanglements with pot gear in the BSAI. Reports of bowhead whales with entanglement scars or with pot gear attached are impacted by pot gear in areas that are unlikely to be affected by this action. Bowhead whales are generally in the Bering Sea during winter, as they are associated strongly with the ice edge. This edge is north of where the anticipated IFQ fishing would occur. Additionally, since both IFQ fisheries are closed during the winter months, overlap during this time would be unlikely. In summer, the Bering-Chukchi-Beaufort Sea (BCBS) bowheads migrate to the Beaufort Sea and are not found where the sablefish or halibut pot fisheries would occur, as neither halibut nor sablefish are found that far north. The Human-Caused Mortality and Injury of NMFS-Managed Alaska Marine Mammal Stocks reports show that two bowhead whales were entangled in commercial pot gear between 2007 and 2015, one in the Western Arctic and one in the Chukchi Sea. One entanglement was associated specifically with crab pot gear (the other was unidentified pot gear) (Helker et al. 2017; Allen, Helker, & Jemison 2014).

3.5.1.2 Humpback Whale Stock Status

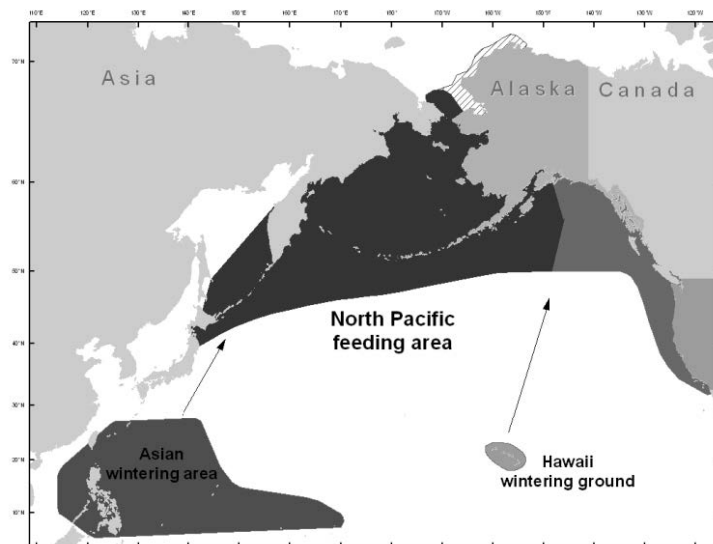
The humpback whale is distributed worldwide in all ocean basins. In winter, most humpback whales occur in subtropical and tropical waters, and in summer most humpback whales migrate to higher latitudes to feed. A large-scale study of humpback whales throughout the North Pacific was conducted in 2004-2006 (SPLASH Project, Calambokidis et al. 2008, Barlow et al. 2011) and indicated that there are at least three breeding populations in the North Pacific: Western North Pacific (WNP), Central North Pacific (CNP), and Mexico/Central America. Of these, the Western North Pacific and Central North Pacific stocks are most likely to be found in the action area.

Western North Pacific Stock

The SPLASH study collected over 18,000 fluke photographs from humpback whales in all known feeding areas from Russia to California and all known wintering areas from Okinawa and the Philippines to the coast of Central America. A total of 566 unique individuals were seen in the Asian wintering area during the 2-year period. Point estimates of the stock range from 938 to 1,107. The minimum population estimate is 865 (Muto et al. 2017). This represents an annual 6.7% rate of increase over the 1991 – 1993 abundance estimate (Calambokidis et al. 2008). The Potential Biological Removal (PBR) for the WNP stock, using the minimum population estimate of 865, is calculated to be 3.0 whales.

The Western North Pacific stock of humpback whales winter near several island chains in the western North Pacific, and feeds in the North Pacific from Okinawa to the central Gulf of Alaska (Figure 7), although the migratory paths and destination of all WNP humpbacks are not fully known. While wintering areas for North Pacific humpbacks are discrete, whales from at least the WNP and Central North Pacific stocks are mixed in the North Pacific feeding area.

Figure 7 Approximate distribution of Western North Pacific humpback whales



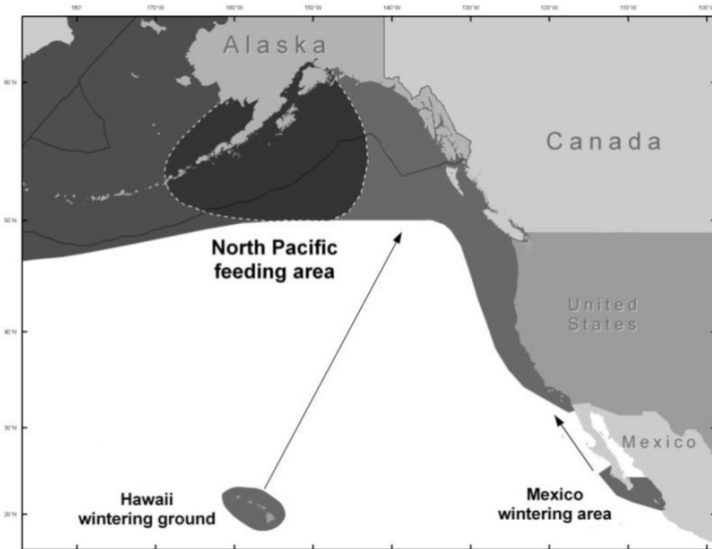
Sources: Muto et al. 2017

Central North Pacific Stock

The Central North Pacific stock of humpback whales winters primarily in the Hawaiian archipelago and feeds in the Gulf of Alaska (Figure 8). The SPLASH study collected photos from wintering areas throughout the Hawaiian archipelago and the North Pacific feeding area. A total of 2,367 unique individuals were seen in the Hawaiian wintering areas during the 2004-2006 SPLASH study. Point estimates for the CNP stock range from 7,469 to 10,103. The minimum population estimate for this stock, using the best fit model estimate of 10,103 individuals, is 7,890 whales. Although the most recent population estimate is more than ten years old, it is substantially higher than the estimate from 1981 (1,407) and the estimate for the entire North Pacific from 1991 – 1993 (6,010), suggesting that abundance increased in the Hawaiian waters between the early 1980s and the early 2000s. Mobely et al. (2001) estimated an increasing population trend of 7% per year for 1993 – 2000 using data from aerial surveys conducted across all of the Hawaiian Islands. Comparisons of SPLASH estimates for the CNP stock to estimate for 1991 – 1993 suggest annual increases that range from 5.5% to 6.0% per year (Calambokidis

2008). The Potential Biological Removal for the CNP stock, using the minimum population estimate of 7,890, is 83 animals.

Figure 8 Approximate distribution of Central North Pacific humpback whales



Source: Muto et al. 2017

Between 2010 and 2014, mortality and serious injury of humpback whales occurred in the Bering Sea/Aleutian Islands flatfish trawl fishery (1) and the Bering Sea/Aleutian Islands pollock trawl fishery (1). Since the stock identification of those whales is not known, and the stocks overlap in the summer feeding area where the events occurred, mortality in these fisheries is assigned to both the WNP and CNP stocks of humpback whales. Between 2010 and 2014, mortality and serious injury due to entanglement in the commercial Southeast Alaska salmon drift gillnet fishery was estimated at 3 whales in 2010, 0.75 in 2011, 1.75 in 2012, 0.75 in 2013, and 2.5 in 2014. The minimum estimate of the mean annual and serious injury rate of humpback whales incidental to U.S. commercial fisheries (Alaska and Hawaii) for the entire Central North Pacific stock in 2010-2014 is 7.4 whales.

3.5.1.3 Killer Whale and Sperm Whale Stock Status

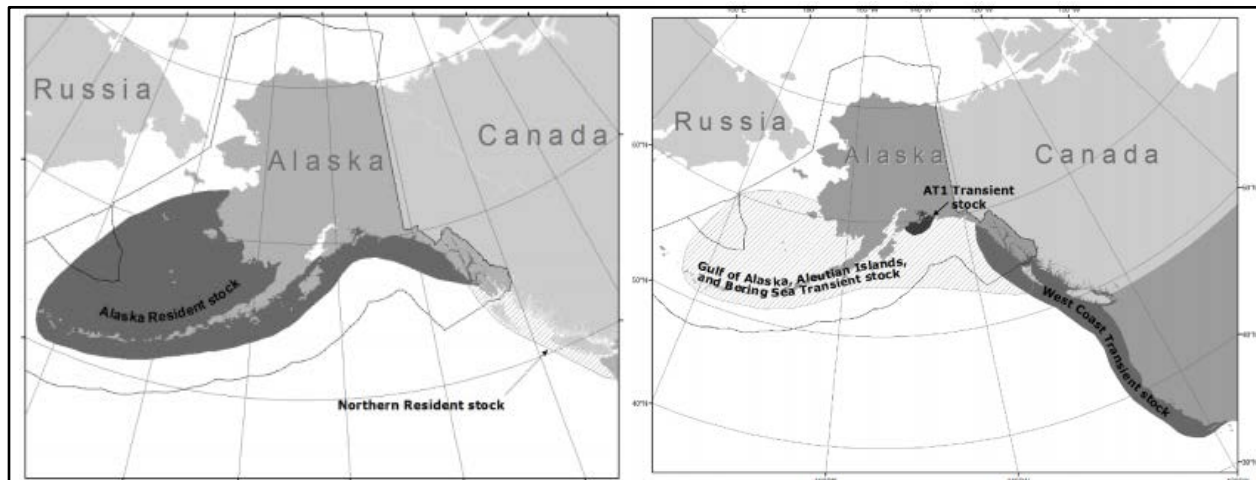
A more detailed discussion of sperm and killer whale status is warranted due to the interactions between sperm whales and killer whales in the sablefish pot fishery and IFQ HAL fishery (Section 3.5.2).

Abundance estimates for the Alaska resident, Eastern North Pacific GOA, Aleutian Islands, and Bering Sea transient killer whale stocks are largely unknown. The minimum abundance estimate for the Eastern North Pacific Alaska Resident stock is likely under-estimated because researchers continue to encounter new whales in Alaskan waters. The most recent population estimate for resident killer whales in the Western Alaska region was 1,475 in 2013 (D. Hanselman, pers. comm. 2017). Seasonal and year-round occurrence has been noted for killer whales throughout Alaska (Braham and Dahlheim 1982).

Alaska resident and transient killer whales are found from southeastern Alaska to the Aleutian Islands and Bering Sea (Figure 9); these stocks overlap with the action area. 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 (Ford and Ellis 2006, Forney and Wade 2006). Resident whales are those most likely to be involved in fishery interactions since these whales are known to be fish eaters. Transient killer whales generally feed on

marine mammals. Fisheries observers report that large groups of killer whales in the Bering Sea follow vessels for days at a time, actively consuming the processing waste, particularly on trawl vessels (NMFS-AFSC, Fishery Observer Program, unpubl. data). Based on currently available data, a minimum estimate of the mean annual mortality and serious injury rate due to U.S. commercial fisheries for killer whales (1 whale) is less than 10% of the PBR (10% of PBR = 2.4) and, therefore, is considered to be insignificant and approaching zero mortality and serious injury rate. A minimum estimate of the total annual level of human-caused mortality and serious injury (1 whale) is not known to exceed the PBR (24) (Muto et al. 2017).

Figure 9 Approximate distribution of resident and transient killer whales in the eastern North Pacific

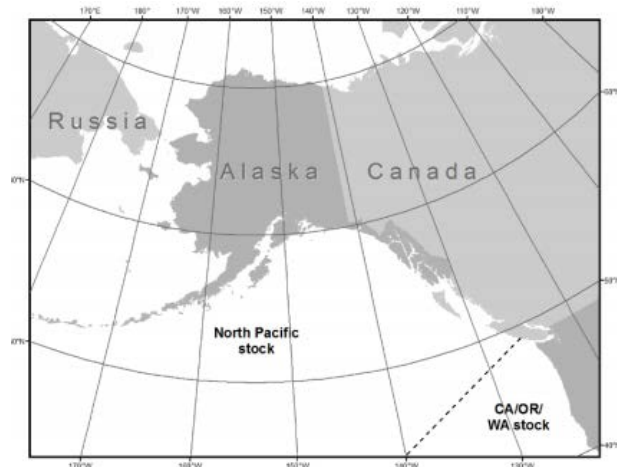


Source: AK Marine Mammals SAR, http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_final_sars_june.pdf
 Note: Dark shaded areas represent distribution.

In the North Pacific, sperm whales are distributed widely (Figure 10), with the northernmost boundary extending from Cape Navarin (62°N) to the Pribilof Islands (Omura 1955). Sperm whales generally inhabit waters 600 m or more depth. While females and young generally stay in tropical and temperate waters, males may be seen during the summer in the Gulf of Alaska, Bering Sea and throughout the Aleutian Islands (ADF&G n.d.), where they feed on the rich biomass of the North Pacific. Sperm whales feed primarily on medium to large-size squids but also take substantial quantities of large demersal and mesopelagic sharks, skates, and fishes (Rice 1989).

Abundance and populations trends of sperm whales in Alaska waters are unknown. New estimates in the GOA indicate a population size of about 345 sperm whales, but no information on trend is available (Rone et al. 2017) because historical estimates of the abundance of sperm whales in the North Pacific are considered unreliable. Sighting surveys conducted by the Alaska Fisheries Science Center's Marine Mammal Laboratory (MML) in the summer months between 2001 and 2010 found sperm whales to be the most frequently sighted large cetacean in the coastal waters around the central and western Aleutian Islands (MML, unpubl. data). While the PBR for the North Pacific sperm whale stock is unknown, there were five serious injuries of sperm whales observed in the Gulf of Alaska sablefish longline fishery from 2010-2014 (Helker, Muto, & Jemison 2016). On the basis of total abundance, current distribution, and regulatory measures that are currently in place, it is unlikely that this stock is in danger of extinction (Braham 1992, as cited in Muto et al. 2017). According to the 2010 Biological Opinion (NMFS 2010), the potential for ship strikes is minimal and unlikely to result in an adverse population level effect for sperm whales in Alaska. Additionally, incidence of sperm whale entanglement in Alaska appears to be low and would not be expected to reach a level that would have population-level consequences (NMFS 2010).

Figure 10 The approximate distribution of sperm whales in the North Pacific



Note: Distribution includes deep waters south of 62°N to the equator

Source: AK Marine Mammals SAR, http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_final_sars_june.pdf

3.5.2 Background on Whale Depredation

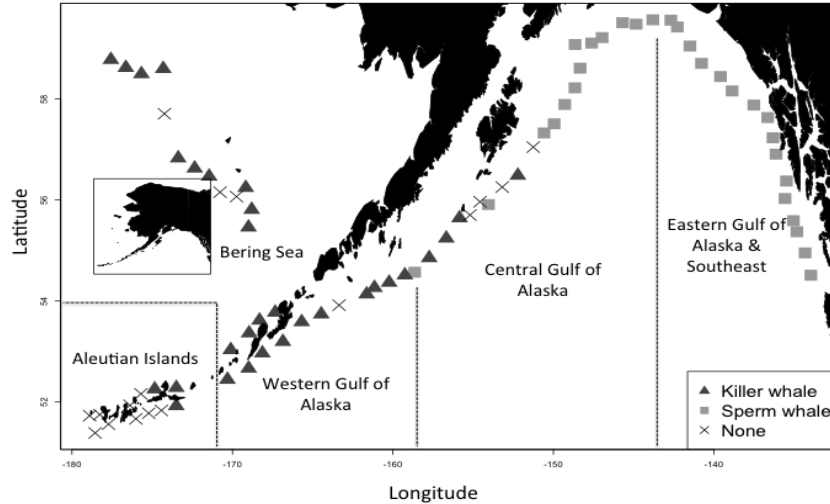
Depredation by killer whales and sperm whales is common in the Alaska sablefish and halibut IFQ fishery (Sigler et al. 2008; Peterson & Hanselman 2017; Peterson et al. 2014). While data on depredation of halibut discarded from sablefish pot gear is limited, testimony from fishery participants has consistently identified it as an issue, as it impedes efficient use of the resource. In 2008, the IPHC received a proposal that described high killer whale depredation of halibut that were discarded from sablefish pot gear, resulting in presumed high discard mortality and a loss to the halibut resource (Jay Herbert 2008). Other fishery participants stated that whale depredation both of halibut discarded in the sablefish pot fishery as well as of halibut and sablefish hooked on longlines is an increasing problem (personal communication, R. Hanson 2018; personal communication, J. Kauffman 2018). In a study conducted by Peterson and Carothers (2013), 87% of longline fishermen surveyed perceived whale depredation as worsening between 1990 and 2010. Because Alternative 2 opens an opportunity for HAL fishermen to switch to pot gear, we expect some shift of effort from HAL gear to pot gear. Therefore, a discussion of whale depredation in the HAL fishery is important to set the stage for potential effects of this action.

Killer whale depredation of sablefish and halibut generally occurs in the BS, AI, and WGOA management areas, whereas sperm whale depredation tends to be more problematic in the Central and Eastern GOA (Figure 11, Figure 12, Table 7). Of the stations sampled by in the AFSC longline survey, all instances of sperm whale depredation in the BSAI have occurred in the Aleutian Islands (Table 7) (NMFS 2010; Hanselman et al. 2017). Because sperm whale depredation is minimal in the action area, they are not considered further in the analysis. Killer whale depredation in the BSAI occurs 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 et al. 2014), and whales seem to target fishing grounds with higher CPUEs (Peterson & Carothers 2013). Killer whales prey upon several groundfish species that are caught on longline gear in Western Alaska, including sablefish, Greenland turbot, arrowtooth flounder and Pacific halibut (Yano and Dalheim 1995, Peterson et al. 2013). This reduces fishery catch rates and decreases the accuracy of stock assessments.

Development of technological solutions to deter whales and changes in fishing strategies can be costly, an inconvenience to fishery participants, and has not resolved the problem (Goetz et al. 2011, Guinet et al. 2014). In October 2006, fishermen and scientists from around the world, including sablefish fishermen

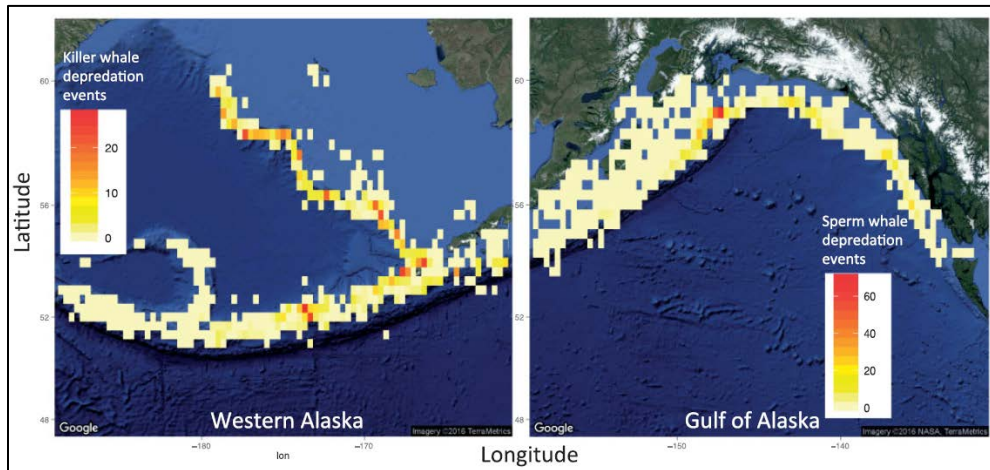
and scientists from Alaska, participated in a depredation workshop focused on mitigating the effects of depredation.¹⁷ A second international depredation and bycatch mitigation workshop was held at the Woods Hole Oceanographic Institution in October 2013.¹⁸ A discussion of whale deterrent efforts can be found in the GOA Sablefish Pots Analysis from 2015 (NPFMC, 2016).

Figure 11 Depredation by whale species and sablefish management area based on NMFS longline survey, 1998-2011



Source: (Peterson and Carothers 2013)

Figure 12 NMFS observer data on depredation events counts by killer whales in western Alaska and sperm whales in the GOA



Source: (Peterson and Hanselman 2017)

Note: shown in 1/3-degree by 1/3-degree cells

¹⁷ Workshop abstracts and summaries are available at: <http://depredation.org>

¹⁸ Abstracts available at <http://www.bycatch.org/node/796>

Table 7 Count of stations where sperm (S) or killer whale (K) depredation occurred

Year	BS (16)		AI (14)		WG (10)		CG (16)		WY (8)		EY/SE (17)	
	S	K	S	K	S	K	S	K	S	K	S	K
1996			n/a	1	n/a	0	n/a	0	n/a	0	n/a	0
1997	n/a	2			n/a	0	n/a	0	n/a	0	n/a	0
1998			0	1	0	0	0	0	4	0		0
1999	0	7			0	0	3	0	6	0	4	0
2000			0	1	0	1	0	0	4	0	2	0
2001	0	5			0	0	3	0	2	0	2	0
2002			0	1	0	4	3	0	4	0	2	0
2003	0	7			0	3	2	0	1	0	2	0
2004			0	0	0	4	3	0	4	0	6	0
2005	0	2			0	4	0	0	2	0	8	0
2006			0	1	0	3	2	1	4	0	2	0
2007	0	7			0	5	1	1	5	0	6	0
2008			0	3	0	2	2	0	8	0	9	0
2009	0	10			0	2	5	1	3	0	2	0
2010			0	3	0	1	2	1	2	0	6	0
2011	0	7			0	5	1	1	4	0	9	0
2012			1	5	1	5	2	0	4	0	3	0
2013	0	11			0	2	2	2	3	0	7	0
2014			1	3	0	4	4	0	6	0	4	0
2015	0	9			0	5	6	0	6	0	7	0
2016			1	0	0	3	3	0	6	0	5	0
2017	0	11			1	2	4	0	3	0	9	0

Source: (Hanselman et al. 2017)

Note: The number of stations sampled that are used for relative population calculations are in parentheses. Areas not surveyed in a given year are left blank. If there were no whale depredation data taken, it is denoted with an “n/a.” Columns represent sablefish regulatory areas: BS= Bering Sea, AI= Aleutian Islands, WG= Western Gulf, CG= Central Gulf, WY= Western Yakutat, EY/SE= Eastern Yakutat/Southeast.

More information exists on whale depredation of sablefish than depredation of Pacific halibut, however, fishery participants in the BSAI report that the Pacific halibut commercial fisheries are heavily impacted by killer whale depredation. According to Peterson et al. (2013), the failure of models to show a significant effect on halibut catch rates in areas impacted by killer whale depredation may be a result of low sample size and lower Pacific halibut catches overall.

In a survey of Alaska longliners carried out by Peterson & Carothers (2013), the majority of respondents (70.7%) that reported interactions with killer whales (primarily western Alaska) estimated that depredation rates exceeded 40% of catch. In 2013, Peterson et al. used NMFS sablefish 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 WGOA. When killer whales were present during survey gear retrieval, whales removed an estimated 54% to 72% of sablefish, 41% to 84% of arrowtooth flounder and 73% of Greenland turbot. Overall sablefish catches (depredated and non-depredated sets) were lower by between 11% and 29% in all three management areas. During the study period from 1998-2011, the frequency of killer whale interactions remained stable in the BS while increasing in the AI and WG. The proportion of skates preyed upon significantly increased in the AI, and data in the BS showed no significant trend.

In follow-up studies by Peterson et al. (2014, 2017), the authors extended their analysis to evaluate the impacts of killer whale depredation on commercial longline fisheries in Western Alaska. Those studies applied a statistical modeling approach to NMFS observer data and fishermen-collected depredation data

to: (1) estimate the frequency of killer whale depredation of commercial longlines; (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 (13%) and was relatively low in the AI and WGOA (approximately 2%).

In direct response to depressed CPUEs associated with killer whale depredation, commercial longliners reportedly react in two ways: dropping their gear back down to “wait the whales out,” or moving to a different fishing site to avoid the whales (Peterson and Carothers 2013). Both avoidance measures result in reduced efficiency through increased operation costs and opportunity costs in lost time, such as extended soak times and distances traveled (costs of avoiding whales are further discussed in Section 4.7.1).

3.5.3 Effects 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 described in Section 3.5.2. In this case, the prey availability is enhanced for these animals because they need less energy for foraging. However, that benefit may be offset by adverse effects from an increased potential for entanglement in the gear or other unknown risks from modified foraging behavior.

The following discussion focuses on the potential interaction of marine mammals with fishing gear currently used in the sablefish IFQ fishery in the BSAI and with pot gear proposed for use in the halibut IFQ fishery in the BSAI. While this analysis also considers potential impacts on humpback whales, it focuses largely on killer whales, which are known to depredate fish caught in the sablefish and halibut IFQ fisheries in the BSAI. These latter interactions reduce the efficiency of the fishery and may increase the likelihood of entanglement of these whales in fishing gear and fishing-related ship strikes. Any potential impacts that do occur are expected to be minimal due to the small predicted shift in effort from the HAL to the pot fishery.

3.5.3.1 Alternative 1

Maintaining the current prohibition of the retention of legal-size halibut in (single or longline) pot gear in the BSAI is the status quo or no action alternative. Continued use of currently allowed gear would not address the purpose and need statement for the action, which stresses the need to minimize fishery interactions with killer whales in the Bering Sea.

Under Alternative 1, there would be no expected changes in incidental take, prey availability, or disturbance effects.

Incidental Take Effects

The BSAI halibut longline (HAL) and BSAI sablefish pot fisheries are listed in the List of Fisheries for 2017 as Category III,¹⁹ with a remote likelihood of or no known interaction with any marine mammal species.

¹⁹ The Proposed List of Fisheries for 2018 (82 FR 47424 October 10, 2017) would remove the Category III AK halibut longline/set line (state and Federal waters) fishery from the LOF as this fishery is covered by AK Gulf of Alaska halibut longline and AK BSAI

Under the status quo in the BSAI, killer whales interfere with HAL fishing operations when they prey upon fish that are hooked. Due to this behavior, these species may be at greater risk of vessel strike and/or entanglement than marine mammals that do not interfere with these fishing operations. However, cetacean entanglements in longline fishing gear are rare. The likelihood of killer whale entanglements in longline gear is very low (Dalla Rosa and Sechi 2007). For killer whales, the minimum estimate of the total annual level of human-caused mortality and serious injury is not known to exceed the PBR, and the status quo alternative is not likely to impact this total serious injury or mortality; therefore, we do not expect any significant population-level impacts as a result of Alternative 1.

Under the status quo, there is potential for sablefish longliners to switch to pots even without a large increase in sablefish densities, however there is no potential for halibut longliners to switch to pots under Alternative 1, which limits the magnitude of those who can take advantage of this opportunity and enter a pot fishery that targets halibut in the BSAI. All the above fisheries are Category III fisheries, and any shift in effort between gear types that occurs under Alternative 1 is not expected to have any significant effects on the incidental take of marine mammals.

Prey Availability Effects

Harvest of marine mammal prey species in the BSAI and GOA fisheries may limit foraging success through localized depletion, overall reduction in prey biomass, and dispersion of prey, making it more difficult for foraging marine mammals to obtain necessary prey. Overall reduction in prey biomass may be caused by removal of prey or disturbance of prey habitat. The timing and location of fisheries relative to foraging patterns of marine mammals and the abundance of prey species may be a more relevant management concern than total prey removals.

Diet data suggest that killer whales are not known to naturally forage for sablefish, likely due to the depth range of sablefish (Rice 1989). The impacts of altered foraging behavior, such as removing hooked fish from longline gear or preying upon fish discarded from fishing vessels, are unknown. Optimal foraging theory states that an animal wants to gain the most benefit (energy) for the lowest cost during foraging, so that it can maximize its fitness. Obtaining food provides the animal with energy, while searching for and capturing food requires both energy and time. Depredation of fishing gear enables decreased energy expenditure required to forage for prey. Under Alternative 1, whale depredation is expected to continue as the status quo.

Several marine mammal species may be impacted indirectly by effects that fishing gear may have on benthic habitat. Table 8 lists marine mammals that may depend on benthic prey and known depths of diving. Diving activity may be associated with foraging. The essential fish habitat (EFH) EIS states that very little information exists regarding the effects of HAL gear on benthic habitat, and published literature is essentially nonexistent (NMFS 2005). Under the status quo alternative, there are presumed to be no impacts to the benthic habitat enough to decrease marine mammal prey base to the extent that it would impact survival rates or reproductive success.

Overall, effects of Alternative 1 on prey availability for marine mammals are not likely to cause population level effects and are therefore not significant.

halibut longline fisheries on the LOF. The AK BSAI halibut longline fishery was listed as a Category III fishery based on analogy to other halibut longline fisheries. NMFS reclassified the AK Gulf of Alaska sablefish longline fishery to Category II based on the uncertainty in stock structure and abundance of sperm whales in the North Pacific, sperm whale mortality and serious injury (M/SI) in the AK Gulf of Alaska sablefish longline fishery. <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries>.

Table 8 Benthic dependent marine mammals, foraging locations, and diving depths

Species	Depth of diving and location
Ribbon seal	Mostly dive < 150 m on shelf, deeper off shore. Primarily in shelf and slope areas.
Harbor seal	Up to 183 m. Generally coastal.
Sperm whale	Up to 1,000 m, but generally in waters > 600 m.
Northern sea otter	Rocky nearshore < 75 m
Gray whale	Benthic invertebrates

Sources: Muto et al, 2017; Burns et al. 1981; <http://www.adfg.state.ak.us/pubs/notebook/marine/rib-seal.php>;
http://www.afsc.noaa.gov/nmml/species/species_ribbon.php;
<http://www.adfg.state.ak.us/pubs/notebook/marine/harseal.php>;
<http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/spermwhale.htm>

Disturbance Effects

Disturbance effects from the groundfish fisheries described in the 2010 Biological Opinion include: disruption of normal foraging patterns by the presence and movements of vessels and gear in the water, abandonment of prime foraging areas because of fishing activities, and disruption of prey schools in a manner that reduces the effectiveness of marine mammals' foraging. The interaction of the BSAI groundfish fisheries with Steller sea lions, which potentially compete for prey, is comprehensively addressed in the Steller Sea Lion Protection Measures EIS and the 2010 Biological Opinion (NMFS 2014; NMFS 2010). NMFS concluded that status quo fisheries do not cause disturbance to marine mammals at a level that may cause population level effects.

3.5.3.2 Alternative 2

Incidental Take Effects

As described in Alternative 1, the BSAI halibut HAL and BSAI sablefish pot fisheries are listed as Category III.²⁰ In terms of Alternative 2, the potential magnitude and direction of impacts on marine mammals depend on changes in fishing behavior as well as how whales respond to any changes in fishery behavior, both of which are difficult to predict and quantify. For example, if there is no or reduced incentive for the whales to be near fishing vessels because fewer halibut are being discarded, the likelihood of ship strike and entanglement would be expected to be reduced. However, we cannot predict whether whales may remain longer with vessels that are still discarding halibut, or with those still catching halibut on longlines.

When fishing with pot gear, it is inevitable that there will be vertical lines in the water, however, specific elements under Alternative 2 will influence the magnitude of entanglement risk for marine mammals. Under Alternative 2, Element 1, gear retrieval, fishery participants would need to tend their gear every so often if they have unfished quota, which would mean it would not be legal for gear to sit on the grounds for more than a certain number of days (sub-options: 5-10). This would decrease the amount of time that

²⁰ The Proposed List of Fisheries for 2018 (82 FR 47424 October 10, 2017) would remove the Category III AK halibut longline/set line (state and Federal waters) fishery from the LOF as this fishery is covered by AK Gulf of Alaska halibut longline and AK BSAI halibut longline fisheries on the LOF, and the AK BSAI halibut longline fishery would be listed as a Category III fishery. This fishery is proposed for classification in Category III based on analogy to other halibut longline fisheries. The GOA sablefish longline fishery is listed as Category II, and the GOA sablefish pot fishery is listed as Category III.

lines can be in the water, and in turn, decrease the risk of marine mammal entanglement. The gear retrieval requirements under Element 2 would not prohibit fishery participants from redeploying pots, so the degree of decreased entanglement risk would depend upon behavior in the fishery. NMFS Office of Law Enforcement (OLE) has noted the difficulty of enforcing gear retrieval requirements. As described in Section 4.7.3, there is also a private incentive to tending gear. Sand fleas and other organisms that may feed on fish caught in pots decrease the quality and value of the product being delivered to processors. Fishermen will want to tend their pot gear in a timely manner to avoid this. It is more likely that entanglement issues would happen when gear is not being tended- for example if it is being stored on the grounds while not actively being fished.

Compared to other whale species, **killer whales** have a fairly low risk of entanglement. Any shift in effort from HAL to pot gear resulting from adoption of Alternative 2 would reduce the opportunity for killer whales to take halibut from- and potentially become entangled in- longlines or to prey upon halibut discarded from sablefish pots. According to Helker et al. (2017), in Alaska from 2011-2015, three killer whales were entangled in HAL gear. One was freed with no serious injuries, one was freed with serious injury and the other was killed. These entanglements occurred in the Pacific cod and Greenland turbot HAL fisheries. In 2015, one killer whale, identified as one of the Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock, was found dead off the coast of California entangled in California Dungeness crab pot gear. If some portion of the HAL fleet switches to pot gear, there could likely be reduced interactions between the commercial HAL IFQ fishery and killer whales because it would decrease the availability of easily accessible prey, and thus the incentive, for killer whales to follow HAL boats.

Given the very small population, any mortality or serious injury of **North Pacific right whales** incidental to commercial fisheries would be considered significant. There are no records of mortality or serious injury of Eastern North Pacific right whales in any U.S. fishery. Increases in the overlap of pot fisheries and right whale critical habitat would increase the likelihood of gear entanglement, but this potential exists even under Alternative 1, depending on fishing behavior. Given the information depicted in Figure 18 and Figure 19, conversations with fishery participants of anticipated pot fishing grounds, and the Area 4 IPHC closed area which partially overlaps with the Bering Sea Critical Habitat Area, minimal to no increase in fishing activity in right whale critical habitat is predicted. Given the remote nature of the known and likely habitats of North Pacific right whales discussed in section 0, it is unlikely that any mortality that were to occur in this population would be observed.

Humpback whales are known to be entangled in pot gear in numerous pot fisheries throughout the country. Despite geographic differences with these other fisheries, similar impacts of pot gear on humpbacks in the BSAI may occur. Entanglements of humpback whales generally occur while gear is untended, rather than on haulback. While BSAI humpback whales migrate south in the winter, they are often still present in the BSAI after the IFQ fisheries are closed, and migrations of individual whales are staggered enough that there is likely no time of year when humpbacks are entirely absent from the BSAI (personal communication, S. Teerlink 2018).

There were 124 human-caused injury and mortality records for humpback whales in Alaska between 2010 and 2015 (Helker et al. 2016; Helker, Muto, & Jemison 2017). Of those recorded interactions, 34 were vessel strikes. Ninety entanglements were reported, with 28 entangled in gillnets, 29 in unknown gear types, 16 entangled in either troll/seine/rawl/HAL, and 17 entangled in pot gear (Table 9). Of pot gear entanglements, 14 were reported in Southeast Alaska and Prince William Sound and 2 were reported with a location in Western Alaska (at least 1 of these was in the BSAI). When the specific type of pot gear could be identified, all but one was identified as crab or shrimp pots. The exception was an entanglement in BSAI sablefish pots being stored over the winter (personal communication, S. Teerlink, 2018).

Table 9 Minimum Human-Caused Injury and Mortality of Humpback Whales in Alaska by Gear Type

Gear Type	Minimum Number of Injuries or Mortalities (2010-2015)
Unknown	29
Gillnet	28
Pot	17
Hook and line	6
Seine	6
Trawl	3
Troll	1

Any shift in effort from HAL to pot gear resulting from adoption of Alternative 2 could have impacts on humpback whales, if the number of vertical lines in the water changes. **If HAL vessels with IFQ switch to pot gear and replace HAL longlines with longline pot gear, and they have the same number of vertical lines in the water during a trip as they did when fishing with HAL gear, there may not be any changes in likelihood of entanglement or incidental take. However, if the number of vertical lines in the water increases, or they are in the water for a longer period of time, entanglement likelihood could correspondingly increase.**

The potential implications of Element 1 (gear retrieval) and similar restrictions such as gear storage requirements, should be considered regarding their effects on marine mammals. The length of time gear is left on fishing grounds and the type of pots used- single or longline (and therefore the number of vertical lines in the water) - could have differing effects on the likelihood of whale entanglement. **Whales are more likely to be entangled in pot and line (single pots) than in longline pots due to the number of vertical lines in the water. Determining future behavior of fishery participants and potential gear configurations is challenging, so a large amount of uncertainty exists regarding entanglement likelihood, specifically for humpback whales.** The ways in which we would expect to see an increase in the number of lines in the water (and thus an increase in entanglement likelihood) are:

- 1) more people enter the fishery who did not previously use HAL gear;
- 2) fishery participants decide to use single pots rather than longline pots; or
- 3) there is a mismatch in effort (i.e., 1 HAL longline is not equal to 1 longline pot in terms of space on vessel/CPUE/time it takes to soak) and therefore more longline pots are set per trip than would have been set with HAL.

Alternative 2 could reduce the risk of marine mammal entanglements in fishing gear, due to the likely decreased interactions between killer whales preying on halibut discarded from pot gear and a shift in effort from HAL gear in general. In contrast, changes in the number of vertical lines in the water could increase entanglement risk, particularly for humpback whales. As gear retrieval was not adopted as part of the preferred alternative, the magnitude of this risk depends upon behavior of fishery participants. Due to the predicted small number of entrants in the fishery (described in Section 4.7.2.1.1), changes in entanglement risk are expected to be minimal. NMFS Sustainable Fisheries Division will determine if an ESA Section 7 consultation of any kind is appropriate and if appropriate initiate consultation on the potential effects of this action on ESA-listed marine mammals.

Prey Availability Effects

Alternative 2 would reduce the opportunity for whales to depredate on longline gear or on halibut discarded from sablefish pots. There would be a decrease in the potential of modifying marine mammal foraging behavior, and this previously non-existent source of prey (halibut) would not be as easily accessible. This is unlikely to have population-level impacts and therefore does not constitute a significant effect on marine mammals.

Table 8 lists marine mammals that may depend on benthic prey and known depths of diving. Diving activity may be associated with foraging. As mentioned in Section 3.2, the effects of pot gear on benthic habitat have not been quantified, and there are no indicators that it would have any effects on EFH. The essential fish habitat (EFH) EIS states that little research has been conducted on the effect of longline pot gear on benthic habitat (NMFS 2005). The area of seafloor contacted by each pot during retrieval is unknown and is expected to depend on vessel operations, weather, and current. No effects more than minimal or not temporary are presumed for EFH from sablefish or halibut pot fishing activity (MacLean 2017). Particularly given the minimal expected increase in pot gear effort, it is unlikely that this action would impact the benthic habitat enough to decrease marine mammal prey base to the extent that it would impact survival rates or reproductive success.

Disturbance Effects

Alternative 2 could reduce the likelihood of measures being taken to deter or evade whale depredation, described in Section 3.5.2. No information in this analysis suggests that a temporal or seasonal shift in sablefish or halibut IFQ fishing is expected to occur under Alternative 2. In fact, a return to historical fishing patterns might be expected, as spatial shifts in fishing patterns to avoid whales may be discontinued by those who switch to pot gear.

Additionally, if more vessels begin to use pots than HAL gear because of this action, we would potentially see decreased interactions between whales and HAL gear. Under Alternative 2, there is likely no change in the potential for disturbance of marine mammals.

While decreased prey availability under Alternative 2 may negatively impact killer whales in the short term because they must return to natural predatory behavior, they could benefit in the long term from a possible decline in entanglements and other, less likely HAL fishery interactions such as ship strikes.²¹

Overall, Alternative 2 is expected to result in no significant population-level impacts to marine mammals. As compared to the status quo, Alternative 2 would likely produce an incremental reduction in the likelihood of the negative effects of commercial fisheries on killer whales.

3.5.3.3 Cumulative Effects on Marine Mammals

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 reasonably foreseeable future actions, the cumulative impacts of the proposed action are determined to be not significant.

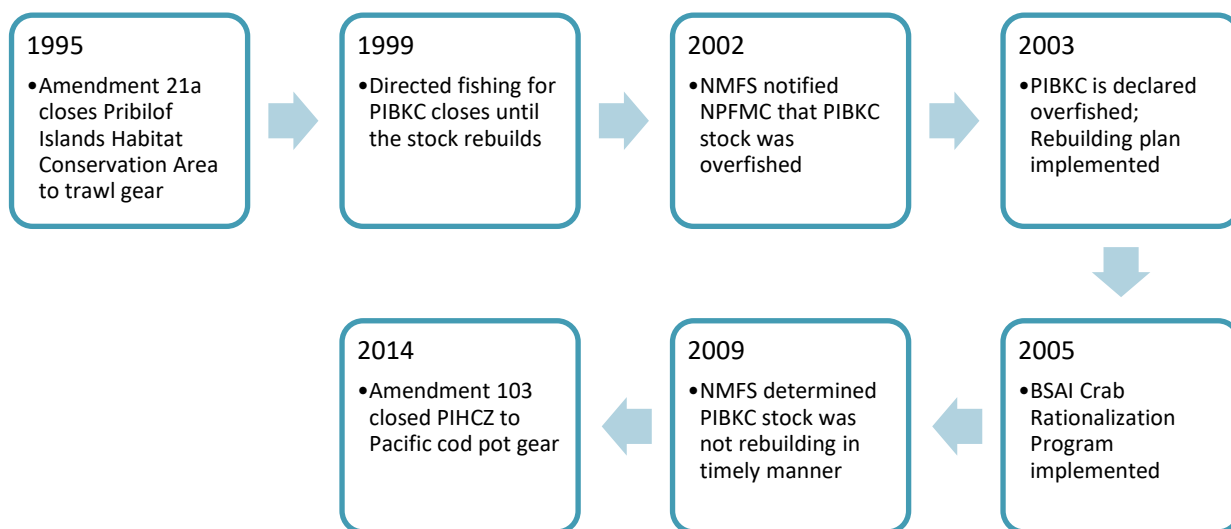
²¹ It is important to note that from 2009-2015, the only ship strikes involving killer whales in Alaska were reported in trawl fisheries, not HAL fisheries.

3.6 Pribilof Islands Blue King Crab and the Pribilof Islands Habitat Conservation Zone

The opportunity to retain halibut in pot gear could lead to increased fishing effort with pots in the Pribilof Islands Habitat Conservation Zone (PIHCZ) or the adjacent stock boundary area, which could adversely impact Pribilof Islands blue king crab (PIBKC) in and the rebuilding plan. The PIHCZ is established in regulation at § 679.22(a)(6), and closes the area shown in Figure 14 to all directed fishing for groundfish using trawl gear, and directed fishing for Pacific cod using pot gear.

Figure 13 shows the timeline of events relevant to this action and Section 3.6.2 briefly describes the management history.

Figure 13 Timeline of Council and NMFS Actions Relevant to PIBKC

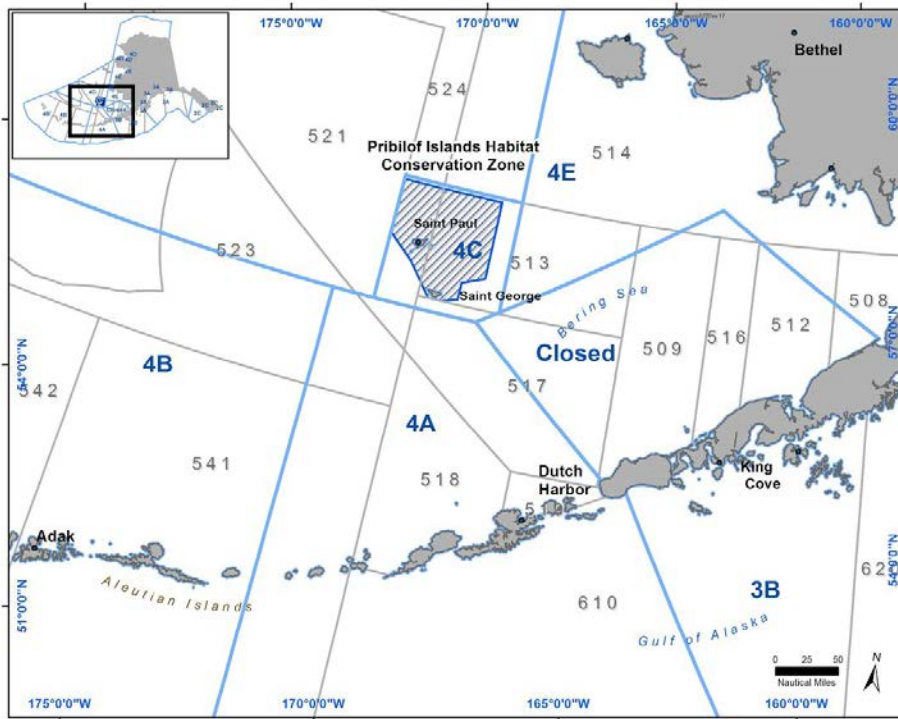


PIBKC are overfished and experienced overfishing in 2016. In 2016, bycatch of PIBKC in BSAI groundfish fisheries resulted in catch that exceeded the overfishing limit (OFL) for PIBKC (i.e., overfishing). NMFS informed the Council that it will use its in-season management authority to make precise closures to BSAI fisheries that use bottom contact gear if the blue king crab stock approaches its acceptable biological catch (ABC) limit and is approaching the OFL in the stock boundary area.

For more information and background on PIBKC rebuilding, please reference the following documents:

- Environmental Assessment of Amendment 17 to the FMP for BSAI King and Tanner Crab (2004) at this link: <https://alaskafisheries.noaa.gov/sites/default/files/analyses/amendment17ea.pdf>
- Regulatory Impact Review and Initial Regulatory Flexibility Analysis for Amendment 103 to the FMP for Groundfish of BSAI and the BSAI Crab FMP at this link: https://alaskafisheries.noaa.gov/sites/default/files/analyses/43_103drafririrfa.pdf
- Environmental Assessment for Pribilof Islands Blue King Crab Rebuilding Plan which can be found at this link: https://alaskafisheries.noaa.gov/sites/default/files/analyses/43_103finalea.pdf
- 2017 SAFE Report for the PIBKC Fisheries of the BSAI found at this link: <https://app.box.com/s/eq1gdh1rxlajhjne45u4pirax7b4u2zu>
- 2016 NMFS Letter to NPFMC describing in-season management approach to monitor PIBKC: <http://npfmc.legistar.com/gateway.aspx?M=F&ID=33e2bca0-df0a-44a3-a464-85290fab29fa.pdf>

Figure 14 Pribilof Islands Habitat Conservation Zone, IFQ regulatory areas and NMFS management areas



Source: NMFS Sustainable Fisheries Division

3.6.1 Background on Crab Rebuilding and PIHCZ Designation

Declines in PIBKC after 1995 resulted in an indefinite closure to directed fishing from 1999 to the present. There does not appear to be potential for directed fishing for PIBKC to occur, nor does it appear likely that the Pribilof Islands red king crab fishery will be opened in the foreseeable future.²² Most recently in 2017, NMFS continues to identify PIBKC as an overfished stock that is not currently experiencing overfishing.²³

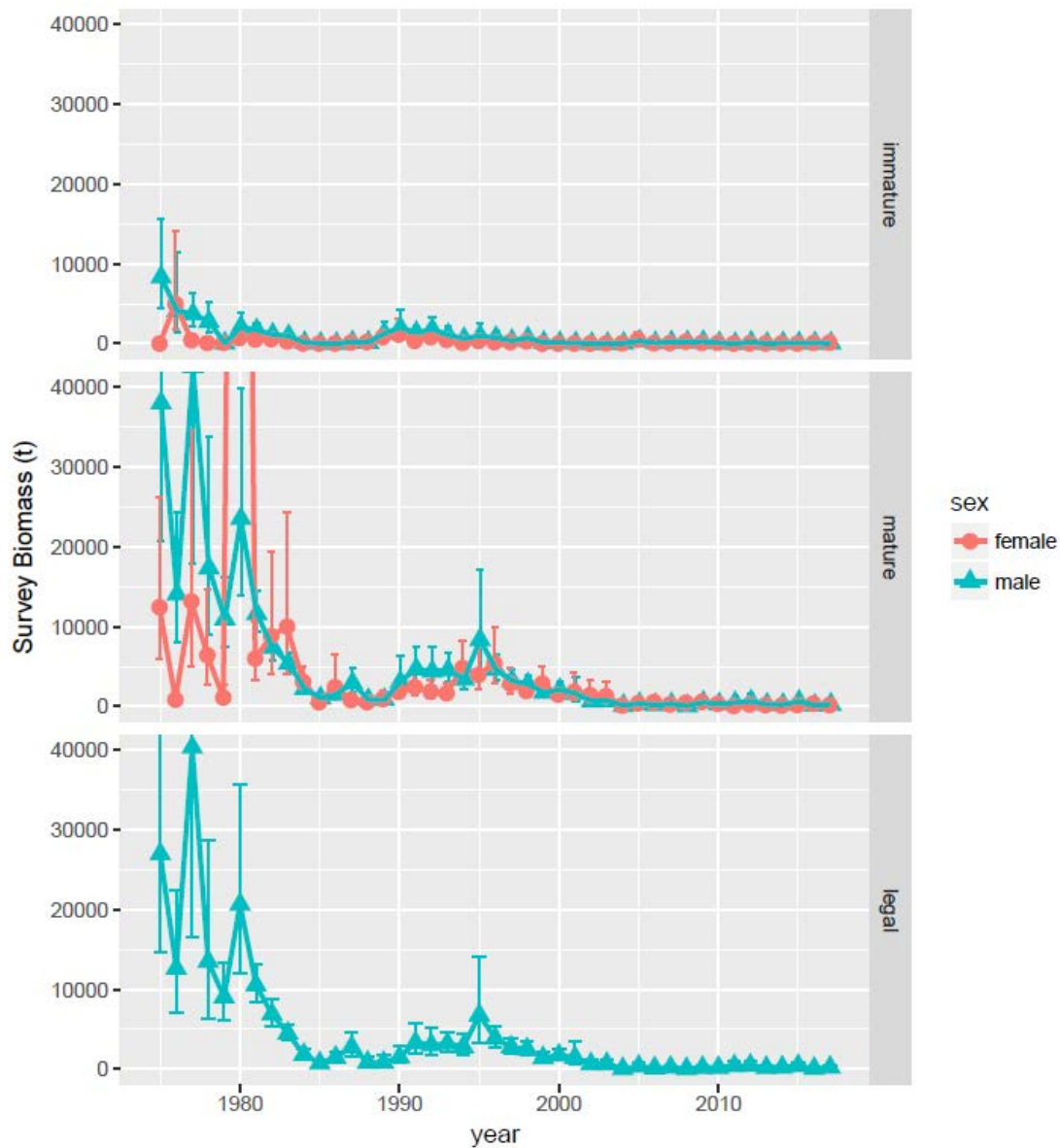
Rebuilding the PIBKC stock has been a Council priority beginning in 2002, when NMFS notified the Council that the PIBKC stock was overfished.²⁴ A rebuilding plan was implemented in 2003 that included the closure of PIBKC directed fishing until the stock was rebuilt. In 2009, NMFS determined that the PIBKC stock was not rebuilding in a timely manner and would not meet the rebuilding horizon of 2014. At present, the PIBKC stock is under a rebuilding plan with no directed fishing allowed. In addition, the Pribilof Islands red king crab fishery has been closed since the 1999 season due mainly to concerns about bycatch of blue king crab and the imprecision of abundance estimates for red king crab.

²² https://alaskafisheries.noaa.gov/sites/default/files/analyses/43_103finalea.pdf

²³ Overfished: A stock that has a population size that is too low and that jeopardizes the stock's ability to produce its Maximum Sustainable Yield. Overfishing: A stock that has a harvest rate higher than the rate it produces its Maximum Sustainable Yield.

²⁴ <https://www.federalregister.gov/documents/2002/10/04/02-25331/fisheries-of-the-exclusive-economic-zone-off-alaska-overfished-fisheries>

Figure 15 Pribilof Islands Blue King Crab Stock Biomass, 1977-2016



Source: <https://app.box.com/s/eq1gdh1rxlachjne45u4pirax7b4u2zu>

Figure 15 represents the current biomass estimates for PIBKC, which has remained at low levels since it was declared overfished in 2002. The economic value of the Pribilof Islands red king crab fishery (which is closed as a precautionary measure to conserve PIBKC) peaked at \$13.0 million in 1993 with an ex-vessel price of \$4.98 per pound, the second highest price on record. The value of the PIBKC fishery peaked at \$13.6 million in 1981/82, with an ex-vessel price of \$1.50 per pound. Total value declined from \$6.8 million in 1995 to \$2.4 million in 1998.²⁵

²⁵https://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/2016CrabSAFE_final.pdf

Crab fishing in the BSAI was rationalized in 2005 during the same time the Council was taking action on rebuilding PIBKC. PIBKC was included in the rationalization program in the event that the stock would rebuild to allow for directed fishing.

Currently the main sources of fishing-related mortality on the PIBKC stock are small amounts caught as PSC in the groundfish fisheries and bycatch in other directed crab fisheries (Table 10). With the exception of the Pacific cod pot fishery in the PIHCZ (which was prohibited by Amendment 103 in 2015), the groundfish fisheries are described in detail in the Programmatic Groundfish Supplemental Environmental Impact Statement (NMFS 2004) and those descriptions are incorporated by reference.

Amendment 21a to the BSAI Groundfish FMP prohibits the use of trawl gear in the Pribilof Islands Habitat Conservation Area (renamed the Pribilof Islands Habitat Conservation Zone in Amendment 43; NPFMC 1994). This amendment was implemented on January 20, 1995 and protects the majority of crab habitat in the Pribilof Islands area from the impact from trawl gear.

Amendment 43 to the Crab FMP and Amendment 103 to the BSAI Groundfish FMP to rebuild the PIBKC stock were adopted by the Council in 2012 and approved by the Secretary of Commerce in early 2014.²⁶ Amendment 43 amended the prior rebuilding plan to incorporate new information on the likely rebuilding timeframe for the stock, taking into account environmental conditions and the status and population biology of the stock. For more information on this action, please review the associated Environmental Assessment (accessed at this link: https://alaskafisheries.noaa.gov/sites/default/files/analyses/43_103finalea.pdf).

²⁶ https://www.npfmc.org/wp-content/PDFdocuments/catch_shares/PIBKcmotion612.pdf

Table 10 Total bycatch mortality from directed and non-directed fisheries for PIBKC (in mt) 1991-2017

Year	Crab Fisheries			Bycatch in Groundfish Fisheries		Total Bycatch Mortality
	females	legal males	sublegal males	fixed gear	trawl gear	
1991/92	--	--	--	0.013	4.959	4.973
1992/93	--	--	--	0.176	48.633	48.809
1993/94	--	--	--	0	27.386	27.386
1994/95	--	--	--	0.007	5.485	5.492
1995/96	--	--	--	0.022	1.027	1.049
1996/97	0	0	0.161	0.006	0.054	0.221
1997/98	0	0	0	0.292	0.104	0.396
1998/99	0.743	0.459	0.093	3.96	0.063	5.319
1999/00	0.394	0.699	0.858	0.159	0.016	2.125
2000/01	0	0	0	0.023	0.018	0.042
2001/02	0	0	0	0.167	0.023	0.19
2002/03	0	0	0	0.014	0.238	0.252
2003/04	0	0	0	0.069	0.182	0.251
2004/05	0	0	0	0.163	0.002	0.165
2005/06	0.01	0	0	0.071	1.071	1.152
2006/07	0.021	0	0	0.028	0.059	0.108
2007/08	0.027	0	0	0.799	0.106	0.931
2008/09	0	0	0	0.028	0.378	0.407
2009/10	0	0	0	0.043	0.165	0.209
2010/11	0	0	0.037	0.008	0.045	0.09
2011/12	0	0	0	0.022	0.006	0.028
2012/13	0	0	0	0.033	0.535	0.568
2013/14	0	0	0	0.013	0	0.013
2014/15	0	0	0	0.029	0	0.029
2015/16	0.021	0	0.046	0.149	0.646	0.861
2016/17	0	0	0	0.018	0.364	0.382

Source: NPFMC BSAI Crab SAFE 2017.

The greatest concentration of PIBKC can be found within the PIHCZ, which encloses the Pribilof Islands and is closed to fishing with trawl gear and fishing for Pacific cod with pot gear (see Figure 14).²⁷ The Council decided to close the PIHCZ year-round to directed fishing for Pacific cod with pot gear in October 2011. In 2014, Amendment 103 to the BSAI Groundfish FMP was published, prohibiting Pacific cod pot gear in the PIHCZ to promote bycatch reduction of PIBKC (see Figure 14).²⁸ No pot fishing for Pacific cod has occurred within the PIHCZ since 2015.²⁹

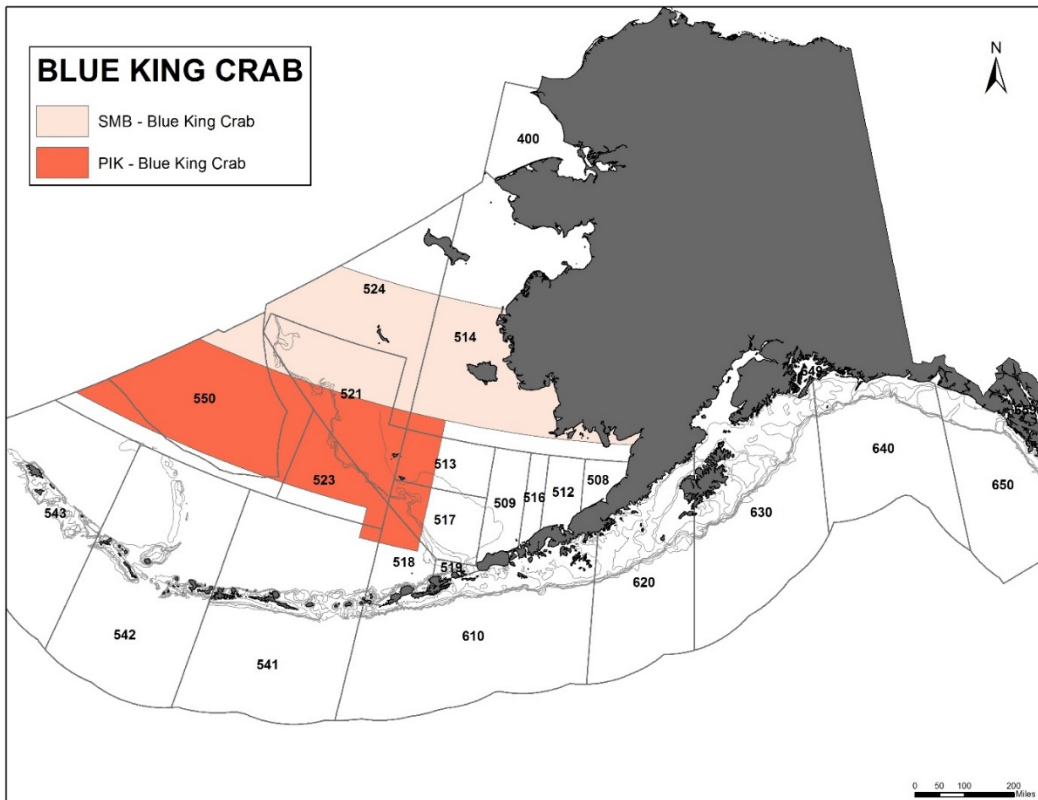
²⁷ https://alaskafisheries.noaa.gov/sites/default/files/analyses/43_103drafririrfa.pdf

²⁸ <https://www.federalregister.gov/documents/2014/12/02/2014-28113/fisheries-of-the-exclusive-economic-zone-off-alaska-pacific-cod-pot-gear-fishing-closure-in-the>

²⁹ NPFMC BSAI Crab SAFE 2017.

In selecting the area for PIHCZ, the Council noted that the best scientific information from survey data on PIBKC based on location of crab, observed catch rates, and habitat type indicate that this area represents the highest concentration of PIBKC as well as PIBKC habitat.³⁰ The boundary selected by the Council allowed vessels using trawl gear access to the edge of the 100 m contour and the groundfish resources to the east and north of the Pribilof Islands. The zone was drawn with straight edges and as few corners as possible in order to facilitate ease of closure enforcement. The area selected does not encompass the entire range of blue king crab in the area but does surround the habitat with highest blue king crab concentrations.³¹

Figure 16 PIBKC stock boundary



Note: PIK refers to Pribilof Islands Blue King Crab and SMB refers to St. Matthews Blue King Crab

The stock boundary for PIBKC begins east of the Pribilof Islands and extends parallel to the Aleutian Islands to the boundaries of EEZ (Exclusive Economic Zone) jurisdiction (see Figure 16). The PIHCZ included known blue king crab habitat yet allowed for trawl access or pot gear fishing for Pacific cod near the Pribilof Islands. The stock boundary encompasses the PIHCZ and any blue king crab bycatch is considered PIBKC stock.

3.6.2 Management of PIBKC Incidental Catch in the BSAI Groundfish Fisheries

NMFS inseason staff and vessel owners fishing in or near the PIBKC stock boundary areas closely monitor catch of PIBKC. Vessels have a high incentive to avoid PIBKC. If the OFL is approached for PIBKC, NMFS may close groundfish fisheries for specific areas, gear types, or fishing seasons to directed

³⁰ https://alaskafisheries.noaa.gov/sites/default/files/analyses/43_103finalea.pdf

³¹ NPFMC BSAI Crab SAFE 2017.

fishing in order to prevent the OFL from being reached. These actions can close directed fisheries in those areas for the duration of the crab year. These actions are limited to groundfish directed fisheries. Inseason management does not currently have explicit authority to close halibut fisheries in the event that the crab OFL is approached, and extending this regulatory authority to the halibut directed fisheries is discussed in Section 4.7.6. The Council wanted to prevent overfishing on an annual basis and ensure that all fisheries contributing to PIBKC bycatch mortality share in the rebuilding effort.

A recent closure occurred in 2015/2016 near the northeastern corner inside the stock boundary and outside of the PIHCZ. When incidental catch in the groundfish fisheries of 1.552 mt surpassed its OFL, NMFS closed all fishing activity in this area. The total number of crabs caught as bycatch in 2015/16 was 609, with 52% of the bycatch by non-pelagic trawl and 48% by HAL gear. Crab directed fishing is jointly managed with ADF&G who manages the crab fishery openers and closures. Based on the continued low abundance and the known distribution of PIBKC, ADF&G closes areas near the Pribilof Islands to crab fishing to limit bycatch of blue king crab.³²

The estimate of blue king crab prohibited species catch (PSC) by gear type in the BSAI is based on catch reports and observer data. In the last five years (2013-2017), estimates of blue king crab PSC numbers by gear type show the pot gear sector incidentally harvested 89% of all blue king crab PSC in the BSAI.³³ The number of blue king crab harvested in the entire BSAI includes crab that are incidentally caught in the PIHCZ and the PIBKC stock boundary, which are sensitive areas subject to closures because of the status of the PIBKC.

Groundfish fishery observer coverage in this area is limited to vessels over 40 feet. Most catcher/processors in the BSAI have at least 100% observer coverage. For the last few years, the OFL has been 1.16 mt or 2,600 lbs. The AKRO Catch Accounting System (CAS) uses available observer data to estimate crab PSC on unobserved trips, including trips taken on vessels less than 40' LOA. Since these vessels are unobserved, an underlying assumption in the CAS methodology is that these vessels have similar catch characteristics as observed vessels. Crabs can be patchy in distribution, resulting in fishing events with no crab catch being next to events with relatively high crab catch. This dispersion can lead to high variability in crab PSC estimates, which complicates management. This is of particular concern when available observer coverage is low and estimates are only able to be made from at-sea observer information that is skewed towards the tails of the 'true' catch population (resulting in a very low estimate or a very high estimate relative to the 'true' mean). This leads to a high degree of uncertainty in the estimates, and in situations where the crab PSC estimate is high, can lead to fishery closures. A small amount of crab PSC can trigger closures near and within the PIBKC stock boundary area.

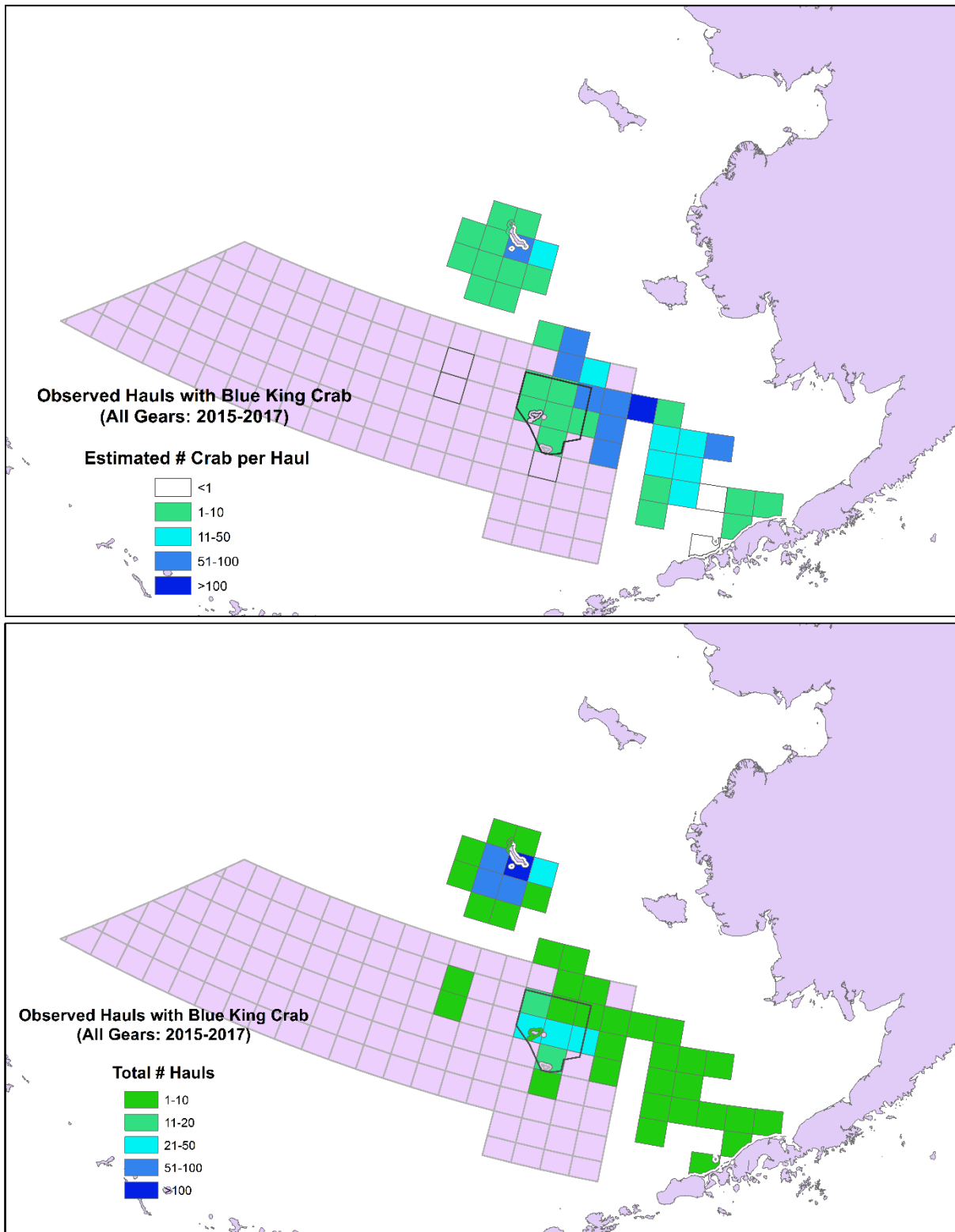
Figure 17 shows the observed hauls with blue king crab incidental catch from 2015-2017. The observed crab numbers per haul are concentrated on the eastern edge of the PIBKC stock boundary. Note that Figure 17 does not show the extrapolated PSC estimates for unobserved vessels.

The PIHCZ bisects ADF&G statistical areas. As a result, estimating PSC on the entire statistical area would potentially overestimate for unobserved vessels since landings are reported at the ADF&G statistical area, and not based on the boundaries of the PIHCZ. The observed hauls shown in Figure 17 mostly represent larger catcher processors and there is minimal observed catch from smaller IFQ vessels. There is no data on catch composition (e.g., the number of crab caught incidentally) for IFQ fishermen within the stock boundary area or the PIHCZ for sablefish pots and HAL and halibut HAL.

³² <http://www.adfg.alaska.gov/FedAidPDFs/FMR17-10.pdf>

³³ NMFS Catch Accounting.

Figure 17 Observed Groundfish Hauls with Blue King Crab Incidental Catch, 2015-2017



Note: Purple shaded area illustrates the PIBKC stock boundary. Black outline indicates the PIHCZ.

3.6.3 Effects of the Alternatives

Pot gear is particularly effective at catching crab. Sablefish pots in the BSAI have PSC of golden king crab, as well as some *C. bairdi*, *C. opilio*, red and blue king crab (Table 14). The proposed action could impact PIBKC if fishing with pot gear increased in the PIBKC stock boundary area.

However, the PIHCZ is on the shelf is prime Pacific cod and halibut habitat. Halibut exist in the PIHCZ and the area is known to be common fishing grounds for HAL vessels of all sizes and capacities, which have never been prohibited from fishing in the PIHCZ.

Years of PIBKC stock rebuilding plans have been in place to protect this species. It is unclear if allowing halibut retention would lead to increased pot gear activity within the stock boundary. Any increased effort using pot gear in the PIHCZ or surrounding PIBKC stock boundary area would lead to increased fishing pressure on a stock that is in its second rebuilding plan because the first plan did not meet its goals.³⁴ Increased crab PSC would increase the risk that the OFL could be reached due to additional bycatch. That could trigger area or fishery closures of groundfish.

3.6.3.1 Alternative 1

Under Alternative 1 (the status quo or no action alternative), retaining halibut in pot gear in the BSAI is prohibited. Amendment 103 closed the PIHCZ (see Figure 14) to pot fishing for Pacific cod to promote bycatch reduction on PIBKC. Pot fishing for other species (sablefish, halibut) was not prohibited in 2015 with Amendment 103. The habitat in PIHCZ is not suitable for sablefish and pot gear has not traditionally been used to fish for halibut. Targeting sablefish with pot gear in the PIHCZ is not common because the shallower depth of the substrate within the PIHCZ is not preferred habitat for sablefish.

3.6.3.2 Alternative 2

Alternative 2 allows halibut retention in pot gear if the QS (quota share) holder onboard has sufficient IFQ pounds onboard. NMFS anticipates that this would lead to an increase in the use of pot gear over status quo. Any increase in pot fishing over status quo in the PIBKC stock boundary area would increase the risk of blue king crab bycatch and could therefore have adverse impacts on rebuilding PIBKC stocks.

The Council intends to limit increased pot gear within the stock boundary area to avoid groundfish fishery and area closures that could be triggered by approaching an OFL for the PIBKC. Since the majority of the PIBKC stock is distributed within the PIHCZ, the preferred alternative includes closing the PIHCZ to all pot gear. To prohibit all pot fishing in the PIHCZ, NMFS would have to change regulations at §679.22(a) and the Fishery Management Plan for the Groundfish of the BSAI Management Area. The impact of increased fishing pressure on PIBKC within the PIHCZ and/or the stock boundary presents a greater risk that groundfish fisheries will be closed when the PIBKC OFL is projected to be reached.

At the April 2018 Council meeting, public testimony explained some vessel operators fishing for halibut IFQ would like to use pot gear to avoid whale depredation. Figure 18 shows the retained sablefish weight by vessels using pot gear from 2013-2017. The area of their activity is near Adak and due north of Dutch Harbor. No sablefish pot gear activity occurred within the PIHCZ. Figure 19 shows retained sablefish and halibut weights by HAL vessels from 2013-2017. The greatest concentration of fishing activity for sablefish occurs northwest from Dutch Harbor, following the contours of a continental shelf. Some HAL vessel activity occurs within the PIHCZ for halibut, whereas sablefish fishing occurs outside the PIHCZ.

³⁴ https://www.npfmc.org/wp-content/PDFdocuments/catch_shares/Crab/PIBKCrebuildingEA512.pdf

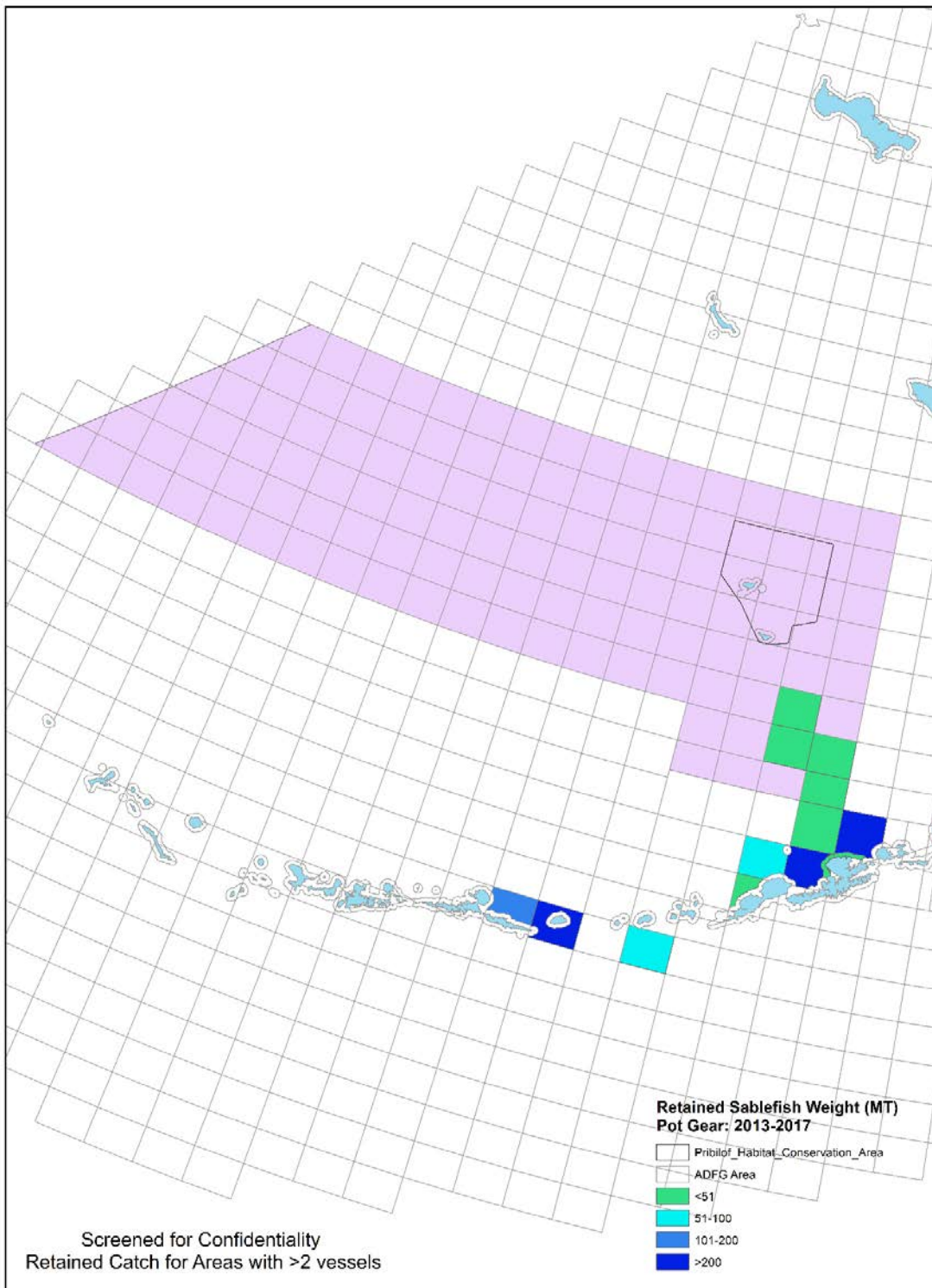
Halibut HAL fishing occurs on the contours of the continental shelf crossing through the PIBKC stock boundary.

In its preferred alternative, the Council has included that regulatory inseason authority be extended to halibut directed fishing in the event that the OFL for PIBKC, or other groundfish or shellfish species, is approached (Element 5). This is in addition to closing the PIHCZ to pot gear. As explained in Section 3.6.1, Element 5 would require additional federal regulations in order to authorize NMFS to close halibut IFQ fishing if an OFL for groundfish or shellfish is approached. This authority would be consistent with the Halibut Act and IPHC regulations and is necessary for the conservation of an overfished species and to prevent overfishing of a species. This regulatory closure authority would be consistent with inseason management authority already implemented for groundfish in § 679.25. For more information, see Section 4.7.6 on Element 5.

Under the preferred alternative, it is expected that future fishing activity could mirror current halibut HAL fishing activity and pot fishing could increase in the PIHCZ or the PIBKC stock boundary area because sablefish and halibut directed fishing with pot gear is not prohibited. If IFQ holders catch more blue king crab in pot gear, NMFS would have to determine if closing the appropriate groundfish fisheries are necessary to meet its obligation to prevent overfishing of PIBKC. It is not possible to estimate the specific number of vessel operators that would switch to pot gear from HAL gear under this proposed action. NMFS does not anticipate the growth to come from the sablefish IFQ pot fishery, in which participation has averaged 4 vessels in the last three years (2014-2016). The total number of vessels that would make the switch would likely be targeting halibut with pot gear in an experimental new fishery. The average number of vessels over 50 ft LOA active in the HAL halibut IFQ/CDQ fishery is 64. These vessels would likely be limited by the costs of pot gear and vessel configuration, risk aversion from using a new gear type to fish for halibut when overall revenues are lower from lowered halibut annual catch limits, and increased recordkeeping and recording and monitoring requirements, such as PNOL, DFL and VMS. On the other hand, HAL halibut IFQ vessel operators likely have an established network of IFQ they use when fishing and public testimony confirmed that whale depredation is increasing for HAL fishermen, which would be a reasonable justification for switching to pot gear to target halibut. Thus, while there is uncertainty in the number of vessels that may switch to pot gear, the analysts expect it to be substantially less than the average 64 vessels greater than or equal to 50 ft LOA that typically fish in the BSAI with HAL gear. For more information on potential entrants, please refer to Section 4.7.1.

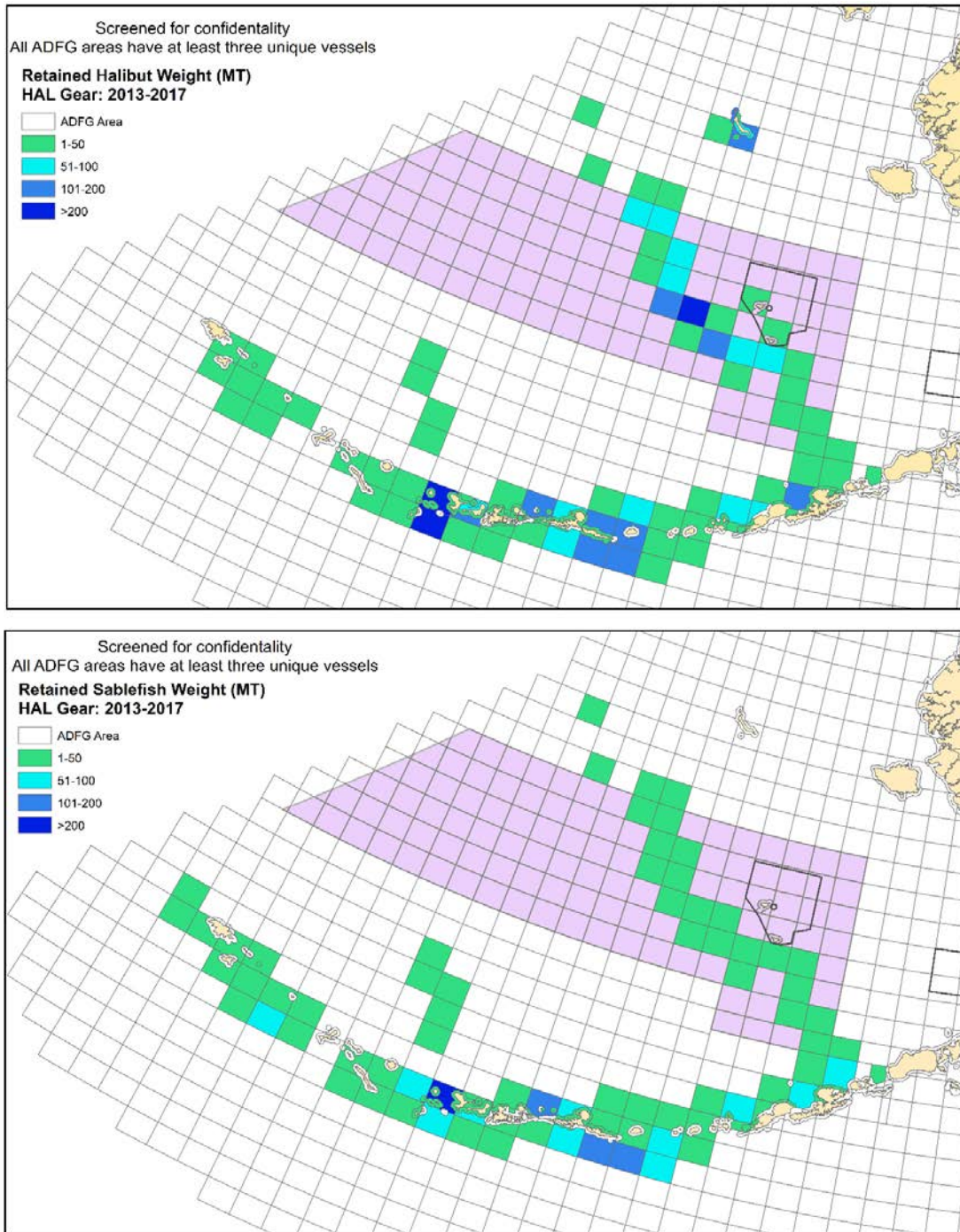
NMFS has identified the PIHCZ as the highest concentration of PIBKC (NMFS 2014). When Figure 18 and Figure 19 are compared with Figure 17, the overlap in pot fishing and crab distribution appears limited, with areas with higher crab rates not overlapping with potential halibut and sablefish areas. However, NMFS is concerned that any increase in incidental crab catch in pots would have a negative impact on stock recovery and needs the flexibility to react to such a situation.

Figure 18 Sablefish Harvest by Pot Gear in BSAI (in mt) 2013-2017



Note: Purple shaded area illustrates the PIBKC stock boundary and black lines show the PIHCZ.

Figure 19 Halibut and Sablefish Harvest by Hook and Line Vessels in BSAI (in mt) 2013-2017



Note: Purple shaded area illustrates the PIBKC stock boundary and black lines show the PIHCZ.

3.6.3.1 Cumulative Effects on PIBKC

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 reasonably foreseeable future actions, the cumulative impacts of the proposed action are determined to be not significant.

3.7 Sablefish

3.7.1 Biology

Sablefish (*Anoplopoma fimbria*) inhabit the northeastern Pacific Ocean from northern Mexico to the Gulf of Alaska (GOA), westward to the Aleutian Islands (AI), and into the Bering Sea (BS) (Wolotira et al. 1993). Adult sablefish occur along the continental slope, shelf gullies, and in deep fjords, generally at depths greater than 200m. Alaskan sablefish spawn at pelagic depths near the edges of the continental slope (300-500m) between January and April. Sablefish observed from a manned submersible were found on or within 1m of the bottom (Krieger 1997). In contrast to the adult distribution, juvenile sablefish (less than 40cm) spend their first two to three years on the continental shelf of the GOA, and occasionally on the shelf of the southeast BS, and begin to move out to the continental slope around age four. The BS shelf is utilized significantly in some years and seldom used during other years (Shotwell et al. 2014).

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. In gill nets set at night for several years on the AFSC longline survey, most young-of-the-year sablefish were caught in the central and eastern GOA (Sigler et al. 2001). Near the end of the first summer, pelagic juveniles less than 20cm move inshore and spend the winter and following summer in inshore waters where they exhibit rapid growth, reaching 30-40cm by the end of their second summer (Rutecki and Varosi 1997).

Sablefish are relatively long-lived. They begin to recruit to the fishery at age four or five and longevity often reaches 40 years (the oldest recorded sablefish in Alaska was 94 years old). Female size at 50% maturity is around 65cm (approximately age 6.5). Females are slightly larger than males, and natural mortality is estimated at $M \sim 0.10$.

3.7.2 Distribution

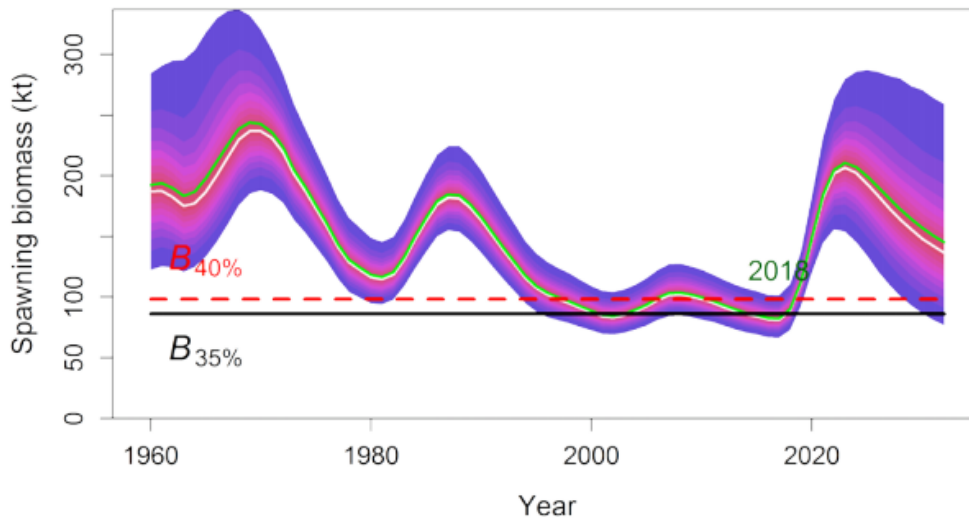
Sablefish have traditionally been thought to form two populations based on differences in growth rate, size at maturity, and tagging studies (McDevitt 1990, Saunders et al. 1996, Kimura et al. 1998). The northern population inhabits Alaska and northern British Columbia waters and the southern population inhabits southern British Columbia, Washington, Oregon, and California waters, with mixing of the two populations occurring off southwest Vancouver Island and northwest Washington. However, recent genetic work by Jasonowicz et al. (2017) found no population sub-structure throughout their range along the US West Coast to Alaska and suggested that observed differences in growth and maturation rates may be due to phenotypic plasticity or are environmentally driven. Significant stock structure among the federal Alaska population is unlikely given extremely high movement rates throughout their lives (Hanselman et al. 2015, Heifetz and Fujioka 1991, Maloney and Heifetz 1997, Kimura et al. 1998).

A three-area spatial sablefish assessment model has been developed to examine regional sablefish biomass, and to use as an estimation model in ongoing apportionment research. There were spatial differences in total and spawning biomass for the three modeled regions; the Western region (comprised of the Bering Sea, Aleutian Islands, and Western GOA management areas) had the greatest total age 2+ biomass (45% in the 2015 terminal model year), the Central region (Central GOA management area) contained an estimated 30% of total biomass, and the Eastern region (West Yakutat and East Yakutat/SE regions) was 25% of total biomass. Model explorations examining alternative movement rates and model spatial parameterization suggested that the model was sensitive to both axes of uncertainty.

3.7.3 Status of the Stock

The sablefish stock is assessed annually in the SAFE report (NPFMC 2017b) and was also evaluated in the Alaska Groundfish Fisheries Harvest Specifications EIS (NMFS 2007a). The sablefish assessment is based on a statistical sex-specific age-structured model. This model incorporates fishery data and fishery independent data from domestic (AFSC longline survey, GOA trawl survey) and Japan-US cooperative longline surveys and. Sablefish fall under Tier 3b of the ABC/OFL control rule. The 2018 age 2+ biomass is estimated to be 330,655 tons. Female spawning biomass had increased from a low of 33% of unfished biomass in 2002 to 42% in 2008 and has declined slightly to about 36% of unfished biomass projected for 2018. Spawning biomass is projected to increase rapidly from 2018 to 2022, and then stabilize (Figure 20).

Figure 20 Estimates of female spawning biomass (thousands t) and their uncertainty



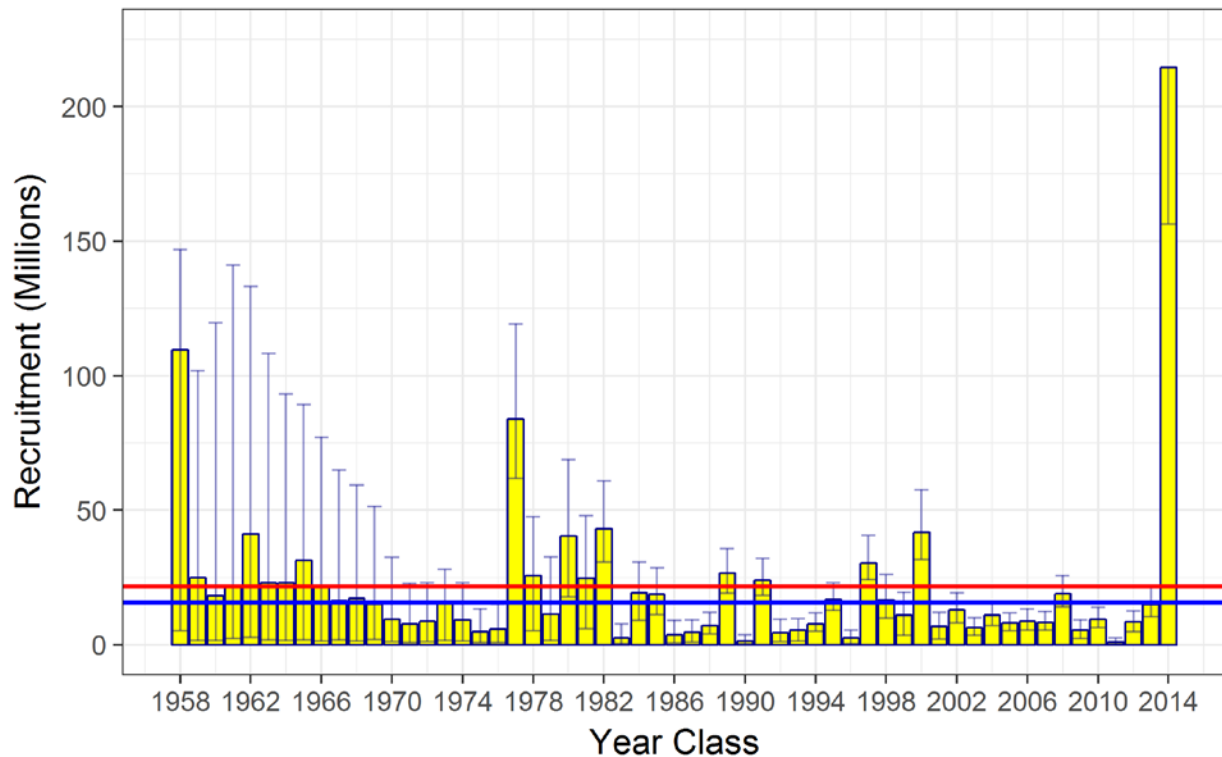
Source: (Hanselman et al. 2017 in NPFMC 2017b)

Note: 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 MCMC simulations. Width of shaded area is the 95% credibility interval. Harvest policy is the same as the projections in Scenario 1 but with a yield multiplier of 0.867.

Since 1988, relative abundance has decreased substantially. Regionally, abundance decreased faster in the BS, AI, and western GOA and more slowly in the central and eastern GOA (Figure 21). Most surveys show that sablefish were at their lowest levels in the early 2000s, with current abundance reaching these lows again in 2014 in the central and eastern GOA, and in 2015 in the western areas. The last two surveys have shown some rebound, particularly in the combined Western areas.

The 2014-year class is estimated to be 2.5 times higher than any other year class observed in the current recruitment regime (Figure 21). Tier 3 stocks have no explicit method to incorporate the uncertainty of this new year class into harvest recommendations. While there are clearly positive signs of strong incoming recruitment, there are concerns regarding the lack of older fish and spawning biomass, the uncertainty surrounding the estimate of the strength of the 2014-year class, and the uncertainty about the environmental conditions that may affect the success of the 2014-year class (Hanselman et al. 2017).

Figure 21 Estimates of the number of age-2 sablefish (millions) with 95% credible intervals by year class



Source: (Hanselman et al. 2017 in NPFMC 2017b)

Note: Red line is overall mean, blue line is recruitments from year classes between 1977 and 2013. Credible intervals are based on MCMC posterior. Upper confidence interval is omitted for the 2014-year class.

Depredation of sablefish off the AFSC longline survey by killer whales is accounted for in the sablefish stock assessment by dropping depredated skates from the calculation of survey abundance indices, because killer whale depredation is so severe it is harder to “correct” for (personal communication, D. Hanselman 2018). Skates that are depredated by sperm whales are included in the assessment, as sperm whale impact on the skate is generally less severe. A new approach has been developed using a generalized linear mixed model to adjust survey catch rates for sperm whales, and this approach was used starting in 2016 (Hanselman et al. 2018). Depredation in the HAL fishery by both killer whales and sperm whales are estimated annually and added to the HAL catch in the assessment model. A projection based on the three-year average of this additional mortality is deducted from the maximum permissible ABC and OFL recommended for harvest limits (Hanselman et al. 2017).

The sablefish stock is neither overfished nor subject to overfishing. Spawning biomass is projected to climb rapidly through 2022 due to the large 2014 size class, and then is expected to rapidly decrease, assuming a return to average recruitment after 2014. It is estimated that the Alaska sablefish fishery under the status quo is sustainable.

3.7.4 Fishery

Sablefish has been harvested in the U.S. since the end of the 19th century as a byproduct of halibut fisheries. Harvests were relatively small, averaging 1,666mt from 1930 through 1957. Japanese longlining began in the Eastern Bering Sea around 1958 and expanded into the AI and GOA through the 1970s. Japanese fleet catches increased throughout the 1960s, and peak sablefish catch reached 36,776mt in 1972. Heavy fishing by foreign vessels during the 1970s led to a substantial population decline and

fishery regulations in Alaska, which sharply reduced catches. Catch in the late 1970s was restricted to about one-fifth of the peak catch in 1972, due to the passage of the Fishery Conservation and Management Act (FCMA). By 1988, U.S. harvests made up the majority of 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.

Annual catches for Alaska fisheries averaged about 1,700 t from 1930 to 1957 and exploitation rates remained low until Japanese vessels began fishing for sablefish in the BS in 1958 and the GOA in 1963. Catches rapidly increased during the mid-1960s. Annual catches for Alaska reached peaks in 1962, 1972, and 1988. The 1972 catch was the all-time high, at 53,080 t, and the 1962 and 1988 catches were 50% and 72% of the 1972 catch. Evidence of declining stock abundance and passage of the MSFCMA led to significant fishery restrictions from 1978 to 1985, and total catches were reduced substantially. Exceptional recruitment fueled increased abundance and increased catches during the late 1980s, which coincided with the domestic fishery expansion. Catches declined during the 1990s, increased in the early 2000s, and have since declined to near 11,000 t in 2015. TACs in the GOA are nearly fully utilized, while TACs in the BS and AI are rarely fully utilized (see Section 4.5.3.1 for more information on harvest and harvest rates).

Amendment 14 to the GOA Fishery Management Plan banned the use of pots for fishing for sablefish in the GOA, effective November 18, 1985, starting in the Eastern area in 1986, in the Central area in 1987, and in the Western area in 1989. An earlier regulatory amendment was approved in 1985 for three months (27 March–25 June 1985) until Amendment 14 was effective. A later regulatory amendment in 1992 prohibited longline pot gear in the BS (57 FR 37906). The prohibition on sablefish longline pot gear use was removed for the BS, except from June 1 to 30 to prevent gear conflicts with trawlers during that month, effective September 12, 1996. Sablefish longline pot gear was allowed in the AI during this time. In April 2015, the NPFMC passed a motion to again allow for sablefish pot fishing in the GOA in response to increased sperm whale depredation. The final motion was passed, and the final regulations were implemented in early 2017. Final regulations were implemented in early 2017, and the development of this gear type in the Gulf of Alaska is carefully monitored by NMFS (Hanselman et al. 2017).

In the BSAI, sablefish are harvested using a few different fixed gear types, including HAL gear, longline pots, single pots (pot and line), and trawl (Table 11). Since the inception of the IFQ system, average set length in the directed HAL fishery for sablefish has been near 9km and average hook spacing is approximately 1.2m. 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 are usually used, except for modified J-hooks on some boats with machine baiters. The gear usually is deployed from the vessel stern with the vessel traveling at five to seven knots. Some vessels attach weights to the longline, especially on rough or steep bottom, so that the longline stays in place on bottom (Hanselman et al. 2017).

Section 4.7.4 includes a description of pot gear used in the sablefish fishery (and gear that would likely be used in the halibut fishery under Alternative 2). Pot data are sparser than longline data, and in some years the data are considered confidential due to fewer than three vessels participating in the fishery. In addition, it is difficult to discern trends, since pot catch rates have wider confidence intervals than longline data due to smaller sample sizes. Observed sets are determined to be targeting sablefish if they comprise the greatest weight in the set.

In 2000, the BS pot fishery accounted for less than five percent, and the AI accounted for less than 10 percent of the sablefish catch in these areas (Table 11). Effort increased substantially in response to killer whale depredation. By 2005, pot gear had accounted for over 50% of the BSAI fixed gear IFQ catch (Hanselman et al. 2017). However, catches in pots have declined significantly in recent years in the AI, except for 2017, which had the highest catch of sablefish in the AI since 2007. In 2016 and 2017 in the

Bering Sea, the percent of sablefish catch in pot gear was the lowest since 2001, with the majority being caught in trawl gear. Pot catches began occurring in the Gulf of Alaska in 2017 but make up a small proportion of the fixed gear catch (Hanselman et al. 2017).

Table 11 Sablefish catch in the Aleutian Islands and the Bering Sea by gear type from 1991-2017

Aleutian Islands							
Year	Pot	Trawl	Longline	Total	% Pot	% Trawl	% Longline
1991-1999	6	73	1,210	1,289	0	6	94
2000	103	33	913	1,049	10	3	87
2001	111	39	925	1,074	10	4	86
2002	105	39	975	1,119	9	3	87
2003	316	42	760	1,118	28	4	68
2004	384	32	539	955	40	3	56
2005	688	115	679	1,481	46	8	46
2006	461	60	629	1,151	40	5	55
2007	632	40	496	1,169	54	3	42
2008	177	76	646	899	20	8	72
2009	78	75	947	1,100	7	7	86
2010	59	74	914	1,047	6	7	87
2011	141	47	838	1,026	14	5	82
2012	77	148	979	1,205	6	12	81
2013	87	58	918	1,063	8	5	86
2014	160	26	635	821	19	3	77
2015	12	15	403	431	3	3	94
2016	21	30	298	349	6	9	85
2017	209	86	176	470	44	18	37
Bering Sea							
Year	Pot	Trawl	Longline	Total	% Pot	% Trawl	% Longline
1991-1999	5	189	539	733	1	26	74
2000	40	284	418	742	5	38	56
2001	106	353	405	864	12	41	47
2002	382	295	467	1,144	33	26	41
2003	363	231	417	1,012	36	23	41
2004	435	293	313	1,041	42	28	30
2005	595	273	202	1,070	56	26	19
2006	621	84	373	1,078	58	8	35
2007	879	92	211	1,182	74	8	18
2008	754	183	204	1,141	66	16	18
2009	557	93	266	916	61	10	29
2010	450	30	273	753	60	4	36
2011	405	44	257	707	57	6	36
2012	432	93	218	743	58	13	29
2013	352	133	149	634	56	21	24
2014	164	34	115	314	52	11	37
2015	108	17	86	211	51	8	41
2016	158	257	116	532	30	48	22
2017	336	677	97	1,110	30	61	9

Source: (Hanselman et al. 2017 in NPFMC 2017b). Both CDQ and non-CDQ catches are included. Catches in 1991-1999 are averages. Catch as of October 1, 2017.

3.7.5 Effects of the Alternatives

The effects of using pot gear to harvest halibut quota in the BSAI fishery are addressed here. This section considers whether the impacts on the sablefish stock are likely to be significant.

The effects of the BSAI sablefish and halibut IFQ and CDQ fisheries on the sablefish stock are assessed annually in the BSAI SAFE report (NPFMC 2017b), which contains a review of the latest scientific analyses and estimates of each species' biomass and other biological parameters, as well as summaries of the available information on the ecosystem and the economic condition of the groundfish fisheries off Alaska. From these data and analyses, the Plan Team recommends an OFL and ABC for each species or species group, which is then reviewed by the SSC, AP, and the Council. Harvest limits always consider uncertainty when they are set. The effects of the BSAI sablefish IFQ and CDQ fishery on the sablefish stock are also evaluated in the Alaska Groundfish Fisheries Harvest Specifications EIS (NMFS 2007a). Under either alternative, NMFS will continue to adhere to this harvest specifications process.

3.7.5.1 Alternative 1

Under the no action alternative, federal regulation governing authorized fishing gear would continue to authorize all pot gear (i.e., longline and single pots) for sablefish harvest from any BSAI reporting area (§679.2). A continued prohibition on halibut retention in BSAI pot gear would not decrease fishing mortality of sablefish. Under the status quo, sablefish fishing effort may continue to adjust to avoid whale depredation on HAL gear. Sablefish quota holders in the BSAI currently have the option of using either HAL or pot gear to fish their quota.

Taking no action would not address the stated purpose and need for the action. The Council has identified the need to reduce the problems associated with whale depredation while minimizing gear conflicts and the amount of unaccounted halibut mortality occurring due to whale depredation.

3.7.5.2 Alternative 2

As demonstrated in Figure 29 in Section 4.5.3.1, sablefish quota shares in the BSAI are not usually fully harvested. For example, in 2017, 54% of the BS sablefish IFQ was harvested, and 30% of the AI sablefish IFQ was harvested. Thus, if IFQ/ CDQ sablefish participants find it to be more cost-effective to harvest sablefish IFQ or CDQ concurrently with halibut (that is, being able to retain incidentally-caught halibut made sablefish pot fishing more attractive), there may be a slight increase in the amount of sablefish harvested, relative to status quo.

An increased harvest potential has existed under status quo as well, and any changes are not expected to be significant, particularly because of the need to hold IFQ and because of the imposed catch limits. No overfishing of sablefish would be allowed to occur. Overall, there are minimal expected effects of Alternative 2 on the sablefish resource. Sablefish IFQ/ CDQ can currently be fished with both single and longline pot gear in BSAI, so there is no expectation that this fishery will change in location, timing, or harvest methods outside of the status quo options.

The only other foreseeable effect on sablefish under Alternative 2 would be changes in sablefish bycatch (abundance or sizes) due to any change in the size of the tunnel opening or the requirement of escape mechanisms on pot gear (Alternative 2, Element 2 and Element 4). If quota holders could target halibut with larger tunnel openings, this may have an impact on sablefish harvest. A requirement for escapement mechanisms may allow smaller sablefish to exit the pot. Current regulations would require the retention of this sablefish if the fishery participant also holds sablefish quota.

3.7.5.3 Cumulative Effects on Sablefish

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.

3.8 Incidental Catch in the Sablefish and Halibut Fisheries

There are a number of different terms referring to the incidental catch of species in fisheries of the EEZ. In this section we make the following distinctions: FMP-managed secondary species are groundfish species that do not dominate the catch but may, in some cases, be retained (some of these groundfish species may be retained up to a certain cap called a maximum retainable amount (MRA)). Non-target species are not managed under an FMP, including species such as sea stars and eelpouts for which there is no significant market and generally no retention. Incidental catch can also include Prohibited Species Catch (PSC), species for which there is a significant market, but retention is prohibited (with the exception of some non-market-based donation programs).

Table 12 demonstrates the incidental catch of FMP-managed species (plus halibut) in the BSAI fixed gear fisheries targeting sablefish, halibut, and Pacific cod. This table does not show trends in the time series (due to a large amount of confidential data) but consolidates catch data from 2015 through 2017. These species are managed under the BSAI Groundfish FMP. None of these species are overfished nor are they experiencing overfishing. Further information on these groundfish species and, for some, their directed fisheries can be found in the most recent BSAI Groundfish SAFE Report.

Table 12 and Table 13 highlight the non-market species and PSC (respectively) that were caught incidentally in the BSAI fixed gear fisheries targeting sablefish, halibut, and Pacific cod from 2015 through 2017. Note that these BSAI fixed gear fisheries have virtually no non-Chinook salmon or herring PSC.

During 2015-2017, the composition of bycatch species caught in observed pots that retained sablefish in BSAI included arrowtooth/Kamchatka flounder, Greenland turbot, rockfish, sea stars, and snails (Table 13 and Table 14). As discussed more in Section 3.4.6.2, the BSAI sablefish pot fishery also catches low rates of halibut PSC. Sablefish pots in the BSAI have caught PSC of golden king crab, as well as some *C. bairdi*, red and blue king crab, and minimal amounts of *C. opilio* (Table 14).

The halibut HAL fishery has more vessels and a greater overall volume of catch in the BSAI than the sablefish pot fishery. Primary non-halibut species caught in HAL gear from 2015-2017 included skates, Pacific cod, sablefish, sculpins, several types of rockfish, arrowtooth/Kamchatka flounder, and Greenland turbot (Table 12). This fishery during this time also caught giant grenadier and sea stars (Table 13) and some crab PSC (primarily golden king crab, fewer red king and blue king crab and even less *C. opilio* and *C. bairdi*) as shown in Table 14. Bycatch of FMP-managed groundfish species in BSAI Pacific cod pots (2015-2017) was mainly comprised of Atka mackerel, flatfish, octopus, pollock, sculpin, yellowfin sole. Non-target species catch in Pacific cod pots primarily included seastars and snails. PSC in Pacific cod pots consisted of large amounts of *C. bairdi*, followed by red king, *C. opilio*, blue king, and golden king crab.

Table 12 FMP- managed groundfish species (and halibut) catch (in mt) in the sablefish, halibut, and Pacific cod BSAI fixed gear fisheries, CPs and CVs, cumulative 2015 through 2017

Gear type	FMP-managed species	Halibut	Pacific Cod	Sablefish
HAL	Arrowtooth Flounder	54.3	1,756.7	6.1
	Atka Mackerel	0.5	55.2 *	
	BSAI Alaska Plaice		1.0	
	BSAI Kamchatka Flounder	23.1	143.7	6.6
	BSAI Other Flatfish	2.7	170.3	5.8
	BSAI Rougheye Rockfish	13.5	89.0	1.0
	BSAI Shortraker Rockfish	56.0	46.7	6.8
	BSAI Skate	948.3	76,707.9	44.5
	Flathead Sole	0.2	1,516.9	0.0
	Greenland Turbot	29.6	260.2	19.4
	Halibut	7,448.3	1.0	100.4
	Northern Rockfish	0.2	147.9	
	Octopus	16.6	122.6	0.2
	Other Rockfish	96.2	146.8	131.6
	Pacific Cod	455.0	386,832.8	27.3
	Pacific Ocean Perch	0.1	12.8	0.1
	Pollock	1.6	20,582.2	0.1
	Rock Sole	0.4	112.1	
	Sablefish	298.2	101.9	748.9
	Sculpin	190.2	5,395.1	0.1
Shark	13.3	124.3		
Squid		0.1		
Yellowfin Sole		4,701.8		
POT	Arrowtooth Flounder		3.8	17.5
	Atka Mackerel		19.5	
	BSAI Alaska Plaice		0.0 *	
	BSAI Kamchatka Flounder		0.3	6.1
	BSAI Other Flatfish		25.6	0.2
	BSAI Rougheye Rockfish		*	
	BSAI Shortraker Rockfish			0.4
	BSAI Skate		0.1	0.4
	Flathead Sole		3.8	
	Greenland Turbot		0.5	10.4
	Northern Rockfish		0.9	
	Octopus		1,080.2 *	
	Other Rockfish		9.6	1.2
	Pacific Cod		134,045.5 *	
	Pacific Ocean Perch		0.2	
	Pollock		64.4 *	
	Rock Sole		8.0	
	Sablefish		2.4	934.7
	Sculpin		735.1 *	
	Shark		*	
Squid		0.1		
Yellowfin Sole		610.3		

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

Notes: Confidential data = *

Table 13 Non-target species catch (in mt) in the sablefish, halibut, and Pacific cod BSAI fixed gear fisheries, CVs and CPs, cumulative 2015 through 2017

Gear type	Species	Halibut	Pacific Cod	Sablefish
HAL	Benthic urochordata	1.4	142.8	
	Bivalves	0.4	22.2	0.0
	Brittle star unidentified	0.0	2.5	0.0
	Corals Bryozoans - Corals Bryozoans Unidentified	3.9	18.8	4.1
	Corals Bryozoans - Red Tree Coral		*	
	Eelpouts		267.4	0.4
	Giant Grenadier	452.3	586.7	1,172.2
	Greenlings	0.2	1.8	
	Grenadier - Rattail Grenadier Unidentified	6.1	79.9	44.3
	Gunnels		0.0	
	Hermit crab unidentified	0.0	0.7	
	Invertebrate unidentified	0.3	18.5	*
	Misc crabs	0.1	3.3	0.2
	Misc crustaceans	0.0	0.1	
	Misc fish	1.9		*
	Misc inverts (worms etc)		0.0	
	Polychaete unidentified		0.2	
	Scypho jellies		19.2	0.0
	Sea anemone unidentified	1.1	569.5	0.0
	Sea pens whips	0.2	145.7	0.0
	Sea star	73.8	1,865.8	0.2
	Snails	3.5	127.8	0.0
	Sponge unidentified	5.0	35.6	3.0
State-managed Rockfish	2.1	0.8		
Stichaeidae		0.0		
urchins dollars cucumbers	1.0	5.1	0.1	
Pot	Benthic urochordata		0.0	
	Bivalves		1.9	
	Brittle star unidentified		0.3	
	Corals Bryozoans - Corals Bryozoans Unidentified		0.1	0.0
	Eelpouts		1.8	
	Giant Grenadier		*	
	Greenlings		0.9	
	Grenadier - Rattail Grenadier Unidentified			0.0
	Hermit crab unidentified		3.5	0.0
	Invertebrate unidentified		0.0	
	Misc crabs		21.3	1.6
	Misc crustaceans		0.0	
	Misc deep fish			0.0
	Misc fish		43.1	0.5
	Scypho jellies		56.3	0.0
	Sea anemone unidentified		0.7	0.0
	Sea star		140.1	1.6
	Snails		64.0	3.7
	Sponge unidentified		0.5	0.1
State-managed Rockfish		0.1		
urchins dollars cucumbers		3.5	*	

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

Notes: Confidential data = *

Table 14 Prohibited species catch (PSC) in the sablefish, halibut, and Pacific cod BSAI fixed gear fisheries, CPs and CVs cumulative 2015 through 2017

PSC species	HAL			Pot	
	Halibut	Pacific Cod	Sablefish	Pacific Cod	Sablefish
Halibut mortality (mt)		714.4	2.9	8.5	0.6
Blue king crab (count)	63	2,026	1	41,990	178
<i>C. bairdi</i> crab (count)	12	56,929	25	1,246,751	831
Chinook PSC (count)	0	116	9	0	0
Golden king crab (count)	755	805	226	23,828	56,772
Red king crab (count)	206	11,444	211	224,640	69
<i>C. opilio</i> crab (count)	16	153	4	174,629	318

Source: NMFS AKRO Blend/Catch Accounting System via AKFIN

3.8.1 Alternative 1

Under the no action alternative, the amount and composition of bycatch species in the sablefish IFQ/CDQ pot fishery would not be expected to change. The amount and composition of bycatch species in the HAL halibut IFQ/ CDQ fisheries would also not be expected to change. Continued prohibition on halibut retention in pot gear in the BSAI would not be expected to change (increase or decrease) the fishing mortality on other fish species, as hooked fish would continue to be preyed upon by whales, retained by the vessel, or discarded. These mortalities are accounted for in the management of the species under the BSAI Groundfish FMP, which is designed to prevent negative effects to groundfish stocks. Total catch of targeted groundfish is managed to prevent exceeding ABCs.

3.8.2 Alternative 2

Halibut retention in a BSAI pot fishery could decrease the amount of halibut HAL retention proportionately. This may result in a shift in the amount and composition of bycatch species, corresponding with the decrease in IFQ/CDQ halibut caught using HAL gear.

If a non-negligible amount of IFQ/ CDQ halibut harvest shifts to the pot fishery, there could be a shift in the magnitude of bycatch, the size selectivity, and species composition of bycatch that are observed. Some information can be gleaned from comparing bycatch of BSAI FMP species in the BSAI sablefish pot fishery to bycatch using other gear types. For instance, there may be a decrease (by some amount) of skates, rockfish, sculpins, and Pacific cod, which are typically caught on HAL, and less prevalent in pot gear. Pot gear has shown to have higher rates of crab PSC; and there may be more crab PSC catch with a shift in halibut harvest, especially if the vessel moves to habitat and depth more suitable for legal-size halibut.

Pacific cod are targeted at depths more like those of where halibut are found. Consequently, the bycatch of the BSAI Pacific cod pot fishery can provide a helpful comparison. As demonstrated in Table 12 and Table 13, bycatch in the Pacific cod pot fishery includes primarily Northern rockfish, sculpins, yellowfin sole, pollock, other flatfish, Atka mackerel, with sea stars, and snails. The BSAI Pacific cod pot fishery also catch crab PSC, chiefly *C. bairdi*, but also red, blue and golden king crab (Table 14).

This fishery may also not be a perfect representation of possible bycatch in an IFQ/ CDQ fishery that allows halibut retention in pot gear, particularly with the adoption of Element 2, an exemption to the

requirement of a maximum 9-inch tunnel opening size. Pot gear used in the BSAI Pacific cod fishery is required to have a 9-inch “halibut excluder” as well.

A change in the size of the tunnel opening (Element 2) or the requirement of an escapement mechanism (Element 4) could affect the amount of bycatch and the size selectivity of the bycatch. A larger tunnel opening could increase the overall amount of larger bycatch, while allowing for some of the smaller bycatch species of bycatch to escape. Generally, it is expected the increase of the tunnel size would increase the crab bycatch and possibly other flatfish species. Escapement mechanisms, depending on their specific design and configurations, could allow certain sized organisms to escape. There is a possibility it may also affect the types of species that enter and are retained in pot gear, for example pot gear with a larger tunnel opening may catch sleeper sharks (personal communication, D. Hanselman, 2018).

Even if halibut are targeted with pot gear in the BSAI (e.g., pots are designed to more effectively catch halibut and vessels move to habitat more suitable for halibut) it is not expected that there would be a large shift of effort from HAL to pot gear. As further explained in Section 4.7.1, there are several barriers to entry in using this opportunity including: access to halibut IFQ/ CDQ, access to sablefish IFQ/ CDQ, and access to a vessel that can safely deploy pot gear in the BSAI. Moreover, the Council’s motion includes direction to review the effects of allowing retention of halibut in pot gear three years after implementation. At this point, catch data should reveal any changes to bycatch species or rates from the status quo.

3.8.2.1 Cumulative Effects on Incidental Catch

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.

3.9 Seabirds

3.9.1 Status

Alaska’s waters support extremely large concentrations of seabirds. Over 80 million seabirds are estimated to occur in Alaska annually, including 40 million to 50 million individuals from the numerous species that breed in Alaska (Table 15; USFWS 2009). An additional 40 million to 50 million individuals do not breed in Alaska but spend part of their life cycle there. These include short-tailed and sooty shearwaters and three albatross species: the black-footed albatross, the Laysan albatross, and the endangered short-tailed albatross (Table 15; USFWS 2009).

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.

Table 15 Seabird species in Alaska

Type	Common name	Status
Albatrosses	Black-footed	
	Short-tailed	Endangered
	Laysan	
Fulmars	Northern fulmar	
Shearwaters	Short-tailed	
	Sooty	
Storm petrels	Leach's	
	Fork-tailed	
	Pelagic	
	Red-faced	
	Double-crested	
Gulls	Glaucous-winged	
	Glaucous	
	Herring	
	Mew	
	Bonaparte's	
	Slaty-backed	
Murres	Common	
	Thick-billed	
Jaegers	Long-tailed	
	Parasitic	
	Pomarine	

Type	Common name	Status
Guillemots	Black	
	Pigeon	
Eiders	Common	
	King	
	Spectacled	Threatened
	Steller's	Threatened
Murrelets	Marbled	
	Kittlitz's	
	Ancient	
Kittiwakes	Black-legged	
	Red-legged	
Auklets	Cassin's	
	Parakeet	
	Least	
	Whiskered	
	Crested	
Terns	Arctic	
Puffins	Horned	
	Tufted	

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

- The URL for the USFWS Migratory Bird Management program is at <http://alaska.fws.gov/mbmp/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 https://alaskafisheries.noaa.gov/sites/default/files/pseis0604-chpt_3_7.pdf.
- The annual Ecosystems Considerations chapter of the SAFE reports has a chapter on seabirds. Back issues of the Ecosystem SAFE reports may be accessed at <http://www.afsc.noaa.gov/REFM/REEM/Assess/Default.htm>.
- The Seabird Fishery Interaction Research webpage of the Alaska Fisheries Science Center: <http://www.afsc.noaa.gov/REFM/REEM/Seabirds/Default.php>.
- The NMFS Alaska Region's Seabird Incidental Take Reduction webpage: <https://alaskafisheries.noaa.gov/pr/seabird-bycatch>.
- 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.alaskafisheries.noaa.gov/npfmc/default.htm>.
- Washington Sea Grant has several publications on seabird takes, and technologies and practices for reducing them: <https://wsg.washington.edu/seabird-bycatch-prevention-in-fisheries/>.
- The seabird component of the environment affected by the groundfish FMPs is described in detail in Section 3.7 of the PSEIS (NMFS 2004), and updated in the PSEIS Supplemental Information Report (NPFMC and NMFS 2015).
- Seabirds and fishery impacts are also described in Chapter 9 of the Alaska Groundfish Harvest Specifications EIS (NMFS 2007).
- USFWS. 2015. Biological Opinion for the Effects of the Fishery Management Plans for the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish Fisheries and the State of Alaska Parallel

Groundfish Fisheries. Anchorage, AK: 52 pp. Document available at:

<https://alaskafisheries.noaa.gov/sites/default/files/analyses/usfws-biop-122315.pdf>

- NMFS. 2015. Programmatic Biological Assessment on the Effects of the Fishery Management Plans for the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish Fisheries and the State of Alaska Parallel Groundfish Fisheries on the Endangered Short-tailed Albatross (*Phoebastria albatrus*) and the Threatened Alaska-breeding Population of the Steller's Eider (*Polysticta stelleri*). Document available at:
<https://alaskafisheries.noaa.gov/sites/default/files/analyses/seabirdba0815.pdf>
- Seabird Bycatch and Mitigation Efforts in Alaska Fisheries Summary Report: 2007 through 2015 (Eich et al. 2016). Document available at:
ftp://ftp.library.noaa.gov/noaa_documents.lib/NMFS/TM_NMFS_AFKR/TM_NMFS_FAKR_12.pdf
- Seabird Bycatch Estimates for Alaska Groundfish Fisheries Annual Report: 2015 (Eich et al. 2017). Document available at:
ftp://ftp.library.noaa.gov/noaa_documents.lib/NMFS/TM_NMFS_AFKR/TM_NMFS_FAKR_13.pdf

3.9.2 Effects on Seabirds

Incidental Take

Pot gear remains the gear type with the least amount of seabird bycatch (Table 16) compared to hook-and-line (Table 17) and trawl. Pot gear represents an overall average of 3% of the total seabird bycatch (of the three gear types: hook-and-line, trawl, and pot) from 2010 through 2017 (range 0.4% to 7.6%). For 2007 through 2017, 62% of the average seabird bycatch attributed to pot gear was in the Bering Sea, 34% was in the GOA, and 4 % was in the Aleutian Islands. In 2017, 98% (616 birds) of the seabird bycatch attributed to pot gear was in the BSAI Pacific cod fishery and 2% (13 birds) was in the BSAI sablefish fishery. No seabird bycatch was estimated for GOA in 2017.

Table 16 Estimated seabird bycatch by target species for pot vessels fishing groundfish in BSAI and GOA

Species/Species Group	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Annual Avg
BSAI Total	92	34	47	69	0	20	20	46	216	181	629	123
<u>Pacific Cod Target</u>	92	34	36	69	0	20	20	46	216	181	616	121
Auklets	0	0	0	0	0	0	0	35	19	29	36	11
Murre	0	0	0	0	0	0	0	0	0	13	0	1
Northern Fulmar	92	34	36	69	0	0	20	11	197	139	581	107
Unidentified	0	0	0	0	0	20	0	0	0	0	0	2
<u>Sablefish Target</u>	0	0	11	0	0	0	0	0	0	0	13	2
Northern Fulmar	0	0	6	0	0	0	0	0	0	0	13	2
Shearwaters	0	0	5	0	0	0	0	0	0	0	0	0
GOA Total	279	60	82	0	37	0	57	39	38	95	0	62
<u>Pacific Cod Target</u>	279	60	82	0	37	0	57	39	38	95	0	62
Auklets	0	0	0	0	0	0	0	0	38	0	0	3
Gull	0	60	0	0	0	0	0	0	0	0	0	5
Northern Fulmar	279	0	82	0	37	0	0	0	0	95	0	45
Other Alcid	0	0	0	0	0	0	0	39	0	0	0	4
Shearwaters	0	0	0	0	0	0	57	0	0	0	0	5
Grand Total	371	94	130	69	37	20	77	85	254	276	629	185

Note: Only includes vessels fishing in Alaska Federal waters

Table 17 Estimated seabird bycatch by target species for HAL vessels fishing groundfish and halibut (BSAI)

Species/Species Group	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Annual Avg
<u>Greenland Turbot</u>	374	247	639	202	543	409	131	62	72	256	153	281
Short-tailed Albatross	0	0	0	0	0	0	0	6	0	0	0	1
Laysan Albatross	2	0	10	0	5	0	0	0	0	0	0	2
Northern Fulmar	243	247	548	171	499	354	65	55	17	82	130	219
Shearwaters	119	0	69	4	38	40	60	0	55	174	14	52
Gulls	0	0	4	17	0	0	0	0	0	0	0	2
Kittiwakes	10	0	4	0	0	0	0	0	0	0	9	2
Unidentified Birds	0	0	4	11	0	15	5	0	0	0	0	3
<u>Halibut</u>	0	0	0	0	0	0	40	9	15	58	447	52
Laysan Albatross	0	0	0	0	0	0	14	0	15	0	30	5
Black-footed Albatross	0	0	0	0	0	0	0	9	0	0	0	1
Northern Fulmar	0	0	0	0	0	0	0	0	0	46	359	37
Shearwaters	0	0	0	0	0	0	0	0	0	0	33	3
Gulls	0	0	0	0	0	0	11	0	0	12	0	2
Unidentified Birds	0	0	0	0	0	0	15	0	0	0	25	4
<u>Other Target Species</u>	7	0	0	0	0	0	0	0	4	0	4	1
Laysan Albatross	4	0	0	0	0	0	0	0	0	0	0	0

Northern Fulmar	3	0	0	0	0	0	0	0	0	0	4	1
Unidentified Birds	0	0	0	0	0	0	0	0	4	0	0	0
<u>Pacific Cod</u>	5,940	4,514	8,090	3,200	6,819	4,129	3,300	1,298	4,051	8,513	4,274	4,921
Unidentified Albatross	0	0	0	0	0	0	0	10	0	0	0	1
Short-tailed Albatross	0	0	0	15	5	0	0	3	0	0	0	2
Laysan Albatross	3	25	4	41	28	34	4	12	38	13	8	19
Black-footed Albatross	18	7	5	9	0	0	0	0	0	0	0	4
Northern Fulmar	2,322	1,640	6,253	1,652	4,633	2,478	2,485	576	2,696	4,686	2,544	2,906
Shearwaters	2,710	1,211	504	492	125	490	135	43	233	2,934	1,079	905
Gulls	436	1,358	845	733	1,644	834	408	573	925	587	372	792
Kittiwakes	0	0	5	0	6	5	3	4	12	6	14	5
Murres	5	6	13	0	0	6	0	0	0	0	10	3
Puffins	0	0	0	9	0	0	0	0	0	11	0	2
Auklets	0	0	0	0	0	7	0	0	0	0	0	1
Unidentified Birds	445	268	460	249	378	275	264	77	147	278	247	281
<u>Rockfish</u>	0	0	0	0	0	0	5	0	0	0	0	0
Gulls	0	0	0	0	0	0	5	0	0	0	0	0
<u>Sablefish</u>	37	53	87	223	100	103	164	206	290	75	0	122
Unidentified Albatross	0	0	0	0	0	0	0	23	0	0	0	2
Laysan Albatross	3	33	25	97	9	90	110	54	122	75	0	56
Black-footed Albatross	0	0	0	0	7	0	13	0	20	0	0	4
Northern Fulmar	13	20	45	26	21	0	30	58	85	0	0	27
Shearwaters	0	0	0	6	35	0	0	71	26	0	0	13
Gulls	17	0	17	88	28	13	12	0	36	0	0	19
Unidentified Birds	4	0	0	6	0	0	0	0	0	0	0	1
Grand Total	6,358	4,814	8,816	3,626	7,462	4,641	3,640	1,575	4,433	8,903	4,878	5,377

The USFWS recently consulted with NOAA Fisheries Alaska Region under section 7 of the ESA on the effects of the halibut fisheries in U.S. Convention waters off Alaska on the endangered short-tailed albatross. In its 2018 biological opinion, the USFWS determined the halibut fisheries off Alaska - as prosecuted at the time of consultation - are likely to adversely affect short-tailed albatross, but they are not likely to jeopardize its continued existence (USFWS 2018). This biological opinion included an incidental take limit of two short-tailed albatross every two years in the halibut fisheries off Alaska. Through informal consultation, the USFWS determined that the halibut fisheries in U.S. Convention waters off Alaska may affect but are not likely to adversely affect spectacled eider or its designated critical habitat, or the Alaska-breeding population of the Steller's eider and its designated critical habitat (USFWS 2018).

In its 1997 biological opinion amendment, the USFWS determined that groundfish fishing activities by vessels less than or equal to 26 ft LOA, and groundfish fishing activities by vessels using pot gear are not likely to adversely affect the short-tailed albatross and Steller's eider (USFWS 2003). No change to that determination has been made in subsequent biological opinions (USFWS 2015).

Surface feeders, such as albatrosses, fulmars, shearwaters, and gulls, are attracted to fishing vessels' offal discharge and bait on HAL gear. Nearshore foragers, such as cormorants, terns, guillemots, murrelets, and puffins, are less likely to interact with offshore groundfish and halibut fisheries. Mostly Northern fulmar,

shearwaters, gulls, and various alcid species are taken by pot gear. It is most likely that the surface and near-surface foragers (procellarids and gulls) are actually “captured” in pots as a result of collisions with pots during bad weather, as reported by several fisheries observers. There are also observer reports that birds can go into pots while on the gear is on deck and then are unable to get out before the gear is submerged; these birds would be counted as when the gear is retrieved. Although 2017 had the highest amount of bycatch since 2007 for this gear type, pot-fishing does not represent a conservation concern for Alaska seabirds.

Prey Availability

The status quo groundfish fisheries do not harvest seabird prey species in an amount that would decrease food availability enough to impact survival rates or reproductive success. Under the Status Quo alternative no substantive changes are expected, and impacts are expected to be negligible.

3.9.2.1 Alternative 1

Incidental Take

The current prohibition of the retention of halibut in pot gear in the BSAI is the status quo, or No Action, alternative. Alternative 1 would not introduce new gear or participants into any BSAI pot fishery and therefore have an insignificant impact on seabirds.

The effects of the status quo fisheries on incidental take of seabirds are described in PSEIS (NMFS 2004), which concluded that these fisheries are not likely to result in significantly adverse impacts to seabirds. It is reasonable to conclude that incidental take of seabirds would not change under the Status Quo alternative.

Prey Availability

Alternative 1 would not introduce new gear or participants into any BSAI pot fishery and therefore have an insignificant impact on seabird prey availability. Again, changes are not expected to be substantial, and any impacts are expected to be negligible.

3.9.2.2 Alternative 2

Incidental Take

Alternative 2 could introduce retention of halibut when pot fishing for IFQ/CDQ sablefish and halibut and has the potential to increase vessel participation. Pot gear has the lowest seabird bycatch rates and it is assumed that the impact to seabirds is insignificant. Under increased retention of halibut in this scenario, there could be more fishing activity and potentially more incidental takes of seabirds which may be small compared to the reduction in seabirds that might occur from less HAL effort. Overall effects on seabird takes are not likely to change substantially, and impacts are expected to be negligible.

Prey Availability

Alternative 2 introduces retention of halibut when pot fishing for IFQ/CDQ halibut and sablefish in the BSAI and has the potential to increase vessel participation. However, the impact to seabird prey availability is not expected to be significant. Again, changes are not expected to be substantial, and any impacts are expected to be negligible.

3.9.3 Cumulative Effects on Seabirds

Reasonably foreseeable future actions for seabirds include ecosystem-sensitive management; rationalization; traditional management tools; actions by other federal, state, and international agencies;

and private actions, as described in Sections 8.4 and 9.3 of the Harvest Specifications EIS (NMFS 2007a). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to seabirds by considering these species more in management decisions, and by improving the management of fisheries through the restructured Observer Program, catch accounting, seabird avoidance measures, and vessel monitoring systems. Changes in the status of species listed under the ESA, the addition of new listed species or critical habitat, and results of future Section 7 consultations may require modifications to groundfish fishing practices to reduce the impacts of these fisheries on listed species and critical habitat. Additionally, since future TACs will be set with existing or enhanced protection measures, we expect that the effects of the fishery on the harvest of prey species and disturbance will not increase in future years.

Any action by other entities that may impact seabirds will likely be offset by additional protective measures for the federal fisheries to ensure ESA-listed seabirds are not likely to experience jeopardy or adverse modification of critical habitat. Direct mortality by subsistence harvest is likely to continue, but these harvests are tracked and considered in the assessment of seabirds. The cumulative effect of these impacts in combination with measures proposed under Alternative 2 is not likely to be significant.

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.

4 Regulatory Impact Review

This Regulatory Impact Review (RIR) examines the benefits and costs of a proposed regulatory amendment to allow retention of legal-size halibut in pot gear used to fish halibut or sablefish individual fishing quota (IFQ) and community development quota (CDQ) in the BSAI, provided the IFQ/CDQ holder also holds sufficient halibut IFQ/CDQ for that IFQ regulatory area.

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

Any action to allow halibut retention in the BSAI sablefish and halibut IFQ fisheries involves the Council, NMFS, and the IPHC. The Pacific halibut fishery off Alaska is managed by the NMFS under the authority of the Northern Pacific Halibut Act of 1982, and in coordination with annual fishery management measures adopted by the IPHC under the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea. The IPHC develops regulations governing the Pacific halibut fishery under the Convention, which are promulgated domestically by NMFS. Additional regulations that are not in conflict with approved IPHC regulations may be recommended by the Council. Council action must be approved and implemented by the Secretary of Commerce (Secretary).

The groundfish fisheries in the U.S. exclusive economic zone of the BSAI, including the sablefish fishery, are managed by NMFS under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Under the authority of the MSA, the Council developed the Fishery

Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management (BSAI) Area and is authorized to prepare and submit to the Secretary for approval any necessary amendments to the BSAI FMP. Regulations implementing the BSAI FMP and general regulations governing groundfish are implemented by NMFS after Council review and Secretarial approval. In addition, under section 305(d) of the Magnuson-Stevens Act, the Secretary has a general responsibility to carry out any fishery management plan or amendment approved or prepared by the Secretary, and the Secretary may promulgate regulations necessary to discharge that responsibility or to carry out any other provision of the Magnuson-Stevens Act (16 U.S.C. 1855(d)). Therefore, coordination between the IPHC, the Council, and NMFS is crucial when considering complementary regulatory amendments.

The Alaska Department of Fish and Game (ADF&G) has one primary regulation pertaining to commercial take of halibut: halibut may not be taken or possessed for commercial use in a way that is inconsistent with IPHC regulations. As long as the Council and NMFS coordinate to ensure that Federal-waters regulations are in line with IPHC regulation, then state-waters rules would also be aligned. ADF&G accomplishes this by adopting Federal rules through a global emergency order. For vessels fishing IFQ, neither a NMFS regulatory amendment to allow incidental halibut retention in BSAI sablefish pots, nor a coordinated NMFS/IPHC package to allow the targeting of BSAI halibut with pots would require complementary action on the part of ADF&G. Verification that a vessel possesses the necessary halibut IFQ for the fish it retains would occur through the normal channels.³⁵

4.2 Purpose and Need for Action

In April 2018, the Council adopted a purpose and need statement and suite of alternatives for initial review. In June 2018, the Council updated the purpose and need statement (below) to include a statement regarding NMFS's authority over the halibut fisheries.

Interactions with whales throughout the Bering Sea and Aleutian Islands affect the ability of sablefish and halibut QS holders to harvest their IFQ by reducing catch per unit of effort and increasing fishing costs. Whale depredation is increasing for vessels fishing halibut IFQ with longline gear, and for halibut discarded when using pot gear to fish sablefish IFQ in the BSAI. The purpose of this action is to address whale depredation on discarded halibut and to allow for more efficient harvest of halibut in areas with whale depredation. Research into developing technological solutions to deter whales and changes in fishing strategies has not resolved this problem. The problem may be addressed by revisions to current regulations that authorize pot gear as legal gear to retain halibut in the BSAI. Allowing retention of halibut caught in pot gear in the BSAI could address the negative impacts of whale depredation on QS holders. This action seeks to reduce the problems associated with whale depredation, including unobserved halibut mortality, while minimizing gear conflicts. In the event that there is conservation concern for a shellfish or groundfish species, NMFS would have the authority to close the directed longline and pot halibut fisheries in both the BSAI and the Gulf of Alaska.

4.3 Alternatives

The preferred alternative in this chapter was designed to accomplish the stated purpose and need for the action. The preferred alternative was designed to allow for more efficient harvest of the halibut resource by decreasing the wastage of legal-size halibut discarded in the BSAI sablefish pot fishery, and to allow for the possibility of reduced whale depredation of halibut off of HAL gear, by allowing operators that hold halibut IFQ/CDQ the opportunity to retain halibut in pot gear. The Council adopted the following

³⁵ Since IFQ are specific to a regulatory area and vessel size category, the amount of halibut retained and landed is crosschecked against the IFQ permit database to verify that the permit holder's IFQ balance is sufficient for the relevant area and vessel size category. In addition, OLE can reference information in NMFS and IPHC logbooks at the time of landing.

revised alternatives, elements, and options to allow halibut retention in pot gear in the BSAI for analysis in June 2018.

The preferred alternative also includes NMFS's recommendation to modify VMS regulations to remove two reporting requirements for vessels in the BSAI and GOA and to make other minor revisions for clarity. This component of the preferred alternative was added to reduce reporting burdens and to provide regulatory clarity for vessels in the BSAI and GOA.

The Council adopted the following revised alternatives, elements, and options to allow halibut retention in pot gear in the BSAI for analysis in June 2018. The Council's preferred alternative was identified in October 2018 (shown in **bold**).

Alternative 1: No action (status quo).

Alternative 2 (Preferred Alternative): Allow retention of legal-sized halibut in single or longline pot gear used to fish for halibut or sablefish IFQ/CDQ in the BSAI provided the IFQ/CDQ holder holds sufficient halibut IFQ/CDQ for that IFQ regulatory area. The Pribilof Islands Habitat Conservation Zone will be closed to all fishing with pot gear.

Element 1: Gear retrieval

Option 1: No gear tending requirements (status quo)

Option 2: A vessel cannot leave gear on the grounds untended for more than (sub-options 5-10 days)

Element 2: Limit of a 9-inch maximum width of tunnel opening does not apply when vessel has unfished halibut IFQ/CDQ onboard.

Element 3: All vessels using pot gear to fish IFQ/CDQ are required to use logbooks and VMS.

Element 4: Require escape mechanisms in the mesh panels of pots.

Option 1: No escape mechanism requirement for crab (status quo)

Option 2: Require escape mechanism for crab

Element 5: Establish regulations that would allow NMFS to close IFQ fishing for halibut if an OFL is approached for a groundfish or shellfish species consistent with regulations in place for groundfish.

The Council requests that NMFS include BSAI IFQ pot gear effort in its annual inseason management report to the Council. The Council intends to review the effects of allowing retention of halibut in pot gear three years after implementation.

To the extent practicable, the Council recommends that halibut fishermen in the BSAI interested in using pot gear under this action consult with crab industry participants on appropriate crab escape mechanisms to minimize crab bycatch.

4.4 Methodology for analysis of impacts

This analysis was prepared using a combination of qualitative and quantitative sources. Qualitative data on harvest, harvesting vessels, and value is obtained from ADF&G Commercial Fisheries Entry

Commission (CFEC) fish tickets sourced through AKFIN using the Comprehensive Fish Ticket database and NMFS catch accounting system. Information about halibut allocation, QS (quota share) holders, and weekly landings is derived from data provided by NMFS Restricted Access Management (RAM) Program (primarily accessible at <https://alaskafisheries.noaa.gov>). This analysis relies on a number of references for both qualitative and quantitative background information as well, notably the IFQ Program 20-year review (NPFMC/NMFS 2016), the analysis for the authorization of pot gear for use in the sablefish IFQ fishery in GOA (NPFMC 2016a), and the BSAI sablefish chapter of the SAFE (Hanselman et al. 2017). For a full list of references, see Section 8. Qualitative and anecdotal information was provided by a number of representatives in management and enforcement, as well as fishery participants and processor representatives, as listed in Section 7.

4.5 Description of Fisheries

This section provides some background information on the harvesting, harvesters, processors, and the communities that could be related to the proposed action. This baseline information is intended to provide a relevant reference for the subsequent discussion of impacts resulting from the proposed action to allow halibut retention in pots in the BSAI.

4.5.1 Description of Management and Allocation

4.5.1.1 IFQ Program

In 1991, the Council recommended an IFQ Program for the management of the fixed gear halibut and sablefish fisheries off of Alaska (NPFMC & NMFS 1992). The Secretary of Commerce approved the Council's IFQ Program as a regulatory amendment in 1993, and the program was implemented by NMFS for the fishing season in 1995. The fundamental component of the IFQ Program is QS, issued to participants as a percentage of the QS pool for a species-specific IFQ regulatory area, which is translated into annual IFQ allocations in the form of fishable pounds.

There are also many references that can provide more comprehensive and extensive background data on the IFQ Program.³⁶ This section highlights only the most relevant elements of the IFQ management system to this current action.

One central management component of the IFQ Program is the catch limit or **total allowable catch** (TAC) established for the IFQ fisheries. In both the halibut and the sablefish fisheries, TACs are established for discrete management areas. The IPHC determines the TACs for the halibut fishery under the authority of the Halibut Act. There are eight halibut IFQ regulatory areas (Figure 1) in Alaska, inclusive of Areas 2C through Area 4E, although all of the Area 4E TAC is allocated to the CDQ Program. For the sablefish IFQ fishery, the Secretary of Commerce determines the TAC available for the directed sablefish fishery, based on the recommendations of the Council. There are two Fishery Management Plan areas (Figure 1), BSAI and GOA. Management areas are further broken out into the Bering Sea and the Aleutian Islands. All halibut and sablefish QS have **regulatory area designations**, which specify the area in which the IFQ derived from those shares may be harvested.

Through an amendment to the IFQ Program, some **harvest flexibility** has been built into the use of Area 4C halibut QS. All or part of the QS and IFQ specified for regulatory area 4C may be harvested in either

³⁶ For example, the IFQ Program Review presented at the October 2016 Council meeting provides a comprehensive assessment of the procession of the program, framed around the 10 objectives identified by the Council when it developed the program (NPFMC/NMFS 2016). Additionally, QS transfer data, disaggregated in many ways, can also be found in the NOAA Fisheries Alaska Region Restricted Access Management (RAM) Transfer Report (NMFS 2015a), and choice statistics about the fishery were provided in the RAM Report to the Fleet (NMFS 2014), which was produced annually up until 2012.

Area 4C or Area 4D. The IPHC considers Areas 4C, 4D, and 4E to be one halibut stock, so using Area 4C, 4D, or 4E IFQ across areas does not interfere with the biological management of the stock. The intent of allowing the harvest of Area 4C IFQ in Area 4D was to provide for increased harvesting opportunities for small boat halibut IFQ fishermen, in response to localized stock depletion around Area 4C.

In addition to area specifications, halibut and sablefish QS retain a **QS class designation**, which represent the size of vessel that is permitted to harvest that IFQ. There are four vessel classes in the halibut IFQ fishery (A through D) and three in the sablefish IFQ fishery (A through C).

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. Sablefish and halibut IFQ seasons are typically set simultaneously to reduce waste and discards. The season dates have varied by several weeks since 1995, but the monthly pattern for both fisheries has been from March to November.

4.5.1.2 CDQ Program

The large-scale commercial fisheries of the BSAI developed in the eastern Bering Sea without participation from rural western Alaska communities. These fisheries are capital-intensive and require large investments in vessels, infrastructure, processing capacity, and specialized gear. The Community Development Program (CDQ) was developed to redistribute some of the BSAI fisheries' economic benefits to communities adjacent to the Bering Sea, by allocating a portion of commercially important BSAI species, including pollock, Pacific cod, crab, halibut, and various groundfish, to such communities.

The CDQ Program is an economic development program associated with federally managed fisheries in the BSAI. NMFS, the State of Alaska, and the Western Alaska Community Development Association (WACDA) administer the CDQ Program. Its purpose, as specified in the MSA, is to provide western Alaska communities the opportunity to participate and invest in BSAI fisheries, to support economic development in western Alaska, to alleviate poverty and provide economic and social benefits for residents of western Alaska, and to achieve sustainable and diversified local economies in western Alaska.

In fitting with these goals, NMFS allocates a portion of the annual catch limits for a variety of commercially valuable marine species in the BSAI to the CDQ Program. The percentage of each annual BSAI catch limit allocated to the CDQ Program varies by both species and management area. These apportionments are, in turn, allocated among six different non-profit managing organizations representing different affiliations of communities (CDQ groups), as dictated under the MSA. Eligibility requirements for a community to participate in the western Alaska Community Development Program are identified in the MSA at section 305(i)(1)(D).

There are 65 coastal Alaska communities³⁷ currently eligible to participate in the CDQ Program, representing a population of 27,702 residents (U.S. Census 2010). The CDQ-qualifying communities have organized themselves into six non-profit groups, with between 1 and 20 communities in each group. The CDQ communities are geographically dispersed, extending from Atka, on the Aleutian chain, along the Bering Sea coast, to the village of Wales, near the Arctic Circle. The current CDQ groups include:

Aleutian Pribilof Island Community Development Association (APICDA)

³⁷ For a full list of the participating communities and the names of their associated group, see Table 7 in 50 CFR Part 679.

Bristol Bay Economic Development Corporation (BBEDC)

Central Bering Sea Fishermen's Association (CBSFA)

Coastal Villages Region Fund (CVRF)

Norton Sound Economic Development Corporation (NSEDC)

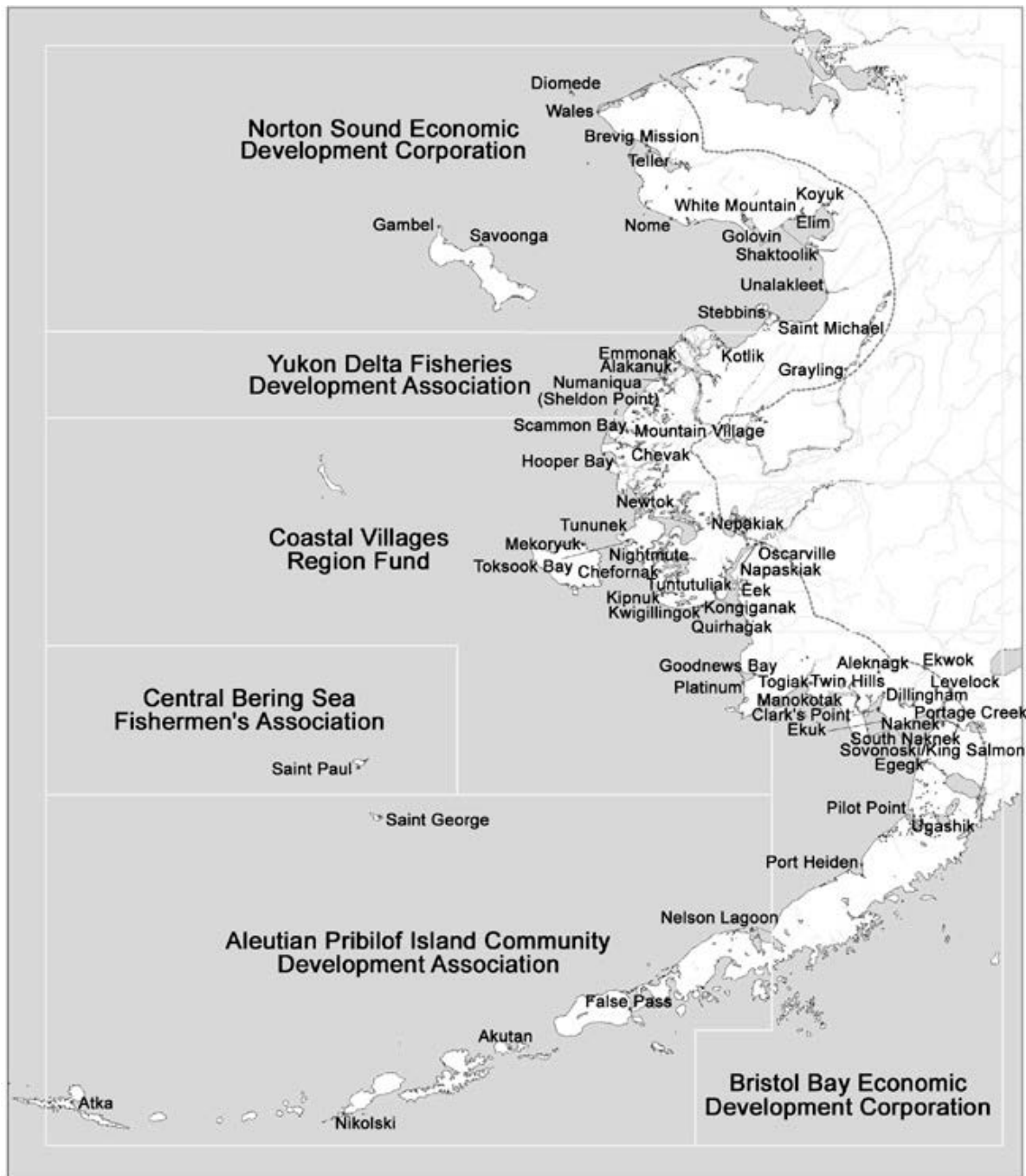
Yukon Delta Fisheries Development Association (YDFDA)

CDQ groups use the revenue derived from the harvest of their fisheries allocations as a basis for funding economic development activities and for providing employment opportunities. Therefore, the successful harvest of CDQ Program allocations is integral to achieving the goals of the program. Annual CDQ allocations provide a revenue stream for CDQ groups through various channels, including the direct catch and sale of some species, leasing quota to various harvesting partners, and income from a variety of investments.

One of the most tangible direct benefits of the CDQ Program has been employment opportunities for western Alaska community residents. CDQ groups have had some success in securing career track employment for many residents of qualifying communities and have opened opportunities for non-CDQ Alaskan residents as well. Jobs generated by the CDQ Program include work aboard a wide range of fishing vessels, internships with the business partners or with government agencies, employment at processing plants, and administrative positions. CDQ groups continue to explore the means to provide continuing and additional employment opportunities for local residents.

Figure 22 identifies the names and locations of the CDQ groups and the communities they represent.

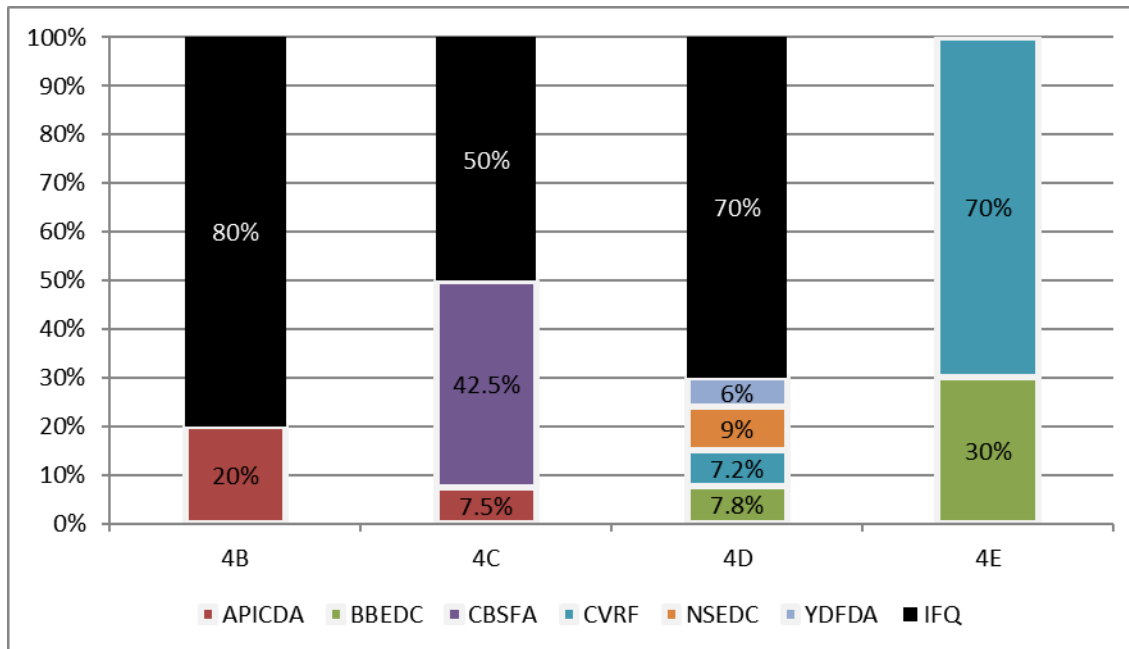
Figure 22 Western Alaska CDQ communities and groups



Source: NOAA, Alaska Fisheries Science Center

Among the species CDQ groups are allocated for commercial fishing, Pacific halibut is an important species for resident employment and income in many of the groups. Halibut is allocated to CDQ groups for commercial fisheries in four IPHC regulatory areas: 4B, 4C, 4D, and 4E (see Figure 23 and Table 18).

Figure 23 Halibut CDQ/ IFQ allocation in the regulatory Areas 4B, 4C, 4D and 4E



Source: 2016 CDQ program quota categories, target and non-target CDQ reserves, allocation percentages, and group quotas: <https://alaskafisheries.noaa.gov/sites/default/files/reports/annualmatrix2016.pdf>

Allocations of halibut quota are expected to provide CDQ groups real opportunities for small vessel fishing for their fleets, and, as such, area allocations of halibut CDQ are generally correlated with the location of the groups (refer to Figure 22 and Figure 23). For instance, Area 4B is located in the Aleutian Islands where the full CDQ allocation is held by APICDA. Area 4C surrounds the Pribilof Islands and the CDQ portion of the TAC is split 85% to St. Paul Island’s CBSFA and 15% to APICDA, which includes St. George Island as a member. The CDQ portion of Area 4D is split 20% to YDFDA, 30% to NSEDC, 24% to CVRF, and 26% to BBEDC. Of the final Area 4E halibut CDQ, 70% is allocated to CVRF and 30% to BBEDC. Table 18 demonstrates the pounds that these percentages have represented over time (2010 through 2017).

Table 18 Annual halibut CDQ allocation by regulatory area 2010 through 2017

Area	Year	TAC	CDQ portion of TAC	APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA
4B	2010	2,160,000	20%	432,000	0	0	0	0	0
	2011	2,180,000		436,000	0	0	0	0	0
	2012	1,869,000		373,800	0	0	0	0	0
	2013	1,450,000		290,000	0	0	0	0	0
	2014	1,140,000		228,000	0	0	0	0	0
	2015	1,140,000		228,000	0	0	0	0	0
	2016	1,140,000		228,000	0	0	0	0	0
	2017	1,140,000		228,000	0	0	0	0	0
4C	2010	1,625,000	50%	121,875	0	690,625	0	0	0
	2011	1,690,000		126,750	0	718,250	0	0	0
	2012	1,107,356		83,052	0	470,626	0	0	0
	2013	859,000		64,425	0	365,075	0	0	0
	2014	596,600		44,745	0	253,555	0	0	0
	2015	596,600		44,745	0	253,555	0	0	0
	2016	733,600		55,020	0	311,780	0	0	0
	2017	752,000		56,400	0	319,600	0	0	0
4D	2010	1,625,000	30%	0	126,750	0	117,000	146,250	97,500
	2011	1,690,000		0	131,820	0	121,680	152,100	101,400
	2012	1,107,356		0	86,374	0	79,730	99,662	66,441
	2013	859,000		0	67,002	0	61,848	77,310	51,540
	2014	596,600		0	46,535	0	42,955	53,694	35,796
	2015	596,600		0	46,535	0	42,955	53,694	35,796
	2016	733,600		0	57,221	0	52,819	66,024	44,016
	2017	752,000		0	58,656	0	54,144	67,680	45,120
4E	2010	330,000	100%	0	99,000	0	231,000	0	0
	2011	340,000		0	102,000	0	238,000	0	0
	2012	250,290		0	75,087	0	175,203	0	0
	2013	212,000		0	63,600	0	148,400	0	0
	2014	91,800		0	27,540	0	64,260	0	0
	2015	91,800		0	27,540	0	64,260	0	0
	2016	192,800		0	57,840	0	134,960	0	0
	2017	196,000		0	58,800	0	137,200	0	0
4CDE	2010	3,580,000		121,875	225,750	690,625	348,000	146,250	97,500
	2011	3,720,000		126,750	233,820	718,250	359,680	152,100	101,400
	2012	2,465,002		83,052	161,461	470,626	254,933	99,662	66,441
	2013	1,930,000		64,425	130,602	365,075	210,248	77,310	51,540
	2014	1,285,000		44,745	74,075	253,555	107,215	53,694	35,796
	2015	1,285,000		44,745	74,075	253,555	107,215	53,694	35,796
	2016	1,660,000		55,020	115,061	311,780	187,779	66,024	44,016
	2017	1,700,000		56,400	117,456	319,600	191,344	67,680	45,120

Note: all units in net headed and gutted pounds),

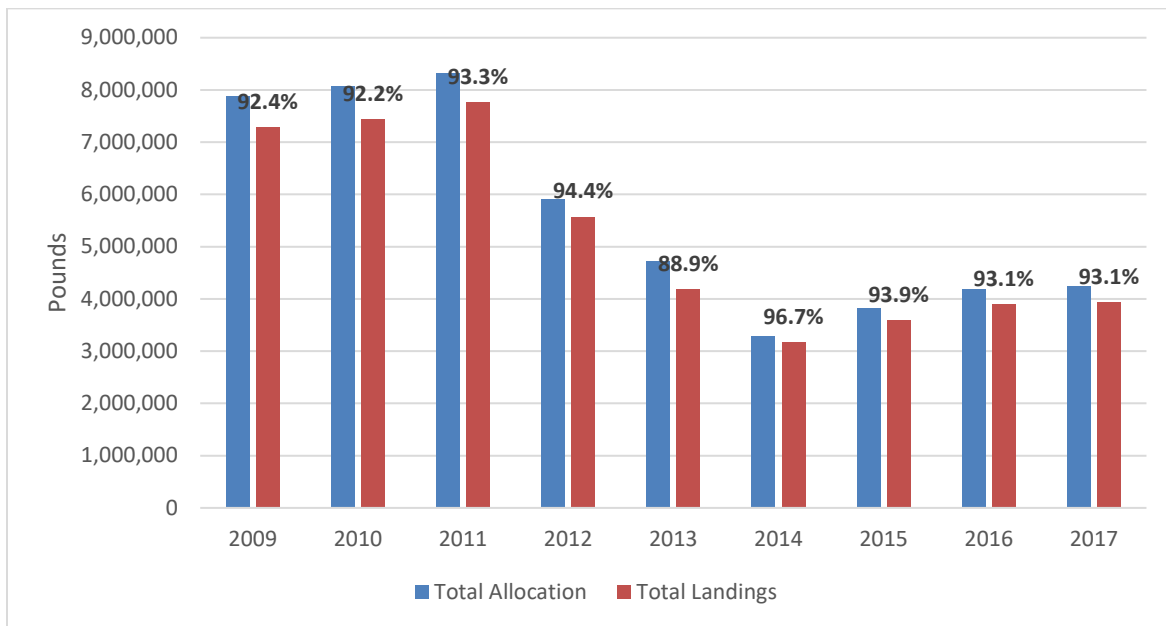
Source: CDQ program quota categories, target and non-target CDQ reserves, allocation percentages, and group quotas (2010 through 2017): <https://alaskafisheries.noaa.gov/sites/default/files/reports/annualmatrix2016.pdf>

4.5.2 Halibut IFQ/ CDQ Fishery

4.5.2.1 Area 4 Harvest

Figure 24 shows the commercial catch limits recommended by the IPHC and quotas implemented by NMFS in each regulatory area from 2008 through 2017. Figure 25 shows the halibut IFQ & CDQ allocations by year, from 2008-2017. Significantly less (over 3x less) halibut quota is apportioned to Area 4 than in Area 2C and 3 (Table 19). Total Area 4 halibut catch limits are generally over 90% harvested, with the lowest percent harvested since 2004 at 88.4% in 2013 (Figure 24). The percent harvested in Area 4 does not vary significantly across sub-areas (Figure 26).

Figure 24 Commercial halibut catch limits (IFQ and CDQ) and amount harvested in Area 4, 2004-2017



Source: NMFS Alaska Region (RAM) division IFQ landings database sourced through AKFIN

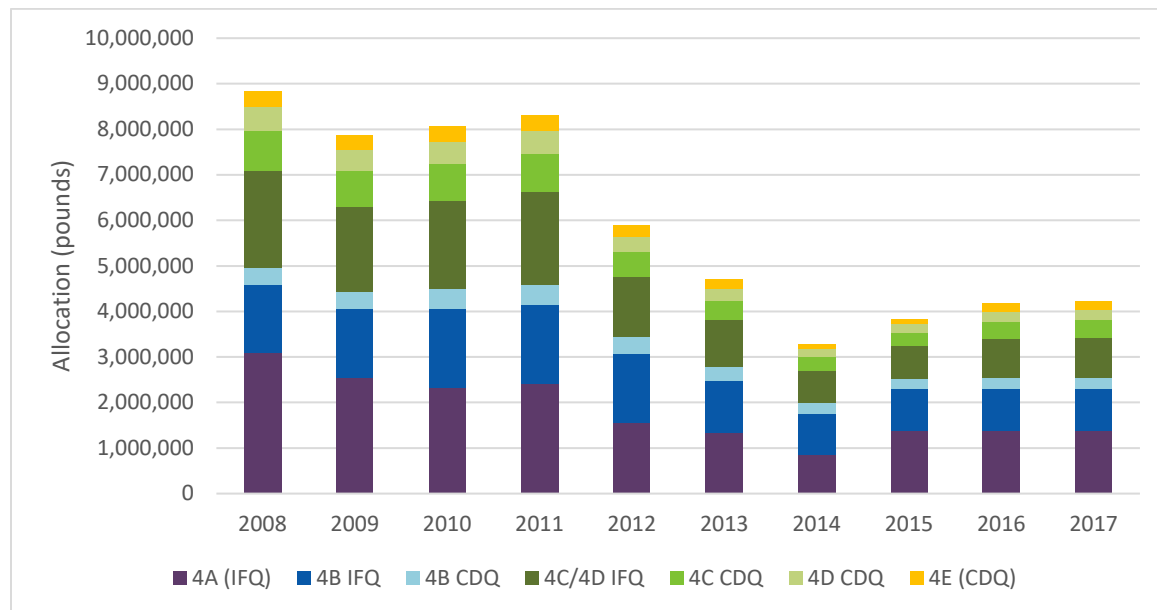
Table 19 Halibut IFQ/CDQ (combined) allocations in Areas 2C & 3 versus Area 4 in millions of pounds

Year	Area 2C & 3	Area 4
2008	41.3	8.9
2009	37.6	7.9
2010	34.3	8.1
2011	23.9	8.3
2012	19.6	5.9
2013	18.3	4.7
2014	13.5	3.3
2015	14.1	3.8
2016	14.0	4.2
2017	15.1	4.2

Source: IPHC Pacific Halibut Regulations 2008-2017

Note: Area 2C and 3 do not line up with GOA and Area 4 does not line up with BSAI because area 4A is split.

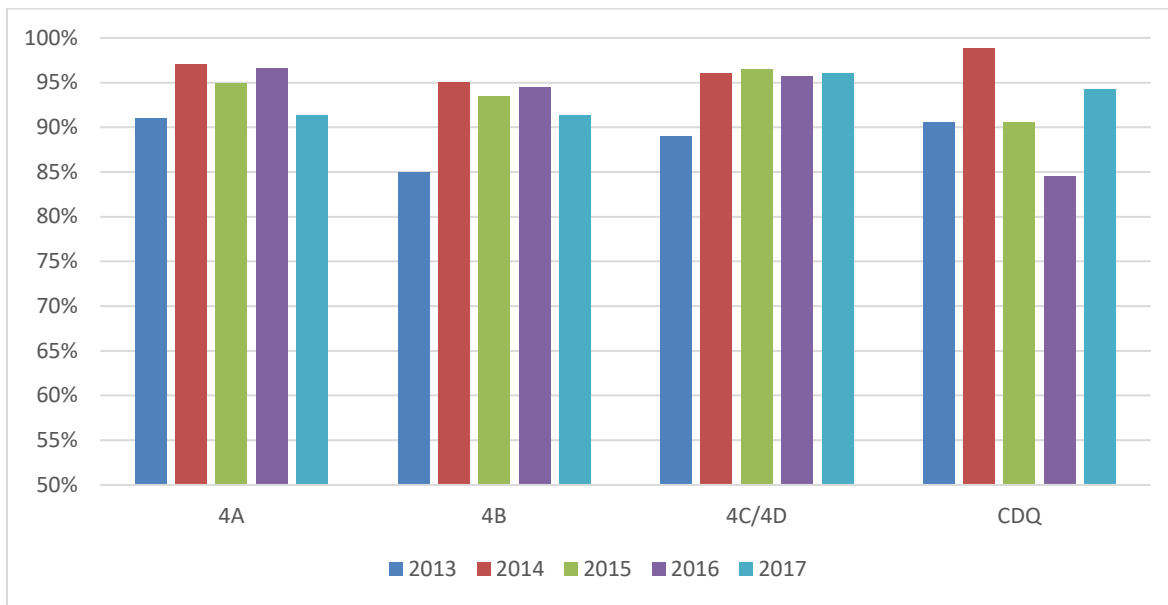
Figure 25 Halibut IFQ & CDQ allocations by year, 2008-2017



Source: NMFS RAM program

Note: 4A quota is all allocated as IFQ, 4E is all allocated as CDQ.

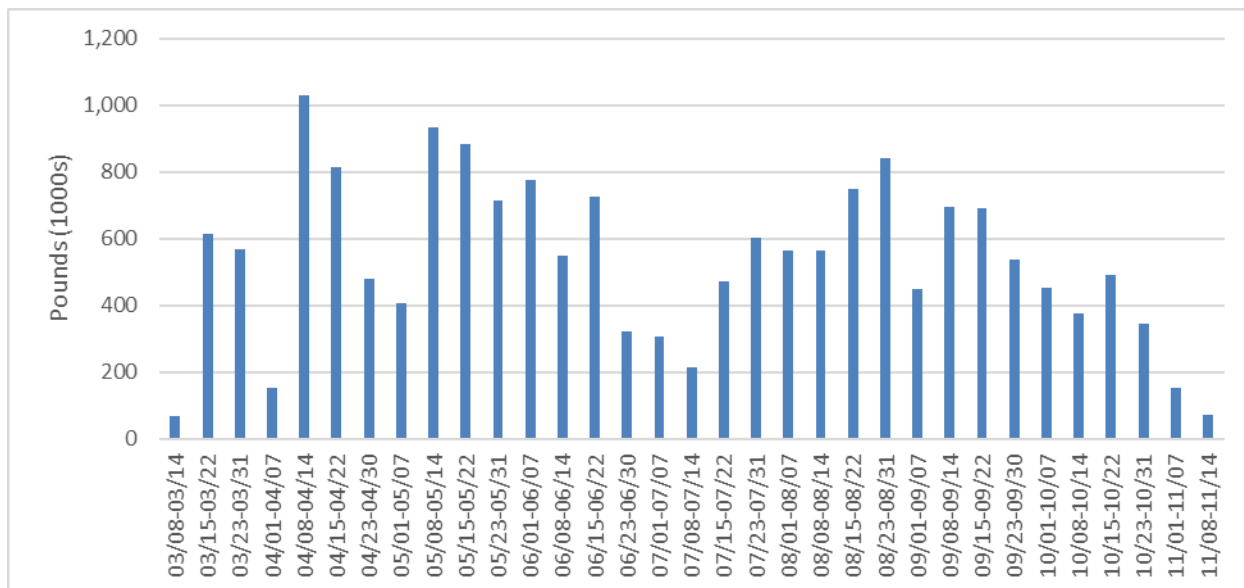
Figure 26 Percent of commercial halibut IFQ (by regulatory Area) and CDQ harvested, 2013-2017



Source: NMFS Alaska Region (RAM) division IFQ landings database sourced through AKFIN

Halibut IFQ season is set by the IPHC and published in the annual regulations under the authority of the Halibut Act. As shown in Figure 27, the greatest volume of landings occurs in April and May. The temporal distribution of these landings is bimodal, with a decrease in halibut harvest around July. This is likely due to the overlap with salmon season and is particularly influenced by the large GOA salmon fishery.

Figure 27 Weekly halibut IFQ landings, 2017



Source: <https://alaskafisheries.noaa.gov/sites/default/files/reports/17ifqweekly.htm>

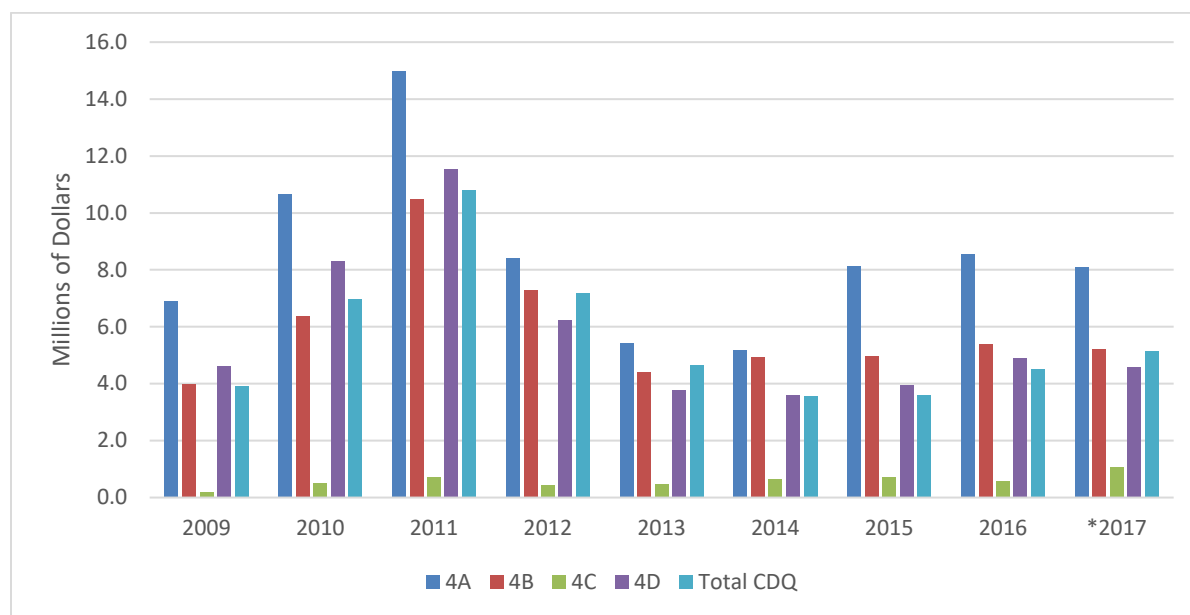
Notes: Weights are reported in net (headed and gutted) pounds. This report summarizes fixed gear IFQ landings reported by Registered Buyers. At sea discards are not included. Dates reflect dates that IFQ landings were reported,

not necessarily when fish were harvested. Data are derived from initial data entry procedures and are preliminary. Dates without landings do not appear in the table. This table includes landings in both the GOA and BSAI.

Bycatch in the halibut fishery is described in Section 3.8. Primary non-halibut species caught in HAL gear include skates, Pacific cod, sablefish, sculpins, several types of rockfish, arrowtooth/Kamchatka flounder, giant grenadier, and sea stars (Table 12 and Table 13). The fishery also has some crab PSC; primarily golden king crab, but also *C. bairdi*, red and blue king crab (Table 14). Bycatch of halibut in other fisheries is significantly higher than regulatory discards of halibut in the commercial halibut fishery (Figure 5). Almost half of all halibut mortality in Area 4A is associated with bycatch in non-halibut fisheries.

Figure 28 shows ex-vessel value of IFQ halibut by regulatory area. In total in Area 4, Area 4A continuously has the highest ex-vessel value, and 4C the lowest. Using 2009-2017 data, CDQ halibut has received less per pound than IFQ halibut. On average, CDQ halibut has been valued at \$4.31/lb, while Area 4 IFQ halibut has been valued at \$5.42/lb.

Figure 28 Ex-vessel value of IFQ halibut by area



Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive FT. *2017 estimated based off 2016 prices. 4E not included due to confidentiality.

4.5.2.2 Area 4 Harvesters

As described in Section 3.4.5, halibut in Area 4 are harvested with HAL gear. Combining IFQ and CDQ together, Table 20 shows that there have been 523 unique vessels that have harvested halibut in the BSAI with between 2011 and 2016. Between 2013 and 2014 there was a substantial decline in the number of CDQ vessels prosecuting the halibut fishery, and a continued decline in 2015 and 2016. There has been a steadier, persistent decline in the number of vessels fishing for halibut IFQ in the BSAI between 2011 and 2016. In 2016, there were 135 unique vessels that harvested halibut in the BSAI. There are some vessels that participate in both IFQ and CDQ fishing. By summing the unique vessels in the IFQ and CDQ fisheries and comparing it to the 523 unique vessels fish halibut in the BSAI in general, Table 20 demonstrates that between 2011 and 2016 there were 55 vessels that participated in both types of fishing.

Table 20 Count of vessels that fished halibut IFQ/ CDQ in the BSAI, 2011-2016

Year	HAL gear		
	BSAI halibut (IFQ)	BSAI halibut (CDQ)	Unique vessels (IFQ and CDQ)
2011	115	240	339
2012	102	241	316
2013	92	251	321
2014	89	100	163
2015	86	71	136
2016	85	70	135
Total unique vessels 2011-2016	173	404	523

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 21 separates the count of vessels that have been active in the BSAI halibut fisheries (IFQ and CDQ) by length overall (LOA) of vessel. This is an important reference for understanding the potential impact of the proposed action. The majority of vessels, particularly CDQ vessels before 2014, harvesting halibut in the BSAI have been less than 50ft LOA. In 2016, 60 unique vessels greater than or equal to 60ft LOA harvested halibut in the BSAI. Overall, there were 419 unique vessels less than 50ft LOA and 104 unique vessels greater than or equal to 50ft LOA that harvested halibut in the BSAI between 2011 and 2016.

Table 21 Count of vessels that fished BSAI halibut IFQ/ CDQ by length overall, 2011-2016

Year	LOA category	HAL gear		
		BSAI halibut (IFQ)	BSAI halibut (CDQ)	Unique vessels (CDQ and IFQ)
2011	<50ft	42	228	264
	≥ 50ft and < 60ft	39	8	40
	≥ 60ft	34	4	35
	Total ≥ 50ft	73	12	75
2012	<50ft	38	228	249
	≥ 50ft and < 60ft	36	10	37
	≥ 60ft	28	3	30
	Total ≥ 50ft	64	13	67
2013	<50ft	33	236	253
	≥ 50ft and < 60ft	34	8	37
	≥ 60ft	25	7	31
	Total ≥ 50ft	59	15	68
2014	<50ft	39	89	109
	≥ 50ft and < 60ft	27	6	27
	≥ 60ft	23	5	27
	Total ≥ 50ft	50	11	54
2015	<50ft	33	56	75
	≥ 50ft and < 60ft	30	8	32
	≥ 60ft	23	7	29
	Total ≥ 50ft	53	15	61
2016	<50ft	31	56	75
	≥ 50ft and < 60ft	30	8	31
	≥ 60ft	24	6	29
	Total ≥ 50ft	54	14	60
Total unique vessels < 50ft, 2011-2016		81	370	419
Total unique vessels ≥ 50ft, 2011-2016		93	34	104

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 22 provides information about the fishing portfolio of vessels that have participated in halibut IFQ fishing in the BSAI in the recent past. For instance, in 2016, of the 85 vessels that participated in halibut IFQ fishing in the BSAI, 35 of those vessels also participated in sablefish IFQ fishing with HAL gear. Table 23 demonstrates the relative connectedness of the fisheries by showing the percent of vessels from each fishery that also participate in the halibut IFQ fishery in the BSAI. For instance, in 2015 only 3 of the 86 BSAI halibut IFQ vessels participated in the sablefish CDQ HAL fishery; however, in that year those 3 vessels represented 100% of the BSAI sablefish CDQ HAL catch. These tables demonstrate that there is substantial overlap between vessels that halibut and sablefish IFQ fish in the BSAI, moderate overlap between vessels that halibut IFQ fish and Pacific cod pot fish in the BSAI, and minimal overlap between vessels that halibut IFQ fish and crab fish in the BSAI.

Table 22 Fishery diversification for vessels that have participated in the halibut IFQ fishery in the BSAI

Year	Count of vessels landing halibut IFQ from BSAI	Of the vessel that fish halibut IFQ in the BSAI using HAL, the number of these vessels that ALSO fish....					
		BSAI sablefish IFQ with HAL	BSAI halibut CDQ with HAL	BSAI Pcod with pot gear	BSAI sablefish CDQ with HAL	BSAI sablefish IFQ with pot gear	BSAI crab (IFQ and state)
2011	115	55	16	9	8	4	6
2012	102	44	27	14	5	3	10
2013	92	40	22	11	6		4
2014	89	38	26	11	7	1	4
2015	86	37	21	11	3	1	4
2016	85	35	20	14	9	4	4

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 23 Percent of vessels from each fishery that have also participated in halibut IFQ fishing in the BSAI

Year	BSAI sablefish IFQ with HAL	BSAI halibut CDQ with HAL	BSAI Pcod with pot gear	BSAI sablefish CDQ with HAL	BSAI sablefish IFQ with pot gear	BSAI crab (IFQ and state)
2011	90%	7%	17%	80%	44%	2%
2012	81%	11%	26%	83%	60%	3%
2013	89%	9%	19%	86%	0%	1%
2014	86%	26%	20%	88%	25%	2%
2015	82%	30%	23%	100%	33%	2%
2016	80%	29%	25%	75%	100%	2%

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Another way to think about diversification and access to a portfolio of fisheries is by the overlap in QS holdings by an individual QS holder. Table 24 demonstrates the overlap in halibut and sablefish QS holdings. For instance, of the 252 QS holders that hold Area 4 halibut, 46 of them also hold sablefish QS in the Aleutian Islands and 50 of them also hold sablefish QS for the Bering Sea. Much of the overlap is among individuals that hold Area 4A halibut QS (30 out of the 84 Aleutian Islands sablefish QS holders, and 39 of the 93 Bering Sea sablefish QS holders also hold Area 4A halibut IFQ) or Area 4B halibut QS (30 out of the 84 Aleutian Islands sablefish QS holders, and 39 of the 93 Bering Sea sablefish QS holders also hold Area 4B halibut IFQ). As demonstrated in Table 20, between 85 and 115 vessels have fished Area 4 halibut IFQ, with a decreasing trend between 2011 and 2016. With 252 Area 4 halibut QS holders, this signifies cooperation among QS holders. Several QS holders may harvest their IFQ on the same vessel in order to share variable costs.

Conversely, in some cases QS holders may also use more than one vessel to harvest their allocation. For example, if an individual holds sablefish QS for the Bering Sea and halibut QS for Area 4A, they may find it more efficient to harvest their halibut on their own vessel right out of Dutch Harbor and consolidate their sablefish QS with a partner vessel fishing further out in the Bering Sea. These business decisions depend on a wide array of factors including the size of the catch limits, changes in costs (such as fuel and potential gear/ vessel maintenance), ocean and weather conditions, availability of crew, etc.

Table 24 Overlap in QS holdings by sablefish and halibut regulatory area

		Sablefish QS		Halibut QS				
		AI	BS	Area 4A	Area 4B	Area 4C	Area 4D	Any Area 4
Sablefish QS	AI	84	37	30	31	14	17	46
	BS		93	39	17	15	17	50
Halibut QS	Area 4A			172	34	15	26	
	Area 4B				80	10	18	
	Area 4C					49	22	
	Area 4D						43	
	Any Area 4							252

Source: NMFS RAM, QS holders

4.5.3 Sablefish IFQ/ CDQ Fishery

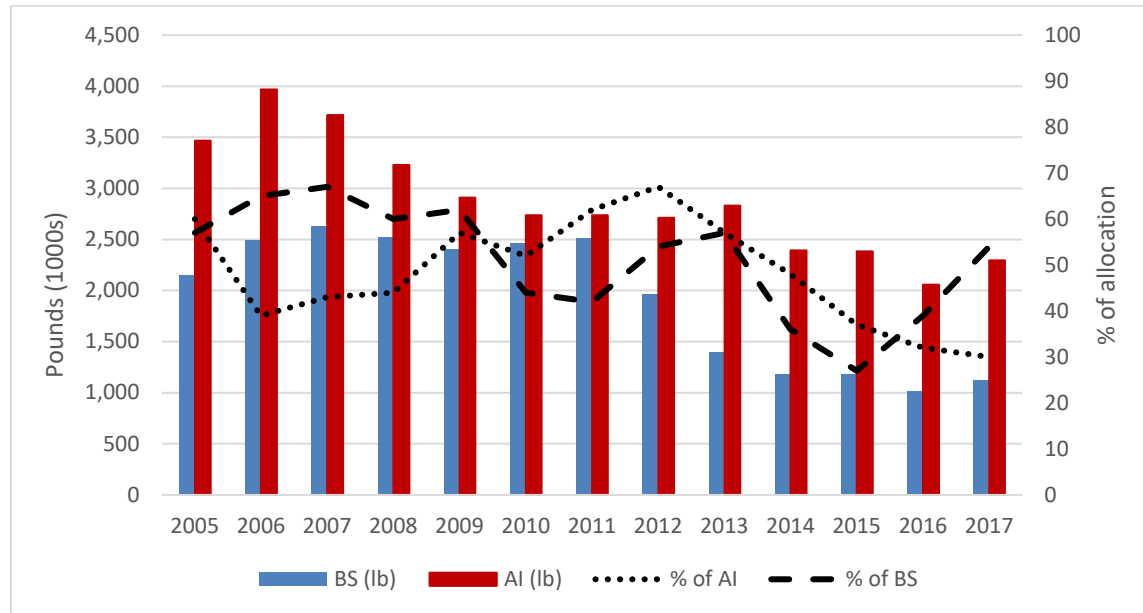
4.5.3.1 BSAI Harvest

The BS and AI sablefish allocations are the least fully harvested in the IFQ Program. Compared to the other IFQ regulatory areas, which typically harvest between 90 to 100% of their allocation (with the exception of the Western Gulf, in some years), Figure 29 demonstrates a much lower harvest rate in the BS and AI. A low of only 30% of the AI sablefish IFQ was harvested in 2017. In 2015, the BS had a low of 27% of the total IFQ harvested. The most recent year when either area took more than half of its sablefish catch limit was 2013, when both areas landed 57% of their allocation. Neither area has caught over 67% of its allocation dating back to 2000, which is the earliest year available on NMFS’s catch and landing report website.³⁸ This under-harvest is the result of many factors, chiefly the cost it takes to prosecute (financial as well as the opportunity cost), given the broad distribution of the stock and the remoteness of the region.

³⁸ <https://alaskafisheries.noaa.gov/fisheries-catch-landings>

This figure also demonstrates that every year, a larger volume of sablefish IFQ is harvested in the Aleutian Islands, relative to the Bering Sea. However, in the last two years (2016 and 2017), a larger percentage of the sablefish IFQ allocation has been harvested in the Bering Sea.

Figure 29 Sablefish IFQ catch and percent catch relative to IFQ allocation, by sub-area (BSAI), 2005-2017



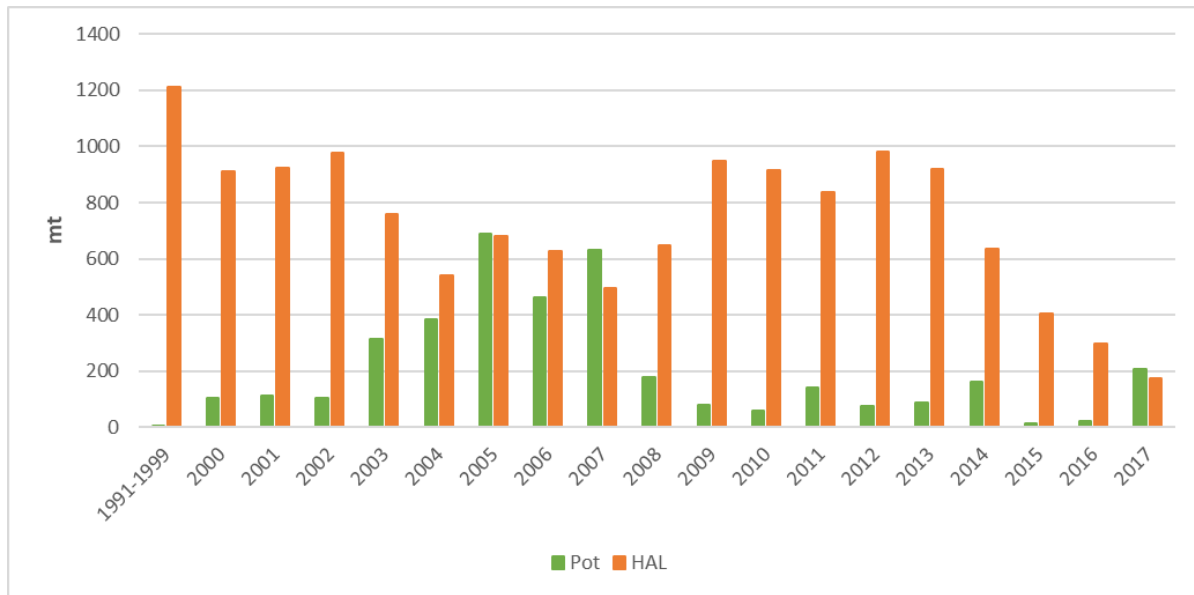
Source: <http://alaskafisheries.noaa.gov/ram/ifqreports.htm>

BSAI sablefish harvest data dating back to 1991 demonstrates a reliance on a mix of fishing gear types (Figure 30 and Figure 31). HAL gear has typically been the prominent gear type prosecuting the sablefish fishery in the AI; however, there have been some years of increased reliance on pot gear (2003 through 2007). In 2007, pot gear harvest of AI sablefish represented 56% of the total fixed gear harvest. In 2017, pot gear harvested 54% of the sablefish in the AI. However, overall harvest of sablefish in AI using fixed gear has dropped, particularly in the last five years, harvesting a total of 385 mt in 2017.

Overall harvest of sablefish using fixed gear has typically been less in the BS compared to the AI, although some years are exceptions (2008 and 2017). Compared to the AI, pot gear has been much more pervasive in the BS. From the 1990s to 2017, sablefish harvest with pot gear in the BS has experienced an increasing and then decreasing trend. The use of pot gear in the BS peaked in 2007 with 81% of the total fixed gear catch harvested with pots. In 2017, relative use of pots compared to HAL gear increased again, with 78% of the BS fixed gear harvest caught in pot gear.

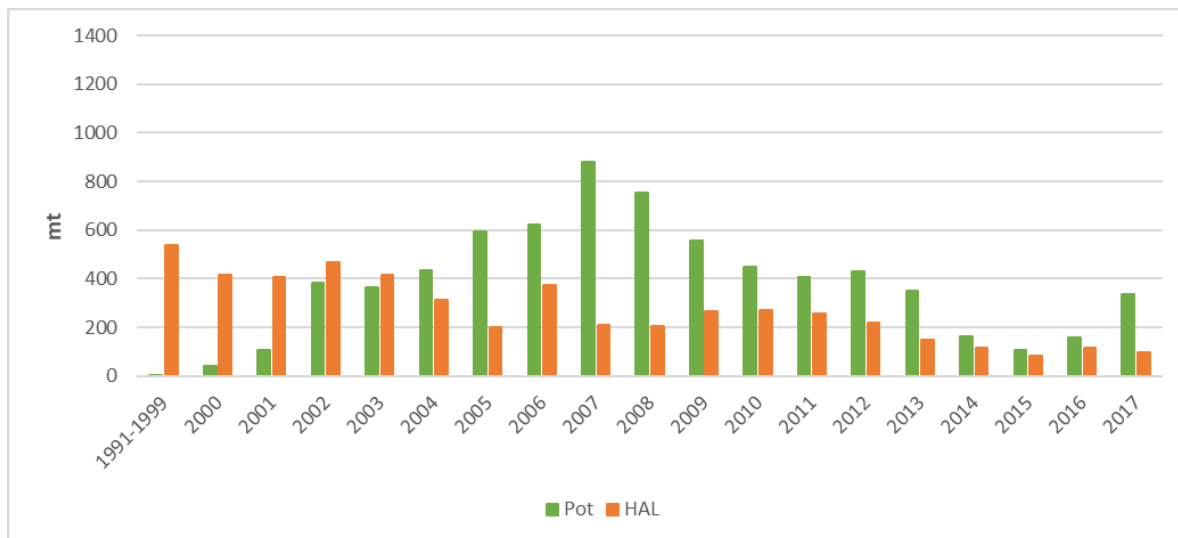
Note that Section 4.5.3.2 demonstrates that there are substantially more HAL vessels that have participated in the sablefish IFQ or CDQ fishery in the BSAI compared to vessels using pot gear. The overall percentage of sablefish harvested with pot gear (particularly in years with high rates of sablefish harvested in pots) means that these few vessels are responsible for a large amount of harvest. If even one of these vessels chooses not to participate, it can contribute large variability in gear trends.

Figure 30 Sablefish catch in the Aleutian Islands by gear type, including CDQ and non-CDQ, 1991-2017



Source: Assessment of Sablefish stock in Alaska (Hanselman et al. 2017 in NPFMC 2017b)
 Notes: Catches from 1991-1999 are averages. Catch as of October 1, 2017.

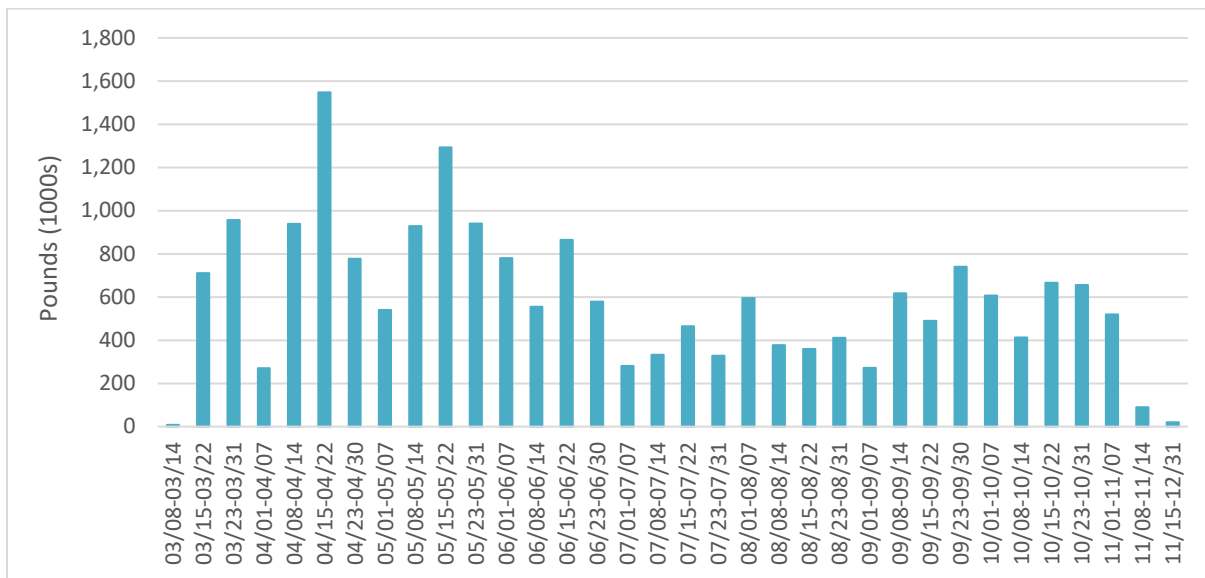
Figure 31 Sablefish catch in the Bering Sea by gear type, including CDQ and non-CDQ, 1991-2017



Source: Assessment of Sablefish stock in Alaska (Hanselman et al. 2017 in NPFMC 2017b)
 Notes: Catches from 1991-1999 are averages. Catch as of October 1, 2017.

Sablefish IFQ seasons are typically set simultaneously with halibut seasons to reduce waste and discards. The halibut season is set by the IPHC and published in the annual regulations under the authority of the Halibut Act. As demonstrated in Figure 32, the greatest volume of sablefish landings occurs in April and May.

Figure 32 Weekly sablefish IFQ landings, 2017



Source: <https://alaskafisheries.noaa.gov/sites/default/files/reports/17ifqweekly.htm>

Notes: Includes both BSAI and GOA

4.5.3.2 BSAI Harvesters

Table 25 and Table 26 capture all vessels that participated in the BSAI sablefish IFQ and/ or CDQ fisheries using fixed gear during the 2011 through 2016 period. Table 25 demonstrates the relative scale of fisheries. There are 11 unique vessels that have fished BSAI sablefish IFQ or CDQ with pot gear from 2011 to 2016. All the vessels that fish sablefish CDQ with pot gear also fished sablefish IFQ with pot gear during that same year. There are 109 unique vessels that participated in the sablefish IFQ fishery using HAL gear during this time period.

Table 25 Count of vessels that fished BSAI sablefish IFQ/ CDQ, by gear type and sector, 2011-2016

Year	Pot gear			HAL gear		
	BSAI sablefish (IFQ)	BSAI sablefish (CDQ)	BSAI sablefish unique vessels (IFQ and CDQ)	BSAI sablefish (IFQ)	BSAI sablefish (CDQ)	BSAI sablefish unique vessels (IFQ and CDQ)
2011	9	3	9	62	10	66
2012	5	3	5	54	6	57
2013	4	3	4	45	7	47
2014	4	2	4	44	8	46
2015	3	2	3	45	3	46
2016	4	2	4	44	12	49
Total unique vessels, 2011-2016	11	5	11	97	26	109

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 26 demonstrates the participating vessels by length overall (LOA). This table demonstrates that almost all vessels participating in the BSAI sablefish pot fishery are greater than or equal to 60 ft LOA. The only vessel participating in the BSAI sablefish pot fishery between 2011 and 2016 that was less than

60ft LOA was at least 50 ft LOA. The majority of vessels fishing sablefish IFQ/ CDQ with HAL have also been greater than or equal to 50 ft LOA. Between 2011 and 2016, all 11 vessels that participated in the BSAI sablefish pot fishery were greater than 50 ft LOA. There were 20 unique vessels less than 50 ft LOA that participated in the BSAI sablefish fishery with HAL gear and 87 unique vessels greater than or equal to 50 ft LOA that participated in the BSAI sablefish fishery with HAL gear between 2011 and 2016.

Table 26 Count of vessels that fished BSAI sablefish IFQ/ CDQ, by gear type and LOA, 2011-2016

Year	LOA category	Pot gear			HAL gear		
		BSAI sablefish (IFQ)	BSAI sablefish (CDQ)	BSAI sablefish unique vessels (IFQ and CDQ)	BSAI sablefish (IFQ)	BSAI sablefish (CDQ)	BSAI sablefish unique vessels (IFQ and CDQ)
2011	<50ft				10		10
	≥ 50ft and < 60ft				28	4	29
	≥ 60ft	9	3	9	24	6	27
	Total ≥ 50ft	9	3	9	52	10	56
2012	<50ft				7		7
	≥ 50ft and < 60ft				20	4	23
	≥ 60ft	5	3	5	27	2	27
	Total ≥ 50ft	5	3	5	47	6	50
2013	<50ft				6		6
	≥ 50ft and < 60ft				20	3	21
	≥ 60ft	4	3	4	19	4	20
	Total ≥ 50ft	4	3	4	39	7	41
2014	<50ft				10	1	10
	≥ 50ft and < 60ft				16	4	17
	≥ 60ft	4	2	4	18	3	19
	Total ≥ 50ft	4	2	4	34	7	36
2015	<50ft				7		7
	≥ 50ft and < 60ft	1	1	1	20	3	21
	≥ 60ft	2	1	2	18		18
	Total ≥ 50ft	3	2	3	38	3	39
2016	<50ft				8	3	9
	≥ 50ft and < 60ft				18	5	19
	≥ 60ft	4	2	4	18	4	21
	Total ≥ 50ft	4	2	4	36	9	40
Total unique vessels < 50ft, 2011-2016		0	0	0	19	4	20
Total unique vessels ≥ 50ft, 2011-2016		11	5	11	76	22	87

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

For purposes of comparing the relative scale of the fisheries and the size of the participating vessels, Table 27 presents counts of vessels in the BSAI Pacific cod fixed gear fisheries, including the State of Alaska BSAI Guideline Harvest Level (GHL) Pacific cod fishery, by LOA. The BSAI Pacific cod pot fishery in particular includes more participating vessels than the BSAI sablefish pot fishery. Between 2011 and 2016 there were 88 unique vessels in the BSAI Pacific cod pot fishery and 59 unique vessels in the BSAI Pacific cod fishery using HAL gear (not shown in Table 27). The majority of these vessels,

particularly for the pot fishery, are greater than or equal to 50 ft LOA. Table 27 demonstrates that there are very few vessels that use both HAL gear and pot gear to harvest Pacific cod in the same year.

Table 27 Count of vessels that fished BSAI Pacific cod, by gear type and LOA, 2011-2016

Year	LOA category	Pot gear	HAL gear	BSAI Pcod unique vessels
2011	<50ft		3	3
	≥ 50ft and < 60ft	15	7	22
	≥ 60ft	37	30	66
	Total ≥ 50ft	52	37	89
2012	<50ft	2	6	8
	≥ 50ft and < 60ft	18	4	21
	≥ 60ft	34	29	62
	Total ≥ 50ft	52	33	85
2013	<50ft	2	10	11
	≥ 50ft and < 60ft	23	5	27
	≥ 60ft	34	29	63
	Total ≥ 50ft	57	34	91
2014	<50ft		5	5
	≥ 50ft and < 60ft	20	3	23
	≥ 60ft	35	28	63
	Total ≥ 50ft	55	31	86
2015	<50ft	1	4	4
	≥ 50ft and < 60ft	21	3	24
	≥ 60ft	27	28	55
	Total ≥ 50ft	48	31	79
2016	<50ft	1	1	2
	≥ 50ft and < 60ft	27	1	28
	≥ 60ft	28	28	56
	Total ≥ 50ft	55	29	84
Total unique vessels < 50ft, 2011-2016		3	14	15
Total unique vessels ≥ 50ft, 2011-2016		85	45	128

Source: ADF&G/CFEF Fish Tickets, data compiled by AKFIN in Comprehensive_FT

To understand more about the small pool of vessels that have participated in the BSAI sablefish IFQ fishery using pot gear in the recent past, Table 28 demonstrates the diversification in other fisheries. Note that value or volume of landings in other fisheries could not be presented in a meaningful way due to the small sample size of vessel and confidential data; however, Table 28 captures vessel counts. For example, of the four vessels that participated in the BSAI sablefish IFQ fishery using pot gear in 2016, two of them also fished sablefish CDQ with pot gear, one fished sablefish IFQ with HAL gear, all four fished halibut IFQ with HAL gear, and one participated in the Pacific cod pot fishery. None of these vessels participated in the sablefish or halibut CDQ fisheries with HAL gear in 2016. In general, this table demonstrates the most overlap with the sablefish CDQ pot fishery and the BSAI halibut IFQ HAL fishery.

Table 28 Diversification of vessels that participated in the BSAI sablefish IFQ fishery using pot gear

Year	Count of vessels in the BSAI sablefish IFQ fishery using pot fishery	Of the vessel that fished BSAI sablefish IFQ with pot gear, number of vessels that also fished BSAI...					
		Sablefish with pot gear (CDQ)	Sablefish with HAL gear (IFQ)	Sablefish with HAL gear (CDQ)	Halibut with HAL gear (IFQ)	Halibut with HAL gear (CDQ)	Pcod with pot gear
2011	9	3	3	0	4	3	3
2012	5	3	3	0	3	1	2
2013	4	3	0	0	0	1	1
2014	4	2	0	0	1	0	1
2015	3	2	0	0	2	1	0
2016	4	2	1	0	4	0	1

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Table 29 demonstrates the overlap in the sablefish QS by regulatory area. For example, of the 84 sablefish QS holders who hold AI sablefish QS, 35 of them also hold sablefish QS in the WG. These types of connections may be important, as Amendment 101 recently permitted both pot gear as an authorized gear type for the harvest of sablefish IFQ in GOA, as well as retention of halibut in sablefish pot gear. This new gear type in GOA may affect the number of vessels participating in the BSAI sablefish pot fishery, if QS holders with sablefish QS in both the BSAI and GOA reconfigure their vessel to fish with pot gear in both areas.

Table 29 Overlap in QS holders regulatory areas, as of 2/23/18

	AI	BS	CG	SE	WG	WY	Total Unique
AI	84	37	34	17	35	26	
BS		93	37	18	36	28	
CG			339	76	81	138	
SE				347	30	93	
WG					140	50	
WY						210	
Total Unique							

Source: NMFS RAM, QS holders

4.5.3.3 The GOA Sablefish Pot Fishery in 2017³⁹

In 2017, 277 catcher vessels fished GOA IFQ sablefish, 245 using only HAL gear (7,364mt), five using only pot gear (240mt), 17 using both, 22 vessels in total (889mt; with 238mt from HAL gear and 652mt from pot gear). In 2017, there were no CPs that participated in sablefish pot fishing in GOA. Table 30 demonstrates GOA sablefish IFQ landings by pot gear GOA sub-area.

³⁹ This section provides an updated version of the NMFS letter to the IFQ committee: <http://nfmfc.legistar.com/gateway.aspx?M=F&ID=ceb7f7f3-10e9-4006-b483-271550d39365.pdf>

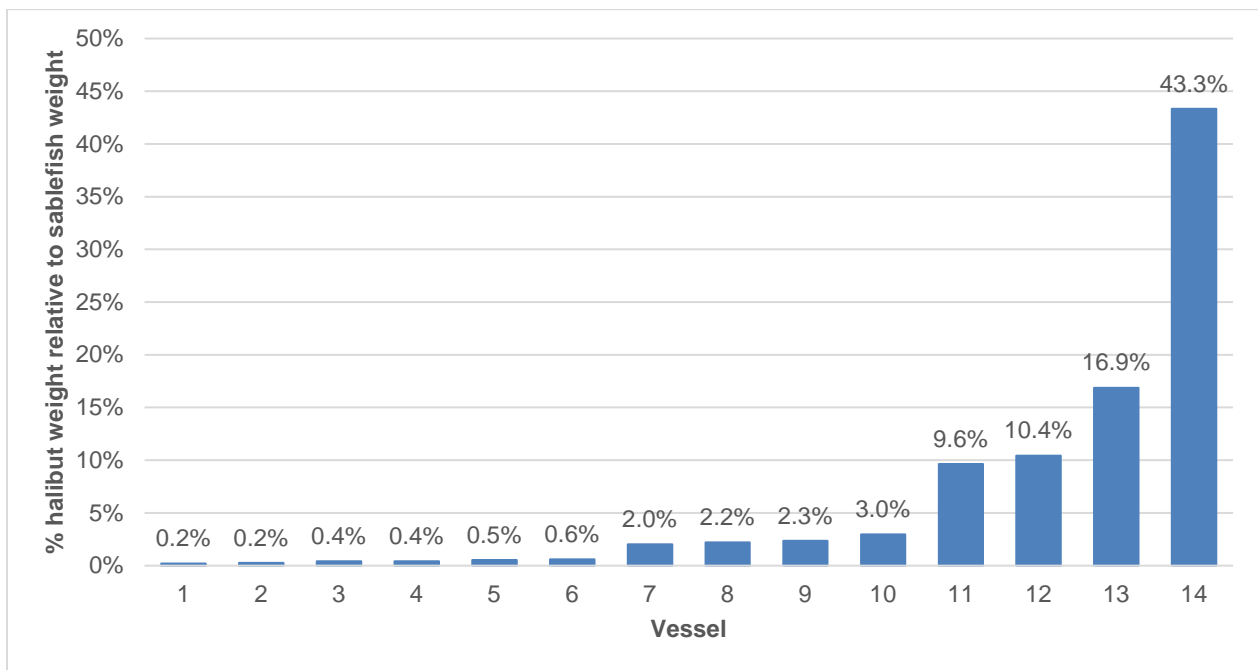
Table 30 GOA sablefish IFQ pot effort in 2017, as of 2/22/18

Area	# of vessels	sablefish (mt)
610	6	225.9
620	17	396.1
630	3	40.4
640	10	92.2
650	10	137.2
Total	22	891.7

Source: NMFS Catch Accounting, sourced through AKFIN

Of the 22 vessels that reported harvest of sablefish in pot gear, 14 of the vessels retained halibut, totaling 18.6mt of halibut. By vessel, their retention ranged from 0.2% to 43.3% of the sablefish catch by weight, or 3% overall for vessels that reported both sablefish and halibut (Figure 33).

Figure 33 Rate of retained halibut IFQ weight to sablefish IFQ weight in GOA sablefish pot fishery, 2017



Source: NMFS Catch Accounting, sourced through AKFIN

In 2017, two of the six vessels that participated in the BSAI sablefish pot fishery also participated in the GOA sablefish pot fishery. The vessel owner’s home community for these two vessels are Cordova, Alaska and Oregon.

4.5.4 Communities, Processors, and Tax Revenue

Communities are associated with the IFQ and CDQ fisheries in a number of ways. One of the most direct ways is as a port of departure or landing for participating vessels. The harvesting and processing activity can generate economic impacts for the departure and landing ports. This includes patronizing businesses with bait, gear, and other provisions, businesses related to vessel maintenance and reconfiguration, as well as businesses that are unrelated to fisheries, but are affected by more people coming through town (e.g.,

accommodations and restaurants). Communities can also benefit from IFQ and CDQ participants that pay state and municipal landings taxes. Economic impacts also extend to communities where the vessel owners, QS holders, and/ or crewmembers live and spend money, as well as communities where secondary service providers reside.

This section provides some relevant background information on communities, processors, and tax revenue associated with the Area 4 halibut and BSAI sablefish IFQ and CDQ fisheries. Note that Section 4.5.1.2 presents additional background on the CDQ communities and allocations. There are many additional resources that provide information on community-level commercial halibut and sablefish sector activities.⁴⁰ The limited scope of background presented here is meant to frame available information that provides direct relevance to the proposed actions.

4.5.4.1 Community Connection with IFQ/ CDQ Landings and Processing

Table 31 identifies the communities and the number of registered buyers/ processors within those communities that have accepted halibut IFQ or CDQ from 2011 through 2016. For a variety of reasons, the number of registered buyers/ processors accepting BSAI halibut has declined in these six years. This decline is due to both consolidation of harvest as well as decline in overall commercial catch limits from 2011 to 2014, with only a slight rise in 2015 and 2016 (see Figure 22). In 2011, there were 32 registered buyers in 23 communities (plus other Alaska). In 2016, there were 20 registered buyers accepting BSAI halibut in 13 communities.

⁴⁰ Examples include AFSC Community Indices which provide commercial fisheries engagement indices, location quotient and regional quotient for the halibut and sablefish IFQ fisheries for all areas off Alaska (Appendix 2.7A of the IFQ 20-year program review; NPFMC/ NMFS 2016), Section 2.7 of the IFQ 20-year program review (NPFMC/ NMFS 2016) and Appendix A to the EA/RIR/IRFA to the Catch Sharing Plan analysis (NPFMC 2013). This document includes as some basic statistical information on QS and CHP holdings by state and community as well as community profiles on Anchorage, Homer, Ketchikan, Kodiak, Petersburg, and Sitka. Additionally, AFSC has produced an interactive map for recreational and commercial fishing, as well as subsistence fishing activities in the state of Alaska (<http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php>). The map displays statistics for on sportfishing licenses sold, sportfishing licenses held, charter guide licenses held, and active fishing business through 2011 (effort is current underway for an update of this information). This map links to individual community profiles produced by the science center.

Table 31 Number of registered buyers with deliveries of BSAI halibut landings by community, 2011 – 2016

Community	2011	2012	2013	2014	2015	2016
Adak	1	1	2	1	1	2
Akutan	1	1	1	1	1	1
Atka	1	1	1	1	1	1
Chefornak	1	1	1			
Dutch Harbor	3	3	3	1	1	2
Goodnews Bay	1	1	1			
Homer	1	1	2	2	2	2
Hooper Bay	2	1	1			
King Cove	2	2	2	2	2	2
Kipnuk	1	1	1			
Kodiak	3	2	3	4	3	3
Mekoryuk	1	1	1			
Nome	1	1	1	1	1	1
Nunivak Island	1	1	1			
Other Alaska	1	2	2	1		
Quinhagak	1	1	1	1		
Sand Point	1	1	1	1	1	1
Savoonga	1	1	1	1	1	1
Seward	1					
St George Island	1	1			1	1
St Paul Island	2	1	1	1	1	1
Togiak	2	3	3	2	2	2
Toksook Bay	1	1	1			
Tununak	1	1	1			
Grand Total	32	30	32	20	18	20

Source: ADF&G/CFEC fish tickets sourced through AKFIN

Deliveries of pot-caught sablefish in the BSAI are much more concentrated (Table 32), due to the small number of vessels participating in this fishery. Based on the fishing effort which generally occurs on both East and West of Unalaska, North along the continental shelf, and West out to Atka (see Figure 15), it makes sense that deliveries have been made to Akutan, Atka, and Dutch Harbor.

Table 32 Number of registered buyers with deliveries of BSAI sablefish landings by community, 2011 – 2016

Community	2011	2012	2013	2014	2015	2016
Akutan	1		1	1	1	
Atka	1	1			1	
Dutch Harbor	2	1	1	1	1	1
Grand Total	4	2	2	2	3	1

Source: ADF&G/CFEC fish tickets sourced through AKFIN

As described in the 20-year IFQ Program Review (NMFPC/ NMFS 2016), the implementation of the IFQ Program fundamentally changed processing needs in the halibut IFQ fishery, with the market shift from a primarily frozen to a majority fresh market. There have been disparate impacts for processors that are off the road system (such as in Western Alaska and in the Aleutians), because this can make it more expensive to move fresh product and more difficult to compete if their sole halibut product is frozen. Thus, as can be seen in Table 33 and Table 34, many registered buyers in BSAI coastal communities are

diversified in other species as well. There are no communities for which sablefish makes up the majority of the landings.

Table 33 Processing diversification by community grouping

Ex vessel value (in millions of USD) and percent of total fisheries value from BSAI halibut, BSAI sablefish, salmon and from all fisheries, 2011- 2016

Community Groups	BSAI Halibut		BSAI Sablefish		Salmon		Total Halibut, Sablefish, Salmon & Other
	Value (mil\$)	% of total	Value (mil\$)	% of total	Value (mil\$)	% of total	Value (mil\$)
Akutan and Unalaska/ Dutch Harbor	71.0	3%	31.2	1%	*	*	2,124.4
BBEDC Communities	1.0	0%	0.0	0%	843.0	99%	851.3
CBSFA and Other APICDA Communities	28.7	7%	*	*	7.0	2%	387.9
CVRF and YDFDA Communities	*	*	0.0	0%	29.9	90%	33.3
Adak & NSEDC Communities	13.0	23%	3.0	5%	8.3	14%	57.2
GOA Communities	13.0	0%	0.5	0%	2445.4	54%	4,510.0
Other Alaska Communities	1.0	1%	0.0	0%	62.5	75%	82.9

Source: ADF&G/CFEC fish tickets sourced through AKFIN [PROC_DIV_LBS (5-1-18)]

Table notes: NSEDC is Norton Sound Economic Development Corporation; BBEDC is Bristol Bay Economic Development Corporation; APICDA is Aleutian Pribilof Island Community Development Association; CVRF is Coastal Villages Region Fund; NSEDC is Norton Sound Economic Development Corporation; and CBSFA is Central Bering Sea Fishermen's Association. See Figure 22 for list of communities within each CDQ group's region.

Table 34 Processing diversification by community grouping

Pounds of retained catch (in millions of pounds) and percent of total fisheries weight from BSAI halibut, BSAI sablefish, salmon and from all fisheries, 2011- 2016

Community Groups	BSAI Halibut		BSAI Sablefish		Salmon		Total Halibut, Sablefish, Salmon & Other
	Weight (lb)	% of total	Weight (lb)	% of total	Weight (lb)	% of total	Weight (lb)
Akutan and Unalaska/ Dutch Harbor	18.2	0%	9.6	0%	*	*	7,347.2
BBEDC Communities	0.3	0%	0.0	0%	807.6	85%	953.4
CBSFA and Other APICDA Communities	7.9	5%	*	*	8.4	5%	170.6
CVRF and YDFDA Communities	*	*	0.0	0%	39.3	94%	41.8
Adak & NSEDC Communities	3.6	5%	0.8	1%	10.0	14%	70.9
GOA Communities	3.2	0%	0.2	0%	3,803.2	51%	7,445.0
Other Alaska Communities	0.3	0%	0.0	0%	71.7	89%	81.0

Source: ADF&G/CFEC fish tickets sourced through AKFIN [PROC_DIV_LBS (5-1-18)]

Table notes: NSEDC is Norton Sound Economic Development Corporation; BBEDC is Bristol Bay Economic Development Corporation; APICDA is Aleutian Pribilof Island Community Development Association; CVRF is Coastal Villages Region Fund; NSEDC is Norton Sound Economic Development Corporation; and CBSFA is Central Bering Sea Fishermen's Association. See Figure 22 for list of communities within each CDQ group's region.

Villages Region Fund; NSEDC is Norton Sound Economic Development Corporation; and CBSFA is Central Bering Sea Fishermen's Association. See Figure 22 for list of communities within each CDQ group's region.

4.5.4.2 Community Connection with IFQ/ CDQ Commercial Fishing Taxes

Communities can directly benefit from tax revenue associated with landings. The two primary landings taxes associated with the halibut IFQ fisheries are:

1. The Alaska Department of Revenue collects a **fisheries business tax** (also known as the “raw fish tax”) from processors and persons who export unprocessed fishery resources from Alaska. Shore-based processors are assessed at a rate of 3% of the ex-vessel price paid to fishermen. The Division shares 50% of tax collected with the incorporated city and organized borough in which the processing took place. The remaining 50% of the revenue contributes to the State's General Fund.⁴¹
2. Both municipalities and boroughs are also authorized to levy a **raw fish tax** in addition to the state's fisheries business tax, which range from 1% to 3%. These rates and the associated annual revenues collected are available in Alaska Taxable.⁴²

Communities can also benefit from the revenue generated from a borough or municipal sales tax, which are levied from anywhere between 1% and 7%. Revenues are collected through the sale of goods and services necessary in order to harvest IFQ on a commercial vessel (e.g., bait and gear). Sales tax percentages are listed by municipality or borough in Alaska Taxable.

4.5.4.3 Community Connection with IFQ/ CDQ Vessel Owners

Some species are important for a community in terms of the processing employment and tax revenue they generate from landings. Some species are important to a community for harvest sector employment and the economic impacts that are generated from QS holders, vessel owners, and crew residing in and spending money in that community. Communities of residence for QS holders, vessel owners, and crew are not necessarily the communities near where the harvesting and processing activity takes place. Income generated from halibut fishing trips to a QS holder, vessel owner, and crew can have a multiplier effect through the communities where they live and spend their money. This includes the impacts to CDQ residents and their communities (as described in Section 4.5.1.2).

This section highlights some of those important socio-economic connections by demonstrating the links between the vessel owner's home community and the fisheries the vessel participates in. Table 35 demonstrates the community associated with the vessel owner for each of the vessels that have participated in the BSAI sablefish pot fishery in 2016. Community connection is based on vessel registration through Commercial Fisheries Entry Commission (CFEC). These are examples of communities that may be affected by the multiplier effect of net revenue generated through sablefish harvested in the BSAI, if some of that revenue is spent in the community.

⁴¹ Alaska State taxes collected through The Alaska Department of Revenue are documented: <http://www.tax.alaska.gov/programs/programs/reports/AnnualReport.aspx?Year=2015#program60633>

⁴² Alaska Taxable (DOC 2016) details sales tax, bed tax, alcohol tax, car rental tax, raw fish tax, fish box tax, tobacco tax, and miscellaneous taxes by boroughs and municipalities: <https://www.commerce.alaska.gov/dkra/DCRARepoExt/RepoPubs/Taxable/2015%20Full.pdf>

Table 35 Vessel owner’s home community for vessels that harvested BSAI sablefish with pot gear in 2016, by LOA category

Vessel owner community	LOA category	Pot		Total Unique
		BSAI sablefish (IFQ)	BSAI sablefish (CDQ)	
Anchorage	≥ 60ft	1	1	1
Cordova	≥ 60ft	1		1
Oregon	≥ 60ft	1		1
Seattle MSA	≥ 60ft	1	1	1
Total		4	2	4

Source: ADF&G fish tickets sourced through AKFIN
 Note: MSA = metropolitan statistical area

Similarly, Table 36 demonstrates the home community associated with the owners of vessels that participated in HAL sablefish and halibut fisheries (IFQ and CDQ) in the BSAI in 2016. This table makes a distinction between vessel LOA as it is important in understand the potential impacts of the proposed action as discussed in the analysis of impacts.

Table 36 Vessel owner's home community for vessels that harvested BSAI sablefish or halibut with HAL gear in 2016, by LOA category

2016		Hook and Line				Total Unique
Vessel Owner City		BSAI sablefish (CDQ)	BSAI sablefish (IFQ)	BSAI halibut (IFQ)	BSAI halibut (CDQ)	
Akutan	<50ft			3		3
Anchorage	<50ft			1	1	1
	≥ 60ft	1	1	2	3	4
Atka	<50ft			3	1	3
Cordova	<50ft			1		1
	≥ 60ft		1	1		1
Delta Junction	<50ft		1	1		1
	≥ 50ft and < 60ft		1	1		1
Dillingham	<50ft				2	2
Douglas	≥ 50ft and < 60ft		1	1	1	1
Dutch Harbor	<50ft	1	1	6	1	6
	≥ 50ft and < 60ft			1		1
Homer	<50ft	1	6	3		6
	≥ 50ft and < 60ft	1	3	5	1	5
Juneau	<50ft	1		1	1	1
	≥ 50ft and < 60ft	1	2	2	2	2
Kodiak	<50ft			1		1
	≥ 50ft and < 60ft	1	2	6		6
	≥ 60ft		3	4		4
Manokotak	<50ft				2	2
Nome	<50				4	4
	≥ 50ft and < 60ft				1	1
Oregon	≥ 60ft			2		2
Other States	<50ft			1		1
	≥ 60ft		2	3		3
Petersburg	≥ 60ft				2	2
Saint George Island	<50ft			1	5	5
Saint Paul Island	<50ft			6	12	12
Savoonga	<50ft				10	10
Seattle MSA	<50ft			1		1
	≥ 50ft and < 60ft	1	5	9	2	9
	≥ 60ft	3	12	14	8	26
Seward	≥ 50ft and < 60ft		1	1		1
Sitka	<50ft					
	≥ 50ft and < 60ft		1	2		2
	≥ 60ft			1		1
South Naknek	<50ft				1	1
Togiak	<50ft				15	15
Wasilla	<50ft			1	1	1
	≥ 50ft and < 60ft	1	1	1	1	1
Grand Total		12	44	86	77	150

Source: ADF&G fish tickets sourced through AKFIN

Note: MSA = metropolitan statistical area

One way to understand relative dependence of a fishing fleet is to examine the harvest diversification of the local fleet. Harvest diversification is considered by community grouping in Table 37. This table demonstrates the relative importance of the ex-vessel value from crab, halibut, sablefish, and salmon by vessel owner's community.

Table 37 Diversification of harvesters

Ex-vessel values (in millions of USD) for catcher vessels based on community group of vessel owner's home town, 2011 -2016

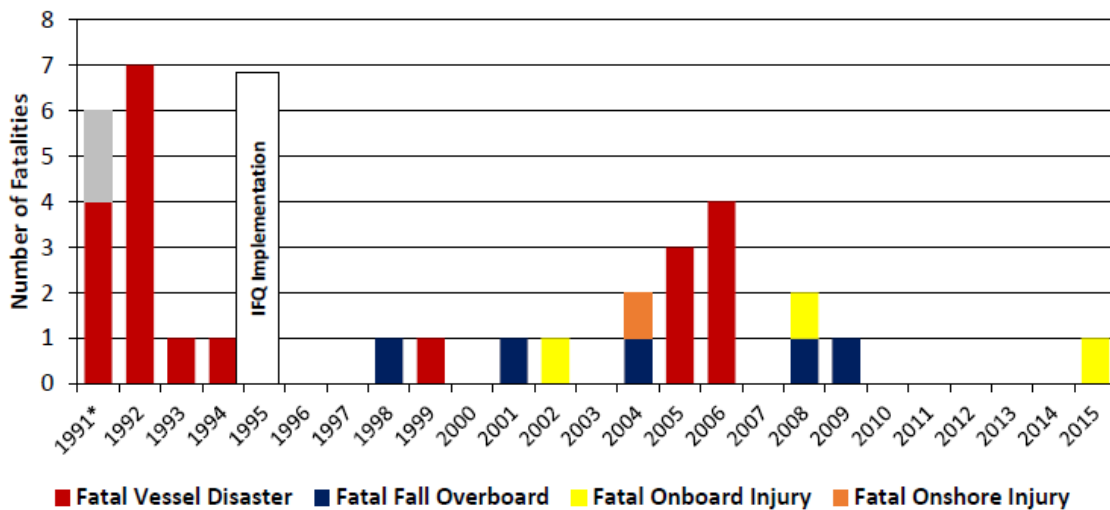
Community Grouping	Crab	BSAI Halibut	BSAI Sablefish	Salmon	Total Halibut, Sablefish, Salmon, Crab & Other
Akutan and Dutch Harbor		6.6	1.4	4.7	28.9
BBEDC communities	*	1.1		71.7	73.9
CBSFA and Other APICDA communities	*	*		4.8	15.6
CVRF and YDFA		3.4		6.4	8,448.5
GOA communities	492.7	49.7	12.7	1,652.5	3,458.1
NSEDC and Adak	10.3	3.9	*	0.2	15.0
Oregon	175.7	3.0	2.0	91.8	526.3
Other AK	12.4	8.9	1.6	287.9	416.1
Other States	19.3	4.4	0.1	200.4	294.6
Washington	913.9	41.6	22.4	739.4	3,600.3

Source: ADF&G fish tickets sourced through AKFIN

4.5.5 Vessel Safety

In terms of fatalities, commercial fishing is one of the most dangerous industries in the U.S. (Syron et al. 2016). The number and causes of fatalities in the Alaska halibut and sablefish fleet specifically, were documented in a National Institute for Occupational Safety and Health (NIOSH) report (2016). Figure 34 demonstrates that a number of fatal vessel disasters occurred in the four years leading up to IFQ implementation resulting in at least 13 casualties. Fatal falls overboard, fatal onboard injuries, and fatal onshore injuries persisted after program implementation. Additionally, four separate vessel disasters causing seven crewmember fatalities occurred in 2005 and 2006.

Figure 34 Number and causes of fatalities in the Alaskan halibut/ sablefish fleet, 1991-2015



*Incident type is unknown for two fatalities in 1991

Source: (NIOSH 2016), data identified from the Commercial Fishing Incident Database

Both HAL and pot fishing can create hazardous conditions for crew.⁴³ Based on Alaska Fishermen’s Fund claims during 2012 – 2015,⁴⁴ of the 2,024 injury and illness claims during this period 202 were traumatic injuries among longliners (10.0% of total claims), and 149 were traumatic injuries among those with pot gear (7.4% of total claims). Among longliners, the events most frequently causing traumatic injuries were contact with objects and equipment (40.9%), overexertion (31.7%), and slips/trips/falls (25.3%). The leading types of injuries seen were open wounds, primarily lacerations and puncture wounds, at 30.2%, and sprains/strains/tears at 27.7%. Contact with fishing gear caused about a quarter of traumatic injuries (25.7%); of those, 63.0% were caused by the hooks.

Among those working with pot gear, the same broad types of events are reported to be causing injuries: contact with objects and equipment (49.3%), overexertion (32.4%), and slips/trips/falls (15.4%). The most frequently reported types of injuries were sprains/strains/tears and dislocations, at 30.9%, followed by open wounds/lacerations at 17.4%. Contact with fishing gear caused 27.0% of injuries. Not surprisingly, 61.8% of those were caused by being struck by or against pots. Hauling and setting pots, as well as moving pots onboard or working on stacked pots present hazards on these vessels.

In addition to other safety measures that apply to commercial fishing vessels in the BSAI, fishing with pot gear in the BSAI requires particular attention to vessel stability. Commercial vessels that are greater than 79 ft LOA are required to carry stability instructions (i.e. a stability report) specifically for that vessel,

⁴³ While the following information is presented in order to characterize the level and types of hazards present for crew when using each gear type, this information does not provide an appropriate metric in order to determine if one gear type is inherently more hazardous than the other. In order to quantify this type of comparison, a researcher would need to use an appropriate rate of comparison. For instance, NIOSH often adjusts the number of fatalities in the fleet based on a common denominator of 100,000 full-time equivalent (FTE) workers (NIOSH 2016). This accounts for the fact that there may not be the same number of crew working in each fishery/ sector and their seasons may not be the same length. The analysts currently do not have the information we would need to create this metric for pot vessels.

⁴⁴ Established in 1951, the Fishermen’s Fund provides for the treatment and care of Alaska licensed commercial fishermen who have been injured while fishing on shore or off shore in Alaska. Benefits from the Fund are financed from revenue received from each resident and nonresident commercial fisherman’s license and permit fee. For more information see: <http://www.labor.state.ak.us/wc/ffund.htm#What%20is%20Fish%20Fund>

developed by a Naval Architect or another qualified individual, detailing the various loading conditions and capacities that pertain to that vessel and the gear employed. The vessel owner is responsible for selecting a qualified individual to conduct necessary tests and calculations to evaluate vessel stability in accordance with §§28.500- 28.590. 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.

Subsequent to the loss of the *F/V Destination* on February 11, 2017, there has been increased focus on maintaining and operating by accurate stability instructions for the vessel and an increase in spot checks by the USCG. Increased checks discovered that many reports on crabbing vessels were out-of-date; they were based on estimates of gear that has in some cases been replaced with heavier, more durable steel frames (Bernton 2017). The USCG released a Marine Safety Alert in October 2017 reminding vessel operators of the best practices for ensuring vessel stability (USCG 2017). In particular for pot gear users, the safety alert suggested:

- To pay special attention to the pot weights
- Annually weigh a percentage of them to verify if the actual weight (including shots of line and buoys) matches that in their stability instructions
- Weight the wet-soaked lines can added as much as 15 pounds per shot, and
- Consult a Naval Architect for loading recommendations and amendment if pots are heavier than what is listed in the Stability Instructions

The safety alert also reminded vessel operators that they should pay special attention to “weight creep” (accumulation of extra gear, equipment and part carried aboard the vessel and not accounted for in their stability instructions) and that icing can make pots heavier and a vessel dangerously unstable. Real life conditions can easily exceed the 1.3 inches of ice accumulation on horizontal surfaces typically assumed in a vessel’s stability instructions; therefore, vessel operators should understand and take into account the increased risk in capsizing and sinking in these conditions.

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 inches of freeboard amidships may be considered to be operating in an especially hazardous condition and would not be allowed to leave port.

While safety concerns related to increased pot fishing have been raised in the Council process, the switch from HAL gear to single or longline pot gear would be voluntary, and not mandatory under this action. The impacts of this action on vessel safety are considered in Section 4.7.12.

4.6 Analysis of Impacts: Alternative 1, No Action

Alternative 1, No Action, Federal regulations at §679.2 would continue to require the discard of all halibut caught in pot gear in any BSAI reporting area, as described in Section 4.3. This alternative does not authorize pots as a legal gear type to harvest halibut in the BSAI.

Under the status quo, legal and sublegal-size halibut discarded in the sablefish pot fishery in the BSAI would continue to constitute wastage (i.e., discards required by regulations). Participants that hold halibut quota would need to discard this halibut caught in the BSAI sablefish pot fishery and make a separate effort to catch their halibut IFQ or CDQ using HAL gear. This may continue to generate additional costs for these participants.

Whale depredation would be expected to persist in the HAL halibut IFQ/ CDQ fishery under the no action alternative. Unlike sablefish QS holders, halibut QS holders currently do not have the ability to employ pot gear as a way to circumvent whale depredation on their target species. Instead, under status quo, a halibut QS holder's response would likely be continuing to employ techniques to avoid or mitigate the damages of such encounters. This may include dropping gear to "wait the whales out", moving to different fishing grounds, setting decoy sets to distract the whales, or leaving and returning at a later date. Measures taken to avoid depredation reduce fishing efficiency through variable operational costs (increased cost of fuel, labor, bait, crew provision) 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 (NPFMC 2015a). The cumulative costs associated with avoiding whale depredation will increase over time under Alternative 1, as participants incur these variable costs.

Under the no action alternative, no changes to the current pot gear specifications in the sablefish fishery would occur (i.e., both single and longline gear would continue to be permitted, maximum 9-inch tunnel opening would be required on all pot gear used to harvest sablefish). In addition, there would continue to be no gear tending requirements. All vessels fishing IFQ sablefish would still need to possess a transmitting VMS consistent with §679.28(f)(3), (f)(4), and (f)(5). Some of the participants fishing sablefish CDQ also are required to have a transmitting VMS. Logbook and PNOL requirements would stay the same; meaning, for example, all vessels using longline pot gear to harvest groundfish (such as sablefish) would continue to use logbooks. For a full comparison of regulations of Alternative 1 compared to Alternative 2, see Table 1.

In addition to not having the opportunity to retain halibut in pot gear in the BSAI, under Alternative 1 there would be no *required retention* of halibut IFQ or CDQ in pot gear even if someone onboard the vessel has available halibut IFQ or CDQ designated for that area.

Under the no action alternative, no changes to the current VMS regulations would occur. For vessels in the BSAI and GOA, operators would remain required to fax to NMFS OLE a check in to register a new VMS unit (§ 679.28(f)(4)(ii)). This check in requirement is estimated at \$1,340 a year in personnel and miscellaneous costs to the industry. For vessels in the BSAI and GOA, operators would remain required to call NMFS OLE at least 72 hours prior to fishing for IFQ sablefish in the BSAI and prior to using longline pot gear to fish for IFQ sablefish in the GOA (§ 679.42(k)). This call in requirement is meant to confirm the VMS unit is operating; this requirement is estimated to cost all vessel operators in the BSAI and GOA \$268 each year. Finally, under the no action alternative, NMFS would not make minor clarifying changes to the current VMS regulations.

4.7 Analysis of Impacts: Alternative 2, Allow Halibut Retention in Pot Gear in the BSAI

Alternative 2 (the preferred alternative) would allow (and require) the retention of legal-size halibut in pot gear used to fish halibut or sablefish IFQ or CDQ in the BSAI, provided the vessel possesses halibut IFQ or CDQ to account for the catch. The IFQ or CDQ used to account for the harvested halibut would need to correspond to the appropriate IPHC regulatory area. The rationale for choosing those elements and options, and for the options not selected, is described in more detail in Section 2.5.

This subsection first provides an overview of the potential socio-economic benefits and costs this action may achieve. This subsection describes the distribution of those positive and negative impacts on harvesters, as well as the expected "new entrants" and the possible magnitude of impacts. Distributional impacts to processors, communities, and other user groups are also highlighted. Next, each element of the alternatives is examined. Management and enforcement considerations specific to each of the five

elements, as well as the Council's additional bullets of clarification, are discussed within the relevant subsections.

4.7.1 Scope of Alternative 2

As described in Section 2.2, Alternative 2 (the preferred alternative) states halibut retention would be permitted in “pot gear used to fish for halibut or sablefish IFQ/CDQ”. **Therefore, the scope of this action would not allow for the retention of halibut IFQ or CDQ in other directed pot fisheries, including the BSAI crab fisheries and BSAI Pacific cod pot fisheries. An IFQ permit holder that was participating in other directed groundfish fisheries with pot gear (such as Pacific cod) or the BSAI crab fishery, would not be required to *nor permitted* to retain halibut on a pot fishing trip while directed fishing for a species that was not halibut or sablefish, even if they held available IFQ, because existing regulations would continue to require the discard of halibut in the BSAI while directed fishing for shellfish or groundfish (with the exception of sablefish) with pot gear.**

The intent of this action is that all Pacific cod and BSAI crab harvesters fishing with pot gear who also have halibut quota available would not be authorized, nor would they be required, to retain legal-size halibut in any of their pot fishing trips. Similar to what is described in for the sablefish fishery under the proposed action, there may be conservation benefits associated with the increased retention of halibut incidentally caught in Pacific cod or BSAI crab fisheries. If these participants have halibut quota, it prevents harvesters from having to “fish twice”. It may also allow for mixed fishing trips with non-IFQ species, potentially allowing for increased efficiency.

However, the requirement to retain legal-size halibut while Pacific cod or crab fishing could add practical challenges to operations. For instance, there could be a situation where a vessel is fishing Pacific cod with pot gear in the BSAI and catches a small amount of halibut incidentally with pot gear. The vessel would be required to retain that halibut if someone onboard has unfished halibut quota. Since the vessel was not originally IFQ fishing, this retained halibut may require them to do a Prior Notice of Landing (PNOL). An IFQ PNOL requires an operator of any vessel making an IFQ landing to notify OLE no fewer than three hours before landing IFQ halibut or IFQ sablefish, unless permission to commence an IFQ landing within three hours of notification is granted by a clearing officer. In addition, they must deliver their product between 6am and 6pm, and find a registered buyer willing to accept a small amount of halibut. One stakeholder suggested that processors that receive Pacific cod deliveries do not always accept deliveries of halibut (personal communication, B. Laukitis 2018). Additionally, since the vessel did not set out intending to catch halibut IFQ, that vessel may not be complying with other requirements that may be designated under this action (e.g. gear specification or retrieval, logbook requirements, etc.). Notwithstanding these practical challenges if retention of halibut in pot gear were authorized/required for Pacific cod and BSAI crab harvester, this action would retain existing regulations that require all Pacific cod and BSAI crab harvested fishing with pot gear to discard halibut while directed fishing for shellfish or groundfish (with the exception of sablefish) with pot gear in the BSAI.

The overlap in harvesters in these fisheries is an important factor in understanding the potential economic impacts under each of the two possible scopes of action. As demonstrated in Section 4.5.2: Table 22, Table 23, and Table 24, the halibut and sablefish IFQ fisheries have a considerable amount of overlap in terms of vessel participation and overlap by QS holdings. Vessel diversification is used to demonstrate the overlap between halibut IFQ fishing and BSAI crab fishing, as well as between BSAI Pacific cod pot fishing. Unfortunately, data are not available to discern the extent to which crewmembers overlap in these fisheries.

In considering vessel overlap in the IFQ fisheries, Table 23 demonstrates that between 80% to 90% of the vessels that have fished BSAI sablefish IFQ with HAL gear between 2011 and 2016 also landed some

halibut IFQ from the BSAI. The overlap between sablefish CDQ and halibut IFQ is also considerable. Between 2011 and 2016, 75% to 100% of the vessels that fished sablefish CDQ with HAL also fished halibut IFQ in the BSAI. The percent of vessels fishing both BSAI sablefish IFQ with pot gear and halibut IFQ with HAL gear has much more inter-annual variability (between 0% to 100% of the vessels, 2011 to 2016). This is likely due to the limited number of vessels that have participated in that fishery with pot gear.

QS holding overlap helps to understand the extent that harvesters would be able to use the proposed opportunity to fish both IFQ species with pot gear on the same trip. It also highlights harvesters that may be required to retain halibut under the proposed action, even if they were not intending to target halibut. Table 24 demonstrates there is overlap in the Area 4 halibut and BSAI sablefish QS holders. For instance, of the 252 QS holders that hold Area 4 halibut, 46 of them also hold sablefish QS in the Aleutian Islands and 50 of them also hold sablefish QS for the Bering Sea.

Halibut and sablefish seasons are typically set simultaneously due to the connection in the fisheries (NPFMC/ NMFS 2016). As demonstrated in Figure 27 and Figure 32, both fisheries are fairly spread out from March through November.

Vessel overlap between halibut IFQ fishing and BSAI Pacific cod (in State and Federal waters), is shown in Table 22 and Table 23. Between 2011 to 2016, between 17% to 26% of the total vessels that fished BSAI Pacific cod with pot gear in State or Federal waters also landed halibut IFQ at some point that year. This represents a moderate amount of overlap. However, most years there is only a short period of overlap in the seasons for Pacific cod and halibut fisheries. For pot CPs and CVs greater than 60 ft LOA, the Pacific cod A season runs from January 1 to June 10, or until the seasonal allocation is harvested. The Pacific cod B season runs from September 1 to December 31. Typically, with a few exceptions the A seasonal allocation for CVs greater than or equal to 60 ft LOA and for CPs is fully harvested by late January or early February (personal communication, M. Furuness 2018). Therefore, the primary overlap would be between September 1 to November 7 (based on recent halibut seasons adopted by the IPHC). Additional public testimony could help the Council understand more about individual economic impacts associated with the opportunity/ requirement to retain halibut IFQ while Pacific cod pot fishing when the quota is available.

Table 23 and Table 24 also demonstrate there is very little overlap between vessels that fish both halibut IFQ in the BSAI and vessels that fish crab (State or Federal) in the BSAI. Of the BSAI crab vessels, between 1% to 3% also land halibut IFQ in the BSAI annually (2011 to 2016). Note this does not highlight the crab crewmembers that may also hold halibut IFQ. However, the majority of the crab seasons are in the winter and do not overlap with the halibut fishing season. Thus, it is unlikely this action would provide additional opportunity to retain halibut IFQ to participants in these fisheries even if the scope was extended to include those directed fishing for shellfish.

4.7.2 Social and Economic Impacts of Alternative 2

Overview of Costs and Benefits

There are two primary economic benefits that may result from the adoption of Alternative 2 (the preferred alternative). The first is in providing greater flexibility for IFQ and CDQ participants in the BSAI; allowing them options to fish their quota opportunistically with either HAL or pot gear. This may increase their economic efficiency as they minimize their variable costs (e.g. fuel, bait, provisions) and opportunity costs that are incurred from avoiding whales. The second potential benefit is in providing positive impacts to halibut user groups from increased efficiency in the use of the resource and possibly better accounting for unobserved mortality due to whale depredation.

The potential costs associated with the preferred alternative include the financial costs to users that chose to reconfigure a HAL vessel to pot fish. This opportunity would not be expected to reach all BSAI halibut harvesters equally. The ability to switch over to pot gear may offer a competitive advantage to larger vessels and vessels that are already equipped to haul pots. Since quota is allocated and there is no longer a race for fish in these fisheries, the primary distributional concern is in the potential for vessels pot fishing to preempt certain fishing grounds and create gear conflicts for vessels that cannot or chose not to switch to pot gear.

The tradeoffs between these potential benefits and costs would be expected to result in different (positive and negative) distributional impacts to communities and potentially processors. This section discusses the expected impacts and highlights areas where the effects are unclear or conditional on individual circumstances.

There is uncertainty in the magnitude of change that may occur under the proposed action. The number of vessels and the amount of halibut harvest that shifts from HAL to pot gear will help dictate the extent of costs and benefits that will occur. While regulations under the proposed action will allow all Area 4 halibut quota holders to have the opportunity to shift from HAL to pot gear, factors such as 1) safety and logistical challenges in storing, deploying, and hauling pot gear on smaller vessels, 2) the costs associated with obtaining gear and retooling a vessel to be able to fish with pot gear, 3) the uncertain CPUE, which may be higher for HAL gear when whales are not present than pot gear overall, and 4) variation in whale depredation impacts and associated costs by area in the BSAI, mean that the scope of change is expected to be somewhat limited.

4.7.2.1 Impacts to Potential Halibut Harvesters

4.7.2.1.1 New Entrants and Magnitude of Change

Under Alternative 2 (the preferred alternative), it is highly likely that much of the existing halibut IFQ/ CDQ fleet will continue to use HAL gear. Most importantly, not all halibut IFQ/ CDQ harvesters in the BSAI have experienced problems with whale depredation. This section explains that certain fishing grounds are better known for issues with whale depredation. Harvesters that *do* incur costs from whale depredation will consider the practicality of converting their vessel over to pot gear (and size constraints), the costs of converting operations or access to a pot vessel and necessary gear, possible costs associated with learning a new gear type, and their expected returns from using this new gear type. Based on these factors, this section explains many halibut IFQ/ CDQ harvesters in the BSAI may not chose to switch from HAL gear to pot gear.

Some stakeholders have described the costs of whale depredation to be different by region of the BSAI (personal communication, A. Drobica 2018; personal communication, J. Kauffman; 2018 personal communication, R. Merculief 2018). Certain regions are better known for a high presence of resident killer whales. For instance, stakeholders have stressed the concerns with killer whale depredation in Area 4D along the continental edge and in certain regions of Area 4A. There are other regions in the BSAI in which halibut harvesters have not experienced these same issues, such as around the Pribilof Islands and around St. Matthew Island. Thus, depending on where they typically fish, not all halibut IFQ/ CDQ harvesters in the BSAI will find it necessary to switch gear types.

Of the halibut IFQ/ CDQ harvesters in the BSAI that do incur costs associated with whale depredation, their individual decision of whether to change gear types depends on size constraints practical issues of converting their vessel to store, deploy and haul pot gear, and their expected returns (i.e. how effective pot gear is at prosecuting the halibut fishery in the area they fish). Thus, the benefits associated with avoiding whale depredation will not be evenly distributed among halibut quota holders.

In this section, the analysts generalize which groups of harvesters are most likely to take advantage of the opportunity to harvest halibut in the BSAI with pot gear (or be required to due to available halibut quota onboard a sablefish pot vessel). Table 38 summarizes these groups and what they would need to become a “new entrant” in a pot fishery for halibut in the BSAI.

The most likely participants are Area 4 halibut quota holders that already have access to the necessary gear and a vessel that can deploy, haul, and store pot gear. Therefore, one group of likely candidates for switching to halibut pot fishing in the BSAI under the proposed action are harvesters that currently fish BSAI sablefish with pots who have access to Area 4 halibut QS. These harvesters have lower marginal costs to begin fishing halibut with pot gear if whale depredation has decreased their halibut CPUE on HAL gear in the past. The ability to combine halibut and sablefish pot fishing trips in the BSAI for those that hold both types of quota could produce greater economies of scale for fishing in the BSAI, decreasing the cost per unit effort. Participants would have the opportunity to fish either their sablefish or halibut quota in pot gear opportunistically, both through the retention of halibut incidentally caught in sablefish pots as well as with pot gear targeting halibut on the same trip they target sablefish (if they use the same pots or have the space on board to bring both types of pots). The BSAI sablefish fishery is widely dispersed and has a fraction of the CPUE to that of the Central GOA (personal communication, D. Hanselman 2018). Sablefish quota in this fishery is not fully utilized, likely due to the costs associated with harvest (see Section 4.5.3.1). Additional revenue from halibut IFQ caught in a pot set, could make a trip out to Area 4D more economically feasible.

There is considerable overlap between vessels that participate in the BSAI sablefish IFQ fishery and the BSAI halibut IFQ fishery. As demonstrated in Table 25, between 2011 and 2016 there have been between three to nine unique vessels that have landed BSAI sablefish IFQ or CDQ from pot gear annually; four vessels in 2016 (Table 28). Recent participation in the sablefish pot fishery has been low, but of those participating vessels, all of them also landed IFQ or CDQ halibut in 2016. Fishery diversification tables for vessels that have landed halibut IFQ from the BSAI between 2011 and 2016, show between 82% to 90% of the HAL vessels that landed BSAI sablefish IFQ also landed some halibut from the BSAI in the same year (Table 22 and Table 23). Table 24 further reinforces the point that some of the harvesters in these fisheries are the same by demonstrating the overlapping QS holdings for halibut and sablefish. Of the 252 QS holders that hold Area 4 halibut, 46 of them also hold sablefish QS for the Aleutian Islands and 50 of them also hold sablefish QS for the Bering Sea.

Other Area 4 halibut QS holders may also be candidates for using this new gear type; however, they may have an additional hurdle as they would need to identify or reconfigure a vessel to fish with pot gear, as well as acquire all of the necessary gear. Based on Table 21, there were an average of 235 unique vessels that participated in halibut IFQ or CDQ halibut fishing each year between 2011 and 2016. The majority of these vessels are less than 50 ft LOA. Fifty ft LOA was used as a threshold in this analysis, to represent vessel that could more likely accommodate pot gear. Vessel size and configuration matters in providing the necessary room for safely storing, deploying, and hauling pot gear. Fifty ft LOA was chosen as a proxy indicator, because the majority of sablefish pot and Pacific cod pot vessels in the BSAI are greater than 50 ft LOA (see Table 26 and Table 27). CDQ resident vessels represent a substantial portion of the halibut HAL vessels that are less than 50ft LOA. Due to size, these vessels would be less likely to convert to pot gear.

The remaining vessels that are greater than or equal to 50 ft LOA that harvest halibut in the BSAI each year (a total of 104 unique vessels and an annual average of 64 vessels from 2011 to 2016) represent an upper

limit of vessels that may convert over to pot gear.⁴⁵ Even if vessel size is not a constraint for converting a vessel to pot gear, other factors previously mentioned in this section (e.g. lack of whale interactions, cost of conversion and new gear, opportunity cost of learning a new gear type, and expectations of returns) may discourage a halibut harvester from switching gear types. Moreover, as demonstrated in Figure 24 and Figure 26, most of the halibut quota in Area 4 is harvested on HAL gear every year. Even with the challenges associated with whale depredation in some regions of the BSAI, the gross revenues appear to outweigh the costs to prosecute the fishery, even if this includes moving to different fishing grounds. Thus, it is expected that particularly in the near term, the scope of halibut harvesters in the BSAI switching over to pot gear will be a small fraction of the average 64 vessels greater than or equal to 50 ft LOA that typically fish halibut in the BSAI with HAL gear.

Table 38 also suggests other fisheries, which a “new entrant” may come from. This includes the BSAI Pacific cod pot fishery, both from state and Federal waters. It also includes IFQ participants that recently geared up to fish sablefish IFQ with pot gear in the GOA. If these harvesters have or can purchase halibut IFQ, they may be able to use their current vessel and gear to harvest halibut with pot gear in the BSAI. Since Area 4 is generally fully prosecuted, if a GOA sablefish pot vessel operator or a BSAI Pacific cod pot vessel operator purchases Area 4 halibut QS and harvests that quota with pot gear, they may or may not be adding vessels to the fishery. These new entrants may be replacing the effort previously expended by a HAL vessel.

⁴⁵ Note that this number would include the vessels that also fish sablefish with pot gear in the BSAI.

Table 38 Categories of harvesters that may fish halibut with pot gear in the BSAI under the proposed action

<p>1. BSAI sablefish IFQ/ CDQ harvesters that have previously fished with pot gear</p> <p>→ Would need access to halibut IFQ or CDQ for the appropriate area⁴⁶</p> <ul style="list-style-type: none">• Range of 3 to 9 vessels annually between 2011 and 2016; average of 6 vessels (Table 25)• There is some overlap in the halibut HAL fisheries, but variable due to limited number of vessels (Table 28)• Harvested between 0 to 430,000 lb. of halibut annually between 2011 and 2016 <p>2. Other Area 4 halibut IFQ/ CDQ harvesters that have previously fished with HAL gear</p> <p>→ May need to obtain gear and reconfigure their vessel or identify a vessel that could deploy pot gear</p> <ul style="list-style-type: none">• Range of 135 to 339 vessels annually between 2011 and 2016; average of 235 vessels (Table 20)• Many of the vessel owned by CDQ residents not likely to adopt pot gear due to size constraints and limited interactions with whales (as discussed earlier in this section)• Range of 54 to 75 vessels ≥ 50ft LOA annually between 2011 and 2016; average of 64 vessels (Table 21) <p>3. BSAI Pacific cod pot harvesters – <i>particularly due to the decline in Pacific cod TAC for 2018 which could drastically shorten the season for some participants</i></p> <p>→ Would need access to halibut IFQ or CDQ for the appropriate area</p> <ul style="list-style-type: none">• Range of 49 and 59 vessels annually between 2011 and 2016; average of 54 vessels (Table 27) <p>4. Operators of GOA sablefish IFQ vessels that have recently fished with pot gear</p> <p>→ Would need access to halibut IFQ or CDQ for the appropriate area</p> <ul style="list-style-type: none">• Twenty-two vessels in 2017 (Section 4.5.3.3)• Two vessels that participated in both BSAI and GOA sablefish pot fishery in 2017 (Section 4.5.3.3) <p>5. Other new entrants</p> <p>→ Would need access to halibut IFQ or CDQ for the appropriate area</p> <p>→ Would need to obtain gear and reconfigure their vessel or identify a vessel that could deploy pot gear</p>
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4.7.2.1.2 Benefits of Avoiding Whale Depredation

This action could provide greater flexibility for IFQ and CDQ halibut harvesters in the BSAI. For vessels that have experienced costs from whale depredation, Alternative 2 could allow vessels the opportunity to minimize the variable costs associated with mitigating whale depredation, as listed in Section 3.5.2. Vessel operators in western Alaska reported waiting on average at least 12 hours and/or transiting 25 miles or more to avoid depredated killer whales (Peterson and Carothers 2013). These depredation avoidance measures can be costly for commercial longliners as they 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 \$1,016 per vessel-day for additional fuel, crew food and the opportunity cost of lost time (Peterson et al. 2014). Based on data from the observed commercial fishery, the additional cost associated with catching the same amount of fish on sets depredated by killer whales was estimated to be approximately \$433 (\pm \$147) per set for additional fuel alone. That estimate does not include additional crew time, bait or opportunity costs in other fishing or non-fishing activities (Peterson et al. 2014).

One primary factor that would determine the potential benefits of the proposed action is the catchability of halibut in pot gear relative to HAL gear. Pot gear has never been exclusively designed for commercially targeting and harvesting halibut in waters off of Alaska, thus there is no data from this area to compare halibut pot CPUE in this area to the CPUE from HAL gear. Even for other species, assessing the CPUE between HAL and pot gear has been a difficult comparison (NPMFC 2015). The analysis for Amendment 101 to allow sablefish pots in the GOA was not able to definitively state whether fishing with pot gear would generate a higher sablefish CPUE in the GOA. This analysis suggested estimated CPUEs for pot and HAL gear were close enough that whale depredation, other environmental factors (e.g. location, weather, bathymetry) and harvester's skills are likely to be key determinants of differences in gear performance (NPMFC 2015). The IPHC setline surveys have demonstrated that halibut weight per unit effort (WPUE) varies by subarea in the BSAI and ocean bathymetry is clearly an important determinant for fishing success.⁴⁷ Thus, pot gear WPUE would likely also vary throughout the BSAI.

Thus, Alternative 2 (Preferred) is expected to provide individual benefits to some harvesters from the ability to avoid whale depredation. An individual halibut IFQ/ CDQ participant will be motivated to switch to pot gear based on their expectation of a change CPUE and the indirect effects this has on their costs associated with whale depredation.

4.7.2.1.3 Cost of Gear and Vessel Conversion

Under Alternative 2 (Preferred), the potential benefits would be weighed against the individual's costs to acquiring the necessary gear and vessel that is configured to deploy and haul pot gear. **Halibut quota holders that may harvest halibut in pot gear under the proposed action may: 1) have existing gear and require little to no cost to begin retaining halibut, 2) be able to collaborate with operators of vessels that have deployed pot gear in the past, or 3) choose to purchase new gear and reconfigure their vessel for a new gear type.**

Halibut quota holders that reconfigure their vessel from HAL fishing to pot fishing would clearly incur the highest costs in this transition. Selecting Alternative 2 merely provides the option for participants to switch to pot gear, so individuals would face a private decision as to how the capital costs of a new configuration balance against the costs of depredation. A Sablefish Gear Committee was formed by the Council to provide

⁴⁶ "Access" to halibut quota meaning, the individual would either need to purchase additional IFQ, lease CDQ from a CDQ group, or they would need to collaborate with someone who had the appropriate IFQ

⁴⁷ IPHC interactive maps on setline survey WPUE and number per unit effort can be found here: <https://iphc.int/data/setline-survey-catch-per-unit-effort>

input during the discussions of Amendment 101. This group provided some estimates in 2013 for the potential costs associated with the vessel conversion from sablefish HAL to pot (NPFMC 2016a). These estimates are the best available information for this analysis.

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. A comparable Committee estimate detailed 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 (as cited in NPFMC 2016a).

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.

Note that these estimates were generated in 2013 and have not been updated. In addition, some stakeholders have suggested that pots more similar to crab pots or pots used in the Pacific cod fishery may be more conducive to halibut fishing than the collapsible groundfish pots used in the sablefish pot fishery. Because crab pots may weigh up to 800 pounds each, deploying single pots may be safer and make it less likely to lose gear. Thus, operators could choose to deploy fewer pots or have some pots on board in addition to HAL gear and conduct mixed-gear fishing trips.

Costs associated with using pot gear to harvest halibut would be much lower if the quota holder already had access to a fishing vessel that was outfitted for pot fishing. This may be a vessel that has previously fished for sablefish, Pacific cod or crab in the past. For Area 4 halibut quota holders that also fish sablefish IFQ or CDQ in the BSAI with pot gear, there may be no additional cost to catching and retaining halibut IFQ/ CDQ incidentally during their sablefish sets. In fact, this category of operators is the only group that may be required to retain halibut in their sablefish pots without taking any affirmative action to “fish for” halibut (as further explained in Section 2.2). For most other halibut quota holders, shifting from HAL gear to pot gear to harvest their halibut quota would be a choice.

While this section focused on impacts to potential halibut harvesters, Section 4.7.4.3.3 includes a discussion of the impact of gear conversion on vessels that currently harvest sablefish using pots. Under Element 4, the sablefish fishery may be required to convert their gear to accommodate new regulations.

4.7.2.1.4 Gear Conflicts and Grounds Preemption

Allowing for pot gear to fish on grounds that have been prosecuted by HAL vessels in the past creates the possibility for grounds preemption and/or gear conflict issues. Grounds preemption occurs when a harvester 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, by setting either across one another or by

snagging on a buoy line. Introducing 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 groundlines are likely to part the smaller and lighter HAL groundlines. Similarly, lost gear preempts grounds until it is removed.

The threat, or cost, of grounds preemption and gear conflict is that vessels unable or choosing not to deploy pot 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 quota. This can create a competitive imbalance between certain vessels; particularly vessels of different sizes as smaller vessels may not be able to carry, deploy, and haul pot gear safely.

There is no systemic data collection on gear conflicts and grounds preemption issues for the IFQ/ CDQ fisheries. The primary source for understanding this subject has been through anecdotal accounts. This section describes how public testimony has shaped policy on gear prohibition in the BSAI, pre and post IFQ Program. Additionally, it describes the analysts' understanding of the current state of gear conflicts in the BSAI sablefish pot and halibut HAL fisheries and ways that conflicts are avoided.

Prior to the IFQ Program, there was known to be some historical conflict between longline pot gear and HAL vessel operators off Alaska, primarily in the GOA. The competitive race for fish that existed at that time provided an incentive for participants to compete for space on the most productive fishing grounds, sometimes laying gear on top of each other (NPFMC/ NMFS 2016). In 1992, the Council recommended a prohibition on the use of longline pot gear in the sablefish fishery in the Bering Sea to prevent longline pot gear from preempting access to fishing grounds by HAL gear (57 FR 37906, August 21, 1992). The Council did not recommend a prohibition on longline pot gear in the Aleutian Islands because gear conflicts were not considered a concern in that sablefish subarea (57 FR 37906, August 21, 1992.).

Implementation of the IFQ Program was expected to provide temporal and spatial flexibility to IFQ participants in how they harvest their IFQ. Since implementation, the Council has incrementally reduced restrictions on sablefish pot gear. In response to concerns over whale depredation on sablefish on HAL gear and the reductions in gear conflicts and preemption of fishing grounds following IFQ, the Council determined that a complete prohibition on longline pot gear in the Bering Sea sablefish fishery was not necessary. On September 18, 1996, NMFS published a final rule to replace the year-round longline pot gear prohibition in the sablefish fishery in the Bering Sea with a regulation that allowed the use of longline pot gear except during the month of June (61 FR 49076). The continued prohibition on use of longline pot gear in June was intended to provide the small vessel sablefish HAL fleet in the Bering Sea with an opportunity to harvest their sablefish quotas without competition from vessels deploying longline pot gear.

In October 2004, a representative for sablefish longline pot fishermen in the Bering Sea proposed that gear competition between the sablefish longline pot fleet and the HAL fleet had not occurred, and asserted that the regulatory prohibition on the use of longline pot gear during June was unnecessary and burdensome. After review of an analysis and public testimony, the Council recommended a regulation to remove the prohibition on the use of longline pot gear during June in the Bering Sea sablefish fishery (73 FR 28733, May 19, 2008). It was also believed that there was minimal gear conflict or fishing grounds preemption happening in the Bering Sea at the time (NPFMC/ NMFS 2016). Beginning in May of 2008, both longline pot and HAL gear has been authorized during the entire year in both the Bering Sea and Aleutian Islands sablefish fisheries.

In the discussions leading up to Amendment 101 to the GOA FMP, accounts of historical gear conflicts and ground preemption in the GOA pre-IFQ Program, as well as the characteristics of the GOA sablefish

fishery which make it different from the BSAI (e.g. more constrained fishing grounds due to a smaller overall area, larger number of participating vessels than in the BSAI, and large number of smaller vessels) contributed to high levels of concern about gear conflicts and grounds preemption in the GOA. As discussed further in Section 4.7.3, these concerns lead to gear retrieval requirements that differ by subarea based on their expectation for conflicts.

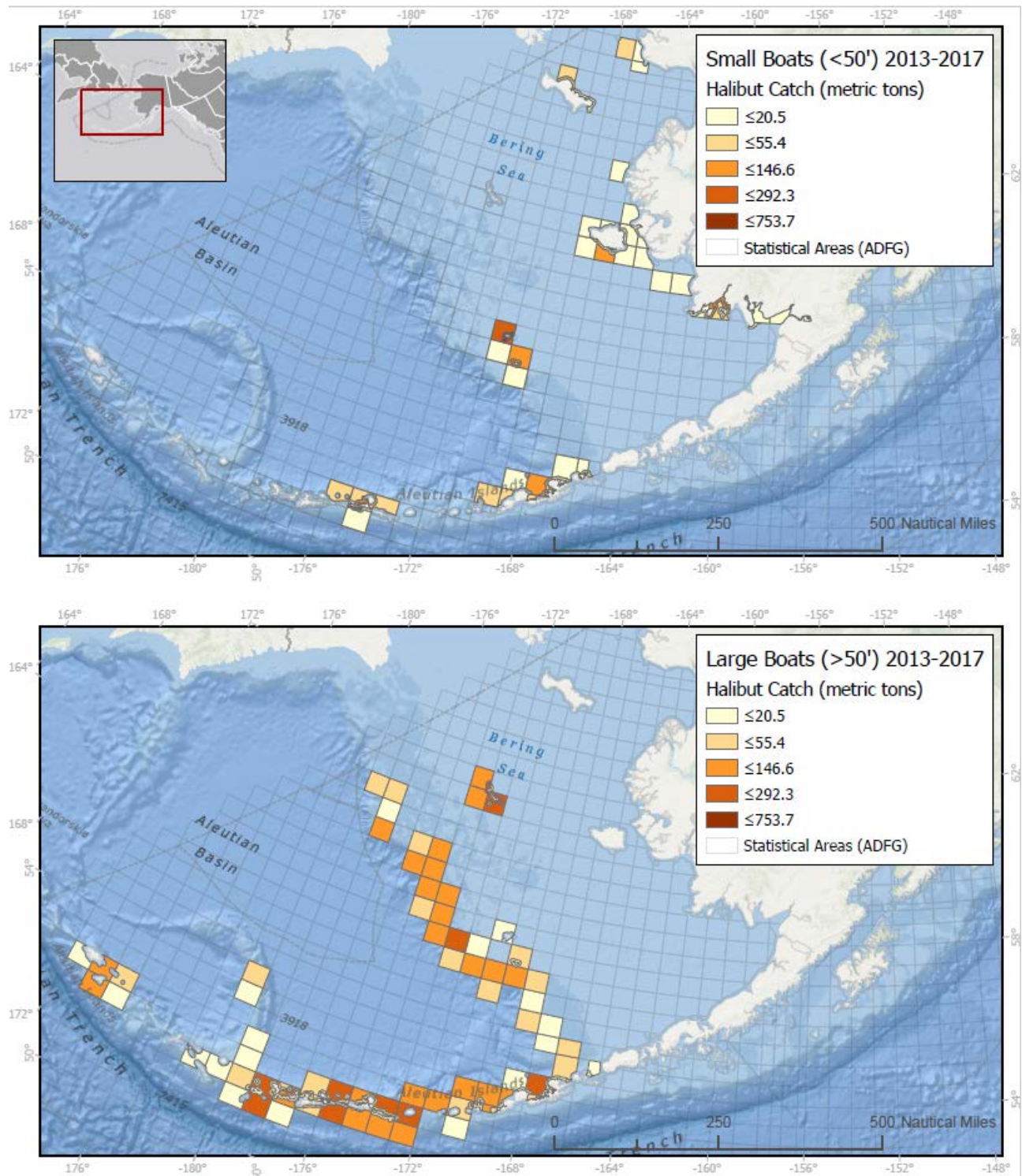
The proposed rule for Amendment 101 also stated that public testimony described that these gear conflict and grounds preemption issues that were a concern for GOA had not been experienced in the BSAI. However, public testimony at the April 2018 Council meeting expressed concern about the potential for future gear conflicts in the BSAI with the introduction of a new gear type for halibut. This concern has been expressed both by a halibut quota holder in communities in the Aleutian Islands, as well as halibut quota holders in the GOA that have experienced these changes in their fishing grounds. Despite the risk of losing or damaging gear if it becomes entangled, the Council also heard public testimony that pot gear has been left on the grounds in the BSAI and untended for a lengthy period of time, specifically over the winter. Similar to in-season gear conflicts and grounds preemption issues, there is no empirical data tracking conflicts that have occurred with pot gear that is stored off-season on the grounds in the status quo fisheries in the BSAI. Thus, it is difficult to predict the likelihood and possible level of conflicts that this action may lead to on productive fishing grounds.

In contrast to this testimony, other BSAI sablefish pot fishermen have stated that they have had no gear conflict or grounds preemption issues. They suggested this is likely due to the small number of vessels being spread over a large area, as well as a collective understanding and effective communication amongst fishery participants to avoid gear conflicts (personal communication, L. Hertzog 2018; personal communication, M. Dye 2018). Fishing gear is expensive to purchase and replace, so participants have a private incentive to incur small additional costs to reduce the likelihood of gear conflicts or lost gear. Vessel operators often operate in proximity to one another over many fishing days and seasons, so the avoidance of conflict between individuals has both a private and a social benefit. One potential indicator of a lack of gear conflicts with the existing sablefish pot fishery is that until this action gear conflict in the Bering Sea has not been raised to the Council since the prohibition on sablefish pots in the Bering Sea was lifted.

If there is an increase in gear conflicts and grounds preemption in the BSAI from the proposed action, smaller halibut vessels may be at a competitive disadvantage, as previously mentioned. This analysis makes the distinction that operators of vessels less than 50 ft LOA are less likely to adopt pot gear to fish their halibut quota due to weight and space requirements. This generalization does not account for vessels that may be larger than 50 ft LOA that are still unable to safely fish pots due to stability of their vessel, nor does it account for vessels less than 50 ft LOA that are able to fish safely with pots.

Figure 35 separates the spatial distribution of fishing effort in the HAL halibut IFQ/CDQ fisheries by vessel LOA. While this figure neither allows for a fine enough spatial resolution nor the temporal component to fully understand whether grounds preemption or gear conflicts have or will occur, it allows for a general understanding of fishing overlap. This figure demonstrates, unsurprisingly, that vessels less than 50 ft LOA tend to stay close to shore. In particular, many of these are CDQ vessels which harvest halibut around Nome, Savoonga, the Pribilof Islands, Atka and other Aleutian Island communities, Bristol Bay communities, around Nunivak Island, Kuskokwin Bay area, and all along other Western Alaskan communities. The larger vessels harvest halibut more intensively around St Matthew Island, all along the continental shelf, and in the Aleutian from Unalaska westward.

Figure 35 Halibut IFQ/ CDQ harvest (mt) in the BSAI, 2013- 2017



Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT

Public testimony from halibut quota holders interested in the potential for switching to pot gear have suggested this opportunity could be most useful when fishing in Area 4A or 4D due to the presence of

resident killer whales in those areas (personal communication, R. Hanson 2018; personal communication, J. Kauffman 2018). Testimony has indicated that halibut quota holders would likely try to use pot gear in the AI, potentially outside of Dutch Harbor, near Akutan and the Islands of Four Mountains. Testifiers also expect halibut quota holders to use pot gear along the Area 4D continental shelf edge up towards the Russian border (personal communication, R. Hanson 2018; J. Kauffman 2018). Participants have suggested that the ability to use pot gear and fish among the whales in Area 4D more successfully might relieve some of the fishing pressure around St. Matthew Island (personal communication, R. Hanson 2018). A return to traditional fishing patterns might be expected, as spatial shifts in fishing patterns to avoid whales may be discontinued by those who switch to pot gear.

Additionally, if sablefish pot vessels retain halibut IFQ/ CDQ incidentally or on the same trip as a sablefish IFQ/ CDQ fishing trip, the footprint of halibut pot fishing may mimic that of the BSAI sablefish pot fleet. Figure 18 demonstrates the spatial distribution of these vessels. Given that the BSAI sablefish pot fleet has been between 3-9 vessels annually (2011 -2016), harvesting an average of 6% of the Aleutian Islands fixed gear TAC and an average of 30% of the Bering Sea fixed gear TAC, fishing efforts are more localized than the larger halibut HAL fleet.

Based on these descriptions and the fishing regions demonstrated in Figure 35 and Figure 15, **it appears that potential future halibut pot fishing may have more spatial overlap with where the larger vessels (greater than or equal to 50 ft LOA) are fishing or have fished in the past.** This is supported by public testimony from the April 2018 Council meeting stating that whale depredation is not persistent in the small vessel fishing grounds outside of the Pribilof Islands or nearshore areas in Area 4B. It is still unclear whether there are expected to be grounds preemption/ gear conflict issues with small vessels around Unalaska, Atka, and nearshore areas in the Aleutian Islands. Similar to other potential impacts of the proposed action, the possibility of these issues largely depends on the magnitude of change in terms of number of vessels and amount of harvest shifting to a new gear type. This analysis describes some reasons to expect that the scope of vessels shifting from halibut HAL fishing to pot fishing will be limited at least initially.

Under status quo, gear interaction between vessels fishing CDQ/IFQ and pot vessels outside of the IFQ program may occur. The Pacific cod pot fishery and BSAI crab fisheries generally operate in the winter months outside of the halibut season. The AI golden king crab (GKC) fishery operates between August and May, with the first deliveries of GKC generally not occurring until September. Since 2005, only 3-4 vessels have participated in this fishery. The number of GKC pots registered in the past 10 years has been between 4,200 and 8,200, and effort in the GKC fishery is primarily focused in the Western Aleutian Islands, West of 174° W (NPFMC 2015b). There is already a small temporal overlap between the HAL IFQ and GKC fisheries in this area. Again, with public testimony as the primary driver of policy change around this subject, the Council has not heard reports of gear conflict or grounds preemption issues in these fisheries.

While currently these issues do not seem prevalent and initial entrants to a halibut pot fishery are expected to be few, any pot gear left on the grounds in the offseason (the winter months) could also create grounds preemption issues with winter fisheries such as GKC and Pacific cod. Removing the gear would open grounds for other fishermen who are still active in other fisheries that use the same grounds. Adding an enforceable gear storage restriction could help to minimize conflicts with HAL fishery. Section 4.7.3 includes a discussion of the proposed management measures to address issues that could potentially arise in the future, as well as anticipated impacts of gear retrieval requirements on other stakeholders.

4.7.2.1.5 Impacts of PIHCZ Closure

Alternative 2 (Preferred) states that the Pribilof Islands Habitat Conservation Zone (PIHCZ) will be closed to all fishing with pot gear. While pot fishing is currently closed in the PIHCZ for Pacific cod pots,

this language would constitute regulatory and FMP amendments for the BSAI sablefish pot fishery. However, it is not expected this area closure would have a negative effect on current sablefish pot fishing as this area is generally not an optimal depth and habitat for sablefish. As seen in Figure 18, although legal, sablefish pot fishing does not occur in this area.

This language in the preferred alternative directs the closure of pot fishing in the PIHCZ for any future halibut pot fishing. Based on the footprint of the HAL halibut fishery in the BSAI (Figure 19 and Figure 20) there could be halibut pot fishing in the PIHCZ if this area closure were not implemented. However, Section 4.7.2.1.4 (and public testimony) did not identify this as one of the areas in which harvesters struggle with whale depredation. Proponents of Alternative 2 have not identified this area as a potential footprint for the halibut pot fishery. Thus, it is not expected this closure would hinder the development of a halibut pot fishery in the BSAI.

4.7.2.1.6 Required Retention of Halibut

Alternative 2 would not only create the opportunity for sablefish and halibut IFQ and CDQ operators to retain legal-size halibut in pot gear when the appropriate IFQ or CDQ is available, it would also create the requirement for those operators to retain halibut with any available halibut quota when not directed fishing for another species (e.g. groundfish other than sablefish or shellfish with pot gear). In other words, if a vessel was targeting sablefish IFQ with pots and someone on board holds unfished halibut IFQ for that Area and vessel class designations, they would be prohibited from discarding any incidentally-caught halibut of legal size, consistent with the existing prohibitions for vessels targeting sablefish IFQ with HAL.

This is due to Section 679.7(f)(11), which specifies a prohibition against discarding halibut or sablefish caught with fixed gear from any catcher vessel when any IFQ permit holder aboard holds unused halibut or sablefish IFQ for that vessel category and the IFQ regulatory area in which the vessel is operating. This prohibition essentially makes high-grading for IFQ species illegal. It is not possible for an IFQ holder to “leave their IFQ at home”; an enforcement officer would have an electronic system of available IFQ tied to the individual’s CFEC permit and NMFS IFQ permit. Due to the management structure of the IFQ Program, enforcement has not needed to know what IFQ species the vessel is “targeting”, only what they have available quota for and what is retained (see Section 2.2). Thus, if a vessel is “targeting” sablefish IFQ/ CDQ with pot gear and catches halibut for which one crew member holds quota for, that halibut must be retained. However, as explained in Section 4.7.1, this action is not intended to authorize or require the retention of halibut IFQ or CDQ in other directed pot fisheries (including the Pacific cod and BSAI crab fisheries), and existing regulations would continue to require the discard of halibut in the BSAI while directed fishing for groundfish other than sablefish and shellfish with pot gear.

Although this requirement makes enforcement more straightforward and addresses the Council’s purpose and need of mitigating some of the wastage of legal-sized halibut from regulatory discards, there may be cases where this is an inconvenience for vessels. For instance, if a vessel is targeting sablefish with pot gear, yet someone on board holds halibut quota, low halibut PSC rates means a vessel may be required to keep a very small amount of legal-sized halibut along with their sablefish harvest. This may be inconvenient to keep separate from the rest of their catch. Moreover, harvesters delivering live sablefish might not be set up to freeze the few halibut they are required to retain.

It is not expected that the burden for a vessel fishing for sablefish IFQ/CDQ would be large. The vessel would already need to be following the requirements of IFQ fishing, such as Prior Notice of Landing (PNOL) and delivering between 6am and 6pm. An IFQ PNOL means that the operator of any vessel making an IFQ landing must notify OLE no fewer than three hours before landing IFQ halibut or IFQ sablefish, unless permission to commence an IFQ landing within three hours of notification is granted by

a clearing officer. Moreover, processors that accept sablefish generally accept halibut (personal communication, S. Wilt 2018; personal communication, J. Scoblic 2018).

4.7.2.2 Processor Impacts and the Value of the Fisheries

The proposed action may have some distributional effects on halibut processors/ registered buyers. It is not expected that the volume of landed halibut IFQ/ CDQ would change, as the preferred alternative is intended to improve the efficiency in which halibut is harvested and Area 4 is generally fully prosecuted up to its catch limits (see Figure 24 and Figure 26). **However, there may be some changes in the distribution of halibut landings and changes in the size of halibut landed.**

Table 31 shows the communities and the number of processors within each community that have received deliveries of BSAI halibut between 2011 and 2016. Table 39 is a truncated version of this table, demonstrating the number of processors and in communities that accepted BSAI halibut in 2016. If Area 4 halibut is harvested in different fishing grounds, these harvesters may be delivered to different processors. This could mean some processors benefit from additional landings and others lose out. As discussed in Section 4.5.4.1, implementation of the IFQ Program was a catalyst for the market transition from frozen to fresh product for many processors and emerging registered halibut buyers. Some of the operators off of the road system continued to produce frozen product. In order to stay competitive, many businesses have become diversified in processing other species. As can be seen in Table 34 and Table 35, most region’s processors are diversified outside of halibut, relying on revenue from other key species such as salmon and (not shown in the table) crab. All of the communities listed in Table 39 (except for Homer, AK) are off the road system, which means they would not have the option of having fresh product driven to the continental US, but instead must ship product by boat or plane.

Table 39 Number of registered buyers with deliveries of BSAI halibut landings by community, 2016

Community	2016
Adak	2
Akutan	1
Atka	1
Dutch Harbor	2
Homer	2
King Cove	2
Kodiak	3
Nome	1
Sand Point	1
Savoonga	1
St George Island	1
St Paul Island	1
Togiak	2
Grand Total	20

Source: ADF&G/CFEC fish tickets sourced through AKFIN

There could be a change in value of the landed halibut IFQ/ CDQ due to a switch from HAL to pot gear. Processors grade every halibut by size and quality. If halibut pots are left soaking too long, sand fleas could degrade the quality of halibut and thus deliver a lower ex-vessel price. Halibut is also assigned an ex-vessel price by the processors based on a tiered size-based ex-vessel pricing scheme, with larger halibut yielding a higher per pound ex-vessel price. This is due to the greater yield (recovery) of product from the larger fillets (personal communication, J. Scoblic 2018; personal communication, S. Wilt 2018).

For instance, a plant may use \$/lb categories like: 10-20, 20-40, 40-60, 60-80, 80-100 & 100+ with ex-vessel price increasing for each tier (personal communication, J. Scoblic 2018).

There is an expectation that pot gear may have a different size selectivity than HAL gear (see Section 3.4.6.2). Depending on the design of the pot, halibut may be, on average, smaller in pot gear. However, new pots could be designed to target larger-size halibut. One pot manufacturer indicated it may be ideal to have a pot designed to catch up to an 80 lb halibut and include a rectangular-shaped escapement slot to allow smaller-size halibut out (personal communication, L. Nylander 2018). This would allow for the targeting of medium to larger-size halibut which can yield a higher market price. There may also be a market incentive to design gear to target even larger halibut (personal communication, J. Scoblic 2018). Other than the possibility of price-differentiation for the size-selectivity of halibut and the potential for price-differentiation due to sand fleas, processor representatives have indicated that they would not expect pot-caught halibut to intrinsically yield a different ex-vessel price than HAL-caught halibut (personal communication, J. Scoblic 2018).

Prices paid for halibut vary across region due to a variety of factors. The more remote an operation is, the more likely that the expenses associated with transportations costs will be higher. This includes shipment costs for the product, but also costs of establishing and improving infrastructure. Thus, in more remote regions, like in Western Alaska and the Aleutian Islands the value per pound of halibut is typical lower than, for example in Southeast Alaska. In addition, fresh product typically yields a premium over frozen product. Operations on or near the road system will spend less to ship out fresh product than a plant that must use air freight.

If there is a change in the distribution of halibut landings, there could be a change in the ex-vessel price the harvesters receive due to the regional variation or the shift from delivering a product that will be fresh to delivering a product that is frozen. However, given high costs and limited air freight capacity for many of the current processors listed in Table 39 that are in Western Alaska or the Aleutians, many of these harvesters will already be delivering halibut for a frozen market and therefore their expected ex-vessel price may not change. **Overall, the value of the halibut fishery is expected to be relatively consistent and will depend on circumstantial factors like the specification of the gear, soak time, and if there is a change in delivery locations.**

4.7.2.3 Distributional Impacts to Communities

Relating to Section 4.7.2.2, if there is a redistribution of halibut to processors where harvesters do not typically deliver, there would be positive and negative distributional impacts to communities. Some communities may experience increased tax revenue and greater economic activity if deliveries increase. Some may lose out on some of the tax revenue and the economic activity that is typically present. Table 31 (and Table 39) demonstrate historical communities where HAL halibut in the BSAI have been delivered. It is difficult to predict which communities may experience a greater volume of halibut deliveries without knowing the specific fishing grounds halibut pot vessels may prosecute. **However, as there are a limited number of processors currently accepting BSAI halibut and many of these processors are diversified to accept deliveries from other harvesters, it is expected that impacts to communities from a change in delivery patterns would be limited in scope as well.**

The distributional benefits from the opportunity to switch over to pot gear and potentially prosecute the halibut IFQ/CDQ more efficiently in the presence of killer whales could also indirectly impact communities. Income generated by QS holders, vessel owners, skippers and crew can be multiplied through a community where these individuals live and spend money. Table 19 and Table 20 demonstrate the community of residents for the vessel owner. Particularly vessel owners that have vessels greater than or equal to 50 ft LOA may be able to take advantage of this action and switch from HAL to pot gear. To

the extent that there are costs associated with grounds preemption and gear conflicts for vessels that do not switch to pot gear, this type of cost could have an indirect adverse impact as well.

With the exception of the potential for grounds preemption and gear conflicts, the proposed action is not likely to directly affect most CDQ group's resident halibut CDQ harvesters. CDQ groups are responsible for determining how to use their allocations of CDQ to generate the maximum economic opportunity for their residents. This can include fishing opportunity, as well as other type of economic development. In some cases, when a species is accessible to residents in nearshore waters, the group will make the CDQ available to the residents that commercially fish. Most of these vessels are small. All of these vessels are smaller than 57 ft LOA, and the majority are under 32 ft LOA (NPFMC 2017c). Due to their size, it is unlikely that these vessels would attempt to use pot gear to harvest halibut CDQ. Some CDQ residents also hold IFQ and participate in the IFQ fisheries. For these residents, as well as those that may have a vessel large enough to convert to pot gear, this action may result in distributional benefits.

CDQ groups will sometimes use harvesting partners to harvest their CDQ allocation. Sometimes groups fully or partially own larger vessels that will harvest the group's allocation. Sometimes groups will lease their halibut CDQ out to an unrelated vessel for a fee. CDQ groups will use the revenue from these ventures to fund other economic development projects within the communities. Based on the preferred alternative, halibut CDQ would have the opportunity to account for halibut caught in pot gear. Some of these larger CDQ vessels and harvesting partners may also take advantage of the opportunity to switch over to pot gear.

4.7.2.4 Efficient Use of the Resource

As described in Section 3.4.6.2, the proposed use of pot gear may allow for halibut harvesters to use the halibut resource more efficiently in a few ways that could affect other halibut users.

The first way is through a possible reduction of unobserved halibut mortality from whale depredation. If halibut harvesters switch from HAL fishing in areas where some unobserved proportion of their catch had been preyed upon by killer whales in the past, to pot gear which is more difficult for whales to access, this may constitute a more efficient use of the halibut resource. All halibut users may be indirectly impacted through a decrease in the unobserved halibut mortality from whale depredation associated with HAL fishing in certain areas. Given the level of expected change (see Section 4.7.2.1.1) and the total coastwide removal, however, this change is likely to be minor overall.

The second way increased harvest efficiency may indirectly benefit other halibut users is through the retention of legal-size halibut in the sablefish pot fishery, which could represent a reduction of regulatory discards. This wastage is accounted for (e.g. for 2018, the discard mortality rate for halibut in the sablefish pot fishery is estimated at 9% for both CPs and CVs; 83 FR 8365, February 27, 2018), although there may be some unobserved mortality due to whale depredation that is not fully captured in the DMR. Halibut users whose allocation is directly affected by the total removals (i.e. the commercial sector and the charter sector in Area 2C/3A), may benefit if total estimated removals decrease with a reduction in some legal-size fish being discarded. As demonstrated in Table 4, the level of legal-size halibut caught incidentally in sablefish pot gear in the BSAI is shown to be low, particularly compared to total removals. Thus, even with more efficient use of halibut IFQ/ CDQ in the sablefish pot fishery, very minimal impacts are expected to be felt by other users. Sublegal-size halibut (U32 inches) would also still contribute to wastage in the sablefish pot fishery.

4.7.3 Gear Retrieval Requirements (Element 1)

Alternative 2, Element 1, Option 1 (Preferred) would maintain the status quo, with no gear tending requirements for BSAI IFQ/CDQ pot vessels. This includes the existing BSAI sablefish pot fisheries, as they currently do not have Federal gear tending requirements.

Element 1, Option 2 would require vessels fishing IFQ/CDQ with pot gear in the BSAI to tend their pot gear every 5-10 days (sub-options). As written, this element would add a new requirement to all BSAI pots used to fish sablefish as well as halibut IFQ/CDQ. A “pot used to fish sablefish or halibut IFQ” is a pot that is not directed fishing for another groundfish or shellfish species, as described in Section 2.2.

The Council considered possible gear tending regulations while balancing the risk of grounds preemption and gear conflict from a new sector, with the expected effectiveness of the measures, as well as the implications to the BSAI IFQ/CDQ harvesters that are currently participating or wish to participate with pot gear. Section 4.7.2.1.4 describes the potential benefits of including regulations to tend gear; i.e. mitigating the risk of grounds preemption and gear conflict issues that could create adverse distributional impacts on certain categories of vessels. Specifically, vessels that fish in the same footprint as the pot vessels intend to fish, that are not able to convert to pot gear may be disadvantaged if vessels set pot gear on mutual fishing grounds for extended periods of time, preventing HAL vessels from deploying gear for fear of gear entanglement. This section notes that compared to other IFQ areas (for instance in the GOA) there has been little testimony about preexisting gear conflict and grounds preemption concerns. However, there has been testimony from individuals concerned for the potential for gear conflicts and the uncertainty of the footprint of a new fishing sector. While the analysis expects this new gear type will be limited in use, at least in the near future (see Section 4.7.2.1.1), gear tending regulations would seek to minimize risk of conflicts.

As no definition of “gear retrieval” or “tending” exists, as specified in Amendment 101, “hauling, re-baiting, and re-setting” pot gear meets the requirement of tending gear under Element 1, Option 2. A gear retrieval requirement could mitigate grounds preemption issues in the BSAI if the gear is truly relocated. However, if a fisherman using pot gear intends to re-set his or her gear, then there is little to no opportunity for a HAL fisherman or another pot fisherman to fish in that location. Element 1, Option 2 would not require gear to be removed from the fishing grounds when they deliver to shore, so long as it could be tended in the appropriate time period. However, it would require vessels to remove gear from the water post-season (as it would be impractical to continuously tend it throughout the winter).

The remainder of this section describes gear retrieval requirements in other pot fisheries, expected impacts of varying gear retrieval requirements on the halibut fishery as well as the existing sablefish pot fishery, the challenges of implementing these requirements, and a discussion on lost gear.

4.7.3.1 Gear Retrieval in Other Fisheries

While there are currently no pot storage or retrieval rules established for the BSAI fisheries in Federal regulations, other pot fisheries throughout the West Coast and Alaska have restrictions on leaving pot gear on fishing grounds as well as storing gear after the fishing season is completed. This section provides some examples of gear retrieval requirements in other fisheries.

The State of Alaska (ADF&G) has jurisdiction over the storage requirements for both State and Federal crab fisheries. These regulations vary by registration area and species.⁴⁸ ADF&G uses a number of measures including establishing specific gear storage designated areas, allowing storage anywhere up to a certain depth (e.g. 25 or 75 fathoms), and allowing gear to be left on the fishing grounds a certain number of days after the end of the fishing season. Table 40 demonstrates some example ADF&G gear storage requirements using the king and Tanner crab fisheries.

Table 40 Example ADF&G gear storage requirements for State and Federal king and Tanner crab fisheries

King crab	
5 AAC 34.052 King crab gear storage requirements (general requirements) (p. 7)	<ul style="list-style-type: none"> • 25 fathoms or less or on the grounds for 7 days following the closure
5 AAC 34.627 King crab gear storage requirements for Registration Area O (Aleutians) (p. 28)	<ul style="list-style-type: none"> • 25 fathoms or less for single line pots • 75 fathoms or less for longline pots
5 AAC 34.827 King crab pot storage requirements for Registration Area T (Bristol Bay) (p. 31)	<ul style="list-style-type: none"> • Regulations provide the lat/longs for a pot storage area in Area T that can be used during the closed season in addition to regulations at 34.052
5 AAC 34.927 King crab pot storage requirements for Registration Area Q (Bering Sea) (p. 39)	<ul style="list-style-type: none"> • Regulations provide the lat/longs for a pot storage area in Area Q that can be used in addition to regulations at 34.052
Tanner crab	
5 AAC 35.052 Tanner crab gear storage requirements (general requirements) (p. 48)	<ul style="list-style-type: none"> • 25 fathoms or less or on the grounds for 7 days following the closure
Rationalized crab fisheries	
5 AAC 39.675 Crab pot gear storage for Bering Sea/Aleutian Islands IFQ, CDQ, and Adak community allocation crab fisheries (p. 121)	<ul style="list-style-type: none"> • Allows for king and tanner gear to be stored at depth on the grounds for 14 days following the completion of fishing activity in rationalized fishery.

Source: ADF&G 2017-2019 King and Tanner Crab Commercial Fishing Regulations

In addition, ADF&G has gear storage regulations that apply to shrimp and Dungeness crab fisheries (5 AAC 31.052 and 5AAC 32.052, respectively) as well as state water groundfish pots in the BSAI area (5 AAC 28.632). Regulations for shrimp pots and Dungeness crab pots do not allow for gear storage in the registration area during the closed season, except that in some areas pots can be stored on fishing grounds at depth on the grounds for between 72 hours and 7 days (depending on the area) provided doors are open and gear is left unbaited. Groundfish pots that are registered in the state fisheries may be stored unbaited with doors open in waters no more than 25 fathoms.

The Pacific Northwest has several regulations that establish gear tending regulations in-season. In Washington State, WAC 220-340-480 (1)(e) prevents fishermen from leaving pots in-season deployed for more than 21 days without attending them. WAC 220-340-450 (1); (2)(b) makes it unlawful to set gear in closed areas, even if it is not being actively fished. According to CFR 660.230(b)(3), in the West coast groundfish limited entry fixed gear fishery, “gear must be attended at least once every 7 days”.

⁴⁸ Dungeness Crab Pot Storage requirements at 5 AAC 32.052
https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015-2018_cf_shrimp_dungeness_misc_shellfish.pdf
 King Crab Pot Storage requirements at 5 AAC 34
http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2017-2020_cf_king_tanner_crab.pdf
 Tanner Crab Pot Storage requirements: 5 AAC 35
http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2017-2020_cf_king_tanner_crab.pdf

Amendment 101 to the GOA FMP, which authorized the use of pot gear for sablefish IFQ fishing in GOA, included several gear redeployment and removal requirements that were in response to concerns about gear conflicts and grounds preemption issues in the Southeast region. The GOA gear retrieval requirements address both in and off-season storage/retrieval of gear. The gear retrieval and removal requirements in paragraphs (l)(5)(iii) and (iv) of § 679.42 apply to all longline pot gear that is assigned to the vessel and deployed to fish IFQ sablefish and to all other fishing equipment attached to longline pot gear that is deployed in the water by the vessel to fish IFQ sablefish. The proposed rule to implement Amendment 101 explains that due to the different characteristics of the sablefish areas and IFQ fleets, different gear redeployment and removal requirements were appropriate by area (81 FR 55408, August 19, 2016). As demonstrated in Table 1 in Section 2.3, this included the following requirements differentiated by sablefish regulatory area:

- In the SEO sablefish area, a CV operator is required to remove longline pot gear from the fishing grounds when the vessel leaves the fishing grounds to make a landing.
- In the SEO sablefish area, a CP operator is required to redeploy or remove longline pot gear from the fishing grounds within five days after deploying the gear.
- In the WY and CGOA sablefish areas a CV or CP operator is required to redeploy or remove longline pot gear from the fishing grounds within five days after deploying the gear.
- In the WGOA sablefish areas a CV or CP operator is required to redeploy or remove longline pot gear from the fishing grounds within seven days after deploying the gear.

4.7.3.2 Impacts on BSAI Halibut Pot Vessels

In evaluating the potential burden of a gear tending requirement on vessels that wish to fish halibut with pot gear in the BSAI, the Council should consider the expected soak time for pots in this fishery, the likelihood of circumstances that may impact how long gear is left untended, and the implications of gear tending regulations with respect to gear storage.

As no halibut pot fishing occurs in waters off of Alaska, there are no data on halibut pot soak time from this area with which to draw from. However, BSAI sablefish harvesters typically soak their pot gear for 3-6 days, depending on the circumstances (as described below in Section 4.7.3.3). Halibut mortality is positively correlated with longer pot soak time, and the length of the soak time can exacerbate the potential for amphipod (sand flea) predation. In addition to the public benefit of decreased halibut and sablefish mortality due to shorter soak times, there is also a private benefit of finding the ideal soak time in order to deliver a marketable product to the processors. Damage that sand fleas can have on the quality of the product creates a private incentive for fishery participants to retrieve their gear in a timely manner. Since sand fleas can particularly be an issue for halibut, it is expected that the soak time for halibut pots may be shorter than for sablefish pots, and more similar to the soak time for halibut caught with HAL gear. Some fishery participants have stated they do not intend to leave halibut pots soaking for longer than 36 hours.

Ideally, a gear tending or retrieval requirement would allow flexibility for vessels to retrieve their gear while balancing desired soak time and enough time in case a vessel needs to leave gear in order to avoid unexpected circumstances (e.g. poor weather and hazardous conditions, vessel or personal issues). Choosing a very short maximum soak time could force vessels to operate in unsafe or unfavorable conditions, which OLE has stated is difficult to enforce. Aside from weather, a short soak time limit could reduce a skipper's ability to fish an optimal gear rotation if the vessel's strings are spaced out over a large geographical area, or if the skipper determines that a longer soak time yields larger fish in that area. To

increase consistency and maximize expected compliance, enforcement has suggested that gear retrieval requirements in the BSAI could mirror those in the WGOA, which state a CV or CP operator is required to redeploy or remove longline pot gear from the fishing grounds within seven days after deploying the gear (Section 4.7.9).

The proposed gear tending requirements would essentially prohibit storing pot gear in the water, as it would be impractical to continuously tend gear throughout the off-season. This requirement would not disrupt existing storage practices for a halibut pot fishery since this pot fishery has never existed before, however, such a requirement would have unintended consequences in the sablefish pot fishery, as described in the Section 4.7.3.3.

4.7.3.3 Impacts on BSAI Sablefish Pot Vessels

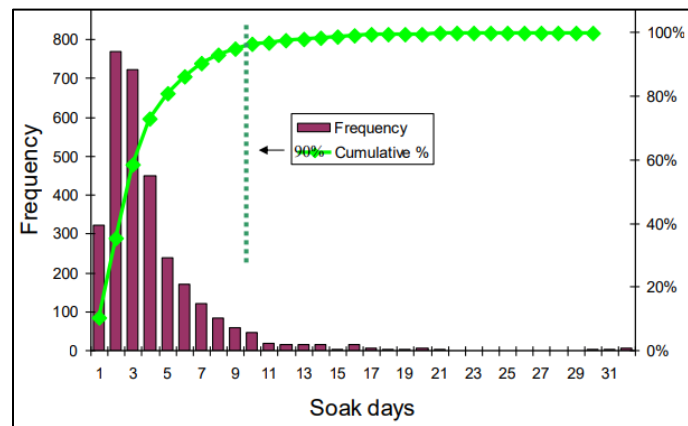
An examination of the impacts of gear retrieval requirements for pot gear must consider the potential impacts of proposed gear retrieval requirements on existing BSAI fisheries. These gear tending regulations would not apply if a pot vessel is directed fishing for a non-IFQ species (i.e., groundfish other than sablefish or shellfish). However, gear tending requirements for pot gear could negatively impact the existing sablefish pot fishery in the BSAI.

As described in Section 4.5.3, there have been between 3 and 9 vessels participating in the BSAI sablefish fisheries with pot gear between 2011 and 2016. In that time frame, sablefish IFQ holders have left between 38 to 66 percent of the BSAI sablefish TAC unharvested. This under-harvest is the result of many factors, including the cost it takes to prosecute (financial as well as the opportunity cost), given the broad distribution of the stock which results in relatively low CPUE.

In order to make these trips economically viable, the few vessels that do participate are generally large (Table 26 demonstrates that all but 1 between 2011 and 2016 was greater than 60 ft LOA), typically use a greater number of pots than vessels in the GOA and attempt to maintain fishing effort by hauling some sets while other pots soak. Vessel operators attempt to keep pots fishing even when the vessel is delivering live sablefish shoreside. The constant rotation of fishing gear means that not all the gear has to or necessarily can fit on the deck of the vessel at one time.

The possibility of the proposed regulations negatively impacting the current BSAI sablefish pot fleet depends on the typical soak time and the occurrence of “unusual” circumstance in which pots are left on the grounds longer, as well as their practice of gear storage when they are done fishing for the season. Participants in the BSAI sablefish pot fishery have described that while they are present on the fishing grounds they are usually tending gear every 3-4 days, but depending on the presence of sand fleas and likelihood of bycatch issues in certain areas (for example, vessels tend to retrieve gear more often in the AI to avoid GKC bycatch (personal communication, L. Hertzog 2018)), some sablefish pot vessels soak their gear for 5-6 days if they are able. In a study from 1999-2005, soak time for sablefish pot gear was typically on the order of one to three days. Ninety percent of BSAI sablefish pots were soaked for seven or fewer days (Figure 36). Because these vessels are generally delivering a live product, they check their gear often, even if it is soaking for a longer period of time.

Figure 36 Number of soak days for 1999-2005 BSAI pot fisheries



Source: GOA Safe Report, 2008⁴⁹

Based on this description of soak time, it would appear that a gear-tending requirement may not disrupt the typical pot haul rotation; however, participants have described both expected and unexpected circumstances during the season in which their gear has been left untended for longer. These proposed requirements may create circumstances where these vessel operators deem it uneconomical to pursue harvesting their quota (personal communication, M. Dye 2018; personal communication, L. Hertzog 2018). When these vessels deliver sablefish shoreside, gear may be soaking longer than the typical 3-4 days. It was suggested that a gear tending requirement would not allow these vessels to fish certain areas, deliver their fish and get back to the fishing grounds to tend all gear that was previously set if they run into bad weather (personal communication, L. Hertzog 2018). If a vessel operator anticipates unfavorable ocean and weather conditions, if they have had issues with sand fleas, or have known reasons they may remain in port longer, they may leave pots on the grounds unbaited. Harvesters also experience unexpected circumstances (e.g., ocean and weather conditions, vessel maintenance issues, personal issues) which could put them in violation of gear tending requirements. Requiring a vessel to return to and tend its gear by a certain day could force vessels to operate in unsafe or unfavorable conditions, which OLE has stated is difficult to enforce.

Current BSAI sablefish pot participants use different methods to store their gear post-season. A gear tending requirement, which applies year-round, may have various impacts on these harvesters. Some vessels pull their gear out of the water at the end of the season. It is a big investment to move large amounts of fishing gear, as it can take several trips. Hauling this gear and transporting it adds fuel and labor costs, as well the cost to store the gear. Safety may be a concern if vessels were to overload gear onboard in order to make fewer trips. This is especially true if they have fish onboard in addition to gear. Fishery participants have also noted that gear stored out of the water may sometimes freeze overwinter, making it more difficult to re-deploy in the spring.

Other sablefish pot vessels store their gear in the water over the winter, as it takes extra time and money to haul gear back to town. These pots are stored in nearshore, shallow waters (~30 fathoms) outside of transit zones. These vessels haul their gear and take several trips to the nearshore areas where they store their gear. It can take several trips to haul all of the gear to its storage area at the end of the season. As mentioned in Section 3.5.3.2, floating vertical lines on pot gear left in the water lead to concerns over marine mammal entanglement, especially if the gear is left untended for a long time. According to fishery

participants, because vessels that store their gear over winter generally store gear in shallower areas, they have not had any entanglement issues, as whales are generally farther offshore. Requiring these vessels to remove their gear from the water would add the additional cost of a place to store gear, and the extra costs of more fuel and labor depending on how much farther the vessel must travel and haul gear to get to a place where it could store gear.

4.7.3.4 Enforcement of Gear Retrieval Requirements

One of the largest challenges in implementing any type of gear tending or retrieval requirements is the ability to enforce these requirements, as OLE enforcement representatives have expressed (Section 4.7.9). To implement gear retrieval requirements for gear used in the IFQ program, there would need to be a way to identify pots used to fish halibut or sablefish IFQ (as opposed to other groundfish or crab). It is difficult for enforcement to know which pots in the water are being “used to fish IFQ/CDQ halibut or sablefish” unless enforcement is present when gear is being hauled. Unless OLE happens to be in the same area for multiple days and sees the gear untended for the duration, or they hear from others, it is difficult for enforcement to know who is responsible for which pots, what the pots are fished for, or how long they have been on the grounds.

OLE can, however, access self-reported logbook information when conducting dockside inspections. Information on pot gear sets that is self-reported in logbooks includes: begin and end positions in latitude and longitude, and time to the nearest minute when the pot gear entered the water and when the last pot of a set is retrieved (NPFMC 2016a). To determine that all vessels in a pot fishery tend or retrieve their gear, logbooks would need to be required to be maintained by vessels participating in the fishery (Element 3).

4.7.3.5 Lost Gear

As mentioned in Section 4.7.1, lost gear can also preempt fishing grounds or cause gear conflicts until it is removed. In addition, there is concern that lost gear may continue “ghost fishing”, as further discussed in Section 4.7.4.3. Lost pot gear was particularly a concern during the derby sablefish fisheries and the derby BSAI crab fisheries (see Section 4.7.2.1.4). Pre-crab-rationalization, it was estimated that 10% to 20% of the crab pots were lost each year (Kruse & Kimker 1993). Estimates for post-rationalized seasons range from 1% to 14% of registered pots; although estimates of lost pots are imprecise (NPFMC 2017d). Sea ice can be a contributing factor to lost BSAI crab pots. In both fisheries, these conflicts were understood to have in large part emerged from the derby-style fishery that existed at the time, wherein fishery participants were competing on increasingly congested fishing grounds and in increasingly shorter fishing seasons for a limited allowable harvest. Participants in the BSAI sablefish pot fisheries noted not having recent problems with lost gear (personal communication, L. Hertzog 2018).

Currently, there are no requirements for reporting lost gear in the BSAI; however, vessel operators may list lost pots in their Federal Daily Fishing Logbook. The only regulations NMFS has about lost gear are from the GOA pot sablefish rule effective in 2017. According to regulations at §679.5(l)(1)(iii)(I), vessel operators in the GOA using longline pot gear must report the number of lost pots to NMFS in the vessel's PNOL submitted prior to landing. There are also requirements for replacing pot tags in the GOA as well.

In 2017, the first year of sablefish pot fishing in GOA since implementation of Amendment 101, 11,557 pots were registered through pot tags and 168 pots were lost. It may be reasonable to expect a learning curve associated with a new gear type. If the same harvesters continue to prosecute this fishery with pot gear, there may be a decrease in annual lost gear over time.

When developing these requirements for the GOA, the Council and NMFS considered and rejected a requirement for vessel operators to report the coordinates of lost longline pot gear to NMFS in an electronic form for release to the public. The Council and NMFS did not adopt this option for two

reasons. First, the coordinates of lost longline pot gear pots are confidential under section 402(b) of the Magnuson-Stevens Act and potentially other laws. Second, NMFS cannot enforce a requirement to report the loss of longline pot gear because it is not possible to verify that fishing gear is lost.

While the Council did not recommend the formalization of a voluntary pot gear-reporting program in its recommendation of Amendment 101 to the GOA FMP, the Council encouraged fishery participants to work cooperatively to develop electronic reporting protocols for reporting the location of pots being fished and/or pots left on the fishing grounds. When recommending Amendment 101, the Council determined, and NMFS agreed, that the expressed willingness of fishermen who intend to use longline pot gear to work beyond the gear specifications and gear retrieval requirements, combined with the Council's commitment to review the use of pot gear, would minimize the potential for gear conflicts and grounds preemption.

Fishery participants are aware of the negative consequences of gear conflicts, grounds preemption, and lost gear. Some have voiced their opinion that in order to most effectively deal with such conflicts, it may be best to wait to see if any issues do arise, given the small expected number of entrants into the halibut pot fishery. Furthermore, the expected negative impacts to existing fishery participants should be weighed against the uncertainty of potential gear conflicts. Attempting to address this type of issues with regulation before fully understanding the details of the issue may not allow managers to properly develop an effective regulatory solution.

4.7.4 Gear Specifications (Elements 2 and 4)

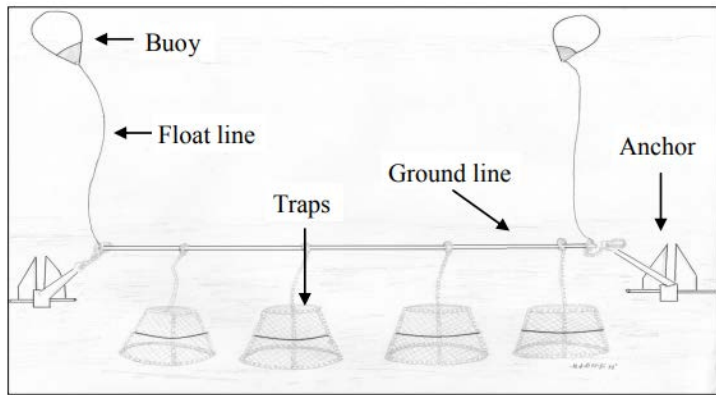
4.7.4.1 Description of Pot Gear

As described in Section 2.2, there is no regulatory definition for “pot gear used to fish for halibut or sablefish IFQ/CDQ”, though there are requirements for groundfish pots at CFR §679.2 that require a biodegradable panel and maximum tunnel opening size of 9 inches.

Longline pot gear involves a stationary, buoyed, and anchored line with two or more pots attached (Figure 37), whereas single pots are limited to one pot on each line. A float line connects the pots to a buoy on the surface of the water. Though it is not required under current regulation, the Sablefish Gear Committee and the USCG reported that marking both ends of the pot longline string is the prevailing industry practice in the sablefish pot fishery (NPFMC 2016a). A groundline connects the pots on the ocean floor. The number of pots per set depends on the size of the vessel and the captain's efforts. Sablefish pots are generally longlined with approximately 40-135 pots per set (Hanselman et al. 2017).

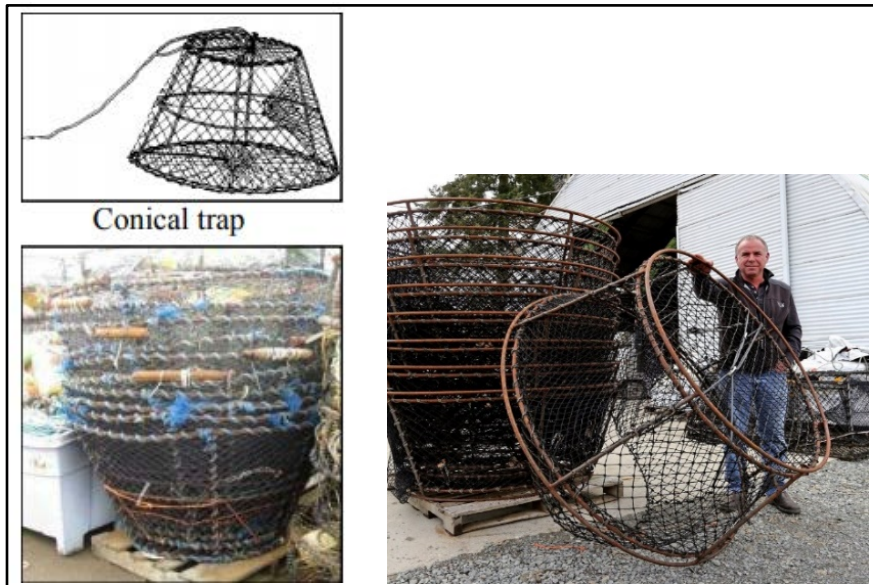
There are no regulations specifying pot shape; sablefish pots are generally conical, trapezoidal, or rectangular (Figure 38, Figure 39, Figure 40). The conical pots have collapsible bottoms, which allow them to be stacked (Figure 38). Size of pots used to fish sablefish varies by vessel, and whether they are fished as single pots or longlined. In discussions with those in the fishery, sablefish pots are generally between 4x4 and 7x7 feet, and weigh no more than 200 pounds (personal communication, J. Kauffman 2018; personal communication, R. Hanson 2018). In general, post used for sablefish in Alaska are medium-size pots which are smaller than crab pots, but bigger than those used to target shrimp.

Figure 37 Longline pots for sablefish



Source: <http://www.westcoast.fisheries.noaa.gov>

Figure 38 Conical traps for sablefish



Sources: <http://www.westcoast.fisheries.noaa.gov>

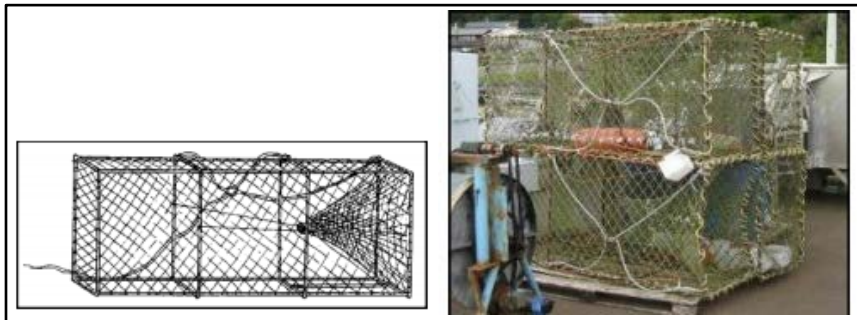
<https://www.seattletimes.com/seattle-news/environment/feds-approve-cod-pots-to-outsmart-opportunistic-whales/>

Figure 39 Trapezoidal sablefish trap



Source: https://kcaw-org.s3.amazonaws.com/wp-content/uploads/2015/02/FinFishPots_NeptuneMarineProducts.jpg?x41310

Figure 40 Rectangular sablefish trap



Source: <http://www.westcoast.fisheries.noaa.gov>

On the larger vessels, vessel operators may end up using their 6x6-, 7x7- or 8x8-foot cod pots to target halibut. These pots are oftentimes modified crab pots, which are constructed with a steel bar frame (1¼ inch-diameter) and covered with tarred nylon mesh netting (3½ inch stretched mesh), and the openings are refitted with plastic triggers or a small mesh “sock”. Each pot has two or three tunnel openings on opposite sides, with plastic finger funnels to retain the fish. A biodegradable escape panel of untreated cotton must be sewn into the mesh (Mohn, et al. 2009) so that in the case the gear is lost, any organisms trapped inside will be able to escape when the cotton panel degrades, thus preventing ghostfishing from occurring. The biodegradable panel is described further in Section 4.7.4.3.

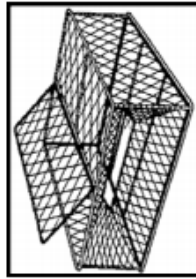
Crab pots are often retrofitted for harvesting Pacific cod. Some fishermen may choose to use these retrofitted crab pots to fish halibut. Generally, if a vessel were using crab pots, they would be deployed as single pots rather than on a longline. Crab pots are generally large (700-800 lbs), and either conical or rectangular, but can also be circular or pyramid-shaped (Figure 41) and can be modified to have more restricted openings and additional layers of mesh or netting to target different sizes of crab.

Figure 41 Different styles of crab or Pacific cod pots/traps



Conical crab pot

Dimensions: 88" base diameter
x 32" tall, 27.5" top opening



Crab or Pacific Cod



Rectangular crab traps

Made from galvanized steel and are covered with polypropylene mesh
Dimensions: 89" x 89"x 36"

Source: <http://www.westcoast.fisheries.noaa.gov>

Because there are few current regulations for pot gear specification, under the proposed action (particularly with the adoption of Element 2) potential “new entrants” would have considerable flexibility in the size and configuration of pots they use to harvest halibut IFQ/ CDQ in the BSAI. For halibut quota holders that already have sablefish pot gear and a vessel equipped to haul this gear, these sablefish pots may be modified or used as is to target halibut as well. Additionally, quota holders that have access to Pacific cod or crab pots may choose to single pot these larger and heavier types of pots. Public testimony at the April 2018 Council meeting indicated that some quota holders may invest in a new configuration of pots specifically designed for targeting halibut. These pots may be much larger in size than typical sablefish pots. One gear manufacturer suggested using a rectangular/ pyramid nesting pot design, 6 ft by 44 in by 26 in (approx. 70-85 lbs), with a tunnel opening that would allow the harvester to target up to an 80 lb halibut (personal communication, L. Nylander 2018). This type of pot may be longlined with 25 to 50 pots per string. Others investing in new gear may choose a heavier pot design more similar to rectangular crab pots.

As a halibut pot fishery has not existed in waters off Alaska, this fishery will likely emerge in an experimental state. Harvesters will likely work with different pot designs to understand which gear design is effective. In general, particularly for those investing in new gear, there is a private incentive to design a pot to maximize catch of the target species, while minimizing bycatch of sublegal and non-target species that take up space in the pot. Thus, new entrants may consider mesh size, escapement mechanisms (rings, slots), types of tunnel openings and other types of design features that may make their efforts more effective (which are discussed more in the following sections). In considering the proposed action, the Council may consider which design elements in the following sections may be appropriate to specify in regulations, versus which elements may be accounted for by industry standards.

The following sections will focus on potential gear modifications on different parts of pots.

4.7.4.2 Tunnel Opening (Element 2)

The second element of the preferred alternative would create an exemption to an existing gear specification that attempts to exclude halibut. According to §679.2 under authorized gear: “each pot used

to fish for groundfish must be equipped with rigid tunnel openings that are no wider than 9 inches and no higher than 9 inches, or soft tunnel openings with dimensions that are no wider than 9 inches.”⁵⁰

This element considers an exemption to this requirement for vessels that have unfished halibut IFQ/CDQ onboard (and are required to retain halibut) to allow for more effective harvest of halibut IFQ/CDQ with pot gear. Adoption of this element would be expected to allow for greater flexibility for IFQ and CDQ participants (that hold both sablefish and halibut quota) to use their quota opportunistically and minimize variable costs. As described in Section 4.7.1, the ability to participate in a mixed-trip, harvesting both halibut and sablefish quota, may make this opportunity more viable for some sablefish quota holders. **Without this element, the extent to which halibut quota holders in the BSAI could target halibut with pot gear would be greatly reduced.**

This exemption expands both the environmental and socio-economic impacts of the action. Section 3.4.6.2 and Section 3.8.2 discuss the potential changes in size selectivity, magnitude, and catch composition of bycatch in pots that have a tunnel opening larger than 9 inches. Moreover, if there is a shift in some of the halibut IFQ/CDQ from HAL gear to pot gear due to this opportunity, this may reduce some halibut mortality resulting from whale depredation of HAL gear that currently goes unobserved. This element could lead to increased efficiency in the harvest of the resource.

Under Alternative 2, Element 2 the Council could exempt pots used to fish halibut or sablefish IFQ/CDQ from the 9-inch maximum size of the tunnel opening, allowing fishery participants the flexibility to decide how large they want the tunnel opening. Alternatively, a 9-inch requirement could be replaced with a larger maximum size restriction, which would still regulate how large of a fish could be caught (mentioned in Section 3.4.6.2). A maximum size limit may prevent larger, spawning female halibut from entering the pot. One pot manufacturer suggested a smooth sock tunnel opening with a 72-inch maximum perimeter should prevent larger halibut from entering, while allowing for retention of a fairly large (~80 lbs) halibut (personal communication, L. Nylander 2018). The Council did not adopt this particular specification as an element when it adopted Element 2, which as adopted by the Council would exempt pots used to fish halibut or sablefish IFQ/CDQ from the 9-inch maximum size of the tunnel opening when the vessel has unfished halibut IFQ/CDQ and is required to retain halibut

The Council asked the analysts to address ways to allow escapement of undersize halibut, crabs, and other incidental catch. One gear manufacturer suggested that soft tunnel openings of potential halibut pots could reduce crab bycatch, as they are difficult for crab to enter (personal communication, L. Nylander, 2018). Other potential modifications are included in the following discussion.

4.7.4.3 Escapement Mechanism (Element 4) & Biodegradable Panel

The tunnel opening on pot gear is a contributing factor to the size and type of species that may enter a pot; however, the size and type of species that stay in pot gear depends on additional gear specifications including, mesh size, escapement mechanisms (e.g. rings or slots), and the use of biodegradable panels. Alternative 2, Element 4 considers whether regulations should provide specific escapement mechanism specifications for pot gear used to fish for halibut or sablefish IFQ/CDQ in the BSAI under the proposed action. As previously described, under the status quo, groundfish pots in federal fisheries in the BSAI are not required to have escape rings or a specific mesh size, but regulations at §679.2 do require federal

⁵⁰ Fishery participants have noted confusion surrounding the 9-inch maximum size of the tunnel opening, which has led to inadvertent violations. Because pots can have either soft or rigid tunnel openings, the measurements of the opening dimensions may vary. A 9-inch by 9-inch rigid opening would have one dimension (the diagonal) longer than 9 inches. If a pot has a soft tunnel opening, this opening can legally only be 9 inches stretched.

groundfish pots be equipped with a biodegradable panel at least 18 inches. This requirement to include a biodegradable panel would also apply to pot gear used to harvest halibut in the BSAI.

This section highlights the relationship between different types of escapement mechanisms and biodegradable panels, and bycatch. The analysts then provide examples of pot specifications that have been regulated by the State, as well as a discussion of whether or not these may be appropriate for a pot targeting halibut. Finally, this section describes potential impacts on existing sablefish pot vessels as well as potential halibut pot vessels if escapement mechanism specifications were regulated under this proposed action. Ultimately, the Council did not recommend any requirements for an escapement mechanism under Element 4.

4.7.4.3.1 Escape Rings, Mesh Size and Biodegradable Panels, and Bycatch

One of the expected impacts of halibut IFQ/ CDQ holders switching to pot gear is a change in the type, magnitude, and size of the bycatch. The analysts anticipate a shift from types of bycatch typically caught on HAL gear to bycatch that is typically caught in pot gear, as described in Section 3.8. Based off the catch from sablefish and Pacific cod pot vessels in the BSAI, analysts would expect to see more incidental catch of crab (PSC), flounder, grenadier and snails, and less skates, rockfish, sculpins, and Pacific cod. However, the sablefish and Pacific cod pot fisheries may not be a perfect representation of expected bycatch if harvesters design halibut-specific pots, which, for instance, incorporate tunnel openings greater than 9-inches wide. Because there is no standard “halibut pot” design in waters off Alaska, experimental pot designs could lead to more or less bycatch (or crab PSC), depending on how they are designed and where gear is deployed. Halibut harvesters wishing to use pot gear in the BSAI may also choose to rely on groundfish pots or crab pots, but fish in a different area and depth compared to sablefish, for instance, which could alter the bycatch present in their pots relative to crab or groundfish fisheries.

In particular, the Council may be concerned about crab PSC, as pot gear is an effective gear type for harvesting this species. Table 14 demonstrates that the sablefish pot fishery catches more golden king crab than any other PSC species and the Pacific cod pot fishery catches more *C. bairdi* than any other PSC species. In addition, Section 0 describes how the Pribilof Islands blue king crab (PIBKC) is one of the two overfished stocks in the North Pacific (NMFS indicated that the SMBKC stock is overfished, dated October 22, 2018). Thus, there is concern about potential PIBKC bycatch in halibut pot gear.

The Council may also be concerned about bycatch of juvenile halibut (less than 32 inches), or other juvenile fish from an increase in the use of pots. Table 3 demonstrates that pot gear has tended to have a greater proportion of sub-legal sized halibut than HAL gear, possibly due to the requirement to have a tunnel opening no larger than 9 inches, which limits entry of larger halibut.

A pot with appropriate mesh size and escapement mechanisms (e.g. rings or slots) can be designed to maximize the catchability of the target species while minimizing retention of unwanted PSC. For example, the mesh size of pots determines what size of a crab or fish can escape. An additional escapement mechanism (e.g. an escapement ring or slot) would allow escapement of crabs and fish that are too large to fit through the mesh, but would not allow the larger, targeted sized species to escape.

Biodegradable panels reduce occurrences of ghost fishing, which occurs when gear is lost and it continues to trap fish (NPFMC 2017). Studies have shown that unbaited crab pots can continue to catch crab, and pots are subject to rebaiting due to the capture of other fish and crab (NPFMC 2017). Biodegradable panels aim to prevent mortality of target and bycatch species by allowing escapement once the cotton thread degrades, essentially disarming the gear if it is lost. Regulations at CFR §679.2 state that “Each pot used to fish for groundfish must be equipped with a biodegradable panel at least 18 inches (45.72 cm) in length that is parallel to, and within 6 inches (15.24 cm) of, the bottom of the pot, and that is sewn up with untreated cotton thread of no larger size than No. 30.”

While Alternative 2 does not mention any change to the biodegradable panel, at the April 2018 Council Meeting, the Advisory Panel and the public noted that if pots are designed with larger tunnel openings and this gear is lost at sea, an 18-inch biodegradable panel may not be large enough for the organisms that make their way inside a larger tunnel opening. There was the suggestion that allowing for the escapement of fish in lost pots would require having a biodegradable panel size that is at least the same size as the tunnel opening. A biodegradable panel that is smaller than the tunnel opening may not allow large organisms to escape freely if caught in lost gear.

4.7.4.3.2 Examples of Escape Rings and Escape Mesh in Regulations

Because there are no current federal requirements regarding escapement mechanisms for groundfish pot gear in the BSAI the analysts have relied on State of Alaska regulations for examples. The State of Alaska fisheries have employed escapement mechanism requirements in crab fisheries, which vary based on the crab fishery and management area (see Table 41).⁵¹ In these fisheries, participants have the option to either include escapement rings in their pots or to rely on a certain mesh size to accomplish the same objective of allowing small fish and crab to escape. Generally, king crab pots are required to have larger escapement rings or mesh size than the Tanner crab pots.

Table 41 ADF&G king and Tanner crab pot specifications

	<i>King Crab Fisheries</i>				<i>Tanner Crab Fisheries</i>		
	BBR	SMB	WAG	EAG	BSS	EBT	WBT
Max. Pot Dimensions	No larger than 10'x10'x42"						
Buoy Markings	ADF&G number must be displayed on at least one buoy per buoy cluster						
Biotwine	Cotton twine 18" long or greater within 6" of the bottom, not larger than 30-thread line knotted only on each end, except can be 60-thread or less for WAG and EAG fisheries						
Tunnel Rigidity	Rigid with 20 pounds of pressure in all directions						
Tunnel Opening	No less than 5" in any one dimension, minimum 36" perimeter				No more than 3" high, minimum 36" perimeter		
Escape Rings	NA	8 rings (4 rings per 2 sides) 5.8" diameter on a vertical plane within 1 mesh size from bottom of pot	4 rings 5.5" diameter on a vertical plane	8 rings (4 rings per 2 sides) 4" diameter on a vertical surface within 1 mesh size from bottom of pot	4 rings 4.5" diameter on a vertical surface within 1 mesh size from bottom of pot		
		OR	OR	OR	OR		
Escape Mesh	9" mesh 1/3 of one vertical surface	8" mesh 1/2 of vertical side	9" mesh 1/3 of one vertical surface	5.25" mesh 1/2 of one side	6.5" mesh 1/3 of one vertical surface		
Pot Limit (buoy tags)	none	none	none	none	none	none	none
Cod Pots	10	10	0	0	20	20	20

Source: ADF&G Dockside Sampling Manual, 5 AAC 34.050, 34.081, and 35.525 (d)

BBR: Bristol Bay red king crab; SMB: Saint Matthew blue king crab; WAG: western Aleutian golden king crab; EAG: eastern Aleutian golden king crab; BSS: Bering Sea snow crab; EBT: Bering Sea Tanner crab (east); WBT: Bering Sea Tanner crab (west).

In the Norton Sound Section of the Bering Sea (Registration Area Q), each pot must have at least four circular escape rings with a minimum inside diameter of 4.5 inches installed on a vertical plane within

⁵¹ ADF&G has jurisdiction over pot specifications for the Federal crab fisheries.

one mesh measurement from the bottom of the pot or have at least one half of one vertical surface or a square pot, or sloping side-wall surface of a conical or pyramid pot, composed of not less than six and one-half inch stretched mesh webbing.⁵²

The Board of Fish recently passed new regulations that require two escape rings in the Southern Southeast sablefish pot fishery with a minimum inside diameter of four inches on opposing vertical or sloping walls of the pot. The introduction of these escape rings for pot gear is intended to reduce harvest of immature sablefish (ADF&G 2018). An industry participant noted they believe a 4-inch escape ring is too large and has allowed target size sablefish to escape, but a 3 7/8-inch ring might be effective. Small adjustments in size of escape rings can have large effects on the catch of target and non-target organisms.

4.7.4.3.3 Possible Council Action and Potential Impacts to Harvesters

Based on the information presented, there are several options for addressing Element 4 under Alternative 2. The options are: 1) no action, which would not require any further escapement mechanisms and would maintain status quo gear requirements 2) specifications for certain escapement rings/slots and/or mesh size could be identified based on specifications employed by ADF&G in the BSAI crab fisheries or other sources, or 3) a policy statement could be established regarding the importance of some type of escapement mechanism in the gear design, and the issue of bycatch and escapement of incidental catch could be reevaluated at 3-year review of the program (Preferred).

The benefit to halibut IFQ/ CDQ participants of not requiring escapement mechanisms (beyond the status quo) would be that they could use available groundfish or crab pot gear opportunistically or choose a new design that performs best for the IFQ species they intend to target. It would also allow more time with which to experiment and gain further understanding of the effectiveness of different styles of escapement mechanisms, both in terms of catching the target species, as well as evading bycatch. Choosing not to regulate specific escape mechanisms does not necessarily mean the industry will not adopt escapement mechanisms. If harvesters are using modified crab pots, for example, they may leave required escapement rings in the mesh of the pots. Reducing bycatch of non-target species and PSC may provide the private incentive of creating more space in the pot for the target catch. However, this action by the Council may pose a risk that harvesters do not voluntarily include certain mechanisms designed to minimize bycatch and catch more than desirable.

PIBKC PSC is a concern in its status as an overfished stock. Again, certain mechanisms designed to minimize bycatch may reduce the risk of approaching the PIBKC OFL. However, these risks would also be mitigated by closing the PIHCZ to all pot gear, requiring VMS (Element 3), and allowing NMFS inseason authority to close halibut fishing in the event that there are conservation concerns (Element 5).

If specific escapement mechanism requirements were included in regulations for pot gear, based on the scope of this action as referenced in Section 2.2, the default assumption would be that this requirement would apply to all pots used to fish IFQ (i.e. not directed fishing for another species) in the BSAI. Therefore, these new regulations could pose a cost (in terms of time and effort required to install escape mechanisms) to the existing sablefish pot fishery in the BSAI which is not currently required to have these escapement mechanisms on pots. As groundfish pots are currently not required to have escapement mechanisms beyond what is mentioned under §679.2, any new gear specifications applied to all “pots used to fish IFQ” could require the existing sablefish pot fishery to reconfigure their gear to align with the requirements. The Council could choose to investigate flexible regulations to separate pots intended to

⁵² Example crab escape mechanism regulation for State of Alaska: 5 AAC 34.125: Registration area Q. Retrieved from http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2017-2020_cf_king_tanner_crab.pdf

target halibut and those in the existing sablefish fishery, but this would require further investigation. As explained in Section 2.2, the need to define “halibut pots” would likely lead to enforcement challenges, complex regulations, and some practical challenges for quota holders that intend to harvest both halibut and sablefish with pot gear.

The benefits of reduced bycatch (as described earlier) should also be weighed against the impacts of requiring gear specifications for “new entrants” in a BSAI halibut IFQ/ CDQ pot fishery. The first impact is that unless the halibut IFQ/ CDQ holder is using crab pots, which adhere to the same specifications, it will likely add a financial cost to the operation as the halibut IFQ/ CDQ holder ensures all pots are outfitted with a proper escapement mechanism.

Additional negative impacts could arise if specifications for escapement mechanisms are not appropriate for halibut pots. The challenge of this action is that halibut pots do not exist in waters off of Alaska; therefore, optimal dimensions of a pot are unknown. Given the vast difference in the shape and size of legal-sized halibut compared to crab, sablefish, or Pacific cod, it is likely the optimal pot designed specifically for catching halibut would have different dimensions. Therefore, while examples from BSAI crab fisheries are intended to demonstrate regulations with a similar intent to reduce bycatch of undersize fish and crab, these specifications might not be appropriate for pots targeting halibut. For instance, in addition to a much wider tunnel opening, these pots may be able to accommodate a much larger escapement mechanism without risking the loss of their target species. Different shapes, sizes, and materials for escapement mechanisms continue to be tested to see which combination is optimal. Fishery participants and gear manufacturers still appear to be in the experimentation stage of understanding what works best for allowing non-target species and PSC to escape. Some members of the industry have mentioned the possibility of using rectangular escape slots, which could be used to let out sublegal-size halibut (personal communication, L Nylander 2018). Establishing escapement mechanism requirements at this time may suppress some opportunities for experimentation in a design of a pot that may work better to minimize bycatch of non-target species and PSC.

A policy statement highlighting the importance of escapement mechanisms in regard to the Council’s goal of minimizing PSC is a third option. This may direct new entrants in how to modify gear to target halibut. Interested participants would still benefit from the flexibility to either be able to experiment with new pot specifications or to modify crab, sablefish, or Pacific cod pots. Requirements for escapement mechanisms could still be developed in the future.⁵³ Note that it may be difficult to gather this information at a 3-year review, as it would require anecdotal reporting of gear design.

4.7.4.4 Pot tags

This section describes the use of pot tags and buoy tags in Alaska State and Federal fisheries. Gear tags are currently used to enforce pot limits in limited access fisheries. Enforcing gear retrieval or storage requirements, even if pot tags are used, is still difficult, particularly in federal fisheries which occur farther offshore, and enforcement is often not present while the gear is being hauled. Much of the information in this section is from the GOA FMP Amendment 101 Analysis (NPFMC 2016a). Pot tags were mentioned at the April 2018 Council meeting, suggested as a mechanism for enforcing gear retrieval requirements. In June 2018, the Council chose to not include pot tags as part of their alternatives. While not considered in the Council’s current motion, the analysts have left this information in the current draft to provide a record of the information the Council had to inform its decision making. The following

⁵³ While a prescribed program review can be a helpful benchmark to evaluate results of policy decision, the Council may always reevaluate decisions made and consider additional action at any time it deems appropriate.

information was intended to provide examples of how tag programs are administered, and the range of associated costs.

Pot limits exist in state-managed fisheries for Pacific cod, Tanner crab, Dungeness crab, and king crab, and the federal GOA IFQ pot fishery. Pot tags, buoy tags, or both are required so that enforcement officers can tell whether the vessel is using more gear than is permitted. A citation would be issued if untagged gear is observed at sea or observed when making a landing. Participants who register the vessel and their gear with ADF&G receive a sequentially-numbered series of tags that is specific to a certain fishery, area, and season – often color coded. The management office records the recipient’s permit and vessel numbers so that they are linked to a specific series of tags in a spreadsheet that is provided to enforcement agencies. Recording the vessel number enables ADF&G to ensure that vessel pot limits are not exceeded when multiple permit holders fish from the same vessel. Issuing tags to multiple permit holders who intend to fish on the same vessel can be challenging when tags are issued from different management offices. The spreadsheet allows managers to go back and check that the number of tags associated with a given vessel is within the vessel limit.

The fisheries discussed here are typically prosecuted with single pots, meaning that tags can be affixed to the buoy above the waterline; this would differ from the likely use of pot tags in a pot longline fishery, where tags would have to be submerged with each of the pots affixed to the groundline between two end buoys. Tags for submerged pots would need to be of sound construction. Alaska state fisheries use tags made of metal or plastic, tied to the pot or buoy with twine. ADF&G managers contract with materials suppliers to acquire pot tags, estimating the number needed for a certain season based on registration for the fishery. Reported acquisition costs range between 60 cents and \$1.25 per tag. The cost to fishermen is typically \$1.50 to \$2.00 per tag. The margin covers shipping costs, some administration, and the cost of overstock tags that are not issued due to lower than expected fishery registration. The budgets for tag programs are held in a separate account, so any remaining funds are applied to tag orders in subsequent years, and not used elsewhere at ADF&G.

Tags can be lost even if the gear is retrieved. Replacement tags are issued at the normal cost after a permit holder submits a lost gear affidavit. An affidavit will typically include information on the cause of the loss, and the last known latitude and longitude of the gear if the pot was lost as well. In addition to pot limit enforcement, this form provides an opportunity to enhance the tracking of lost fishing gear.

The Federal sablefish pot fishery in the GOA was also implemented with a requirement for pot tags, in addition to other gear marking requirements that are intended to enhance visibility (i.e. flags, buoy clusters and radar reflectors). Amendment 101 was implemented with area-specific pot limits to control fishing effort and limit the total amount of fishing grounds that any single vessel could use at a given time. The requirement to register and receive pot tags in the GOA sablefish pot fishery was intended to enhance the enforceability of pot limits in the GOA, by letting enforcement officers tell whether the vessel is using more gear than is permitted. Pot tags are registered to the vessel and are a certain color based on the area they are intended to be used in (since each area has a different pot limit). In order for pot tags to be practical in the GOA fishery, the Council needed to consider and address issues such as: pot tags that may be lost, vessel operators that share pots, vessel operators that use the same pots in multiple areas, and vessels that are leased and operated by a different person than the owner (NPFMC 2016a).

Enforcement representatives have stated the proposed gear retrieval requirements for this action in the BSAI, which would have required gear to be tended at least every (sub-options) 5 to 10 days, would be difficult to enforce. As described in Section 4.7.3, it would be difficult for an enforcement officer to know which IFQ holder is associated with gear without being present when the gear is set. If the NMFS ID is listed on a registered pot tag enforcement may know which quota holder is associated with the gear. However, similar to the enforcement challenges with gear retrieval in the GOA, unless the enforcement

representatives or another fishery participant saw the gear deployed and knows it has not been tended within the specified time period, it still may be difficult to enforce.

Moreover, NMFS has described the experience in the GOA to be fraught with complications and require considerable resources to manage. Since the implementation of Amendment 101, NMFS has had to follow procurement rules to purchase the tags from a vendor and ensure that there is inventory on hand so fishing plans are not affected. Once tags are purchased, NMFS programmers must program the tag registration system. All of these tasks are billed under cost recovery for the IFQ Program. Since new pot tag regulations would impact existing participants in the BSAI, the Council will need to decide if a cumbersome logistical process that is difficult to enforce is a necessary route in order to track gear.

To maximize expected compliance, enforcement has also suggested gear retrieval requirements could mirror those in the WGOA, which state a CV or CP operator is required to redeploy or remove longline pot gear from the fishing grounds within seven days after deploying the gear (see Section 4.7.9).

4.7.5 Monitoring (Element 3)

Alternative 2, Element 3 states that all operators of vessels using pot gear to fish IFQ or CDQ would be required to use logbooks and a Vessel Monitoring System (VMS) under the proposed action. In addition, NMFS proposes to require operators of vessels using pot gear to fish IFQ or CDQ to provide additional information on pot gear on the prior notice of landing. This section estimates the impact of these requirements by comparing the preferred alternative to the status quo for vessels participating in the sablefish IFQ/CDQ fisheries.

Under Alternative 2, NMFS has expressed concern over any additional pot fishing activity not only in the PIHCZ, but also in the PIBKC stock boundary area. **NMFS recommended that the Council also adopt Element 3, the requirement that all vessels retaining an IFQ species in pot gear use logbooks and VMS to ensure consistency in monitoring fishery behavior.** These requirements would also be consistent with the regulations in the GOA under Amendment 101.

The IFQ and CDQ Programs already include requirements for participants to report specific information to NMFS and other management agencies for management, monitoring, and enforcement purposes. The IFQ Program Review provides a comprehensive overview of the recordkeeping and reporting requirements in this Program (NPFMC 2016a). In general, vessels that fish halibut and sablefish CDQ must adhere to many of the same requirements, although there are some differences. There is overlap in vessels that fish for halibut and sablefish IFQ and vessels that fish halibut and sablefish CDQ, particularly among the larger vessels. A vessel can retain both CDQ and IFQ species on the same trip.

All vessels that participated in the BSAI sablefish IFQ or CDQ pot fishery in 2016 have VMS and maintain a Daily Fishing Logbook (DFL) already. However, under Alternative 2, some vessels that may be impacted by this action may need to install VMS or begin maintaining a DFL, especially if they have never used pot gear to target halibut. The following sub-sections describe the qualification for VMS, DFL, and PNOL, and the number of vessels that might be impacted by these additional requirements

4.7.5.1 VMS

NMFS requires the owners and operators of selected vessels participating in federally managed groundfish and crab fisheries off Alaska to obtain, install, and maintain an operational, NMFS-approved VMS. Tracking of vessel location using VMS is required to monitor compliance with complicated time and area closures in the GOA and BSAI designed to protect Steller sea lions or essential fish habitat, to monitor compliance with area-specific catch allocations, and to monitor compliance with requirements to redeploy or remove fishing gear from commercial fishing grounds.

The VMS units integrate global positioning system and communications electronics in a single, tamper-resistant package to automatically determine the vessel's position several times per hour. The units can be set to transmit a vessel's location periodically and automatically to an overhead satellite in real time. The VMS unit is passive and automatic, requiring no reporting effort by the vessel operator.

Vessels fishing for IFQ sablefish in the BSAI are required to have a transmitting VMS on board, as are any vessels with an FFP fishing in the Aleutian Islands.⁵⁴ Vessels fishing for CDQ sablefish and vessels fishing for IFQ or CDQ halibut in the Bering Sea are not required to have VMS. However, any vessel that carries a transmitting VMS while fishing for halibut in Area 4A, 4B, 4C, or 4D is exempt from vessel clearance requirements in the halibut annual management measures.

VMS is a tamperproof system, set to report a vessel identification and location to OLE at fixed 30-minute intervals. VMS is required in some fisheries to ensure that vessels comply with area restrictions and to provide enforcement with a tool to monitor compliance. The basic function of a VMS is to determine a vessel's location at a given time and periodically transmit this information to an onshore monitoring system. A communications service provider receives the transmission and relays it to NMFS OLE, who then provides VMS data access through vTrack to other government users after they sign a non-disclosure agreement. Vessel owners and operators also may have their vessel VMS data relayed to a third-party designee such as Marine Exchange of Alaska so that vessel owners can track their vessels and fleets.

There are both fixed and variable costs associated with the installation and operation of a new VMS. Average fixed cost for installation and activation is about \$3,500.⁵⁵ The NOAA-funded reimbursement program, administered by Pacific States Marine Fisheries Commission, will aid eligible users up to \$3,100 of that initial cost.⁵⁶ Variable costs may include transmission costs ranging from \$40 to \$55 per month depending on the unit installed and potential maintenance and repairs averaging to \$77 per year.

At this time, Alternative 2 is particularly expected provide an opportunity for/ impact two types of harvesters 1) vessels (and halibut quota holders) that participate in the sablefish pot fishery in the BSAI and may retain halibut IFQ as well under this action and 2) vessels (and halibut quota holders) that switch from harvesting halibut with HAL gear to pot gear. NMFS estimates that three vessels that have been involved in the sablefish CDQ or IFQ fisheries or the halibut CDQ or IFQ fisheries in 2016 over 50 ft LOA would fall under these new VMS requirements under Element 3.

NMFS does not anticipate an increase in sablefish IFQ fishing from this action but does anticipate new entrants who would like to target halibut with pot gear. The concern is from vessels that typically target halibut with HAL that want to use pot gear. OLE does not differentiate between fishing for sablefish IFQ and halibut IFQ as long as IFQ pounds are onboard. NMFS anticipates that halibut pot fishing could occur in the PIHCZ if the PIHCZ were not closed to all pot fishing within this area (see recommendations in Section 3.6.3.2). Additionally, pot fishing could still occur in the PIBKC stock boundary. Careful monitoring, in addition to pot gear closures in the PIHCZ, would reduce concerns about overfishing of PIBKC.

4.7.5.2 Logbooks

The operator of a catcher vessel 60 ft or greater LOA, using fixed gear, setline, or pot gear to harvest IFQ sablefish or IFQ halibut must maintain a longline (HAL) and pot gear Federal daily fishing logbook (DFL). All catcher processors must also maintain a daily catcher processor logbook (DCPL). DFLs are

⁵⁴ <https://alaskafisheries.noaa.gov/fisheries/cwm>

⁵⁵ http://www.cio.noaa.gov/itmanagement/pdfs/0445Rev_BF42.pdf

⁵⁶ For more information on the reimbursement program see <http://www.psmfc.org/program/vessel-monitoring-systemreimbursement-program-vms>.

available to catcher vessels free of charge from NMFS Sustainable Fisheries Division. The DFL includes information on set number, time and date gear was set and hauled, beginning and end positions, permit numbers, and estimated total haul weight for each set. The DFL also requires the operator to record the discard and disposition information of the trip, including recording of discard quantities over the maximum retainable amount for Pacific cod or rockfish when closed to directed fishing. The operator may use an electronic reporting option, eLogbooks, if they choose, with some exceptions. Few, if any, IFQ catcher vessels utilize the eLogbook option, which was originally developed for trawl catcher processors. In the future, NMFS plans to better customize the eLogbook option for catcher vessels so it is a more viable option for participants.

OLE monitors the sablefish and halibut IFQ fisheries on a regular basis, conducts random dockside inspections in ports throughout the BSAI, and enforces NMFS regulations. The OLE uses logbook information during dockside vessel inspections to verify landings. NMFS logbooks serve as a record of the location of gear set, the number of sets, and the harvest and discard of target and some non-target species by set.

In addition to federal regulations, the IPHC requires that any operator of any US vessel fishing for halibut that has an overall length of 26 ft or greater must maintain an accurate log of halibut fishing operations.⁵⁷

Table 42 shows which vessels must maintain a DFL, DCPL, or electronic logbook (elog) under current regulations. No groundfish catcher vessels under 60 ft LOA using longline gear have to fill out a daily logbook under the status quo.

⁵⁷ <https://www.iphc.int/uploads/pdf/2017iphcregs.pdf>

Table 42 Logbook Requirements for Federal Fisheries Permit Holders

Vessel Category	Gear	Vessel size	Fisheries	Paper logbook requirement & logbook type	Electronic Logbook (elog) requirement
Catcher Vessel	Other (Jig)	<60ft LOA	Groundfish	No	No
	Longline	<26 ft LOA	IFQ halibut	No	No
		26-59 ft LOA	Groundfish	No	No
			IFQ halibut	CV LL/Pot DFL or IPHC logbook	No
	>60ft LOA	Groundfish, IFQ sablefish, IFQ halibut	CV LL/Pot DFL	No	
	Longline Pot	All lengths in GOA	Groundfish, IFQ sablefish, IFQ halibut	CV LL/Pot DFL	No
	Pot	<60ft LOA	Groundfish	CV LL/Pot DFL	No
		>60ft LOA	Groundfish, CR Crab	CV LL/Pot DFL	No
	Trawl	<60ft LOA	Groundfish	No	No
		>60ft LOA	Groundfish	CV Trawl DFL	No, but some use it voluntarily
Catcher Processor	Longline	All lengths	Groundfish, IFQ sablefish, IFQ halibut, CDQ halibut	CP LL/Pot DCFL	Yes – if required to use flow scale
	Longline Pot	All lengths	Groundfish, IFQ sablefish, IFQ halibut, CDQ halibut	CP LL/Pot DCFL	Yes – if required to use flow scale
	Pot	All lengths	Groundfish, IFQ sablefish, IFQ halibut, CDQ halibut, CR Crab	CP LL/Pot DCFL	Yes – if required to use flow scale
	Trawl	All lengths	Groundfish	CP Trawl DCFL	Yes – if required to use flow scale
Mothership	All gear types	All lengths	Groundfish	No	Yes

Under Alternative 2 (the preferred alternative), all CVs or CPs using pot gear to fish IFQ or CDQ would be required to use logbooks. The Council has clarified that Element 3 of Alternative 2 refers to DFL. Many of the vessels that have previously participated in the sablefish CDQ or IFQ fishery (with pot or HAL gear) within the last five years (2012 through 2016) are at least 60 ft LOA, and therefore already required to maintain a DFL. In addition, there are safety issues for vessels under 50 ft LOA deploying pot gear in the BSAI, thus vessels less than 50 ft LOA are uncommon. Therefore, the universe of participants considered as potentially retaining halibut IFQ or CDQ in pot gear and falling under these new DFL requirements includes vessels 50 ft or greater but less than 60 ft LOA that participated in the sablefish CDQ or IFQ fishery (with pot or HAL gear) within the last five years. Based on this pool of participants, NMFS estimates five vessels could need to begin using DFL under this action.

In addition, NMFS OLE has requested that vessels report the number of pots set, the number of pots lost, and the number of pots left deployed on the fishing grounds, in addition to the information they currently submit on their PNOL.

4.7.6 In-Season Halibut Fishery Closures (Element 5)

NMFS inseason management closely monitors fishing activity in the BSAI and closes groundfish fisheries to prevent exceeding the total allowable catch. Inseason management actively manages both groundfish catch by pot gear vessels and incidental catch of non-target species in these fisheries. If a groundfish fishery leads to reaching the overfishing level (OFL) of another groundfish species or species group, under § 679.20, specific fisheries identified by gear and area that incur the greatest incidental catch of that species may be closed. If the rate of catch is not sufficiently slowed, then closures may expand to other groundfish fisheries. Overfishing level closures are rare. This authority provides flexibility for in-season management to make adjustments to the fishery to prevent reaching or exceeding an OFL.

Under § 679.25, NMFS also has the authority to close groundfish fisheries, including the sablefish IFQ fishery, to prevent overfishing of shellfish species. However, NMFS does not currently have federal regulations authorizing closures to the IFQ or CDQ halibut fishery to prevent overfishing of groundfish or shellfish. NMFS has cited concerns that if pot gear use in the PIBKC stock boundary increases, it could result in the increased incidental catch of PIBKC. This may result in inseason actions to prevent reaching or exceeding the PIBKC OFL. These closures may not be limited to pot gear and could impact other groundfish fisheries in the BSAI. NMFS is proposing to amend § 679.25 to allow NMFS to limit or to close halibut if groundfish or shellfish OFLs are approached.

4.7.6.1 NMFS Authority Under the Halibut Act

The Halibut Act allows NMFS closure authority under the Halibut Act 773c (c) stating that “The Regional Fishery Management Council having authority for the geographic area concerned **may develop regulations governing the United States portion of Convention waters, including limited access regulations, applicable to nationals or vessels of the United States, or both, which are in addition to, and not in conflict with regulations adopted by the Commission.** Such regulations shall only be implemented with the approval of the Secretary, shall not discriminate between residents of different States, and shall be consistent with the limited entry criteria set forth in section 1853(b)(6) of the MSA.” In addition, NMFS has the authority to add to IPHC inseason regulations through §300.62 if it is deemed necessary to implement this action.⁵⁸

NMFS authority to manage the halibut fishery is a one-way ratchet; NMFS regulations can only be more restrictive than IPHC regulations. NMFS inseason halibut fishery management must be consistent with IPHC-issued annual management measures. NMFS does not have the same discretion with halibut as it may have with groundfish; at this time NMFS may not reallocate halibut throughout the season to other gear types.

Annual halibut management measures for 2018 were published March 9, 2018 (83 FR 10390, March 9, 2018), which reflected the 2018 IPHC recommendation to modify Section 20 to authorize pot gear if such retention is authorized by NMFS regulations published at 50 CFR Part 679:

On December 28, 2016, NMFS published a final rule to authorize longline pot gear for the IFQ sablefish fishery in the Gulf of Alaska (81 FR 95435). The Gulf of Alaska sablefish fishery takes place in a portion of Area 2C (not including the inside waters), all of Areas 3A, 3B, and that portion of 4A in the Gulf of Alaska west of Area 3B and east of 170°00' W. longitude. The NMFS final rule also requires retention of halibut caught incidentally in longline pot gear subject to current retention requirements for the halibut IFQ Program (i.e., only if the halibut are of legal size and a person(s) on the vessel holds sufficient halibut IFQ). This recommendation is intended to avoid discard mortality of legal-size halibut caught incidentally in longline pots in the sablefish IFQ fishery, similar to current regulations that authorize sablefish and halibut IFQ holders using hook-and-line gear to retain legal-size halibut caught incidentally during the sablefish IFQ fishery. At its 2016 annual meeting, the IPHC recommended approval of longline

⁵⁸ §300.62 Annual management measures may be added and modified through adoption by the Commission and publication in the Federal Register by the Assistant Administrator, with immediate regulatory effect. Such measures may include, *inter alia*, provisions governing: Licensing of vessels, inseason actions, regulatory areas, fishing periods, closed periods, closed areas, catch limits (quotas), fishing period limits, size limits, careful release of halibut, vessel clearances, logs, receipt and possession of halibut, fishing gear, retention of tagged halibut, supervision of unloading and weighing, and sport fishing for halibut. The Assistant Administrator will publish the Commission's regulations setting forth annual management measures in the FEDERAL REGISTER by March 15 each year. Annual management measures may be adjusted inseason by the Commission.

pot gear, as defined by NMFS, as legal gear for the commercial halibut fishery in Alaska when NMFS regulations permit the use of this gear in the IFQ sablefish fishery.

At its 2018 annual meeting, the IPHC received a proposal for additional regulatory revisions that would allow halibut taken with pot gear to be retained in the Bering Sea and Aleutian Islands. The proposal was prompted by evidence of conflicts with whale depredation of halibut on longline gear and referenced the Council's consideration of an action to authorize longline pot gear for the IFQ sablefish fishery in the Bering Sea and Aleutian Islands. After considering the proposal, the IPHC recommended changes to Section 20 (Fishing Gear) in parts (1)(b) and (2)(b) to authorize longline or single pot gear and struck the phrase that restricted retention of halibut taken in pot gear to only pot gear used the sablefish IFQ fishery. In recommending these changes, the IPHC noted the existing references in each subsection that allow pots to be used for halibut fishing "if such retention is authorized by NMFS regulations published at 50 CFR Part 679".

Therefore, the regulatory revisions continue to authorize retention of halibut in the GOA sablefish IFQ fishery consistent with NMFS regulations. The revisions also would accommodate a potential future Council recommendation and NMFS implementation of regulations to authorize retention of halibut taken in pot gear in the Bering Sea and Aleutian Islands.

4.7.6.2 Background on Inseason Closures to Limit Overfishing and NMFS Recommendations

NMFS is concerned about PIBKC incidental catch, which is described in Section 0 of the EA. Any increase in pot fishing activity over the status quo is likely to add fishing pressures within the stock boundary of the PIBKC.

Additionally, Saint Matthew blue king crab (SMBKC) is also estimated to drop below its MSST in 2019, according to the 2018 stock assessment (Zheng & Ianelli 2018, in NPFMC 2018). The Council received an overfished determination (dated October 22, 2018) from NMFS which will initiate steps to prepare and implement a rebuilding plan amendment for this stock. Fishing pressure on SMBKC is not expected to increase under this action. In fact, industry participants have noted that some halibut HAL vessels began fishing the areas around St. Matthew Island to avoid whale depredation in other areas of the Bering Sea, and these vessels may begin to use pot gear and shift their fishing effort back to traditional fishing grounds, away from St. Matthew Island.

NMFS would like to proactively mitigate fishing pressure if the OFL of PIBKC, or other species, is approached through inseason closures, following the same regulations for PIBKC or other shellfish in the groundfish fisheries. NMFS currently has authority under Section 305(c) of the MSA to promulgate emergency regulations to close halibut directed fishing in the event a groundfish or shellfish OFL is approached or reached. The regulatory authority to do so under the Halibut Act, however, is not explicit. The preferred alternative would provide explicit regulatory authority for NFMS to limit or close halibut directed fishing in the event a groundfish or shellfish OFL is reached, which is consistent with NMFS's authority under the Halibut Act. If this regulatory amendment is made, NMFS would expect to follow the same inseason procedure for halibut that it applies to groundfish (§ 679.25).

In 2015, catch of squid approached the BSAI OFL predominately from incidental catch by the AFA pollock CV and CP fleet. Prior to any federal closures, inseason staff first communicated with the fleet to ensure that they were going to move to other areas with less concentrated squid before inseason began closing specific areas that were prone to high bycatch of squid. The AFA pollock fleet in this case responded and moved to other fishing grounds. Since each scenario for inseason closures varies, it is difficult to compare possible future scenarios with prior inseason actions. However, this squid OFL

situation was an example of cooperation with industry prior to beginning to close hot spots through inseason management authority.

Regulations at 50 CFR 679.25(a) and (b) provide the regulatory process that NMFS undertakes as an overfishing level is approached. Section 679.25(a) provides:

(a) *General*—(1) *Types of adjustments*. Inseason adjustments issued by NMFS under this section include:

- (i) Closure, extension, or opening of a season in all or part of a management area.
- (ii) Modification of the allowable gear to be used in all or part of a management area.
- (iii) Adjustment of TAC and PSC limits.
- (iv) Interim closures of statistical areas, or portions thereof, to directed fishing for specified groundfish species.

When inseason closures are determined to be necessary, NMFS begins initiating closures in a stepwise fashion, taking into account one or more of the following factors (§ 679.25(b)):

- (1) The effect of overall fishing effort within a statistical area;
- (2) Catch per unit of effort and rate of harvest;
- (3) Relative distribution and abundance of stocks of groundfish species and prohibited species within all or part of a statistical area;
- (4) Condition of a stock in all or part of a statistical area;
- (5) Inseason prohibited species bycatch rates observed in groundfish fisheries in all or part of a statistical area;
- (6) Historical prohibited species bycatch rates observed in groundfish fisheries in all or part of a statistical area;
- (7) Economic impacts on fishing businesses affected; or
- (8) Any other factor relevant to the conservation and management of groundfish species or any incidentally caught species that are designated as prohibited species or for which a PSC limit has been specified.

In practice, very rarely has NMFS used these regulations to limit groundfish fisheries as an OFL is reached, or to constrain fishing once an OFL has been reached. Based on a review of the last 10-years, NMFS has only needed to use this provision once. In 2011, NMFS prohibited directed fishing for Pacific cod by vessels using pot gear in the BSAI to limit incidental catch of octopus. The 2011 OFL for octopus in the BSAI was 528 mt and approximately 530 mt were harvested before NMFS closed directed fishing for Pacific cod by vessels using pot gear in the BSAI.⁵⁹ In making this closure, NMFS considered the fisheries and gears that were harvesting octopus and targeted the closure to limit the fishery and gear in the management area (e.g., BSAI Pacific cod pot fishery) to ensure that additional catch did not accrue beyond the OFL. NMFS did not apply this closure broadly to all groundfish fisheries or gears that had a *de minimus* amount of octopus catch, consistent with the provisions in (§ 679.25).

⁵⁹ <https://www.federalregister.gov/documents/2011/10/27/2011-27848/fisheries-of-the-exclusive-economic-zone-off-alaska-pacific-cod-and-octopus-in-the-bering-sea-and>

Until this point, halibut IFQ fishing has not been subject to any closures due to conservation concerns for other species. The need to close halibut fishing in a statistical area has not been an issue in the past. With anticipated effects of this action, NMFS anticipates that this could jeopardize the rebuilding of PIBKC stocks and without the ability in place to close the halibut fishery, other measures could be taken that would impact other groundfish fisheries. It seems logical that the halibut directed fishery in the BSAI should share in the conservation of the PIBKC and mitigating risk through closures is the way to proceed.

Although NMFS is proposing this change in response to the increased risk that the use of halibut pot gear could result in reaching the PIBKC OFL, NMFS believes it is appropriate to establish these regulations to ensure that NMFS has the authority to ensure the potential for overfishing any species is limited, consistent with general requirements under the Magnuson-Stevens Act. Until this point, NMFS has not identified a specific conservation concern that would require NMFS to close the halibut IFQ fishery to limit overfishing, however, establishing this authority in regulation would ensure that NMFS has the ability to undertake necessary action to limit the IFQ and CDQ halibut fisheries consistent with regulations applicable to groundfish and shellfish fisheries. NMFS inseason management authority to close a fishery due approaching an OFL has been applied only once in the last 10 years, thus NMFS does not anticipate that this provision would be applied to the IFQ or CDQ halibut fisheries in the foreseeable future. However, it would provide a clearly defined regulatory process to limit the halibut IFQ or CDQ fishery if there was a need to consider management measures in the event the OFL is reached.

At this time, NMFS suggests draft edits to § 679.25(a) in red and bolded text to ensure that NMFS has the authority to conduct in-season closures for the IFQ or CDQ commercial halibut fishery if necessary to conserve PIBKC, or another species of fish or groundfish to prevent overfishing for that species. In the event that an OFL was approached, NMFS would initiate a closure under § 679.25(a) incrementally, for the IFQ and CDQ halibut fisheries as shown in Table 43. These proposed changes may be modified during the regulatory process, but provide the reader with a general assessment of the types of changes that may be required.

Table 43 Draft Inseason Adjustments Regulations Scenario for Halibut

§ 679.25(a)(1)(v)	(a) <i>General</i> — (1) <i>Types of adjustments.</i> Inseason adjustments for directed fishing for groundfish or halibut issued by NMFS under this section include: (v) Inseason closures of an area, district, or portions thereof, to directed fishing for specified halibut fisheries.
§ 679.25 (a)(2)(i)(A)	(a) <i>General</i> — (2) <i>Determinations.</i> (i) Any inseason adjustment taken under paragraphs (a)(1)(i), (ii), (iii), or (v) of this section must be based on a determination that such adjustments are necessary to prevent: (A) Overfishing of any species or stock of fish or shellfish;
§ 679.25 (a)(2)(iii)(C)	(a) <i>General</i> — (2) <i>Determinations.</i> (iii) The selection of the appropriate inseason management adjustments under paragraphs (a)(1)(i) and (ii) of this section must be from the following authorized management measures and must be based upon a determination by the Regional Administrator that the management adjustment selected is the least restrictive necessary to achieve the purpose of the adjustment: (C) Closure of a management area or portion thereof, or gear type , or season to all groundfish or halibut directed fishing;

4.7.7 Annual Inseason Management Reports and Three-Year Review

The Council's motion requests that NMFS include information on the BSAI IFQ pot gear effort in its inseason management report. It also expressed its intent to review the effects of allowing retention of halibut in pot gear in the BSAI three years after implementation.

NMFS inseason management produces a BSAI report and a GOA report every year which provides an overview of the catch in that region for the preceding year. The report is delivered to the Council typically at the December Council meeting. Based on a similar Council request after Amendment 101 (allowing sablefish longline pot gear in the GOA in 2017), NMFS inseason management began including statistics on the number of GOA sablefish pot vessels, metric tons of sablefish harvested, and percent of sablefish harvest by gear type and sub-area in the GOA. They also included the number of registered pots and the number of lost pots. Assuming three or more vessels participate in a BSAI halibut pot fishery (so information is not confidential), similar information could be reported for a BSAI halibut pot fishery to track the changes in the fishery.

In addition, a three-year review of a halibut pot fishery could provide valuable insight into how the fishery has developed and if there are elements that are not meeting the Council's management objectives. For instance, three years after implementation of the amendment, a review might include:

- The number of vessels that have been landing sablefish and halibut IFQ/CDQ harvested in single and longline pot gear
- The magnitude of halibut and sablefish IFQ/CDQ that has been landed from pot gear vs. HAL
- Location of vessel activity- has effort returned to traditional fishing grounds? Are there spatiotemporal overlaps between HAL and pot gear effort?
- Number of lost pots (as recorded in the Daily Fishing Logbooks/PNOL)
- Amount and incidental catch by species, including crab PSC
- Species diversification at the trip-level (sablefish trips vs. halibut trips)

Any anecdotal information on gear conflicts, gear soak times, marine mammal entanglements and whale depredation could be raised during public testimony during this Council review. The Council may consider amendments to the management of a Federal fishery any time an issue is raised, but a scheduled review offers a chance to look at a fishery more holistically with an opportunity for public input in the context of available statistical information.

There are both advantages and disadvantages to waiting until a three-year review to see how the fishery develops before determining whether to establish more restrictive regulations. On one hand, there is uncertainty in the number of vessels that may begin to use pot gear and the amount of halibut harvest that may shift from being caught on HAL gear to pot gear. Analysts expect participation to be limited due to a number of practical constraints (see Section 4.7.2.1.1). Waiting until the fishery has had a few years to develop could allow the Council and the public an opportunity to understand this change and its implications before determining whether additional restrictions are necessary. If the magnitude of change is limited, it is less likely that the mitigation of negative impacts would require regulatory solutions. For instance, with limited participation in a halibut pot fishery in the BSAI, gear conflict and grounds preemption may be minimal. Creating additional regulations about gear retrieval from the onset of the amendment may be overly burdensome on the existing participants if the fishery remains limited in scope.

Similarly, waiting to determine if and what gear specifications are necessary would allow the industry time to experiment with different designs that may be more effective at catching halibut and avoiding other species. Since halibut pot gear would be new to waters off of Alaska, gear manufacturers and harvesters have expressed the desire to be flexible.

On the other hand, operators may wait until this three-year review and any regulatory changes associated with the review to consider how successful targeting halibut with pots could be before they make a transition. Participating in a new, experimental halibut pot fishery in the BSAI would be an expensive transition for many. Harvesters may not choose to invest in and participate in this fishery until after these three years are over and they have more confidence in the rules that will be in place. In this way, a three-year review would not paint a representative picture of what the future of the fishery may look like. Future issues (for example, gear conflicts) might be under-represented in a three-year review. Note that analysts already expect that this fishery will experience slow entry rates, as operators test gear, soak time, and have a better understanding of the possible CPUE of this fishery.

The IFQ Program is reviewed in depth every seven years, with the most recent review completed in 2016. The effects of the GOA sablefish pot fishery will be included in the next program review and it is anticipated that this action would be included in the review as well.

4.7.8 NMFS Recommendation to Modify VMS Regulations

NMFS is recommending revisions to the VMS regulations. The revisions would remove two regulatory requirements that are no longer necessary, which would reduce reporting burdens for vessels in the BSAI and GOA, and would make other minor revisions to provide regulatory clarity and reduce confusion for the regulated operators in the BSAI and GOA. Existing VMS requirements, coverage, and equipment would not materially change.

Currently, regulations impose specific requirements on a vessel owner activating a VMS unit for the first time. Section 679.28(f)(4) requires vessel owners to (i) register the vessel's VMS unit with an appropriate service provider; (ii) use the VMS check-in report to contact OLE by fax and provide the date, vessel name, USCG documentation number, FFP number or Federal crab vessel permit number, name and telephone number of contact person, and VMS transmitter ID or serial number; and (iii) call OLE at least 72 hours before leaving port and receive confirmation that the transmissions are being received. NMFS proposes to remove the requirement to check in by fax to register a new unit with OLE when activating a VMS unit for the first time (§ 679.28(f)(4)(ii)). This requirement applies to vessel owners in the BSAI and GOA. This faxed check-in is no longer necessary for management or enforcement purposes because the information OLE needs about a new VMS unit is provided automatically by the VMS unit when the new unit is activated.

In addition, vessel operators fishing for IFQ sablefish in the BSAI and vessel operators using longline pot gear to fish for IFQ sablefish in the GOA are required to contact NMFS by phone prior to fishing and receive confirmation that their VMS unit is operating. The sablefish vessel clearance requirements in the BSAI require the operator of the vessel to contact NMFS between 0600 and 0000 A.l.t. and receive a VMS confirmation number at least 72 hours prior to fishing for IFQ sablefish in the BSAI (§ 679.42(k)(1)(ii)(B)). The sablefish vessel clearance requirements in the GOA require the operator of the vessel to contact NMFS between 0600 and 0000 A.l.t. and receive a VMS confirmation number at least 72 hours prior to using longline pot gear to fish for IFQ sablefish in the Gulf of Alaska (§ 679.42(k)(2)(ii)(B)). These vessel clearance call-in requirements are no longer needed for management or enforcement purposes because the VMS unit provides the information needed by OLE to monitor these fisheries.

NMFS estimates that each faxed check-in report to register a new VMS unit takes 12 minutes to complete and that it costs approximately \$1,340 per year to complete.

NMFS estimates that each sablefish call-in takes 12 minutes and that it costs approximately \$43 per call (and \$268 per year).⁶⁰

NMFS also proposes minor administrative changes to provide greater clarity and specificity in the VMS regulations. Section 679.28(f)(6) lists when a VMS unit must be transmitting when participating in the Federally-managed fisheries off Alaska. The current list, however, is only a partial list of all the circumstances when a VMS unit must be transmitting pursuant to 50 CFR part 679 and 50 CFR part 800. The proposed revisions would update the list to include references to all regulatory requirements for when a VMS unit must be transmitting. This will provide clarity in the regulations for operators of vessels in the Federally-managed fisheries off Alaska regarding when a VMS unit must be transmitting.

Section 679.7(a) lists prohibited conduct in the GOA and BSAI. Section 679.7(a)(21) prohibits the operation of a federally permitted vessel in the Aleutian Islands subarea without an operable VMS and without complying with the requirements at § 679.28. Section 679.7(a)(22) prohibits the operation of a federally permitted vessel in the GOA with non-pelagic trawl or dredge gear onboard without an operable VMS and without complying with the requirements at § 679.28. The proposed revisions would revise § 679.7(a)(21)-(22) to specifically cross-reference § 679.28(f). This will provide specificity in the regulations for operators of vessels in the BSAI and GOA regarding existing VMS requirements.

These revisions would not change existing VMS requirements, coverage, and equipment. No additional costs would be imposed on vessels subject to VMS requirements, nor would NMFS incur any additional costs. Benefits to the regulated public include the minor benefits associated with providing greater clarity and specificity in the VMS regulations and reducing confusion about existing VMS requirements.

4.7.9 Enforcement Considerations

The following describes enforcement challenges and recommendations, as informed by OLE (Office of Law Enforcement) representatives for NMFS Fisheries Enforcement. In general, OLE noted challenges regarding consistency with GOA regulations, and that their preference would be maintaining consistency across the GOA and BSAI where possible, while balancing maximum flexibility for fishermen. As in the GOA, this action poses some enforcement challenges that are not easily solved.

OLE does not have the personnel, vessel, or fiscal resources to conduct at-sea inspections. The USCG is responsible for conducting at-sea fisheries law enforcement boardings onboard vessels participating in the sablefish IFQ fishery. At-sea boardings are conducted at random or in response to specific intelligence of suspected possible violations or inconsistencies provided by OLE. Boarding teams conduct enforcement of NMFS regulations at-sea to include, logbook inspections, documentation checks, and limited gear inspections (gear is inspected on deck, and thus deployed gear is not directed to be retrieved for inspection). Following these at-sea boardings, the USCG forwards any suspected violations complete with documentation and evidence to OLE for further investigation. The OLE may make random spot checks of the gear, but typically 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. The OLE also may conduct limited monitoring and enforcement activities through at-sea boarding in coordination with the USCG and Alaska Wildlife Troopers.

Currently, legal-size, incidentally-caught halibut are required to be retained in the BSAI HAL 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 permit holders onboard a HAL vessel fishing sablefish could

⁶⁰ <https://www.cio.noaa.gov/itmanagement/pdfs/0445ext17.pdf>

be used for a vessel using pot gear to fish a mix of sablefish and halibut IFQ (as is already done with solely sablefish IFQ in pots). Since IFQ are specific to regulatory area and vessel size category, the amount of halibut retained and landed by a vessel is crosschecked against the IFQ permit database to verify that 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.

Regarding Alternative 2:

OLE recommends allowing and requiring the retention of legal-size halibut, for consistency with GOA regulations.

However, under Amendment 101 in GOA, the ability to retain halibut in pot gear is also dependent on the availability of sablefish IFQ (in addition to following all the regulations for sablefish IFQ fishing with pot gear described in §679.42(l)). Since there is no requirement or regulatory definition that an IFQ species be a certain proportion of the vessel's total catch, enforcement representatives stated that, particularly in the field, it can be very difficult to prove what a vessel is "fishing for". Enforcement is able to identify that participants have IFQ for the species they are retaining.

Element 1: Gear retrieval

OLE recommends the BSAI remains consistent with Western Gulf regulations by adopting the requirement that a vessel operator must redeploy or remove all [longline] pot gear that is assigned to the vessel and deployed to fish IFQ sablefish within seven days of deploying the gear. (§679.42(l)(5)(iii)(D)).

Element 2: Tunnel opening

OLE recommends keeping the existing 9-inch maximum tunnel opening requirement for all areas for consistency. A different requirement could make enforcement difficult in GOA locations near the BSAI. Additionally, having different applicability of the 9-inch requirement could make general enforcement difficult.

Element 3: Logbooks and VMS

VMS is already required for federal waters (§679.42(k)(1)(i)). However, state AI sablefish requirements do not require VMS. *If the state adopts these rules, a VMS requirement should be considered as well. OLE recommends requiring the use of Daily Fishing Logbook (DFL) for consistency with GOA requirements (§679.42(l)(7)(i)).*

Element 4: Escapement mechanism

OLE stresses the importance of consistency across fisheries and areas with regards gear mechanisms. OLE also noted it is very difficult to enforce this.

Element 5: NMFS authority

OLE noted that all the above proposed requirements (with exception of logbook & VMS) are difficult to enforce. They also noted that consistency across all areas makes enforcement easier, even in GOA areas that are not part of this proposal.

4.7.10 Observer Program and Sampling

All participants in the federally-managed commercial groundfish fisheries off Alaska are subject to Observer Program requirements. Vessels and processors are placed into one of two observer coverage categories: 1) the full coverage category, or 2) the partial coverage category. Described at §679.51(a)(1), the partial coverage category includes catcher vessels when fishing for sablefish IFQ or fixed gear sablefish CDQ.

Each year, NMFS releases an Annual Deployment Plan (ADP) that documents how the agency intends to assign fishery observers and Electronic Monitoring (EM) to vessels for the upcoming year. For vessels in the partial coverage category, the ADP describes the sampling design and selection rate—the portion of trips (or vessels) that are sampled. In 2018, the sampling design is defined by EM, gear fished, and tender deliveries; Vessels that fish with longline pot gear fall into 3 categories:

- EM selection pool – composed of fixed gear boats that opted into the EM pool and were approved by NMFS. In 2018, NMFS approved 141 vessels to be in the EM selection pool.
- Pot trip-selection pool -- composed of all catcher vessels in the partial coverage category that are greater than or equal to 40 ft LOA that are fishing pot gear, including vessels fishing longline pot gear. In 2018, the deployment rate for pot vessels is 16.21%, which equates to 53 trips expected to be observed.⁶¹
- No selection pool -- Longline and pot catcher vessels less than 40 ft LOA are not subject to observer coverage.

Observer deployment and sampling techniques would not change under this suite of alternatives.

4.7.11 Prohibited Species Catch Estimation

NMFS estimates of PSC are derived from observer data, which is an independent source of information, rather than from industry reported catch. In the CAS, the observer data are used to create PSC rates (a ratio of the estimated PSC in the sampled hauls to the estimated total catch in sampled hauls). On observed trips with unsampled hauls, an estimate of total PSC (by species) for the trip is derived by expanding a PSC rate from sampled hauls during the trip to the total catch of groundfish (retained + discarded) during the trip. For trips that are unobserved, the PSC rates are applied to industry reported landings of retained catch. Depending on the observer data that are available, the extrapolation from observed vessels to unobserved vessels is based on varying levels of post-stratification. Data are matched based on processing sector (e.g. CV or CP), week, fishery (e.g., Pacific cod), gear (e.g., pot), and Federal reporting area. If data are not available from an observed vessel within the same sector then rates are applied based on observer data from all sectors in the same target fishery, using the same gear, and fishing in the same Federal reporting area. If observer data are not available from any vessels within the same week then a three-week average is used from all vessels in the same target fishery using the same gear and fishing in the same Federal reporting area. If data are not available within a three-week period, then a three-month average is used. Finally, if data from the same Federal reporting area are not available then observer data from the fishery and the FMP area (e.g. BSAI) as a whole will be applied. The PSC for crab is currently estimated in numbers of crab. When the observer program obtains samples of crab, both the weight and the number of crab in the sample are collected. NMFS then converts the sample weights into numbers of crabs in the haul. The number of crabs in each sampled haul is then used in PSC estimation (as described above) so that NMFS can monitor PSC limits on the number of crabs. For further information see Cahalan et al. (2014).

4.7.12 Vessel Safety

Section 4.5.5 of the analysis describes some of the current safety measures required for pot vessels and includes some information on the number and type of non-fatal illness and injury from longliners and crew on pot vessels, based on claims made under the Alaska Fishermen’s Fund. Although these statistics

⁶¹ https://alaskafisheries.noaa.gov/sites/default/files/final_2018_adp.pdf

cannot be used to make a statement about which gear type is inherently more hazardous than the other, there are clearly unique hazards to pot fishing in the BSAI.

Under Alternative 2, vessels are not being required to carry any extra gear and have the option to participate in the opportunity created by this action. The number of IFQ/ CDQ participants reconfiguring their vessels to pot gear is expected to be limited (as described in Section 4.7.2.1.1), due to the high cost to purchase gear and convert a vessel, as well as the uncertainty in the effectiveness of the gear type in targeting halibut. Moreover, all vessels over 79 ft would still be required to abide by safety requirements for stability. All except one vessel that have fished sablefish quota in the BSAI from 2011-2016 are over 79 ft LOA. A USCG safety alert from October 2017 informs vessel operators they should confirm the accuracy of their stability instructions, and update it if needed, if they have had “major conversions” or “substantial alterations” to their vessel (defined in 46 CFR 28.50 and 28.501, respectively) and if there are changes to a vessel’s rigging, deck or fishing equipment (including pots). Therefore, if a vessel greater than 79 ft LOA is reconfigured to accommodate pots, the vessel owner should have his or her stability instructions reevaluated by a Naval Architect or another qualified individual. Based on these factors, it is expected that vessel safety is unlikely to change significantly from the status quo.

The perceived improvements in halibut and sablefish vessel safety after the shift to the IFQ management regime, is in part due to the end of the “race for fish” which in some cases incentivized vessels to fish in unfavorable ocean conditions or poor weather (NMPFC/ NMFS 2016). A gear requirement to retrieve gear between 5- 10 days, under Element 1, could create scenarios in which vessels are required to tend their gear in unfavorable ocean conditions or poor weather.

4.7.13 Affected Small Entities

Section 603 of the Regulatory Flexibility Act (RFA) requires that an initial regulatory flexibility analysis (IRFA) be prepared to identify if a proposed action will result in a disproportionate and/ or significant adverse economic impact on the directly regulated small entities, and to consider any alternatives that would lessen this adverse economic impact to those small entities. As of January 2017, NMFS Alaska Region will prepare the IRFA in the classification section of the proposed rule for an action. Therefore, the preparation of a separate IRFA is not necessary for Council final actions on this issue. This section provides information that NMFS will use to prepare the IRFA for this action, namely a description and estimate of the number of small, directly regulated entities to which the proposed action will apply and the expected impacts.

The proposed action would make single or longline pot gear a legal gear type for harvesting halibut IFQ/ CDQ in the BSAI, and would authorize retention of halibut caught in pot gear for harvesting sablefish IFQ/CDQ in the BSAI, provided the IFQ/CDQ holder holds sufficient halibut IFQ/CDQ for that IFQ regulatory area. It would close the Pribilof Islands Habitat Conservation Zone to all fishing with pot gear and require monitoring tools (logbooks, PNOL, and VMS) for vessels that are IFQ or CDQ fishing with pot gear in the BSAI (i.e., not directed fishing for a non-IFQ species). The proposed action would also establish regulations that would allow NMFS to limit or close IFQ or CDQ fishing for halibut if an OFL is approached for a groundfish or shellfish specific consistent with regulations in place for groundfish.

The Council did not adopt gear retrieval or escapement mechanism requirements from its suite of elements. Discussion of the potential impacts of those elements can be found in Sections 4.7.3 and 4.7.4.

Identification of Directly Regulated Entities

Entities that might be directly regulated by this action includes those that commercially harvest halibut in the BSAI (CDQ or IFQ) and choose to switch to pot gear. Under the preferred alternative, these halibut

harvesters may have the opportunity to use a different gear type, which includes some new rules and regulations under the PPA (e.g. a requirement to carry an operating VMS and complete a Daily Fishing Logbook). Note that the preferred alternative merely allows commercial halibut harvesters in the BSAI to use pot gear in addition to HAL gear; it does not require it. Thus, since halibut harvesters in the BSAI have traditionally used HAL gear, it generally requires IFQ/ CDQ holders to “opt in” to the use of pots; the additional regulation under the proposed action would be avoided if the IFQ/ CDQ holders continue to use HAL gear.

In addition, this action may directly regulate commercial sablefish harvesters that fish with pot gear in the BSAI in a few ways. Unlike the BSAI halibut harvesters, these existing operators will not be “opting in” to any new activity for the regulations to directly impact them. This action would close the Pribilof Islands Habitat Conservation Zone to all pot gear. Current regulations do not specify this area closure for the sablefish IFQ/ CDQ pot fishery; however, BSAI sablefish pot vessels do not typically fish in this area. Additionally, BSAI sablefish harvesters that use pot gear *and* hold unfished halibut quota for the IPHC regulatory area they are fishing in would not only have the option of retaining legal-sized halibut, they would be required to retain it.

Finally, this action could potentially directly regulate all IFQ harvesters in IPHC regulatory areas off of Alaska (i.e. Area 2C, 3A, 3B, 4A, 4B, and 4CDE) if NMFS ever determined it was necessary to close IFQ fishing for a specific area or gear type due to another species nearing its OFL. The vessels listed in Table 44 provide the most realistic potentially directly regulated groups. Based on these potentially directly regulated groups, this analysis focuses around all vessels that have recently harvested halibut IFQ/ CDQ in waters off Alaska and vessels that have recently harvested BSAI sablefish with pot gear.

Count of Small, Directly Regulated Entities

Under the RFA, businesses that are classified as primarily engaged in commercial fishing are considered small entities if they have combined annual gross receipts not in excess of \$11.0 million for all affiliated operations worldwide, regardless of the type of fishing operation (81 FR 4469; January 26, 2016). If a vessel has a known affiliation with other vessels – through a business ownership or through a cooperative – these thresholds are measured against the small entity threshold based on the total gross revenues of all affiliated vessels.

Using the \$11.0 million threshold and total gross revenue for 2016, Table 44 identifies the number of vessels that would be considered small entities based on the RFA. In the BSAI sablefish pot fishery this includes 1 vessel of the 4 total vessels that participated in 2016 (see Table 25 for a count of vessels that have participated over time). Between the BSAI and the GOA there was 689 vessels that participated in the IFQ or CDQ commercial halibut fisheries in 2016; 664 of which are considered small entities based off of the \$11.0 million threshold (see Table 20 for a count of vessels that have participated in BSAI halibut fishing overtime).

Table 44 Number of entities considered “small” among different potentially directly regulated groups using total gross revenues from 2016

	Total vessel	Vessels considered “small entities”
BSAI halibut vessels	135	122
BSAI sablefish pot vessels	4	1
GOA halibut vessels	554	542

Source: Comprehensive_FT sourced by AKFIN

Note that some entities (i.e., individuals or businesses) that participate in BSAI sablefish pot fishing also hold halibut IFQ and may fish halibut separately. Similarly, some individuals/ businesses may hold halibut quota in multiple area and use different vessels to harvest it. Therefore, the number of total vessels may be double counting these businesses or individuals; the metric the RFA seeks to identify. In addition, some individuals/ businesses will consolidate their halibut or sablefish quota onto one vessel to share in the variable costs associated with the trip. In this way, the numbers in Table 44 may underestimate the number of individuals or businesses that participate in these fisheries.

Impacts to Small, Directly Regulated Entities

BSAI halibut harvesters that are directly regulated by this action are expected to benefit from the additional flexibility to use a new gear type in order to minimize the costs of whale depredation that occurs on HAL gear. Additional impacts may be expected for BSAI small, directly regulated halibut harvesters in terms potential additional costs for daily fishing logbooks, PNOL, or VMS requirements. BSAI halibut harvesters that are directly regulated by this action are those that have “opted into” the opportunity to use pot gear to fish BSAI halibut. Therefore, it is assumed these individuals have weighed their own benefits and costs to taking on these additional regulations and determined they would receive net benefits from the additional flexibility to use a new gear type. If the halibut harvesting entity does not begin using pot gear, they would not be directly regulated under this action.

It is expected that the magnitude of change (in terms of the number of vessels that may choose to use pots and the amount of halibut that would shift from being caught exclusively on HAL gear to both types of fixed gear) will be limited in scope. Factors such as 1) safety and logistical challenges in storing, deploying, and hauling pot gear on smaller vessels, 2) the costs associated with obtaining gear and retooling a vessel to be able to fish with pot gear, 3) the uncertain CPUE, which may be higher for HAL gear when whales are not present than pot gear overall, and 4) variation in whale depredation impacts and associated costs by area in the BSAI, mean that few BSAI halibut harvesters would be expected to switch gear types.

The one sablefish pot vessel fishing in the BSAI considered to be a small entity directly regulated in this action is expected to experience the same types of impacts as described above for all BSAI sablefish pot vessels. It might be impacted from a Pribilof Islands Habitat Conservation Zone closure even though it has not fished in this area in the recent past, and this area has not shown to be a suitable depth or habitat for sablefish. This vessel may also be impacted from the requirement to retain legal-sized halibut IFQ/ CDQ if they have unfished halibut quota for that area and their fishing trip is not set up to be conducive for delivering halibut. As described in Section 4.7.2.1.6, although these vessels generally catch only small amounts of legal-sized halibut due to the depth they fish and the 9-inch maximum tunnel opening, there

may be some situations where retaining these few halibut becomes inconvenient (e.g. if they are delivering live sablefish and they do not have ice ready for halibut).

In addition to all other halibut IFQ/ CDQ harvesters, those considered small entities could be directly negatively impacted if NMFS ever determined it was necessary to close halibut IFQ or CDQ fishing for a specific area or gear type due to another species nearing its OFL. Section 5 describes that this is a highly unlikely event. NMFS currently has authority under Section 305(c) of the MSA to promulgate emergency regulations to close halibut directed fishing in the event a groundfish or shellfish OFL is approached or reached. The regulatory authority to limit or close halibut directed fishing is consistent with the Halibut Act. This proposed regulatory provision would set the process in place, similar to other species managed under the MSA, should there ever be a need.

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

If the Council had selected “no action” (Alternative 1) as its preferred alternative- the baseline against which the selected preferred alternative is compared- HAL gear would remain the only legal gear for the harvest of BSAI halibut IFQ (under Alternative 1). Net benefits would not change from the status quo under this outcome. The IFQ and CDQ fisheries would continue to operate as they currently do; whale depredation would continue to impose direct and opportunity costs on halibut harvesters in the BSAI, bycatch of other groundfish species and shellfish would presumably continue unchanged from their present rates, and incidences of seabird and marine mammal interaction with HAL gear would continue to occur at present levels.

Under the preferred alternative, single and longline pot gear would be permitted in the BSAI halibut IFQ/ CDQ fishery but would not be required. Given the diversity in the size, configuration of the vessels, and the differential access to capital of the vessel owners in the fleet, it is likely that the fishery will be prosecuted with two different gear types. The analysis identifies reasons to believe that the magnitude of change (both in terms of number of vessels adopting pot gear for halibut fishing, as well as the amount of halibut harvested with pot gear) would be limited if this opportunity were available (see Section 4.7.2.1.1 in particular).

The possible benefits of replacing some HAL effort with pot effort are aligned with the Council’s purpose and need for this action – namely, to reduce the amount of whale interaction with halibut HAL gear in the BSAI and reduce some of the halibut mortality from legal-sized halibut discarded in the BSAI sablefish pot fishery. If halibut harvesters switch from HAL fishing in areas where some unobserved proportion of their catch had been preyed upon by killer whales in the past, to pot gear which is more difficult for whales to access, this may constitute a more efficient use of the halibut resource. All halibut users may be indirectly impacted through a decrease in the unobserved halibut mortality from whale depredation associated with HAL fishing in certain areas. Given the level of expected change and the total coastwide removal, however, this change is likely to be minor overall.

The second way increased harvest efficiency may indirectly benefit other halibut users is through the retention of legal-size halibut in the sablefish pot fishery, which could represent a reduction of regulatory discards. This wastage is accounted for, although there may be some unobserved mortality due to whale depredation that is not fully captured in the discard mortality rate. Halibut users whose allocation is directly affected by the total removals (i.e. the commercial sector and the charter sector in Area 2C/3A), may benefit if the number of total estimated removals decreases with a reduction in some legal-size fish being discarded. However, the level of legal-size halibut caught incidentally in sablefish pot gear in the BSAI is low, particularly compared to total removals. Thus, even with more efficient use of halibut IFQ/

CDQ in the sablefish pot fishery, very minimal impacts are expected to be felt by other users. Sublegal-size halibut (U32 inches) would also still contribute to wastage in the sablefish pot fishery.

Additional net benefits from reducing whale depredation would accrue to BSAI halibut harvesters if they are able to successfully employ pot gear to increase their economic efficiency. These net benefits may be in the form of reduced variable costs and opportunity costs of having to fish with whale depredation. This includes the added expenses of fuel, bait, crew provisions and opportunity costs of having to stay out at sea longer. There could be individual costs associated with purchasing new gear, reconfiguring a vessel and complying with any new regulations added to this fishery through this amendment; however, it is assumed that an individual will evaluate their own potential net benefits before choosing to opt into this new gear type. Reducing these variable costs and increasing operator efficiency is also in line with the Council's stated purpose and need.

Participants who are not able to fish pot gear on their vessels – due to financial or operational constraints or are unmotivated to do so due to a lack of resident killer whales in their fishing grounds – would not experience the same benefit associated with reduced whale depredation. These vessels may experience no changes in benefits or they may experience some negative distributional impacts from any potential gear conflicts or grounds preemption issues. Introducing 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 groundlines are likely to part the smaller and lighter HAL groundline. Additionally, pot gear can preempt a fishing area especially when vessels haul and re-bait their sets in rotation until their fish hold is full and they return to port to make a delivery, and lost gear can preempt fishing grounds until it is removed. Therefore, to the extent that pot gear and HAL gear are fishing in overlapping fishing grounds, gear conflicts or grounds preemption issues may develop. Stakeholders have highlighted that there are certain areas resident killer whales frequent and areas that are known to have less conflicts with whale depredation. Gear conflicts and grounds preemption may be minimal, if changes in effort from HAL to pot gear remains limited, and the pot fishing occurs only in areas with known whale depredation issues.

The preferred alternative may also include a tradeoff of bycatch species; with a decrease in the bycatch of fish and shellfish species typically caught with HAL gear (e.g. skates, rockfish, sculpin, and Pacific cod) and an increase in the types of bycatch fish and shellfish species typically caught with pot gear (e.g. crab, flounder, grenadier, snails). Potentially more rockfish and Pacific cod may be available to users in their directed fisheries, benefitting other commercial harvesters and potentially consumers. However, certain pot gear designs (e.g. escapement rings and tunnel sock tunnel design) could minimize negative impact on the directed crab fisheries; although the preferred alternative would not impose regulatory requirements to use specific bycatch reduction measures, industry could voluntarily develop and use measures to reduce bycatch. In addition, the preferred alternative proposes to close the Pribilof Islands Habitat Conservation Zone to pot fishing and provide a process for NMFS inseason management to limit or close halibut fishing if needed in order to protect overfished stocks (i.e. Pribilof Islands blue king crab) and stocks that are nearing their OFL.

Overall, there would be no expected changes to the amount of halibut harvested, product produced, price of the product, or other impacts to the consumers, with the exception that consumers may derive some benefit from knowing that halibut are being managed for sustainability with a better set of information on mortality. Given the level of expected changes, either the preferred alternative would have no effect on net benefits to the Nation, or if some vessels were able to increase their economic efficiency, the action could potentially produce small net benefits to the Nation.

5 Magnuson-Stevens Act and FMP Considerations

5.1 Magnuson-Stevens Act National Standards

Although this action is primarily centered around changes to Federal regulations regarding the retention of halibut, which is managed under the Halibut Act (Section 6), this action has potential implications on groundfish, crabs, and other resources managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Therefore, this section evaluates the effects on these resources under the proposed action, relative to the National Standards. Below are the 10 National Standards as contained in the Magnuson-Stevens Act (16 U.S.C. 1851), and a brief discussion of how each alternative is consistent with the National Standards, where applicable. In recommending a preferred alternative, the Council must consider how to balance the National Standards.

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

The preferred alternative would continue conservation and management of groundfish and crab fisheries under the current harvest specification process and inseason management authority to prevent overfishing and achieve, on a continuing basis, the optimum yield from each fishery. The preferred alternative would allow for the more efficient harvest of halibut by decreasing the wastage of legal-sized halibut discarded in the BSAI sablefish pot fishery.

Recognizing that any increase in incidental crab catch in pot gear could have a negative impact on stock recovery, the Council has stated that under the preferred alternative, the Pribilof Islands Habitat Conservation Zone will be closed to all fishing with pot gear. Additionally, Element 5 under the preferred alternative would allow NMFS to have inseason management authority over halibut under the Halibut Act, which would allow NMFS to close IFQ or CDQ fishing for halibut if an OFL is approached for a groundfish or shellfish species consistent with regulations in place for groundfish. Inseason management can determine whether closures are necessary in order to prevent overfishing.

National Standard 2 — Conservation and management measures shall be based upon the best scientific information available.

The information in this analysis represents the most current, comprehensive information available to the Council. The preferred alternative has the potential to mitigate a source of scientific uncertainty in assessing the abundance of halibut stocks. As described in Section 3.4.6, incidental mortality of halibut due to whale depredation is not explicitly accounted for in stock assessment models because a time series of total annual whale depredation does not exist. Additionally, some of this depredation of HAL gear may go unobserved, and thus this source of removals is not directly included in the halibut stock assessment. The stock assessment model implicitly represents whale depredation losses as a reduction in the overall stock productivity (i.e., recruitment strengths and mortality rates). The preferred alternative is likely to reduce the amount of unaccounted mortality, to the extent that fishermen exercise the option to use pot gear for halibut. As a result, the information available for future conservation and management measures would be marginally improved.

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

This action would not change the manner in which individual stocks are managed as a unit throughout their range, and interrelated stocks are managed as a unit or in close coordination.

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

The preferred alternative would affect all vessel owners and quota shareholders equally of residency. Residents of various states, including Alaska and the states of the Pacific Northwest, participate in the major sectors affected by the proposed action, including both groundfish and halibut fisheries. The preferred alternative would be implemented without discrimination among participants. To the extent that the preferred alternative reduces bycatch of fish species or mitigates interaction of marine mammals and seabirds with fishing gear, the action is not likely to negatively impact conservation. The preferred alternative would not directly affect the allocation of fishing privileges, and thus cannot be said to directly create excessive shares. Existing limits on excessive share accumulation would not be altered by the preferred alternative.

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

Relative to the status quo, the preferred alternative considers efficiency in that it seeks to mitigate the reduced catch per unit of fishing effort (CPUE) that is caused by whale depredation off of hook-and-line gear. The preferred alternative provides greater flexibility for IFQ and CDQ participants in the BSAI; allowing them options to fish their quota opportunistically with either HAL or pot gear. This may increase their economic efficiency as they minimize their variable costs (e.g. fuel, bait, provisions) and opportunity costs that are incurred from avoiding whales. The Council's objective of providing the fleet with an additional tool to solve the depredation problem is not allocative in nature, so the considered management measure cannot be said to be creating any economic allocation. For more information, please see Section 4.7.1.

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

The preferred alternative would not alter the underlying management of the BSAI fisheries, which are structured to allow for variations in the fishery, resources, and available catch. The increasing frequency of whale depredation is, itself, an emerging issue under the status quo. Therefore, the preferred alternative seeks to account for a change in the fishing environment by increasing flexibility by authorizing a new gear option in the BSAI.

National Standard 7 — Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The preferred alternative would not directly increase costs, as it merely provides the fleet with an option in gear choice, although operators that choose to use pot gear to harvest halibut would be required to comply with monitoring and recordkeeping requirements. In fact, the preferred alternative could operational efficiency and limit the costs associated with whale avoidance measures. The preferred alternative is not duplicative of any existing management measures. For more information, please see Section 4.7.2.

National Standard 8 — Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks),

take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of National Standard 2, in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The preferred alternative takes into account the importance of groundfish, halibut, and crab resources of the BSAI. As described in Section 4.7.2.3, the distributional benefits from the opportunity to switch over to pot gear and potentially prosecute the halibut IFQ/CDQ more efficiently in the presence of killer whales could also indirectly impact communities. Income generated by QS holders, vessel owners, skippers, and crew can induce impacts through a community where these individuals live and spend money. Particularly vessel owners that have vessels greater than or equal to 50 ft LOA may be able to take advantage of this action and switch from HAL to pot gear. To the extent that there are costs associated with grounds preemption and gear conflicts for vessels that do not switch to pot gear, this type of cost could have an indirect adverse impact as well. Due to the minimal effort that is expected to shift to pot gear, combined with a three-year review of the program, the preferred alternative is structured in a manner that seeks to minimize disadvantages to fishery participants who choose not to switch from HAL to pot gear.

If there is a redistribution of halibut to processors where harvesters do not typically deliver, there could be positive and negative distributional impacts to communities. Some communities may experience increased tax revenue and greater economic activity if deliveries increase. Some may lose out on some of the tax revenue and the economic activity that is typically present in those areas. Currently, there are a limited number of processors which accept BSAI halibut and many of these processors are diversified to accept deliveries from other harvesters. For this reason, it is expected that impacts to communities from a change in delivery patterns would be limited in scope.

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

Under the no action alternative, all BSAI halibut fishermen would continue to use HAL gear. HAL gear tends to produce greater amounts of bycatch of groundfish species that are included in the BSAI groundfish fishery management plan (such as skates, rockfish, sculpin, and Pacific cod) relative to pot gear. Compared to the status quo of HAL gear, the preferred alternative would allow the use of gear that is typically more selective. Bycatch species that are caught using pot gear would be physically protected from whale depredation, so the preferred alternative could be said to mitigate at least one source of bycatch mortality. Additionally, halibut that are caught in sablefish pots would no longer be considered bycatch if the vessel holds the appropriate IFQ, as that halibut would be legal to retain and sell (if of legal size). Use of pot gear might result in higher bycatch for species such as crab; however, industry could voluntarily design pot gear to reduce the amount of crab bycatch and increase the escapement of juvenile crab bycatch with specific features (i.e., soft tunnel openings, escapement mechanism, etc.). Additionally, the preferred alternative has been structured in a way that attempts to reduce fishing with pot gear in areas with overfished blue king crab. For more information, please see Section 3.6.

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

Safety of human life at sea is considered in the existing fishery management plans and federal regulations that govern the BSAI groundfish and crab fisheries, some of which is described in Section 4.5.5. Under the preferred alternative, all vessels over 79 ft would still be required to maintain and

abide by their stability instructions for their vessel and gear. Vessels of all sizes are not being required to carry any extra gear and have the option to participate in the opportunity created by this action. For more information, please see Section 4.7.11.

5.2 Section 303(a)(9) Fisheries Impact Statement

Section 303(a)(9) of the MSA requires that a fishery impact statement be prepared for each FMP amendment. A fishery impact statement is required to assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for (a) participants in the fisheries and fishing communities affected by the plan amendment; (b) participants in the fisheries conducted in adjacent areas under the authority of another Council; and (c) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery (16 U.S.C. 1853(a)(9)).

The EA/RIR prepared for this plan amendment constitutes the fishery impact statement. The likely effects of the proposed action are analyzed and described throughout the EA/RIR. The effects on participants in the fisheries and fishing communities are analyzed in the RIR portion of the analysis (Section 4). The proposed action affects the BSAI IFQ and CDQ halibut and sablefish fisheries in the EEZ off Alaska, which are under the jurisdiction of the North Pacific Fishery Management Council. Impacts on participants in fisheries conducted in adjacent areas under the jurisdiction of other Councils are not anticipated as a result of this action. The effects of the proposed action on safety of human life at sea are evaluated in Section 4.7.11, and above in Section 5.1 under National Standard 10. Based on the information reported in this section, there is no need to update the Fishery Impact Statement included in the FMP.

5.3 Council's Ecosystem Vision Statement

In February 2014, the Council adopted, as Council policy, the following:

Ecosystem Approach for the North Pacific Fishery Management Council

Value Statement

The Gulf of Alaska, Bering Sea, and Aleutian Islands are some of the most biologically productive and unique marine ecosystems in the world, supporting globally significant populations of marine mammals, seabirds, fish, and shellfish. This region produces over half the nation's seafood and supports robust fishing communities, recreational fisheries, and a subsistence way of life. The Arctic ecosystem is a dynamic environment that is experiencing an unprecedented rate of loss of sea ice and other effects of climate change, resulting in elevated levels of risk and uncertainty. The North Pacific Fishery Management Council has an important stewardship responsibility for these resources, their productivity, and their sustainability for future generations.

Vision Statement

The Council envisions sustainable fisheries that provide benefits for harvesters, processors, recreational and subsistence users, and fishing communities, which (1) are maintained by healthy, productive, biodiverse, resilient marine ecosystems that support a range of services; (2) support robust populations of marine species at all trophic levels, including marine mammals and seabirds; and (3) are managed using a precautionary, transparent, and inclusive process that allows for analyses of tradeoffs, accounts for changing conditions, and mitigates threats.

Implementation Strategy

The Council intends that fishery management explicitly take into account environmental variability and uncertainty, changes and trends in climate and oceanographic conditions, fluctuations in productivity for managed species and associated ecosystem components, such as habitats and non-managed species, and relationships between marine species. Implementation will be responsive to changes in the ecosystem and our understanding of those dynamics, incorporate the best available science (including local and traditional knowledge), and engage scientists, managers, and the public.

The vision statement shall be given effect through all of the Council's work, including long-term planning initiatives, fishery management actions, and science planning to support ecosystem-based fishery management.

In considering this action, the Council is being consistent with its ecosystem approach policy. This action increases flexibility in the IFQ and CDQ fisheries to allow for harvesters to adapt to changes within the fishery and the environment. Reflecting the Council's intent to be adaptive to changes in the ecosystem, this action allows longline fishermen to potentially better avoid increasing whale interactions with fishing gear. This action also may help minimize unaccounted halibut discard mortality due to whale depredation, which is directly supportive of the Council's intent to provide best data possible for scientists, managers, and the public in order to ensure sustainable fisheries for managed species and their effects on associated ecosystem components.

6 Pacific Halibut Act Considerations

The fisheries for Pacific halibut are governed under the authority of the Northern Pacific Halibut Act of 1982 (Halibut Act, 16 U.S.C. 773-773k). For the United States, the Halibut Act gives effect to the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea. The Halibut Act also provides authority to the Regional Fishery Management Councils, as described in § 773c:

(c) Regional Fishery Management Council involvement

The Regional Fishery Management Council having authority for the geographic area concerned may develop regulations governing the United States portion of Convention waters, including limited access regulations, applicable to nationals or vessels of the United States, or both, which are in addition to, and not in conflict with regulations adopted by the International Pacific Halibut Commission. Such regulations shall only be implemented with the approval of the Secretary, shall not discriminate between residents of different States, and shall be consistent with the limited entry criteria set forth in section 1853(b)(6) of this title. If it becomes necessary to allocate or assign halibut fishing privileges among various United States fishermen, such allocation shall be fair and equitable to all such fishermen, based upon the rights and obligations in existing Federal law, reasonably calculated to promote conservation, and carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of the halibut fishing privileges.

The Halibut Act states that the Council may develop regulations to govern the fishery, provided that the Council's actions are in addition to, and not in conflict with, regulations adopted by the International Pacific Halibut Commission (IPHC). As described in Section 2.4, implementation of the Council's PA would not require changes to current IPHC regulations, however, NMFS implementation of the PA would require that NMFS develop regulations to "conduct in-season closures for the directed halibut fishery if necessary to conserve PIBKC, or another species of fish or groundfish to prevent overfishing for that species".

It is necessary for the Council to consider the directions in the Halibut Act about the regulations that may result from this action. Much of the direction listed in §773c(c) is duplicative with the Magnuson-Stevens Act's National Standard 4, requiring that regulations not discriminate between residents of different States, and directing that if halibut fishing privileges are allocated or assigned among fishermen, such allocation shall be fair and equitable.

The Halibut Act also directs regulations to be consistent with the limited entry criteria set forth in the Magnuson-Stevens Act. These are criteria that the Council and the Secretary must take into account when establishing a limited access system for a Magnuson-Stevens Act fishery (16 U.S.C. 1853(b)(6)). The criteria are listed below.

- (A) present participation in the fishery;
- (B) historical fishing practices in, and dependence on, the fishery;
- (C) the economics of the fishery;
- (D) the capability of fishing vessels used in the fishery to engage in other fisheries;
- (E) the cultural and social framework relevant to the fishery and any affected fishing communities;
- (F) the fair and equitable distribution of access privileges in the fishery; and
- (G) any other relevant considerations.

For each of the criteria, a reference is provided to areas in the analysis that are particularly relevant to the consideration of that criterion, although they may not be the only information that is relevant to the issue.

- Section 3.4 includes a brief history of the commercial halibut fishery and its footprint.
- Sections 4.5.1 and 4.5.2 describe the halibut IFQ and CDQ programs and allocation under those programs.
- Section 4.5.2 also provides a description of harvesters in the commercial halibut fishery in the Bering Sea, the economics of the fishery, and the vessels' diversification into other fisheries.
- Dependence of fishing communities on the halibut IFQ fishery is discussed in Section 4.5.4. This section includes information on harvest diversification of local fleets, processor diversification by community grouping, and benefits of fishing taxes to communities.
- Section 4.7.2 evaluates the impacts from Alternative 2 with respect to these considerations.

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