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Environmental Assessment/ Regulatory Impact Review For 2018 Pacific halibut catch limits and associated management measures in International Pacific Halibut Commission Regulatory Areas: Area 2C (Southeast Alaska), Area 3A (Central Gulf of Alaska), Area 3B (Western Gulf of Alaska), and Area 4 (subdivided into 5 areas, 4A through 4E, in the Bering Sea and Aleutian Islands of Western Alaska)

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Abstract: This Environmental Assessment (EA)/Regulatory Impact Review (RIR) – collectively, Analysis – examines alternative methods for establishing Pacific halibut catch limits in 2018 for the following International Pacific Halibut Commission (IPHC) Regulatory Areas: Area 2C (Southeast Alaska), Area 3A (Central Gulf of Alaska), Area 3B (Western Gulf of Alaska), and Area 4 (subdivided into five areas, 4A through 4E, in the Bering Sea and Aleutian Islands of Western Alaska). This action is necessary to ensure that halibut catch limits, charter halibut fishery management measures, and catch sharing plan (CSP) allocations are in place at the start of the commercial individual fishing quota (IFQ) and Western Alaska Community Devleopment Quota Program (CDQ) halibut fishery on March 24, 2018 that better protect the declining Pacific halibut resource. This action is intended to enhance the conservation of Pacific halibut and is within the authority of the Secretary of Commerce (Secretary) to establish additional regulations governing the taking of halibut which are more restrictive than those adopted by the IPHC.

This Analysis examines three alternative catch limits and their impacts: Alternative 1 – maintain catch levels equal to those adopted by the IPHC in 2017; Alternative 2 – reduce catch limits as suggested by, but not adopted by, the U.S Commissioners; and Alternative 3 – reduce catch limits consistent with the IPHC's interim management procedure. This Analysis examines the potential impacts of these alternatives on commercial harvests, guided sport (charter) allocations in Area 2C and Area 3A, management of applicable management measures to the charter halibut fisheries in Area 2C and Area 3A, and a CSP for the commercial IFQ and CDQ halibut fisheries in Areas 4C, 4D, and 4E.

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List of Commonly Used Acronyms and Abbreviations

AAC	Alaska Administrative Code
ABC	acceptable biological catch
ADF&G	Alaska Department of Fish and Game
AEQ	adult equivalent
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
AGDB	Alaska Groundfish Data Bank
AKFIN	Alaska Fisheries Information Network
ANILCA	Alaska National Interest Lands Conservation Act
BASIS	Bering Sea-Aleutian Salmon International Survey
BEG	biological escapement goal
BOF	Board of Fish
BSAI	Bering Sea and Aleutian Islands
CAS	Catch Accounting System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COAR	Commercial Operators Annual Report
Council	North Pacific Fishery Management Council
CP	catcher/processor
CV	catcher vessel
CWT	coded-wire tag
DPS	distinct population segment
E	East
E.O.	Executive Order
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FCEY	Fishery constant exploitation yield
Fxx%	Fishing Intensity Rate
FMA	Fisheries Monitoring and Analysis
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRFA	Final Regulatory Flexibility Analysis
ft	foot or feet
GHL	guideline harvest level
GOA	Gulf of Alaska
IFQ	Individual fishing quota
IPHC	International Pacific Halibut Commission
IRFA	Initial Regulatory Flexibility Analysis
JAM	jeopardy or adverse modification
lb.(s)	pound(s)
LEI	long-term effect index
LLP	license limitation program
LOA	length overall

m	meter or meters
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MSST	minimum stock size threshold
t	tonne, or metric ton
NAICS	North American Industry Classification System
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPAFC	North Pacific Anadromous Fish Commission
NPFMC	North Pacific Fishery Management Council
NPUE	Numbers per unit effort
Observer Program	North Pacific Groundfish and Halibut Observer Program
OMB	Office of Management and Budget
PBR	potential biological removal
PSC	prohibited species catch
PPA	Preliminary preferred alternative
PRA	Paperwork Reduction Act
PSEIS	Programmatic Supplemental Environmental Impact Statement
PWS	Prince William Sound
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future action
RIR	Regulatory Impact Review
RPA	reasonable and prudent alternative
RSW	refrigerated seawater
SAFE	Stock Assessment and Fishery Evaluation
SAR	stock assessment report
SBA	Small Business Act
Secretary	Secretary of Commerce
SEG	sustainable escapement goal
SET	sustainable escapement threshold
SNP	single nucleotide polymorphism
SPLASH	Structure of Populations, Levels of Abundance, and Status of Humpbacks
SPR	spawning potential ratio
SW	southwest
TAC	Total allowable catch
TCEY	Total constant exploitation yield
U.S.	United States
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	vessel monitoring system
W	west
WPUE	weight per unit effort

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Executive Summary

This Analysis examines three alternative Pacific halibut catch limits and charter management measures in specific International Pacific Halibut Commission (IPHC) Regulatory Areas (Areas) in waters off Alaska in 2018.

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- **Alternative 2** -- Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A, as suggested by, but not adopted by, the U.S Commissioners at the 2018 IPHC Annual Meeting.
- **Alternative 3** -- Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.

This document is an Environmental Assessment/Regulatory Impact Review (EA/RIR -- Analysis). An EA/RIR provides assessments of the environmental impacts of an action and its reasonable alternatives (the EA), and the economic benefits and costs of the action alternatives, as well as their distribution (the RIR). This EA/RIR addresses the statutory requirements of the Northern Pacific Halibut Act of 1982 (Halibut Act), the National Environmental Policy Act, and Presidential Executive Order 12866 to provide the analytical background for decision-making.

Purpose and Need

The IPHC can recommend regulations that govern the Pacific halibut fishery, pursuant to the Convention between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Convention), Mar. 2, 1953, 5 U.S.T. 5, and the Protocol Amending the Convention Between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Protocol), Mar. 29, 1979, 32 U.S.T. 2483. The IPHC has been established to assess the status of the halibut resource, and regulate halibut consistent with the Convention, Protocol, and applicable U.S. and Canadian law. As provided by the Halibut Act at 16 U.S.C. § 773b, the Secretary of State, with the concurrence of the Secretary of Commerce, may accept or reject, on behalf of the United States, regulations recommended by the IPHC in accordance with the Convention (Halibut Act, Sections 773-773k). The Halibut Act provides the Secretary of Commerce with general responsibility to carry out the Convention under the Halibut Act (16 U.S.C. 773(c)(a) and (b)). This general responsibility included adopting such regulations, in consultation with the U.S. Coast Guard, as may be necessary to carry out the purposes and objectives of the Convention and the Halibut Act (16 U.S.C. 773c(b)).

At the IPHC's annual meeting in January 2018, the U.S. and Canada did not reach agreement on catch limits and other regulations for the management of charter halibut fisheries in U.S. or Canadian waters in 2018. Under the provisions of the Convention, catch limits and regulations in place in 2017 will remain in effect until superseded by regulations implemented by the IPHC, or through domestic regulations implemented by Canada or the U.S. Biological information presented by IPHC scientists at the annual meeting indicate that the total biomass, and

specifically the total exploitable biomass, of halibut is projected to decline substantially over the next several years if catch limits are not reduced relative to 2017. Reductions in catch limits, and associated charter halibut management measures in IPHC Regulatory Area 2C (Southeast Alaska), Area 3A (Central Gulf of Alaska), Area 3B (Western Gulf of Alaska), and Area 4 (subdivided into 5 areas, 4A through 4E, in the Bering Sea and Aleutian Islands of Western Alaska) are necessary for 2018 to establish management measures that will better protect the declining halibut resource and enhance the conservation of Pacific halibut while taking into account the potential adverse socioeconomic impacts that may result from lower catch limits.

Alternatives

This Analysis considers three alternatives.

- **Alternative 1** (status quo) -- Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.
- **Alternative 2** -- Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A, as suggested by, but not adopted by, the U.S Commissioners at the 2018 IPHC Annual Meeting.
- **Alternative 3** -- Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.

Section 2 of the Analysis provides additional clarifications that is not repeated here.

Environmental Assessment

The primary effects of all of the alternatives would be on the catch limits that are allocated to the directed commercial halibut individual fishing quota (IFQ), the Western Alaska Community Development Quota Program (CDQ), and the charter halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. There would also be indirect effects on the status of the halibut resource throughout its range, with the greatest longer-term impacts likely to accrue to directed halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E because these areas encompass the largest overall proportion of the halibut biomass. Table 2 summarizes the environmental effects of the alternatives.

For all alternatives, the resulting catch limits described here do not include the amount of incidental mortality from the commercial fishery (i.e., wastage or discard mortality) for Areas 2C and 3A unless otherwise noted, and all pounds are net pounds. Net pounds are defined as the weight of halibut from which the gills, entrails, head, and ice and slime have been removed. This terminology is used to be consistent with the IPHC, which establishes catch limits and calculates mortality in net pounds.

For all of the alternatives, the analysis did not identify potential impacts on fishery habitats, marine mammals, seabirds, the ecosystem, or other factors other than the halibut and groundfish fisheries due to the limited scope, duration, and intensity of the proposed action. The analysis does describe the potential impact of the alternatives on the incidental harvest of groundfish

resources, but notes that the overall impacts are expected to be minimal and do not vary substantially among the alternatives.

Alternative 1

Overall, the stock biomass and total exploitable biomass (the term Total Constant Exploitation Yield – TCEY is used in the IPHC process) would be expected to decline in 2019, 2020, and 2021.

Under Alternative 1, catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E would be 22,620,000 net pounds. These catch limits, and the resulting charter management measures, would be expected to result in fishery harvest rate of $F_{38\%}$ on a coastwide basis. Section 3.3.3 of the Analysis describes that harvest rates of $F_{38\%}$ are expected to result in overall removals that are in excess of an $F_{40\%}$ harvest rate. NMFS and the North Pacific Fishery Management Council (NPFMC) consider $F_{40\%}$ a conservative and sustainable harvest rate for groundfish fisheries, including flatfish species, that are managed under Fishery Management Plans (FMPs) off Alaska.

Alternative 1 would be expected to substantially increase the risk of declines in spawning stock biomass and fishery yield over the foreseeable future relative to Alternatives 2 and 3. Alternative 1 would nearly double the risk that the spawning stock biomass will decline by at least 5% in 2019 (34%), compared to Alternatives 2 (19%), and would greatly increase the risk relative to Alternative 3 (5%). Similarly, the catch limits and charter management measures under Alternative 1 would increase the risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if spawning biomass declines below specific levels.

Alternative 1 would be expected to increase the probability that catch limits will continue to decline in future years relative to Alternatives 2 and 3. As shown in Table 6, under Alternative 1, there is 76% chance that the fishery yield will be more than 10% lower than than the status quo of 40,800,000 pounds (18,507 mt) in 2019, and a 76% chance that it will be more than 10% lower. The potential reduction in 2019, is greatest for Alternative 1 compared to Alternative 2 (63%), and Alternative 3 (38%). This same pattern holds for 2020 and 2021.

Alternative 1 would also result in harvests in specific Areas that are less proportionate to the best available information on the estimated biological abundance in each Area relative to Alternatives 2 and 3. As noted in Section 3.2, IPHC 2018b, and IPHC 2018c, the IPHC has distributed catch limits among Areas based on the distribution of O26 (over 26” fish) as estimated through survey and other data. Generally, the IPHC and NMFS have relied on these methods to help reduce the risk that harvests in a specific Area could cause localized depletion of that resource. Alternative 1 uses the estimated biological abundance in various Areas for 2017 rather than the most recent and best available IPHC estimates that are used in Alternatives 2 and 3.

Alternative 2

Under Alternative 2, the stock biomass and TCEY would be expected to decline in 2019, 2020, and 2021, the probability and amount of this decline would be expected to be less under Alternative 2 relative to Alternative 1, but would be greater than the decline projected for Alternative 3.

Catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E are reduced to 20,520,000 net pounds (9.3% reduction relative to Alt. 1). These catch limits, and the resulting charter management measures, would be expected to result in fishery harvest rate of $F_{41\%}$ on a coastwide basis. Section 3.2 of the Analysis describes that NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries managed under FMPs off Alaska. In comparison to standards applicable to groundfish species in the North Pacific, Alternative 2 would be expected to result in a harvest rate that is approaching the upper bound of removals considered sustainable.

Alternative 2 would be expected to decrease the risk of declines in spawning stock biomass and fishery yield over the foreseeable future relative to Alternative 1, but would increase the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternative 3. Alternative 2 would result in a 19% chance that the spawning stock biomass will decline by at least 5% in 2019, compared to a 34% chance under Alternative 1, and a 5% chance under Alternative 3. Compared to the most conservative alternative (Alternative 3), the catch limits and charter management measures under Alternative 2 would increase the risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below a specific level. However, this risk would be less under Alternative 2 as comparted to Alternative 1.

Alternative 2 would also result in harvests in specific regulatory areas that are more proportionate to the best available information on the estimated biological abundance in various Areas relative to Alternative 1. As noted in Section 3.2, IPHC 2018b, and IPHC 2018c, the IPHC has distributed catch limits among Areas based on the distribution of O26 as estimated through survey and other data. Generally, the IPHC and NMFS have relied on these methods to help reduce the risk that harvests in a specific Area could cause localized depletion of that resource.

In the Areas covered by this proposed action, Alternative 2 would effectively reduce harvests in regulatory areas so that the resulting catch limits and CSP allocations in Areas 2C and 3A are roughly equal to an amount that is half-way between the catch limits and CSP allocations adopted in 2017 (Alternative 1), and the catch limits and CSP allocations that would result if the IPHC's current interim management procedure were implemented (Alternative 3).

Alternative 3

Under Alternative 3, the stock biomass and TCEY would be expected to decline in 2019, 2020, and 2021, but the probability and amount of this decline would be expected to be less under Alternative 3 relative to Alternatives 1 and 2.

Catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E are reduced to 18,010,000 net pounds (18.6% reduction relative to Alt. 1). These catch limits, and the resulting charter management measures, would be expected to result in fishery harvest rate of $F_{46\%}$ on a coastwide basis (see Section 3.3). Section 3.2 of the Analysis describes that NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries managed under FMPs off Alaska. In comparison to standards applicable to groundfish species in the North Pacific, Alternative 3 would be expected to result in a harvest rate that is considered sustainable, and would provide the greatest likelihood that removals do not exceed the $F_{40\%}$ harvest rate commonly used as an upper limit of sustainable harvest in groundfish fisheries off Alaska.

Alternative 3 would be expected to decrease the risk of declines in spawning stock biomass and fishery yield over the foreseeable future relative to Alternatives 1 and 2. Alternative 3 would result in only a 5% chance that the spawning stock biomass will decline by at least 5% in 2019, compared to a 34% chance under Alternative 1, and a 17% chance under Alternative 2. Alternative 3 represents the most conservative alternative, and would pose the lowest risk that the stock abundance could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below that threshold.

Alternative 3 would be expected to decrease the probability that catch limits will continue to decline in future years relative to Alternatives 1 and 2. Under Alternative 3, there is only a 38% chance that the fishery yield (effectively catch limits) will be more than 10 lower than 31,000,000 pounds (14,061 mt) in 2019, compared to Alternative 1 (76%), and Alternative 2 (63%). This same pattern holds for 2020 and 2021.

Alternative 3 would also result in harvests in specific Areas proportionate to the best available information on estimated biological abundance in each Area. As noted in Section 3.2, IPHC 2018b, and IPHC 2018c, the IPHC has apportioned catch limits among Areas based on the distribution of O26 fish as estimated through survey and other data. Generally, the IPHC and NMFS have relied on these methods to help reduce the risk that harvests in a specific Area could cause localized depletion of that resource.

Regulatory Impact Review

The primary impact of all of the alternatives is on revenue from commercial halibut and charter halibut fisheries. The analysis notes that because commercial and charter halibut fishing operations are distributed among many communities the impacts of the alternatives are likely to be broadly shared, but somewhat diffuse among various communities. The social and economic impacts of the alternatives are summarized in Table 2.

Alternative 1

Alternative 1 would be expected to provide greater harvest opportunities, and therefore greater economic revenue for commercial IFQ and halibut CDQ harvests in 2018 relative to Alternatives 2 and 3. Under Alternative 1, total ex-vessel value of the commercial fisheries is estimated at approximately $133 million dollars.

Alternative 1 would be expected to provide slightly greater charter fishing opportunities, and therefore greater economic revenue for charter operators in Areas 2C and 3A relative to Alternative 2, and substantially greater charter fishing opportunities and economic revenue relative to Alternative 3.

Alternative 1 would be expected to provide fewer harvest opportunities, and therefore potentially less economic revenue for commercial IFQ and halibut CDQ harvests in 2019, 2020, and 2021 relative to Alternatives 2 and 3 because the probability of decreased fishery yield is greater under Alternative 1. Section 4 provides a qualitative description of the potential loss in economic revenue that could occur in 2019, 2020, and 2021 under all of the alternatives since this potential loss in revenue cannot be reliably quantified.

Alternative 2

Alternative 2 would be expected to provide approximately $12.3M less commercial revenue in 2018 relative to Alternative 1, with the most significant reductions in potential revenue concentrated in Areas 2C, 3A, and 3B. Area 4E would have the greatest relative (percentage) reduction in revenue compared to Alternative 1, approximately 50%, due to specific factors in the allocation of catch limits in Areas 4CDE described in Section 4.

Alternative 2 would be expected to provide slightly greater charter fishing opportunities in Areas 2C and 3A relative to Alternative 3, and slightly fewer charter fishing opportunities relative to Alternative 1. Table 42 in Section 4 of the Analysis notes that under Alternative 2, there would be approximately 4,200 fewer angler days, and $1.2M less revenue in 2018 compared to Alternative 1.

Under Alternative 2, two charter management measures would change to be more restrictive than Alternative 1 but less restrictive than Alternative 3. In Area 2C, the reverse slot limit would be revised. A reverse slot limit that prohibits a person on board a charter vessel from taking or possessing any halibut, with head on, that is less than or equal to a certain length or greater than or equal to a certain length. Under Alternative 1, the Area 2C reverse slot limit is less than or equal to 44 inches and greater than or equal to 80 inches (203.2 cm), as measured in a straight line, passing over the pectoral fin from the tip of the lower jaw with mouth closed, to the extreme end of the middle of the tail. This is commonly designated as U44-O80. Under Alternative 2, the reverse slot limit would narrow to U38-O80 (i.e., less than or equal to 38” and greater than or equal to 80”). This narrowing would reduce the number of larger fish (from 38” to 44”) that could be retained, thereby reducing charter harvests. In Area 3A, the number of days-of-week closures would increase from 3 Tuesdays in July and August (July 18, July 25, and August 1 in 2017) to 6 Tuesdays in July and August (July 10, July 17, July 24, July 31, August 7, and August 14 in 2018). Increasing the number of day-of-week closures reduces the amount of charter harvest opportunities, charter harvests and revenue to charter operators relative to Alternative 1.

Alternative 2 would be expected to provide reduced harvest opportunities, and therefore potentially less economic revenue for commercial IFQ and halibut CDQ harvests in 2019, 2020, and 2021 relative to Alternative 3 because the probability of decreased fishery yield is greater under Alternative 2 compared to Alternative 3. Alternative 2 would be expected to result in a

greater risk of reduced harvest and revenue in 2019, 2020, and 2021. Section 4 provides a description the potential loss in economic revenue that could occur in 2019, 2020, and 2021 under all of the alternatives.

Alternative 3

Alternative 3 would be expected to provide the least amount of harvest opportunities, and therefore reduced economic revenue for commercial IFQ and halibut CDQ harvests in 2018 relative to Alternatives 1 and 2. Alternative 3 would be expected to provide approximately $25.6M less commercial revenue in 2018 relative to Alternative 1, with the most significant reductions in potential revenue concentrated in Areas 2C, 3A, and 3B. Area 4E would have the greatest relative (percentage) reduction in revenue compared to Alternative 1, approximately 50%, due to specific factors in the allocation of catch limits in Areas 4CDE described in Section 4.

Alternative 3 would be expected to provide fewer charter fishing opportunities in Areas 2C and 3A relative to Alternatives 1 or 2. Under Alternative 3, there would be approximately 8,600 fewer angler days, and $2.6M less revenue for charter operators in 2018 compared to Alternative 1. Section 4 provides a detailed description of the charter management measures and charter fishing opportunities that would be expected under all of the alternatives.

Under Alternative 3, two charter management measures would change and be more restrictive relative to Alternatives 1 and 2. In Area 2C, the reverse slot limit would be revised from U44-O80 under Alternative 1, to U35-O80. In Area 3A, the number of days-of-week closures would increase from 3 Tuesdays in July and August (July 18, July 25, and August 1 in 2017) to 10 Tuesdays in June, July and August (June 19, June 26, July 3, July 10, July 17, July 24, July 31, August 7, and August 14 in 2018). Both of these changes in charter management measures would be expected to reduce the amount of charter harvest opportunities, charter harvests and revenue to charter operators relative to Alternatives 1 and 2.

Alternative 3 would be expected to provide the greatest reduction in risk of reduced harvest, and therefore potentially less economic revenue for commercial IFQ and halibut CDQ harvests in 2019, 2020, and 2021 relative to Alternatives 1 and 2 because the probability of decreased fishery yield is greater under Alternatives 1 and 2 compared to Alternative 3. Section 4 provides a description the potential loss in economic revenue that could occur in 2019, 2020, and 2021 under all of the alternatives.

Prefered Alternative

Alternative 2 is the preferred alternative. Alternative 2 would best meet the objectives of the purpose and need statement. Alternative 2 would balance the need to protect the declining halibut resource and enhance the conservation of Pacific halibut while taking into account the potential adverse socioeconomic impacts of lower catch limits. Sections 3 and 4 of this analysis provide the information that supports Alternative 2 as the preferred alternative.

The key effects of the alternatives are summarized in Table ES-1 below.

Table ES-1 Comparison of alternatives and major impacts.

	Alternative 1	**Alternative 2 Preferred Alternative**	Alternative 3
Description of Alternative	Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.	Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Modify charter management measures in Areas 2C and 3A, as suggested by, but not adopted by, the U.S Commissioners at the 2018 IPHC Annual Meeting.	Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.
Catch Limits (All Areas 2C though Area 4)	Catch limit for all Areas is **22,620,000** net pounds.	Reduce catch limit for all Areas to **20,520,000** net pounds (9.3% reduction from Alt. 1).	Reduce catch limit for all Areas to **18,010,000** net pounds (18.6% reduction from Alt. 1).
Charter halibut management measures Areas 2C & 3A	Maintain 2017 charter management measures including: **Area 2C** reverse-slot limit of U44-O80; **Area 3A** 3 Tuesday day-of-week closures in July and August.	Charter management measures in 2017 maintained, except: **Area 2C** reverse-slot limit of U38 – O80; **Area 3A** 6 Tuesday day-of-week closures in July and August.	Charter management measures in 2017 maintained, except: **Area 2C** reverse-slot limit of U35 – O80; **Area 3A** 10 Tuesday day-of-week closures in June, July, and August.
Halibut Stock and Fishery Yield	Greatest risk of reduced biomass and fishery yield (2019–2021). $F_{38\%}$ harvest rate. 34% chance spawning biomass is 5% lower in 2019. 76% chance fishery yield is more than 10% lower in 2019.	Moderate risk of reduced biomass and yield (2019–2021). $F_{41\%}$ harvest rate. 19% chance spawning biomass is 5% lower in 2019. 63% chance fishery yield is more than 10% lower in 2019.	Lowest risk of reduced biomass and yield (2019–2021). $F_{46\%}$ harvest rate. 5% chance spawning biomass is 5% lower in 2019. 38% chance fishery yield is more than 10% lower in 2019.
Groundfish resources	No conservation concern identified. Minimal difference among the alternatives. Alternative 3 would have the smallest amount of incidental groundfish catch compared to Alternative 2 or 1, but overall incidental groundfish catch in commercial and charter fisheries is small relative to Acceptable Biological Catch.		
Comercial and charter revenue in 2018	Estimated commercial revenue is $133M, and no expected change in charter revenue from 2017.	Reduces commercial revenue by $12.3M, and charter revenue by an estimated $1.2M in addition to unquantified loss compared to Alt.1.	Reduces commercial revenue by $25.6M, and charter revenue by an estimate $2.6M in addition to unquantified loss compared to Alt.1.
Commercial and charter revenue in 2019, 2020, 2021	Under all Alternatives, some risk of reduced fishery yields in 2019 through 2021 (see Halibut Stock and Fishery Yield). This potential risk, and amount of the risk is greatest under Alternative 1, and least with Alternative 3. Data are not available to reliably quantify and differentiate the potential economic impacts among the alternatives that may result.		
Social (Community) Impacts	Most fishing opportunities distributed among many communities. Greatest risk of reduced benefits (2019-2021)	Reduced fishing opportunities and potential benefits relative to Alt. 1, but lower risk of reduced benefits (2019-2021). Approximately a 50% reduction in Area 4E CDQ for communities reliant on Area 4E opportunities	

1 Introduction

This Analysis examines three alternative Pacific halibut catch limits and charter management measures in specific IPHC Regulatory Areas (Areas) in waters off Alaska in 2018.

- **Alternative 1 (status quo) --** Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.
- **Alternative 2 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A, as endorsed by the U.S. Commissioners but not recommended by the IPHC at the 2018 IPHC Annual Meeting.
- **Alternative 3 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.

This document is an Environmental Assessment/Regulatory Impact Review (EA/RIR -- Analysis). An EA/RIR provides assessments of the environmental impacts of an action and its reasonable alternatives (the EA), and the economic benefits and costs of the action alternatives, as well as their distribution (the RIR). This EA/RIR addresses the statutory requirements of the Northern Pacific Halibut Act of 1982 (Halibut Act), the National Environmental Policy Act, and Presidential Executive Order 12866 to provide the analytical background for decision-making.

1.1 Purpose and Need

The IPHC can recommend regulations that govern the Pacific halibut fishery, pursuant to the Convention between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Convention), Mar. 2, 1953, 5 U.S.T. 5, and the Protocol Amending the Convention Between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Protocol), Mar. 29, 1979, 32 U.S.T. 2483. The International Pacific Halibut Commission (IPHC) has been established to assess the status of the halibut resource, and regulate halibut consistent with the Convention, Protocol, and applicable U.S. and Canadian law. As provided by the Halibut Act at 16 U.S.C. § 773b, the Secretary of State, with the concurrence of the Secretary of Commerce, may accept or reject, on behalf of the United States, regulations recommended by the IPHC in accordance with the Convention (Halibut Act, Sections 773-773k). The Halibut Act provides the Secretary of Commerce with the authority and general responsibility to carry out the requirements of the Convention and the Halibut Act. The Secretary of Commerce may implement regulations governing harvesting privileges among U.S. fishermen in U.S. waters that are in addition to, and not in conflict with, approved IPHC regulations, under the authority of Article 1 of the Protocol and sections 773b and 773c of the Halibut Act.

At the IPHC's annual meeting in January 2018, the U.S. and Canada did not reach agreement on catch limits and other regulations for the management of charter halibut fisheries in U.S. or Canadian waters in 2018. Under the provisions of the Convention, catch limits and regulations in place in 2017 will remain in effect until superseded by regulations implemented by the IPHC, or through domestic regulations implemented by Canada or the U.S. Biological information

presented by IPHC scientists at the annual meeting indicate that the total biomass, and specifically the total exploitable biomass, of halibut is projected to decline substantially over the next several years if catch limits are not reduced relative to 2017. Reductions in catch limits, and associated charter halibut management measures Area 2C (Southeast Alaska), Area 3A (Central Gulf of Alaska), Area 3B (Western Gulf of Alaska), and Area 4 (subdivided into 5 areas, 4A through 4E, in the Bering Sea and Aleutian Islands of Western Alaska) are necessary for 2018 to establish management measures that will better protect the declining halibut resource and enhance the conservation of Pacific halibut while taking into account the potential adverse socioeconomic impacts that may result from lower catch limits.

1.2 History of this Action

Pacific halibut (*Hippoglossus stenolepsis*) is a commercially, recreationally, and culturally valued species that ranges throughout the Pacific Ocean from northern California to the Aleutian Islands and throughout the Bering Sea. Pacific halibut (referred to simply as "halibut" throughout this analysis) has been commercially harvested since the late-1880's (IPHC 2014). Halibut has been traditionally harvested by indigenous cultures throughout the Pacific for millennia, and continues to have significant cultural importance and value as a food source today (Goen and Erikson 2017, Fall and Kostner 2017, IPHC 2014). Due to increasing commercial fishing effort off the Pacific coast of Canada and the U.S. in the early 1900's, catch rates began to decline. Commercial fishery participants from Canada and the U.S. sought an international agreement between the two countries to provide for more effective management of the resource (IPHC 2014). Canada and U.S. signed a convention in 1923, ratified in 1924, governing the management of halibut in the waters off Canada (British Columbia) and the U.S. (Alaska, California, Oregon, and Washington). In 1924 the organization now known as the IPHC was formed and began management of the halibut resource. The 1924 Convention between Canada and the U.S. has been amended several times since 1923.

Pursuant to provisions of the Convention (as amended) and accompanying Protocol, the IPHC can recommend regulations that govern the Pacific halibut fishery. The IPHC has established several Areas to more effectively manage the resource. Those Areas are: Area 2A (California, Oregon, and Washington); Area 2B (British Columbia); Area 2C (Southeast Alaska), Area 3A (Central Gulf of Alaska), Area 3B (Western Gulf of Alaska), and Area 4 (subdivided into 5 areas, 4A through 4E, in the Bering Sea and Aleutian Islands of Western Alaska). These Areas are described in 50 C.F.R. Part 679, Figure 15, and in Section 1.3 of this analysis. The U.S. implements the Convention and accompanying Protocol under the authority of the Halibut Act.

As provided by the Halibut Act at 16 U.S.C. § 773b, the Secretary of State, with the concurrence of the Secretary of Commerce, may accept or reject, on behalf of the United States, regulations recommended by the IPHC in accordance with the Convention (Halibut Act, Sections 773-773k). The Secretary of State, with the concurrence of the Secretary of Commerce, accepted the 2018 IPHC regulations agreed upon and recommended by the IPHC as provided by the Halibut Act at 16 U.S.C. § 773-773k. Pacific Halibut Fisheries; Catch Sharing Plan, (83 FR 10390, March 9, 2018).

The Halibut Act provides the Secretary of Commerce with general responsibility to carry out the Convention under the Halibut Act (16 U.S.C. § 773(c)(a) and (b)). This general responsibility

included adopting such regulations, in consultation with the U.S. Coast Guard, as may be necessary to carry out the purposes and objectives of the Convention and the Halibut Act (16 U.S.C. 773c(b)). The Regional Fishery Management Councils may develop, and the Secretary of Commerce may implement, regulations governing harvesting privileges among U.S. fishermen in U.S. waters which are in addition to, and not in conflict with, regulations adopted by the IPHC (16 U.S.C. 773c(c)). Id.; Protocol, Article 1. Also, the North Pacific Fishery Management Council (NPFMC) has exercised this authority most notably in developing halibut management programs for three fisheries that harvest halibut in Alaska: the subsistence, sport, and commercial fisheries. The Pacific Fishery Management Council (PFMC) has exercised this authority by developing a catch sharing plan governing the allocation of halibut and management of sport fisheries on the U.S. West Coast. . See 50 C.F.R. pPart 300 and Pacific Halibut Catch Sharing Plan for Area 2A available on the PFMC website (http://www.pcouncil.org/wp-content/uploads/2017/02/Final_2017_PACIFIC_HALIBUT_CATCH_SHARING_PLAN_FOR_AREA_2A.pdf).

The Secretary exercised the authority under Article I of the Convention and 16 U.S.C. 773c(a) and (b) in 1990 to implement regulations on commercial and sport catch limits that were more restrictive than the IPHC regulations published in 1989 because the IPHC, at its annual meeting in 1990, did not approve new management measures for 1990 (62 FR 11929, March 30, 1990) and the regulations published in 1989 were in effect until superseded.

Subsistence and sport halibut fishery regulations for Alaska are codified at 50 CFR Part 300. Commercial halibut fisheries in Alaska are subject to the IFQ Program and CDQ Program (50 CFR Part 679) regulations, and the area-specific catch sharing plans (CSPs) for Areas 2C, 3A, and Areas 4C, 4D, and 4E.

The NPFMC implemented a CSP among commercial IFQ and CDQ halibut fisheries in IPHC Regulatory Areas 4C, 4D, and 4E (commonly referred to as Area 4CDE, Western Alaska) through rulemaking, and the Secretary of Commerce approved the plan on March 20, 1996 (61 FR 11337). The Area 4 CSP regulations were codified at 50 CFR 300.65, and were amended on March 17, 1998 (63 FR 13000). New annual regulations pertaining to the Area 4 CSP also may be implemented through regulations established by the Secretary that are necessary to carry out the purposes and objectives of the Convention.

The NPFMC recommended and NMFS implemented through rulemaking a CSP for charter and commercial IFQ halibut fisheries in IPHC Regulatory Area 2C and Area 3A on January 13, 2014 (78 FR 75844, December 12, 2013). The Area 2C and 3A CSP regulations are codified at 50 CFR 300.65. The CSP defines an annual process for allocating halibut between the commercial and charter fisheries so that each sector's allocation varies in proportion to halibut abundance, specifies a public process for setting charter fishery management measures, and authorizes limited annual leases of commercial IFQ for use in the charter fishery as guided angler fish (GAF).

The IPHC held its annual meeting in Portland, Oregon, January 22 through 26, 2018, and recommended a number of changes to the 2017 IPHC regulations (82 FR 12730, March 7, 2017).

The Secretary of State accepted the annual management measures, including the following changes to the previous IPHC regulations for 2018 pertaining to:

- New commercial halibut fishery opening and closing date;
- Revisions to existing regulations to clarify the requirement for commercial halibut to be landed and weighed with the head attached;
- Modifications that align IPHC regulations to recent NPFMC actions that would allow CDQ groups to lease (receive by transfer) halibut quota share (QS) in Areas 4B, 4C, and 4D;
- A minor revision to clarify that halibut harvested on a charter vessel fishing trip in Area 2C or Area 3A must be retained on board the vessel on which the halibut was caught until the end of the fishing trip;
- Addition of language to existing regulations that clarifies the skin-on requirement of halibut that are retained and cut into sections on board a sport fishing vessel;
- Changes to allow halibut to be taken with pot gear under specific circumstances provided in NMFS regulations;
- Revisions to the management measures for Area 2C and Area 3A charter halibut anglers that close three Tuesdays to charter halibut fishing. The dates for the 2017 closures are revised to conform to specific dates in 2018; and
- Minor revisions to standardize terminology and clarify the regulations, including a new table to specify the commercial, sport, and Treaty fishing catch limits for all IPHC regulatory areas.

Pursuant to regulations at 50 CFR 300.62, the 2018 IPHC annual management measures recommended by the IPHC and accepted by the Secretary of State were published in the Federal Register to provide notice of their immediate regulatory effectiveness and to inform persons subject to the regulations of their restrictions and requirements (provide FR citation to 2018 AMM).

At its 2018 annual meeting, the IPHC did not recommend:

- New catch limits in any IPHC regulatory area;
- Revised CSP allocations for charter and commercial IFQ halibut fisheries in Area 2C and Area 3A;
- Revised charter halibut management measures in Areas 2C and 3A; or
- Revised CSP allocations for the commercial IFQ and CDQ halibut fisheries in Areas 4C, 4D, and 4E.

All of the catch limits, CSP allocations, and charter management measures considered for recommendation by the IPHC in 2018 were intended to reduce the harvest of halibut compared to 2017 because the biological information presented by the IPHC scientists indicated that the spawning biomass, and the biomass available to the halibut fisheries, is projected to decline and the rate of fishing mortality is projected to increase over the next several years if harvests are not reduced relative to 2017.

Although the United States and Canada voiced consensus at the IPHC's January 2018 annual meeting that some reduction in catch limits relative to 2017 in all Areas was appropriate, U.S. and Canadian Commissioners could not agree on specific catch limits for 2018. Therefore, the IPHC did not make a recommendation to the Secretary of State to revise the catch limits that were recommended and implemented in 2017. Because the U.S. and Canadian Commissioners could not reach agreement on the specific catch limits in each Area, the IPHC did not provide specific recommendations to revise the allocations resulting from the CSP for charter and commercial IFQ halibut fisheries in Area 2C and Area 3A, charter halibut management measures in Areas 2C and 3A, or the allocations resulting from the CSP for the commercial IFQ and CDQ halibut fisheries in Areas 4C, 4D, and 4E.

Although the U.S. and Canada could not agree on specific catch limits, the U.S. Commissioners did endorse specific catch limits that would apply to waters off Alaska (Areas 2C through 4), and specific allocations and charter management measures based on the CSPs in place.

This proposed action would consider implementing catch limits in Areas: 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, catch sharing plan (CSP) allocations for charter and commercial IFQ halibut fisheries in Area 2C and Area 3A, charter halibut management measures in Areas 2C and 3A, and CSP allocations for the commercial IFQ and CDQ halibut fisheries in Areas 4C, 4D, and 4E. This proposed action is necessary to carry out the purposes and objectives of the Convention, and consistent with NMFS's authority under the Convention and the Halibut Act.

This analysis examines alternative catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, CSP allocations in Areas 2C and 3A, CSP allocations for Areas 4CDE (encompassed in the alternative catch limits for Areas 4CDE), and charter management measures in in Areas 2C, 3A, NMFS is also considering alternative catch limits for Area 2A under a separate analysis.

1.3 Description of Management Area

The geographic scope of this proposed action is IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Those areas are shown in Figure 1, and described in the following text.

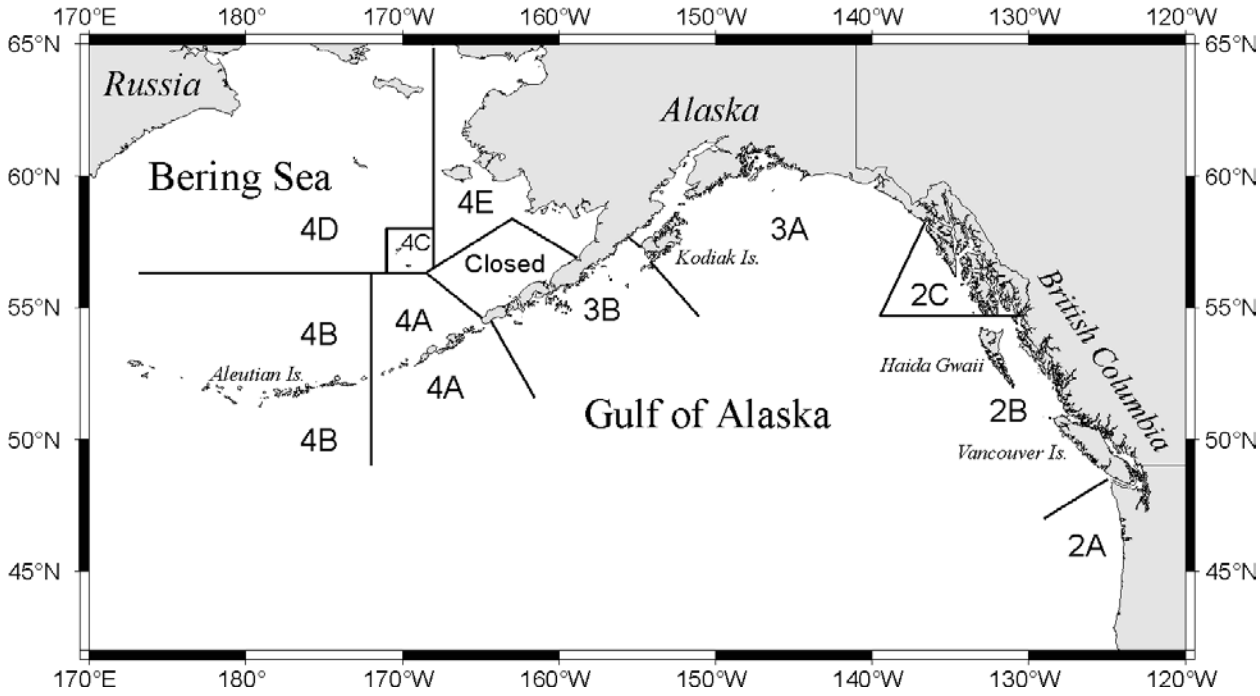

Figure 1 IPHC regulatory areas for the Pacific halibut fisheries

IPHC regulatory area boundaries for Pacific halibut fisheries (Figure 1) are as follows:

- Area 2A includes all waters off the states of California, Oregon, and Washington;
- Area 2B includes all waters off British Columbia;
- Area 2C includes all waters off Alaska that are east of a line running 340° true from Cape Spencer Light (58° 11'56" N latitude, 136° 38'26" W longitude) and south and east of a line running 205° true from Said Light;
- Area 3A includes all waters between Area 2C and a line extending from the most northerly point on Cape Aklek (57° 41'15" N latitude, 155° 35'00" W longitude) to Cape Ikolik (57°17'17" N latitude, 154° 47'18" W longitude), then along the Kodiak Island coastline to Cape Trinity (56° 44'50" N latitude, 154° 08'44" W longitude), then 140° true;
- Area 3B includes all waters between Area 3A and a line extending 150° true from Cape Lutke (54° 29'00" N latitude, 164° 20'00" W longitude) and south of 54° 49'00" N latitude in Isanotski Strait;
- Area 4A includes all waters in the Gulf of Alaska (GOA) west of Area 3B and in the Bering Sea west of the closed area defined in section 11 of the Pacific Halibut Fishery Regulations (83 FR 10390, March 9, 2018) that are east of 172° 00'00" W longitude and south of 56° 20'00" N latitude;
- Area 4B includes all waters in the Bering Sea and the GOA west of Area 4A and south of 56° 20'00" N latitude;
- Area 4C includes all waters in the Bering Sea north of Area 4A and north of the closed area defined in section 11 of the Pacific Halibut Fishery Regulations, which are east of 171° 00'00" W longitude, south of 58° 00'00" N latitude, and west of 168° 00'00" W longitude;

- Area 4D includes all waters in the Bering Sea north of Areas 4A and 4B, north and west of Area 4C, and west of 168° 00'00" W longitude; and
- Area 4E includes all waters in the Bering Sea north and east of the closed area defined in section 11 of the Pacific Halibut Fishery Regulations, east of 168° 00'00"W longitude, and south of 65° 34'00" N latitude.

2 Description of Alternatives

NEPA requires that an EA analyze a reasonable range of alternatives consistent with the purpose and need for the proposed action. The alternatives in this chapter were designed to accomplish the stated purpose and need for the action. All of the alternatives are either required for consideration under NEPA (Alternative 1 – status quo), or are directly responsive to the purpose and need (Alternatives 2 and 3), to reduce catch limits and establish management measures that are necessary to better protect the declining halibut resource and enhance the conservation of Pacific halibut in the absence of action by the IPHC.

This Analysis considers three alternatives.

- **Alternative 1 (status quo) --** Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.
- **Alternative 2 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A, as endorsed by the U.S. Commissioners but not recommended by the IPHC at the 2018 IPHC Annual Meeting.
- **Alternative 3 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.

For purposes of this analysis we provided the following clarifications:

First, under all of these alternatives, NMFS assumes that if catch limits were established for Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E that similar catch limits would apply in the two other Areas that are not directly regulated by this action – Area 2A (California, Oregon, and Washington), and Area 2B (British Columbia, Canada). For example, under Alternative 1, this analysis assumes that if status quo catch limits (2017 catch limits) are applied in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E, the same catch limits (2017 catch limits) would also apply in Areas 2A and 2B. This assumption is made for purposes of reducing complexity that could occur if there are multiple alternative catch limits selected for Areas 2A and 2B as compared to the catch limits selected for Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E. Overall, under this assumption the suite of alternatives in this analysis would capture the reasonable range of total catch limits that could occur. For example, Alternative 1 assumes that all Areas would have the same catch limit as established in 2017, the maximum limit permissible given the provisions of the Convention that limit the U.S. and Canada from adopting catch limits that are greater than those adopted by the IPHC, and Alternative 3 assumes that all Areas would apply the IPHC interim management procedure. If catch limits for Areas 2A and 2B varied from those in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E, the suite of alternatives under consideration captures the range of effects.

Second, this analysis also assumes that all other sources of mortality (e.g., natural mortality, recreational harvests, bycatch, subsistence, and Tribal harvests not managed under catch limits) not affected by catch limits (or the charter management measures in Areas 2C and 3A) remain at the same level as those observed in 2017. This assumption is supported by data from IPHC (IPHC 2018b) that shows that interannual variability of these other sources of mortality is not

expected to change substantially. Section 3.1.1 provides references for the mortality from recreational, bycatch, subsistence, and Tribal harvests not managed under catch limits.

Third, under Alternative 3, the IPHC's interim management procedure seeks to maintain the total mortality of halibut across its range from all sources based on a reference level of fishing intensity so that the Spawning Potential Ratio (SPR) is equal to 46%. An $F_{46\%}$ SPR is reference point that seeks to allow a level of fishing intensity that is expected to result in approximately 46% of the spawning stock biomass to remain compared to an unfished stock (i.e., no fishing mortality). Lower values indicate higher fishing intensity.

Fourth, these three alternatives would modify charter management measures in Areas 2C and 3A to ensure that the charter harvests would be maintained within the allocations established by the Area 2C and 3A CSP. The Area 2C and 3A CSP was implemented in 2014 (NMFS/NMFS 2013a). Under Alternative 1, the CSP and charter management measures are identical to those implemented in 2017 because under the Convention management measures are maintained until superseded.

Fifth, the reader is reminded that the scope of this action is limited. These alternatives analyze the effects of establishing different catch limits and charter halibut management measures for Areas 2C, 3A, 4A, 4B, 4C, 4D, and 4E and only for one year, 2018. While this analysis notes that catch limits established in 2018 could have longer term impacts on the halibut resources over the reasonably foreseeable future (until 2021 based on the best available information from IPHC scientists – see IPHC 2018a, IPHC 2018c), the alternatives considered under this action are intended to be of limited duration. Under the provisions of the Convention and Halibut Act, the IPHC has a specific authority to recommend catch limits and charter halibut management measures for 2019 and future years. Therefore, this analysis assumes that the impact of this action is limited to only the effects of modifying catch limits and charter halibut measures for 2018, and that the annual process used by the IPHC to recommend catch limits for adoption by the U.S. and Canada will be used in future years. This assumption is reasonable given the long history of the IPHC recommending, and NMFS implementing annual management measure regulations. NMFS has documented only two instances, once in 1990 (62 FR 11929, March 30, 1990), and in 2018, when the IPHC has been unable to come to agreement on catch limits applicable to the U.S.

Sixth, none of the alternatives would modify the overall enforcement of the commercial or charter halibut fishery, or introduce new management measures that have not been used in past years. None of the alternatives would modify the methods that NMFS uses to issue commercial permits for fishing (i.e., individual fishing quota), reporting methods, or enforcement considerations relative to the status quo. None of the alternatives would introduce novel management measures for the charter fishery that have not been used in past years.

Because this action is limited in scope and duration, the potential impacts of the alternatives on other environmental factors such as habitat and groundfish resources would not be expected to differ substantially from the status quo since the alternatives under consideration would not extend beyond 2018, and would not appreciably change the overall conduct of the halibut fishery in Areas 2C, 3A, 4A, 4B, 4C, 4D, and 4E in terms of the areas fished, gear used, or other

operational changes that would modify the conduct of the fishery. The following sections of this analysis provide the detailed support for that conclusion.

2.1 Alternative 1

Under Alternative 1, catch limits in 2018 in Areas 2C, 3A, 4A, 4B, 4C, 4D and 4E and the associated management measures for charter fisheries in Areas 2C and 3A would remain unchanged from 2017. Given the provisions of the Convention and the Halibut Act, all management measures relevant to catch limit and charter management measures would remain as they were in 2017. In other words, Alternative 1 would not adjust current charter management measures in Areas 2C and 3A.

Under this alternative catch limits would be maintained at 2017 levels that equate to 22,126,000 pounds in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Alternative 1 would be on the directed commercial IFQ, CDQ, and charter halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, there would also be indirect effects on the status of the halibut resource throughout its range, with the greatest longer-term impacts likely to accrue to directed halibut fisheries in these Areas because these areas encompass the largest overall proportion of the halibut biomass. For all alternatives the resulting catch limits described here do not include the amount of incidental halibut mortality from the commercial fishery (i.e., wastage or discard mortality) for Areas 2C and 3A unless otherwise noted, and all pounds are net pounds. Net pounds are defined as the weight of halibut from which the gills, entrails, head, and ice and slime have been removed. This terminology is used to be consistent with the IPHC, which establishes catch limits and calculates mortality in net pounds.

Table 6 summarizes the impact of Alternative 1. Overall, the stock biomass and total exploitable biomass (the term Total Constant Exploitation Yield – TCEY is used in the IPHC process) would be expected to decline in 2019, 2020, and 2021. A detailed description of the IPHC stock assessment process is provided in documents produced by the IPHC (IPHC 2018c, IPHC 2018a).

Under Alternative 1, the catch limits and charter management measures would be expected to result in fishery harvest rate of $F_{38\% \, on}$ a coastwide basis (see Section 3.3.3). Section 3.3.3 of the Analysis describes that harvest rates of $F_{38\%}$ are expected to result in overall removals that are in excess of an $F_{40\%}$ harvest rate. NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries, including flatfish species, that are managed under FMPs off Alaska.

Alternative 1 would be expected to substantially increase the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternatives 2 and 3. As shown in Table 6, Alternative 1 would nearly double the risk that the spawning stock biomass will decline by at least 5% in 2019 (34%), compared to Alternatives 2 (19%), and Alternative 3 (5%). Similarly, the catch limits and charter management measures under Alternative 1 would increase the risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below a specific level. The IPHC has established a harvest control rule reduces the target harvest rates linearly if the coastwide stock status is below 30% of unfished equilibrium female spawning biomass (SB0), and harvest rates are set to zero if the coastwide stock status is below 20% of SB0. Section 3.3.1 of this Analysis,

and Hicks and Steward (2017) provide a description of IPHC management of when stock threshold S$B_{30\%}$ and the limit reference point of $B_{20\%}$ are triggered.

Alternative 1 would be expected to increase the probability that catch limits will continue to decline in future years relative to Alternatives 2 and 3. As shown in Table 6, under Alternative 1, there is 76% chance that the fishery yield (effectively catch limits) will be more than 10 lower than 31,000,000 pounds (14,061.36 mt) in 2019. Under this alternative, the IPHC estimates at least an 81 percent chance that the fishery yield will be lower in 2020 and 2021, and at least a 77 percent chance that it will be more than 10 percent lower in 2020 and 2021. This alternative would provide the highest short-term catch limits and the most harvest opportunities for 2018 of the three alternative catch limit scenarios described in this analysis.

Alternative 1 would also result in harvests in specific Areas that are less proportionate to the best available information on the estimated biological abundance in each Area relative to Alternatives 2 and 3. As noted in Section 3.3, IPHC 2018b, and IPHC 2018c, the IPHC has apportioned catch limits among Areas based on the distribution of O26 (over 26" fish) as estimated through survey and other data. Generally, the IPHC and NMFS have relied on these methods to help reduce the risk that harvests in a specific Area could cause localized depletion of that resource. Alternative 1 uses the estimated biological abundance in various Areas for 2017 rather than the most recent and best available IPHC estimates that are used in Alternatives 2 and 3.

Alternative 1 would be expected to result in slightly higher amounts of incidental catch of groundfish species relative to Alternatives 2 and 3. Table 9 and Table 10 in Section 3.4.2 show there is limited difference among the alternatives in terms of their impacts on groundfish resources in terms of absolute amounts of incidental catch and in terms of the percentage of the allowable biological catch (ABC) for the various groundfish species that are incidentally harvested in the NMFS management areas that correspond with Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E.

Alternative 1 would be expected to provide greater harvest opportunities, and therefore greater economic revenue for commercial IFQ and halibut CDQ harvests in 2018 relative to Alternatives 2 and 3. Table 37 in Section 4 of the Analysis estimates that under Alternative 1, total ex-vessel value of the commercial fisheries is approximately $133 million dollars. Section 4 provides a detailed description of the estimated economic revenue under all of the alternatives.

Alternative 1 would be expected to provide slightly greater charter fishing opportunities, and therefore greater economic revenue for charter operators in Areas 2C and 3A relative to Alternative 2, and substantially greater charter fishing opportunities and economic revenue relative to Alternative 3. Table 42 in Section 4 of the Analysis estimates that Alternative 1 would provide the several thousand more angler days of potential charter opportunity relative to Alternatives 2 or 3. Section 4 provides a detailed description of the charter management measures and charter fishing opportunities that would be expected under all of the alternatives.

Alternative 1 would be expected to provide fewer harvest opportunities, and therefore potentially less economic revenue for commercial IFQ and halibut CDQ harvests in 2019, 2020, and 2021 relative to Alternatives 2 and 3 because the probability of decreased fishery yield is greater under

Alternative 1. Section 4 provides a qualitative description of the potential loss in economic revenue that could occur in 2019, 2020, and 2021 under all of the alternatives since this potential loss in revenue cannot be reliably quantified.

2.2 Alternative 2 (Preferred Alternative)

Under Alternative 2, catch limits in 2018 in Areas 2C, 3A, 4A, 4B, 4C, 4D and 4E and the associated management measures for charter fisheries in Areas 2C and 3A would be those endorsed by the U.S. Commissioners but not recommended by the IPHC at the 2018 IPHC Annual Meeting.

Under this alternative catch limits would equate to 20,520,000 pounds in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E.

Table 1 Percent Change in Catch Limits from 2017 to 2018 in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E Under Alternative 2.

Area	2017 Catch Limit under Alternative 1 (lb)	2018 Catch Limit under Alternative 2 (lb)	Change from 2017 (percent)
2C	5,250,000	4,450,000	-15.2
3A	10,000,000	9,450,000	-5.5
3B	3,140,000	2,620,000	-16.6
4A	1,390,000	1,370,000	-1.4
4B	1,140,000	1,050,000	-7.9
4CDE	1,700,000	1,580,000	-7.1
Total (2C - 4)	22,620,000	20,520,000	-9.3

As with Alternative 1, the primary effect of this alternative would be on the directed commercial IFQ, CDQ, and charter halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, there would also be indirect effects on the status of the halibut resource throughout its range, with the greatest longer-term impacts likely to accrue to directed halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E because these areas encompass the largest overall proportion of the halibut biomass.

Table 6 summarizes the impact of Alternative 2. Overall, the stock biomass and TCEY would be expected to decline in 2019, 2020, and 2021, the probability and amount of this decline would be expected to be less under Alternative 2 relative to Alternative 1, but would be greater than the decline projected for Alternative 3. A detailed description of the IPHC stock assessment process is provided in documents produced by the IPHC (IPHC 2018c, IPHC 2018a).

Under Alternative 2, the catch limits and charter management measures would be expected to result in fishery harvest rate of $F_{41\%}$ on a coastwide basis (see Section 3.2). Section 3.2 of the Analysis describes that NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries managed under FMPs off Alaska. In comparison to standards

applicable to groundfish species in the North Pacific, Alternative 2 would be expected to result in a harvest rate that is approaching the upper bound of removals considered sustainable.

Alternative 2 would be expected to decrease the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternative 1, but would increase the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternative 3. As shown in Table 6, Alternative 2 would result in a 19% chance that the spawning stock biomass will decline by at least 5% in 2019, compared to a 34% chance under Alternative 1, and a 5% chance under Alternative 3. Compared to the most conservative alternative (Alternative 3), the catch limits and charter management measures under Alternative 2 would increase the risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below a specific level. However, this risk would be less under Alternative 2 as comparted to Alternative 1.

Alternative 2 would be expected to increase the probability that catch limits will continue to decline in future years relative to Alternative 3. As shown in Table 6, under Alternative 2, there is 63% chance that the fishery yield (effectively catch limits) will be more than 10 lower in 2019, compared to Alternative 1 (76%), and Alternative 3 (38%). This same pattern holds for 2020 and 2021.

Alternative 2 would also result in harvests in specific Areas that are more proportionate to the best available information on the estimated biological abundance in each Area relative to Alternative 1. As noted in Section 3.2, IPHC 2018b, and IPHC 2018c, the IPHC has apportioned catch limits among Areas based on the distribution of O26 (over 26" fish) as estimated through survey and other data. Generally, the IPHC and NMFS have relied on these methods to help reduce the risk that harvests in a specific Area could cause localized depletion of that resource. In the Areas covered by this proposed action, Alternative 2 would effectively reduce harvests in Areas so that the resulting catch limits and CSP allocations in Areas 2C and 3A are roughly equal to an amount that is half-way between the catch limits and CSP allocations adopted in 2017 (Alternative 1), and the catch limits and CSP allocations that would result if the IPHC's current interim management procedure were implemented (Alternative 3).

Alternative 2 would be expected to result in slightly lower amounts of incidental catch of groundfish species relative to Alternative 1, but slightly higher amounts of incidental catch relative to Alternative 3. Table 6 in Section 3.3.2 shows that overall there is limited difference among the alternatives in terms of their impacts on groundfish resources in terms of absolute amounts of incidental catch and in terms of the percentage of the ABC for the various groundfish species that are incidentally harvested in the NMFS management areas that correspond with Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E.

Alternative 2 would be expected to provide greater harvest opportunities, and therefore greater economic revenue for commercial IFQ and halibut CDQ harvests in 2018 relative to Alternative 3. Similarly, Alternative 2 would provide somewhat less harvest opportunity than under Alternative 1. Table 38 in Section 4 of the Analysis notes that Alternative 2 would be expected to provide approximately $12.3M less commercial revenue in 2018 relative to Alternative 1, with the most significant reductions in potential revenue concentrated in Areas 2C, 3A, and 3B. Area

4E would have the greatest relative (percentage) reduction in revenue compared to Alternative 1, approximately 50%, due to specific factors in the allocation of catch limits in Areas 4CDE described in Section 4. Section 4 provides a detailed description of the relative economic revenue that would be expected under all of the alternatives.

Alternative 2 would be expected to provide slightly greater charter fishing opportunities in Areas 2C and 3A relative to Alternative 3, and slightly fewer charter fishing opportunities relative to Alternative 1. Table 42 in Section 4 of the Analysis notes that under Alternative 2, there would be approximately 4,200 fewer angler days, and $1.2M less revenue in 2018 compared to Alternative 1. Section 4 provides a detailed description of the charter management measures and charter fishing opportunities that would be expected under all of the alternatives.

Under Alternative 2, two charter management measures would change to be more restrictive than Alternative 1 but less restrictive than Alternative 3. In Area 2C, the reverse slot limit would be revised. A reverse slot limit that prohibits a person on board a charter vessel from taking or possessing any halibut, with head on, that is less than or equal to a certain length or greater than or equal to a certain length. Under Alternative 1, the Area 2C reverse slot limit is less than or equal to 44 inches and greater than or equal to 80 inches (203.2 cm), as measured in a straight line, passing over the pectoral fin from the tip of the lower jaw with mouth closed, to the extreme end of the middle of the tail. This is commonly designated as U44-O80. Under Alternative 2, the reverse slot limit would narrow to U38-O80 (i.e., less than or equal to 38” and greater than or equal to 80”). This narrowing would reduce the number of larger fish (from 38” to 44”) that could be retained, thereby reducing charter harvests. In Area 3A, the number of days-of-week closures would increase from 3 Tuesdays in July and August (July 18, July 25, and August 1 in 2017) to 6 Tuesdays in July and August (July 10, July 17, July 24, July 31, August 7, and August 14 in 2018). Increasing the number of day-of-week closures reduces the amount of charter harvest opportunities, charter harvests and revenue to charter operators relative to Alternative 1.

Alternative 2 would be expected to provide reduced harvest opportunities, and therefore potentially less economic revenue for commercial IFQ and halibut CDQ harvests in 2019, 2020, and 2021 relative to Alternative 3 because the probability of decreased fishery yield is greater under Alternative 2 compared to Alternative 3. Alternative 2 would be expected to result in a greater risk of reduced harvest and revenue in 2019, 2020, and 2021. Section 4 provides a description the potential loss in economic revenue that could occur in 2019, 2020, and 2021 under all of the alternatives.

2.3 Alternative 3

Under Alternative 3, catch limits in 2018 in Areas 2C, 3A, 4A, 4B, 4C, 4D and 4E and the associated management measures for charter fisheries in Areas 2C and 3A would be based on the IPHC’s current interim management procedure of $F_{46\%}$ SPR.

Under this alternative catch limits would equate to 18,010,000 pounds in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. As with Alternatives 2 and 3, the primary effect of this alternative would be on the directed commercial IFQ, CDQ, and charter halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, there would also be indirect effects on the status of the halibut resource throughout its range, with the greatest longer-term impacts likely to accrue to directed halibut

fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E because these areas encompass the largest overall proportion of the halibut biomass.

Table 6 summarizes the impact of Alternative 3. Overall, the stock biomass and TCEY would be expected to decline in 2019, 2020, and 2021, the probability and amount of this decline would be expected to be less under Alternative 3 relative to Alternatives 1 and 2. A detailed description of the IPHC stock assessment process is provided in documents produced by the IPHC (IPHC 2018c, IPHC 2018a).

Under Alternative 3, the catch limits and charter management measures would be expected to result in fishery harvest rate of $F_{46\%}$ on a coastwide basis (see Section 3.3). Section 3.2 of the Analysis describes that an $F_{40\%}$ harvest rate. NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries managed under FMPs off Alaska. In comparison to standards applicable to groundfish species in the North Pacific, Alternative 3 would be expected to result in a harvest rate that is considered sustainable, and would provide the greatest likelihood that removals do not exceed the $F_{40\%}$ harvest rate commonly used as an upper limit of sustainable harvest in groundfish fisheries off Alaska.

Alternative 3 would be expected to decrease the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternatives 1 and 2. As shown in Table 6, Alternative 3 would result in only a 5% chance that the spawning stock biomass will decline by at least 5% in 2019, compared to a 34% chance under Alternative 1, and a 17% chance under Alternative 2. Alternative 3 represents the most conservative alternative, and would pose the lowest risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below a specific level.

Alternative 3 would be expected to decrease the probability that catch limits will continue to decline in future years relative to Alternatives 1 and 2. As shown in Table 6, under Alternative 3, there is only a 38% that the fishery yield (effectively catch limits) will be more than 10 lower in 2019, compared to Alternative 1 (76%), and Alternative 2 (63%). This same pattern holds for 2020 and 2021.

Alternative 3 would also result in harvests in specific Areas proportionate to the estimated biological abundance in each Area. As noted in Section 3.2, IPHC 2018b, and IPHC 2018c, the IPHC has apportioned catch limits among Areas based on the distribution of O26 fish as estimated through survey and other data. Generally, the IPHC and NMFS have relied on these methods to help reduce the risk that harvests in a specific Area could cause localized depletion of that resource.

Alternative 3 would be expected to result in slightly lower amounts of incidental catch of groundfish species relative to Alternatives 1 and 2. Table 9 and Table 10 in Section 3.3.2 shows that overall there is limited difference among the alternatives in terms of their impacts on groundfish resources.

Alternative 3 would be expected to provide the least amount of harvest opportunities, and therefore reduced economic revenue for commercial IFQ and halibut CDQ harvests in 2018

relative to Alternatives 1 and 2. Table 38 in Section 4 of the Analysis notes that Alternative 3 would be expected to provide approximately $25.6M less commercial revenue in 2018 relative to Alternative 1, with the most significant reductions in potential revenue concentrated in Areas 2C, 3A, and 3B. Area 4E would have the greatest relative (percentage) reduction in revenue compared to Alternative 1, approximately 50%, due to specific factors in the allocation of catch limits in Areas 4CDE described in Section 4. Section 4 provides a detailed description of the relative economic revenue that would be expected under all of the alternatives.

Alternative 3 would be expected to provide fewer charter fishing opportunities in Areas 2C and 3A relative to Alternatives 1 or 2. Table 42 in Section 4 of the Analysis notes that under Alternative 3, there would be approximately 8,600 fewer angler days, and $2.6M less revenue for charter operators in 2018 compared to Alternative 1. Section 4 provides a detailed description of the charter management measures and charter fishing opportunities that would be expected under all of the alternatives.

Under Alternative 3, two charter management measures would change and be more restrictive relative to Alternatives 1 and 2. In Area 2C, the reverse slot limit would be revised from U44-O80 under Alternative 1, to U35-O80. In Area 3A, the number of days-of-week closures would increase from 3 Tuesdays in July and August (July 18, July 25, and August 1 in 2017) to 10 Tuesdays in June, July and August (June 19, June 26, July 3, July 10, July 17, July 24, July 31, August 7, and August 14 in 2018). Both of these changes in charter management measures would be expected to reduce the amount of charter harvest opportunities, charter harvests and revenue to charter operators relative to Alternatives 1 and 2.

Alternative 3 would be expected to provide the greatest reduction in risk of reduced harvest, and therefore potentially less economic revenue for commercial IFQ and halibut CDQ harvests in 2019, 2020, and 2021 relative to Alternatives 1 and 2 because the probability of decreased fishery yield is greater under Alternatives 1 and 2 compared to Alternative 3. Section 4 provides a description the potential loss in economic revenue that could occur in 2019, 2020, and 2021 under all of the alternatives.

Table 2 summarizes the differences among the alternatives on the key resource factors that would be affected by this proposed action.

Prefered Alternative

Alternative 2 is the preferred alternative. Alternative 2 would best meet the objectives of the purpose and need statement. Alternative 2 would balance the need to protect the declining halibut resource and enhance the conservation of Pacific halibut while taking into account the potential adverse socioeconomic impacts of lower catch limits. Sections 3 and 4 of this analysis provide the information that supports Alternative 2 as the preferred alternative.

2.4 Comparison of Alternatives

Table 2 Summary of alternatives and major impacts.

	Alternative 1	**Alternative 2 Preferred Alternative**	Alternative 3
Description of Alternative	Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.	Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Modify charter management measures in Areas 2C and 3A, as suggested by, but not adopted by, the U.S Commissioners at the 2018 IPHC Annual Meeting.	Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.
Catch Limits (All Areas 2C though Area 4)	Catch limit for all Areas is **22,620,000** net pounds.	Reduce catch limits for all Areas to **20,520,000** net pounds (9.3% reduction from Alt. 1).	Reduce catch limit for all Areas to **18,010,000** net pounds (18.6% reduction from Alt. 1)
Charter halibut management measures Areas 2C & 3A	Maintain 2017 charter management measures including: **Area 2C** reverse-slot limit of U44-O80; **Area 3A** 3 Tuesday day-of-week closures in July and August.	Charter management measures in 2017 maintained, except: **Area 2C** reverse-slot limit of U38 – O80; **Area 3A** 6 Tuesday day-of-week closures in July and August.	Charter management measures in 2017 maintained, except: **Area 2C** reverse-slot limit of U35 – O80; **Area 3A** 10 Tuesday day-of-week closures in June, July, and August.
Halibut Stock and Fishery Yield	Greatest risk of reduced biomass and fishery yield (2019–2021). $F_{38\%}$ harvest rate. 34% chance spawning biomass is 5% lower in 2019. 76% chance fishery yield is more than 10% lower in 2019.	Moderate risk of reduced biomass and yield (2019–2021). $F_{41\%}$ harvest rate. 19% chance spawning biomass is 5% lower in 2019. 63% chance fishery yield is more than 10% lower in 2019.	Lowest risk of reduced biomass and yield (2019–2021). $F_{46\%}$ harvest rate. 5% chance spawning biomass is 5% lower in 2019. 38% chance fishery yield is more than 10% lower in 2019.
Groundfish resources	No conservation concern identified. Minimal difference among the alternatives. Alternative 3 would have the smallest amount of incidental groundfish catch compared to Alternative 2 or 1, but overall incidental groundfish catch in commercial and charter fisheries is small relative to Acceptable Biological Catch.		
Comercial and charter revenue in 2018	Estimated commercial revenue is $133M, and no expected change in charter revenue from 2017.	Reduces commercial revenue by $12.3M, and charter revenue by an estimated $1.2M in addition to unquantified loss compared to Alt.1.	Reduces commercial revenue by $25.6M, and charter revenue by an estimated $2.6M in addition to unquantified loss compared to Alt.1.
Commercial and charter revenue in 2019, 2020, 2021	Under all Alternatives, some risk of reduced fishery yields in 2019 through 2021 (see Halibut Stock and Fishery Yield). This potential risk, and amount of the risk is greatest under Alternative 1, and least with Alternative 3. Data are not available to reliably quantify and differentiate the potential economic impacts among the alternatives that may result.		
Social (Community) Impacts	Most fishing opportunities distributed among many communities. Greatest risk of reduced benefits (2019-2021)	Reduced fishing opportunities and potential benefits relative to the status quo, but lower risk of reduced benefits (2019-2021). Approximately a 50% reduction in Area 4E CDQ for communities reliant on Area 4E opportunities	

2.5 Alternatives Considered but not Analyzed Further

In 2018, IPHC scientists provided information on the implications of a broad range of potential catch limits, and their potential impact on the halibut resource (IPHC 2018c and 2018a). The potential implications of these alternative catch limits are summarized in the assessment and harvest decision tables provided by IPHC staff (IPHC 2018c and IPHC 2018a, respectively). The harvest decision table prepared by the IPHC describes the implications of catch limits greater than those implemented in 2017, and a range of other catch limits, including no fishing. A modified version of the harvest decision table prepared by the IPHC and found in IPHC 2018a, is shown in Table 6 in Section 3.2.3 of this analysis.

Catch limits that are greater than those implemented in 2017 (Alternative 1) are not analyzed further because under the provisions of the Convention, the U.S. could not implement catch limits that are more permissive (i.e., less restrictive than) those implemented through the IPHC. Similarly, this analysis did not consider alternatives that would implement catch limits that would constrain catch more than the IPHC's interim management procedure (Alternative 3). More constraining alternatives would be inconsistent with the IPHC's interim management procedure, and would be more restrictive than catch limits adopted by the IPHC based on scientific information it has received in past years. More constraining limits would run counter to the provisions of the purpose and need statement that clarifies that this action should "protect the declining halibut resource and enhance the conservation of Pacific halibut while taking into account the potential adverse socioeconomic impacts that may result from lower catch limits."

3 Environmental Assessment

There are four required components for an environmental assessment. The need for the proposal is described in Chapter 1, and the alternatives in Chapter 2. This chapter (Chapter 3) addresses the probable environmental impacts of the proposed action and alternatives. Finally, a list of agencies and persons consulted is included in Chapter 6.

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) (Chapter 4).

Recent and relevant 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, and evaluates the significance of these impacts. If significant impacts are likely to occur, preparation of an EIS is required. Although an EA should evaluate economic and social 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 Council on Environmental Quality (CEQ) guidelines recognize that it is most practical to focus cumulative effects analysis on only those effects that are truly meaningful.

3.1 Documents incorporated by reference in this analysis

This EA relies heavily on the information and evaluation contained in numerous documents prepared by the IPHC, and previous environmental assessments, and these documents are incorporated by reference. The documents listed below contain information about the status of the halibut resource and fishery, other marine resources (i.e., groundfish), ecosystem, social, and economic elements of the halibut fisheries. They also include comprehensive analysis of the effects of the halibut fisheries on the human environment, and are referenced in the analysis of impacts throughout this analysis.

Each year, the IPHC produces documents that summarize the status of the halibut resource. These documents are all available on the IPHC website at the URLs listed. This EA specifically relies on the following documents prepared in January and Feburary 2018:

- **Summary of the data, stock assessment, and harvest decision table for Pacific halibut (Hippoglossus stenolepis) stock at the end of 2017. IPHC-2018-AM094-11. Prepared by IPHC Secretariat (Steward, Hicks, Webster, and Wilson). (IPHC 2018a).**
  https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-11.pdf

- **Overview of data sources for the Pacific halibut stock assessment, harvest strategy policy, and related analyses. IPHC-2018-AM094-09. Prepared by IPHC Secretariat (Steward and Webster). (IPHC 2018b).**
  https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-09.pdf

- **Assessment of the Pacific halibut (Hippoglossus stenolepis) stock at the end of 2017. IPHC-2018-AM094-10. Prepared by IPHC Secretariat (Steward and Hicks). (IPHC 2018c).**
  https://iphc.int/uploads/pdf/am/2018am/iphc-2018-am094-10.pdf

- **Report of the 94th Session of the IPHC Annual Meeting (AM094). Portland, Oregon, U.S. A., 22 – 26 January 2018. IPHC-2018-AM094-R. Prepared by IPHC Secretariat. (IPHC 2018d)**
  https://iphc.int

This analysis also incorporates the following documents that describe the halibut and sablefish IFQ Program:

- **Supplemental Environmental Impact Statement (SEIS) for the Individual Fishing Quota Management Alternative for Fixed Gear Sablefish and Halibut Fisheries (NPFMC/NMFS 1992).**
  This analysis analyzes the effects of the implementation of the halibut and sablefish IFQ fishery on the human environment.
  https://alaskafisheries.noaa.gov/sites/default/files/analyses/Amd15_20seis.pdf

- **Twenty-Year Review of the Pacific Halibut and Sablefish Individual Fishing Quota Management Program (NPFMC/NMFS 2016).**
  This analysis reviews the commercial IFQ fishery from its implementation in 1995 through 2015, and provides and evaluation of the performance of the fishery relative to a range of metrics.
  https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf

- **Biological Opinion for the Effects of Pacific Halibut Fisheries in Waters off Alaska on the Engangered Short-tailed Albatross (*Phoebastria albatus)*. February 16, 2018. (USFWS 2018)**
  http://www.alaskafisheries.noaa.gov

  This Biological Opinion addresses potential impacts of the halibut fisheries on short-tailed albatross and includes description of overall trends of seabird bycatch.

This analysis also incorporates the most recent comprehensive analysis on the overall impacts of the incidental catch (bycatch) of halibut in the groundfish fisheries off Alaska on the halibut resource.

- **Final Initial Environmental Assessment/ Regulatory Impact Review/Initial Regulatory Flexibility Analysis for Amendment 111 to the Fishery Management Plan for Groundfish of the Bering Sea/Aleutian Islands Management Area (NMFS 2016).**

  This analysis provides an evaluation of the impacts of halibut bycatch in the groundfish fishery, specifically in the Bering Sea/Aleutian Islands (BSAI) (corresponding approximately to all of Area 4).
  https://alaskafisheries.noaa.gov/sites/default/files/analyses/finalbsai111earirfa0116.pdf

- **Final Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis to Reduce Gulf of Alaska Halibut Prohibited Species Catch Limits. Amendment 95 to the Fishery Management Plan for Groundfish of the Gulf of Alaska (NPFMC/NMFS 2013b).**

  This analysis provides an evaluation of the impacts of halibut bycatch in the groundfish fishery, specifically in the GOA (corresponding approximately to Area 2C, 3A, and 3B).
  https://alaskafisheries.noaa.gov/sites/default/files/analyses/finalbsai111earirfa0116.pdf

This analysis also incorporates the following documents concerning the status of the recreational (charter and unguided) fisheries, particularly in Areas 2C and 3A.

- **Final EA/ RIR/ IRFA: Regulatory amendment for a Pacific halibut catch sharing plan for the charter sector and commercial setline sector in International Pacific Halibut Commission regulatory Area 2C and 3A. (NPFMC/NMFS 2013a)**
  This analysis evaluates the impacts of establishing a CSP for charter and commercial IFQ fisheries in Areas 2C and 3A.

This analysis incorporates recent assessments on subsistence halibut harvests off Alaska (Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E).

- **Subsistence Harvests of Pacific Halibut in Alaska, 2016. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 436, Anchorage. (Fall and Koster, 2017).**

This analysis incorporates several analyses prepared for the groundfish fisheries.

- **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 Bering Sea and Aleutian Islands management areas and is referenced here for an understanding of the groundfish fishery. The EIS examines alternative harvest strategies that comply with Federal regulations, the FMP for Groundfish of the GOA, the FMP for Groundfish of the BSAI Management Area, and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens 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/fisheries/groundfish-harvest-specs-eis

- **Stock Assessment and Fishery Evaluation (SAFE) Report for the Groundfish Resources of the BSAI and GOA (NPFMC 2017a and 2017b).**

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

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

  The PSEIS evaluates the Alaska groundfish fisheries management program as a whole, and includes analysis of alternative management strategies for the GOA and BSAI groundfish fisheries. The EIS is a comprehensive evaluation of the status of the environmental components and the effects of these components on target species, non-specified species, forage species, prohibited species, marine mammals, seabirds, essential fish habitat, ecosystem relationships, and economic aspects of the groundfish fisheries. A Supplemental Information Report (NPFMC/NMFS 2017) was prepared in 2017, which considers new information, and affirms that new information does not indicate that there is now a significant impact from the groundfish fisheries where the 2004 PSEIS concluded that the impact was insignificant. The PSEIS document is available from https://alaskafisheries.noaa.gov/node/33552, and the Supplemental Information Report from https://alaskafisheries.noaa.gov/sites/default/files/bsai_goa_sir_2017.pdf

3.2 Resource components addressed in the analysis

Table 3 shows the components of the human environment and whether the proposed action and its alternatives have the potential to impact that resource component and thus require further analysis. 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.

The resource components that are effected by the alternatives are primarily the halibut resource, and to a much lesser extent on groundfish resources that are incidentally harvested during the halibut fishery. All of the alternatives would be expected to have social and economic impacts as well. These effects are anticipated because the alternatives would modify the amount of halibut harvest (and revenue) and groundfish that may be incidentally harvested during the halibut fishery.

No effects are expected on marine mammals, seabirds, habitat, and the ecosystem. No effect is presumed for these components because the proposed action would not change current fishing regulations (e.g., areas fished, seasons, and gear types), or regulations protecting marine mammals, seabirds, habitat, and important breeding areas as described in previous NEPA documents (e.g., NPFMC/NMFS 1992, NMFS 2004, NMFS 2007, NMFS 2017, USFWS 2018). No effects are presumed for marine mammals because existing protection measures would not be changed, nor would this action modify allowable harvest amounts for important prey species. No effects are anticipated for seabirds under this proposed action that are different from those described in the Biological Opinion for ESA-listed species (USFWS 2018). This proposed action would not be expected to affect the ecosystem because this proposed action would not modify predation pressure on shared prey species (i.e., species that are prey for both halibut and other species), or be expected to reduce prey availability for predators of halibut or other species, alter habitat, modify existing bycatch amounts or bycatch mortality, or modify the amount and type of fishing gear in any substantive way that is not already considered under previous NEPA analyses (e.g., NPFMC/ NMFS 1992, NMFS 2004, NMFS 2007, NPFMC/ NMFS 2013b, NPFMC/NMFS, and NPFMC/ NMFS 2017). As a result, further analysis is included only for the halibut, groundfish, and social and economic components, the only resource components the proposed action may impact.

Table 3 Resources potentially affected by the proposed action and alternatives

Potentially affected resource component						
Halibut	**Groundfish**	**Social And economic**	**Marine Mammals**	**Seabirds**	**Habitat**	**Ecosystem**
Y	Y	Y	N	N	N	N

N = no impact anticipated by each alternative on the component.
Y = an impact is possible if each alternative is implemented.

3.2.1 Methods used for the impact analysis

As noted in Section 3.1, this analysis relies on documentation provided by the IPHC to assess the potential impact of this action on the halibut resource. This analysis relies on catch and observer data available from NMFS to assess the potential impact on groundfish resources incidentally harvested in the halibut fishery. This analysis relies on halibut catch data from NMFS and the Alaska Department of Fish and Game to assess socioeconomic impacts of this proposed action on commercial and recreational fisheries.

3.2.2 Cumulative effects analysis

This EA analyzes the cumulative effects of each alternative and the effects of past, present, and reasonably foreseeable future actions (RFFA). Based on Table 3, the resources with potentially meaningful cumulative effects are halibut, groundfish, and social and economic. 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 the relevant past, present, and RFFA that may result in cumulative effects on the resource components analyzed in this document.

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, this cumulative effects analysis includes the effects of climate change.

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

3.3 Halibut

3.3.1 Status

Pacific halibut (*Hippoglossus stenolepsis*) is one of the largest species of fish in the world, with individuals growing up to eight feet in length and over 500 lb. 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, Japan, and Korea.

The depth range for halibut is up to 250 fathoms (457 m) for most of the year and up to 500 fathoms (914 m) 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. Research has shown that the halibut then begin what can be called a journey back. This movement runs counter to the currents that carried them away from the spawning grounds and has been documented at over 1,000 miles for some fish. Most male halibut are sexually mature by about 8 years of age, while half of the females are mature by about age 11.6 (NPFMC/NMFS). 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. Figure 2 provides a representation of the halibut life cycle.

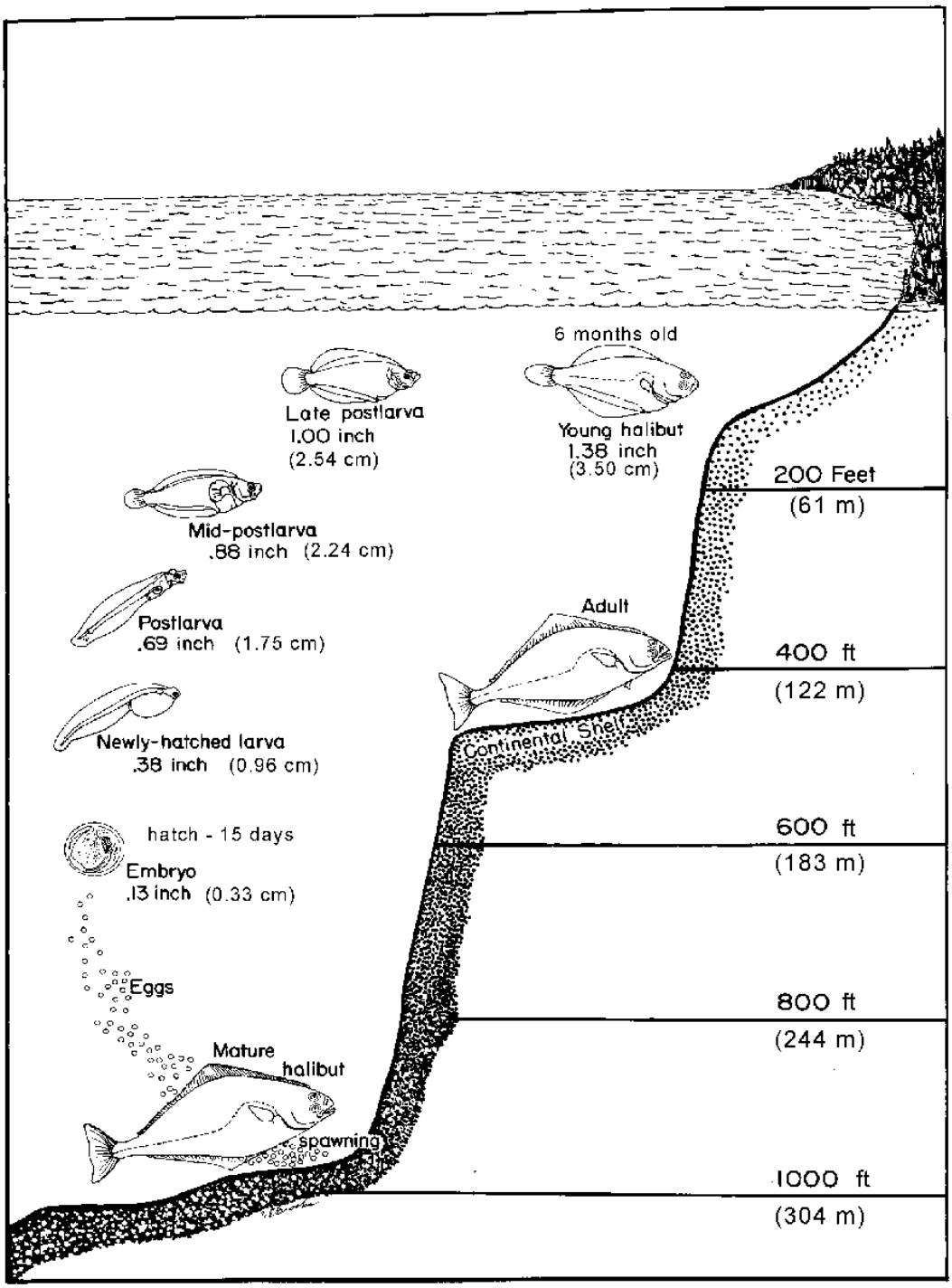

Figure 2 Life cycle of Pacific halibut
(Source: IPHC 2014)

3.3.1.1 Biomass and abundance

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 (see Figure 3). The results of the 2017 assessment indicate that the stock declined continuously from the late 1990s to around 2010 (IPHC 2018a).

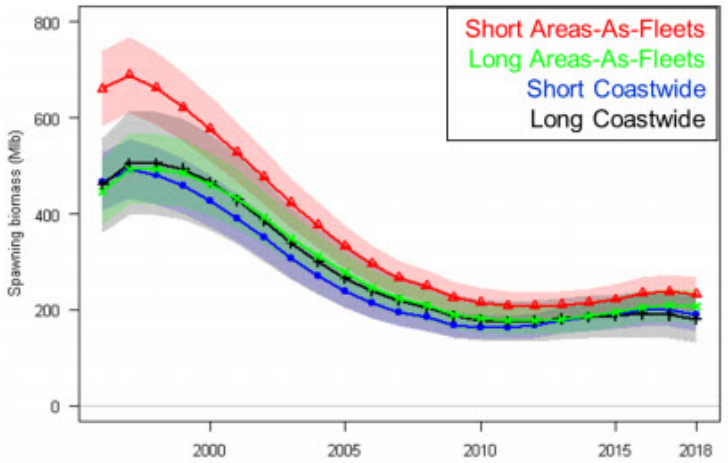

Figure 3 **Spawning biomass estimated from each of the four models included in the 2017 stock assessment ensemble. Series indicate the maximum likelihood estimates, shaded intervals indicate approximate 95% confidence intervals**

(Source: IPHC 2018a)

The ensemble model approach was developed to more accurately convey the uncertainty in the estimation of stock status and as a more robust assessment tool to avoid abrupt changes in the halibut stock assessment, such as that occurring between annual cycles in 2011 and 2012. In 2012, IPHC staff reported that then-recent stock assessments for Pacific halibut had consistently overestimated biomass and underestimated harvest rates due to a retrospective bias in the stock assessment. As described in Stewart et al. (2013), the model misspecification was corrected for the 2012 assessment by adding a time-varying availability element, capturing the dynamic at a coastwide scale since there is interaction between the spatial distribution of the stock and differences in population characteristics among areas. These improvements resulted in an ensemble that does not exhibit retrospective trends.

Although the 2012 assessment was corrected and the assessment results tracked observed halibut trends, stock size estimates decreased by approximately 30% compared to previous assessments, primarily due to a flat rather than increasing trend over the terminal years (i.e., most recently assessed years).

The IPHC assesses the coastwide biomass of halibut, including fish that are accessible in the IPHC setline survey and to the commercial halibut fishery (generally O26 halibut). The IPHC estimates the distribution of the coastwide stock based on survey catch rate among 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.

In general, recruitment has decreased substantially since the highs of the 1980s. Several 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 IPHC-2018-AM094-08 [IPHC 2018b] Page 9 of 16 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 Areas. The coastwide trend is driven largely by trends in Area 3 (corresponding to the central and western GOA – see Figure 1), 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).

Based on the most recent stock assessment conducted (IPHC 2018c), the IPHC notes that:

> Coastwide mortality (removals; including all sizes of Pacific halibut) from all sources in 2017 were estimated to be 42.4 million pounds (~19,200 t), up slightly from 41.8 million pounds (~18,960 t) in 2016….
>
> Age distributions in 2017 from both the setline survey and fishery remained similar to those observed in 2011-16, but with somewhat fewer fish younger than the 2005 cohort (age-12), indicating that subsequent coastwide recent recruitment events have been lower than those in previous years. At the coastwide level, individual size-at-age continues to be very low relative to the rest of the time-series, and there has been little clear change over the last several years….
>
> The results at the end of 2017 indicate that the Pacific halibut stock declined continuously from the late 1990s to around 2010, as a result of decreasing size-at-age, as well as somewhat weaker recruitment strengths than those observed during

> the 1980s. Since the estimated female spawning biomass (SB) stabilized near 200 million pounds (~90,100 t) in 2010, the stock is estimated to have been increasing gradually to 2017. The SB at the beginning of 2018 is estimated to be 202 million pounds (~91,600 t), with an approximate 95% confidence interval ranging from 148 to 256 million pounds (~67,100- 116,100 t). Pacific halibut recruitment estimates show the largest recent cohorts in 1999 and 2005; cohorts from 2006 through 2013 are estimated to be smaller than any recruitment 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.
>
> The stock is projected to decrease gradually over the period from 2018- 20 for removals around the reference spawner per recruit (SPR, $_{46\%}$) level (31 million pounds, ~14,060 t). There is a relatively small chance (21%) that the stock will decline below the threshold reference point ($SB_{30\%}$) in projections for all the levels of TCEY up to 40 million pounds (~18,100 t) evaluated over three years; for TCEYs exceeding that level, the probability begins to increase rapidly….

Of particular note, even under Alternative 3 (IPHC interim management procedure), 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).

Table 4 provides biomass estimates from 1996 through 2018, and also identifies estimates of halibut fishing intensity (from all sources of estimated removals) during that time period. Fishing intensity (F_x) is the calculated fishing mortality rate at which the equilibrium spawning biomass per recruit is reduced to x percent of its value in the equivalent unfished stock.

Table 4 **Median spawning biomass (millions of pounds, net weight) and fishing intensity estimates (based on median Spawning Potential Ratio) from the 2018 halibut stock assessment ensemble**

Year	Female Spawning Biomass	Fishing Intensity (F_{xx}%)
1996	475	**48**
1997	514	**43**
1998	509	**41**
1999	495	39
2000	467	39
2001	433	36
2002	392	**32**
2003	347	**29**
2004	309	**26**
2005	274	**24**
2006	245	**24**
2007	223	**24**
2008	208	**24**
2009	190	**25**
2010	182	**25**
2011	179	**29**
2012	180	**34**
2013	186	36
2014	192	**41**
2015	198	**42**
2016	207	**42**
2017	208	**40**
2018	202	NA

(Source: IPHC 2018c)

Generally, studies of similar BSAI and GOA groundfish have confirmed that an exploitation rate of $F_{35\%}$ is an adequate proxy for the level of fishing that will achieve maximum sustainable yield (F_{MSY}; Goodman et al. 2002). Catch that corresponds to an $F_{40\%}$ rate is precautionary relative to $F_{35\%}$ and is generally considered to accommodate uncertainty in the stock assessment. An $F_{40\%}$ harvest rate is considered a conservative maximum reference point in Alaskan fisheries, including flatfish such as halibut. Table 4 displays fishing intensity above $F_{40\%}$ in green bolded text, and fishing intensity below $F_{40\%}$ in red bolded text.

The Fishery Management Plans for groundfish in federal waters off Alaska describe control rules that use limit reference points for setting biologically sustainable catch limits (NPFMC 2017a; 2017b). The control rules follow a tiered system that considers both data availability and stock status. Common among all tiers are harvest limit rules for specifying both an overfishing limit (OFL) and allowable biological catch level (ABC). The ABC is always specified below the OFL such that it provides for scientific uncertainty. Several tiers (tiers 2-4) use $F_{40\%}$ as the fishing mortality rate that specifies the maximum permissible ABC. A fishing mortality rate at $F_{40\%}$ is

expected to reduce the spawning biomass per recruit (equivalent to lifetime egg production) to 40% of its equilibrium value for an unfished stock. A limit reference point between $F_{35\%}$ and $F_{40\%}$ is well defined in the literature and in technical guidance NMFS uses to ensure compliance with Magnuson-Stevens Act National Standards as a proxy for F_{MSY} (, Restrepo et al., 1998) and is used as such for most groundfish stocks where F_{MSY} is not directly estimated (Clark 1993, Gabriel and Mace 1999, Mace 1994). Gabriel and Mace (1999) found this fishing mortality range to be appropriate for stocks with average to low resiliency (which is the case for most Alaska groundfish stocks, and would be expected to apply to halibut). In the case of Alaska groundfish stocks, $F_{35\%}$ is a proxy for F_{MSY}, and $F_{40\%}$ provides an appropriately conservative rate of harvest relative to what is the best available information to estimate F_{MSY} (NMFS 2004).

Since 2014, the IPHC has set catch limits that result in a total fishing impact that would be considered conservative by fishery management scientists (IPHC 2018c). This has not always been the case. Fishing mortality was most intense for a 15-year period from 1999 through 2013, with the harvest rate consistently exceeding the $F_{40\%}$ harvest rate. During the mid to late 2000s, the halibut stock assessment model then in use was misspecified resulting in a retrospective bias that overestimated biomass. During this time, fishing intensity rates of up to $F_{24\%}$ occurred, far greater than amounts generally considered to be sustainable in Alaskan groundfish fisheries. This period of intense harvest likely contributed to later declines in biomass. During this period, the stock also experienced reduced recruitment subsequent to very strong year classes through the 1908s and 1990s.

Figure 4 shows that during the periods of high removal, the majority of the mortality on the halibut stock was due to commercial catch (also see Table C-3 in IPHC 2018b). In 2017 the three top sources of removals were commercial harvests (including discard mortality in the commercial fishery, i.e., “wastage”) accounted for 65% of the removals, recreational harvests (including charter harvests) accounted for 19%, and commercial groundfish fishery bycatch (referred to as prohibited species catch, or PSC, in fisheries off Alaska) accounted for 14% of removals. Restricting commercial halibut fishery catch controls a significant portion of the total mortality on the stock. Historically, limiting commercial catch has been key to the conservation of the halibut resource.

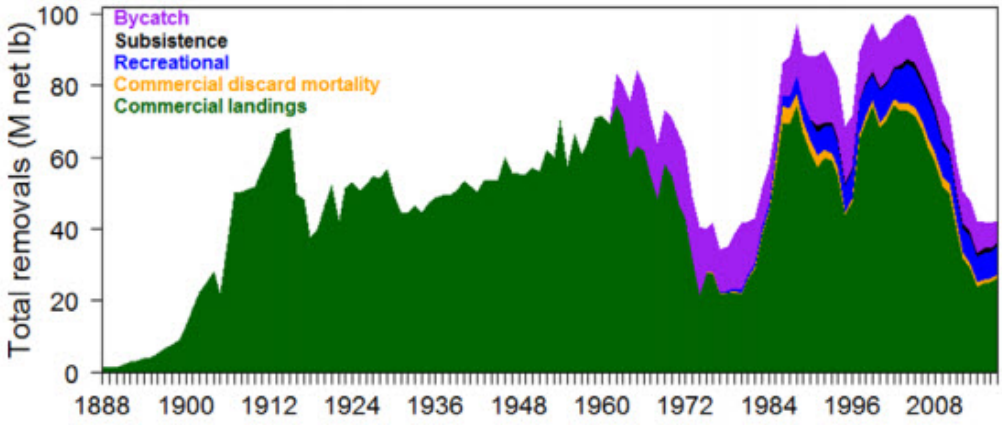

Figure 4 **Annual sources of mortality of Pacific halibut (Coastwide)**
(Source: IPHC 2018a)

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. As part of the 2017 stock assessment process, the IPHC did present an assessment of the status of the halibut stock that characterized its status relative to what the IPHC staff would consider an allowable catch limit (see Figure 5). This would be analogous to an ABC in the context of groundfish fisheries off Alaska. The IPHC has also presented an assessment of fishing intensity relative to the IPHC's interim management procedure ($F_{46\%}$), and in all recent years, fishing intensity has been greater than the current $F_{46\%}$ SPR (see Figure 6).

Indicators	Values	Trends	Status
Total mortality 2017: Retained mortality 2017: Average mortality 2013-17:	42.44 Mlbs, 19,250 t[1] 35.29 Mlbs, 11,864 t 43.34 Mlbs, 19,659 t	Mortality stable 2014-17	**2017 MORTALITY BELOW 100-YEAR AVERAGE**
SPR_{2017}: P(SPR<46%): P(SPR<limit):	40% (29-58%)[2] 75% Limit not specified	Fishing intensity increased from 2016 to 2017	**FISHING INTENSITY HIGHER THAN REFERENCE LEVEL**[3]
SB_{2018} (Mlb): SB_{2018}/SB_0: $P(SB_{2018}<SB_{30})$: $P(SB_{2018}<SB_{20})$:	202 Mlbs (148–256) 40% (26-60%) 6% <1%	SB decreased from 2017 to 2018	**NOT OVERFISHED**[4]
O32 stock distribution: All stock distribution:	See Table 1 and Figure 6	Distribution stable 2013-17	**REGION 2 ABOVE, REGION 3 BELOW HISTORICAL VALUES**

[1] Weights in this document are reported as 'net' weights, head and guts removed; this is approximately 75% of the round (wet) weight).
[2] Ranges denote approximate 95% confidence intervals from the stock assessment ensemble.
[3] Status determined relative to the IPHC's interim reference Spawning Potential Ratio level of 46%.
[4] Status determined relative to the IPHC's interim management procedure biomass limit of $SB_{20\%}$.

Figure 5 **Status summary of Pacific halibut at the end of 2017**
(Source: IPHC 2018a)

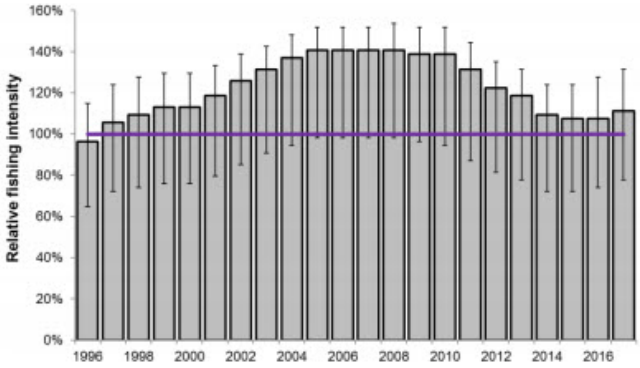

Figure 6 **Recent estimated fishing intensity (based on the Spawning Potential Ratio) relative to the SPR=46% reference level (horizontal line). Vertical lines indicate approximate credible intervals from the stock assessment ensemble**
(Source: IPHC 2018c)

The current level of female spawning biomass (SB) for halibut is estimated to be approximately 40% of the equilibrium condition in the absence of fishing ($SB_{40\%}$), with a 6 out of 10 chance that the stock is below $B_{30\%}$. The IPHC's harvest policy sets a threshold reference point of $SB_{30\%}$ and the limit reference point of $B_{20\%}$ as triggers of reductions in halibut harvest rates. A more

detailed description of $SB_{30\%}$ and $B_{20\%}$ is provided in Hicks and Stewart (2017). These harvest control rules have not been triggered, even during the most recent years of relatively low spawning biomass. Generally speaking, the harvest rates since 2014 are considered risk-averse relative to short or long term halibut resource sustainability, with catch corresponding to a harvest rate at or above $F_{40\%}$ during this time period (see Table 4).

3.3.1.2 Distribution and Migration

The distribution of the halibut resource has been a topic of considerable research and interest, particularly in recent years. The IPHC stock summary documents (IPHC 2018a) note that Areas have been used for distributional summary historically, and population-level information suggests that broader regions (with the exception of Area 4B) may be more biologically meaningful (Seitz et al. 2017). Trends over the last five years indicate that population distribution, measured either via the O32 component of the setline survey catch or all sizes has been relatively stable (Table 5). In recent years, there has been an increasing proportion of the coastwide stock occurring in Area 2 and a decreasing proportion occurring in Area 3 (IPHC 2018a). It is unknown to what degree either of these periods corresponds to historical distributions from the mid-1900s or to the average distribution likely to occur in the absence of fishing mortality.

In 2015, the IPHC initiated a new tagging pilot program that is aimed at tagging halibut that are intercepted in the NMFS trawl surveys. The program is intended to be part of a long-term monitoring effort to examine the connectivity of Bering Sea halibut, primarily juveniles, with the rest of the halibut stock in other Areas. 2015 was a pilot year, to see how many fish can be tagged without impeding the work of the survey. The trawl survey is a useful vehicle for this program because the survey catches juveniles, and very little is understood about juvenile outmigration from the Bering Sea. This tagging effort was subsequently extended to include all sublegal halibut encountered on the IPHC's setline survey each year. The scale of the tagging research program is not such that the study would be able to determine specific movement rates of halibut, but the tag recoveries should inform managers about the movement of halibut among Areas and provide insight about the changes in these pathways over time.

Table 5 illustrates the estimated distribution of the halibut stock greater than 32 inches in length (O32) across the Areas. The observed distribution of the stock available to the directed fisheries in each year will reflect not only the historical fishing effort in each Area, but also the interaction of recruitment distribution and movement rates (IPHC 2018b).

Table 5 **Time series of stock distribution based on 032 setline survey weight per unit of effort by Area (net lb./skate)**
(Source: IPHC 2018b)

Year	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
1993	1.6%	7.0%	7.4%	35.1%	24.7%	9.1%	9.5%	5.5%	100.0%
1994	1.5%	8.8%	8.6%	31.7%	25.0%	9.6%	9.6%	5.3%	100.0%
1995	1.3%	10.1%	9.3%	31.2%	24.9%	9.1%	9.0%	5.1%	100.0%
1996	1.3%	8.1%	8.0%	30.2%	27.4%	10.0%	9.0%	6.1%	100.0%
1997	1.3%	6.2%	8.1%	33.4%	24.8%	10.9%	9.0%	6.3%	100.0%
1998	1.4%	5.2%	6.9%	27.0%	29.7%	13.6%	8.6%	7.6%	100.0%
1999	1.4%	4.4%	5.8%	26.0%	33.4%	13.3%	7.5%	8.1%	100.0%
2000	1.4%	5.3%	6.1%	30.8%	28.3%	13.0%	6.6%	8.6%	100.0%
2001	1.4%	6.7%	7.5%	33.0%	25.6%	11.2%	5.4%	9.2%	100.0%
2002	1.1%	6.8%	8.5%	39.0%	21.6%	10.4%	4.3%	8.3%	100.0%
2003	1.1%	5.5%	7.8%	37.9%	24.7%	10.1%	4.0%	8.8%	100.0%
2004	1.3%	5.3%	5.7%	45.0%	21.4%	9.2%	3.8%	8.3%	100.0%
2005	1.5%	6.1%	7.1%	46.1%	18.6%	9.0%	4.1%	7.5%	100.0%
2006	1.3%	6.2%	7.0%	42.7%	20.5%	8.3%	4.9%	9.1%	100.0%
2007	1.2%	6.8%	7.2%	42.0%	20.8%	7.7%	6.0%	8.2%	100.0%
2008	1.3%	7.9%	7.6%	39.6%	18.4%	9.1%	6.8%	9.2%	100.0%
2009	1.1%	10.0%	7.5%	35.5%	19.3%	9.4%	6.4%	10.8%	100.0%
2010	1.6%	11.2%	8.3%	36.0%	16.8%	8.6%	6.1%	11.3%	100.0%
2011	2.0%	11.6%	10.4%	36.1%	14.8%	8.1%	6.2%	10.8%	100.0%
2012	1.7%	12.1%	12.1%	38.1%	13.4%	7.4%	4.7%	10.5%	100.0%
2013	1.9%	13.6%	14.2%	32.9%	13.0%	6.8%	5.8%	11.9%	100.0%
2014	2.0%	12.9%	13.9%	34.2%	12.3%	7.0%	4.9%	12.8%	100.0%
2015	2.4%	14.1%	13.9%	31.1%	13.1%	6.8%	4.9%	13.7%	100.0%
2016	2.0%	13.2%	14.8%	33.5%	13.3%	6.0%	4.5%	12.6%	100.0%
2017	1.7%	11.3%	16.6%	35.6%	10.0%	6.6%	4.8%	13.3%	100.0%

Determining how limits should be apportioned across the areas is a challenge in setting area-specific limits under a coastwide assessment model. The IPHC's interim management procedure uses area-specific survey information to apportion biomass among the areas. The procedure recognizes the value of biocomplexity across the geographic range of the Pacific halibut stock. Balancing the removals against the current stock distribution is likely to protect against localized depletion of spatial and demographic components of the stock that may produce differential recruitment success under changing environmental conditions. This concept of utilizing a 'portfolio effect' by distributing harvest in proportion to stock distribution is widely recognized in fisheries management, particularly among salmon stocks (Hilborn et al., 2003, Schindler et al., 2010). This approach provides an additional precautionary buffer against spatial recruitment overfishing.

Apportioning stocks among management areas is commonly used in Alaskan groundfish fisheries as well to protect the spatial and demographic components of those stocks. NMFS uses surveys to apportion stocks with broad "coastwide" distribution in the North Pacific (e.g., Pacific cod and sablefish). These methods are described in the most recent SAFE reports (NPFMC 2017a; 2017b). This method has several advantages in that it is based on a standardized annual assessment of stock (survey), is not reliant on commercial fishery data that can mask changes in underlying stock dynamics, and is precautionary towards local depletion and spatial recruitment overfishing. The IPHC continues to discuss and refine apportionment methods; however, the current method represents the best available scientific method for apportioning coastwide catch.

3.3.2 Halibut fishery management off Alaska

The Council and NMFS manage Pacific halibut allocations in Alaska in Federal regulations, under the authority of the Halibut Act, while the IPHC is responsible for halibut stock assessment and catch recommendations. The IPHC was established in 1923 by the Convention. Its mandate is research on and management of the stocks of Pacific halibut within the Convention waters of both nations. The IPHC consists of three government-appointed commissioners for each country, and a director and staff. Annually, the IPHC meets to discuss and approve budgets, research plans, biomass estimates, catch recommendations, and regulatory proposals, which are then forwarded to the respective governments for implementation.

The IPHC refers to halibut "bycatch" to describe the mortality of all sizes of halibut caught in the commercial groundfish fisheries that are managed by the Council and NMFS (hook-and-line sablefish and Pacific cod; trawl Pacific cod, pollock, flatfish, and rockfish, and pot Pacific cod), and minor amounts in commercial shrimp trawl and crab pot fisheries. In the groundfish fisheries, Pacific halibut is a prohibited species, and bycatch mortality of halibut is referred to as halibut PSC.

In IPHC terms, "wastage" describes halibut killed, but not landed by the commercial (hook-and-line) halibut fisheries, due to lost and abandoned gear, and mortality of fish released due to the minimum commercial size limit of 32 inches in length. Wastage is not included in IPHC estimates of "bycatch", but is reported annually and included in all analyses. More recently, the IPHC has adopted the term "discard mortality" to describe "wastage", but both terms are used interchangeably in this analysis.

3.3.2.1 How are halibut fishery catch limits determined?

Halibut fishery catch limits are the result of a multi-step process by the IPHC, with allocative input from U.S. and Canadian fishery management organizations, with the objective of determining how much can be harvested by the commercial halibut fishery, given the IPHC's goals for stock conservation. The current harvest policy for Pacific halibut is based on two harvest targets: the distribution of harvest rates among Areas, and scale of that harvest at the coastwide level. The process starts with IPHC staff determining the scale or size of the coastwide removals (generally, halibut greater than 26 inches in length (O26), based on the stock assessment and target SPR) and then estimating its distribution or apportionment among each of eight Areas: 2A, 2B, 2C, 3A, 3B, 4A, 4B, and 4CDE (IPHC 2018c) using the setline survey weight per unit effort adjusted for gear saturation and survey timing differences among areas and the relative target harvest rates: 1.0 for Areas 2A-3A, and 0.75 for Areas 3B-4CDE

The IPHC does not currently have an approved harvest policy based on reference limits or targets. The IPHC has used an $F_{46\%}$ SPR as an interim management procedure, or "handrail" to guide management decisions. Using the stock distribution by area the IPHC's staff provide a target distribution of the total amount of coastwide yield available for harvest, referred to as the Total Constant Exploitation Yield, or TCEY. U26 mortality is accounted for in the SPR calculation, but not in the area-specific removals, as these fish are capable of redistributing to other Areas prior to becoming accessible to the directed halibut fisheries...

The third step in the allocation of harvest is to subtract all other removals of O26 halibut from the TCEY, in order to determine the Fishery Constant Exploitation Yield or FCEY (IPHC 2018a, IPHC 2018c). The FCEY is calculated such that all O26 removals sum to the TCEY target within each Area, and at the coastwide level. The FCEY includes commercial fishery limits in all areas, and other sectors in any area subject to Catch Sharing Plans for allocation of the halibut harvest (i.e., the CSP in Areas 2C and 3A that allocate halibut between commercial and recreational sectors). The Catch Sharing Plans are developed by the responsible fishery management organizations in each Area. Non-FCEY removals include catches which either have no explicit limits on the amount of harvest (unguided sport harvest in Alaska, subsistence/personal use harvest in Canada and Alaska, and wastage from the commercial halibut fishery, except where this is explicitly included in catch-sharing plans), or catches which the IPHC has no authority to manage (bycatch mortality, such as halibut PSC in Alaska). Non-FCEY values are assumed to remain constant at the previous year's level (e.g., unguided recreational landings) or rate (e.g., discard mortality). Bycatch (including halibut PSC) and wastage of U26 halibut is accounted for in the stock assessment with respect to total mortality on the halibut stock, but is not part of the TCEY.

The IPHC staff provides catch limit calculations in advance of the IPHC Annual Meeting in January, which are distributed to allow the halibut stakeholders to discuss and provide comment to the IPHC. Once the Annual Meeting commences, the IPHC considers all of the input—public comment, recommendations from its advisory bodies, and the catch limit calculations—and then adopts fishery catch limits and other measures which seek to balance the advice it has received, with stock conservation being the primary consideration.

Since 2013, alternative harvest levels representing lower and higher levels of removals have also been presented, and evaluated with respect to risk against stock and fishery metrics, in a decision table (IPHC 2018a). The decision table provides estimates of the fishing intensity rate associated with alternative harvest levels. The specific catch limits and decision tables associated with the three alternatives are shown in Section 3.2.3.

From 2013 through 2017, fishing intensity rates were either slightly more conservative, or as conservative, as the harvest policy used in managing some Alaskan groundfish fisheries (Table 4) which define the overfishing level for comparable flatfish species at $F_{35\%}$, and set the acceptable biological catch at a maximum of $F_{40\%}$. As described in this section, this was not the case in previous years.

The IPHC's interim management procedure of $F_{46\%}$ is not the same as an overfishing limit (OFL) or ABC in the Alaska groundfish context. The OFL and ABC are both biologically-based harvest limits that are not to be exceeded, within which the Council recommends annual TACs. The IPHC's harvest policy represents a target level of removals from the application of the IPHC's interim management procedure, but the policy is not binding on the Commissioners. As illustrated by the IPHC decision table, the staff provides a broad suite of options to inform the Commission's decisions. Unlike the Magnuson-Stevens Act, the Halibut Act does not include specific provisions that require Commissioners to allocate quotas within, for example, an overfishing threshold; their broad mandate is the conservation of the halibut stock.

In the last decade, the IPHC coastwide catch limit recommendation has exceeded either staff recommendations (from 2006 through 2012), formal IPHC harvest policies commonly known as the "blue line" (2013 – 2015, when they were in place) or the current interim management procedure (since 2016), in nine of twelve years, and the area-specific catch limit recommendations have exceeded either formal IPHC harvest policies (when they were in place) or the current interim management procedure in all areas at least once, and for some areas in most years (see IPHC 2018b, NPFMC/NMFS).

3.3.2.2 Area 2C and 3A Catch Sharing Plan and Charter Management Measures.

In 2013, NMFS implemented a catch sharing plan for the guided sport (charter) and commercial fisheries for Pacific halibut in Areas 2C and 3A (78 FR 75844, Dec. 12, 2013). This CSP was established to provide specific allocations between charter and commercial fishery participants and establish a process for implementing charter management measures that would maintain catch within allocations, on average over a long-term period. This CSP defines an annual process for allocating halibut between the charter and commercial fisheries in Area 2C and Area 3A, and establishes allocations for each fishery. Under the Area 2C and 3A CSP, the commercial fishery will continue to be managed under the Individual Fishing Quota system. To allow flexibility for individual commercial and charter fishery participants, the catch sharing plan also authorizes annual transfers of commercial halibut quota to charter halibut permit holders for harvest in the charter fishery. A detailed description of the process used to determine charter management measures is available in the final rule implementing the CSP (78 FR 75844, Dec. 12, 2013), the analysis prepared for the CSP regulations (NMFS/NMFS 2013a), and in the 2017 annual management measures adopted by the IPHC (Meyer and Power 2017).

3.3.2.3 Area 4 Catch Sharing Plan

The BSAI management area equates approximately to the IPHC's Area 4. Area 4CDE and the Closed Area are considered to be a single unit in all IPHC apportionment and harvest policy analyses. Halibut allocations of the IPHC catch limits to sectors within each of the Area 4 Areas (Area 4A, 4B, and 4CDE) are under the jurisdiction of the Council and NMFS, rather than the IPHC.

The 4C, 4D, and 4E subareas were created to serve the needs of the Council's Area 4CDE Catch Sharing Plan (CSP). Annually, the IPHC adopts the Council's CSP to determine the specific catch limits for these subareas. The NPFMC implemented a CSP among commercial IFQ and CDQ halibut fisheries in Areas 4CDE through rulemaking, and the Secretary of Commerce approved the plan on March 20, 1996 (61 FR 11337). The Area 4 CSP regulations were codified at 50 CFR 300.65, and were amended on March 17, 1998 (63 FR 13000). New annual regulations pertaining to the Area 4 CSP also may be implemented through IPHC action, subject to acceptance by the Secretary of State.

Under the current Area 4CDE CSP: Areas 4C and 4D each receive 46.43% of the IPHC's adopted catch limit for Area 4CDE, and Area 4E receives 7.1%. If the total catch limit for Area 4CDE exceeds 1,657,600 pounds, Area 4E receives 80,000 pounds off the top of the total catch limit before the percentages are applied.

Within Area 4CDE, the annual catch limit is further allocated among CDQ and IFQ fishing within subareas. The amounts allocated to CDQ by area are: Area 4C 50%, Area 4D 30% and Area 4E 100%. There are also provisions within the CSP allowing Area 4C CDQ and IFQ to be harvested in Area 4D, and for allowing Area 4D CDQ fish to be harvested in Area 4E. The CDQ allocations are apportioned among the six CDQ groups that represent CDQ communities according to procedures that are consistent with section 305(i) of the Magnuson-Stevens Act that governs the process of allocating fishery resources among CDQ groups. A recent example of the CDQ allocations among each of the six CDQ groups is available at: https://alaskafisheries.noaa.gov/sites/default/files/reports/annualmatrix2017.pdf.

3.3.3 Effects of the Alternatives

Under each of the alternatives, the primary impact is on the overall amount of removals of halibut. Table 6 shows the potential impact of the alternatives catch limits in terms of stock status and fishery yield. Table 6 is drawn from IPHC documentation. For purposes of this analysis row titled "TCEY" includes mortality associated with directed harvests. Specifically, it includes commercial landings (catch), commercial wastage (discards), subsistence catch, and recreational catch (including discards). For Areas 3B, 4A, 4B, and 4CDE TCEY is equivalent to FCEY, and FCEY is equivalent to the catch limits established under this proposed action. For Areas 2C and 3A, the TCEY includes commercial catch limits, the charter catch limits, and any discards associated with those allocations.

Table 7 provides a more detailed description of how the TCEY and FCEY are calculated under Alternative 2 for illustrative purposes. To aid the reader in translating between the IPHCs terminology and the allocations under this proposed action, the amounts that are equivalent to commercial catch limits are shown in blue highlighted text, and the charter allocations are shown in yellow highlighted text.

Table 8 shows how the commercial and charter allocations would be apportioned by Area under potential each of the alternatives. As noted earlier, the CSP in Areas 2C and 3A apportions catch among areas based on specific regulations described in the final rule implementing the CSP (78 FR 75844, Dec. 12, 2013), and summarized in Section 4 of this analysis. The IFQ allocations shown for Areas 2C and 3A are the amounts that remain after removing the estimated incidental mortality (i.e., wastage or discard mortality) in the commercial IFQ fishery. This is consistent with how allocations are made under the CSP. For all Areas off Alaska, the commercial allocation is assigned as IFQ to QS holders in the IFQ Program, or to the CDQ Program for allocations that are made in Areas 4B, 4C, 4D, and 4E. The amount of the commercial catch limit assigned to the IFQ Program and CDQ Program varies among Areas 4B, 4C, 4D, and 4E. The 20-year review of the IFQ Program provides a detailed description of the allocations among the IFQ Program and CDQ Program (NPFMC/NMFS 2016), and Section 4 of this analysis summarizes those allocations.

Table 6 Decision table of 2018 yield alternatives (columns) and risk metrics (rows). Values in the table represent the probability, in "times out of 100" of a particular risk

2018 Alternative			No removals	*Alt. 3: Reference SPR=46%*	*Alt. 2: Suggested Catch Limits*	*Alt. 1: Status quo, 2017 Catch limits*	
Total removals (M lb)			0.0	32.8	39.0	42.6	51.8
TCEY (M lb)			0.0	31.0	37.2	40.8	50.0
Fishing intensity			$F_{100\%}$	$F_{46\%}$	$F_{41\%}$	$F_{38\%}$	$F_{32\%}$
Fishing intensity interval			--	34-64%	30-60%	27-57%	23-53%
Stock Trend (spawning biomass)	in 2019	is less than 2018	1	78	93	>99	>99
		is 5% less than 2018	<1	5	19	34	69
	in 2020	is less than 2018	<1	67	88	98	>99
		is 5% less than 2018	<1	21	48	68	94
	in 2021	is less than 2018	<1	76	92	99	>99
		is 5% less than 2018	<1	46	72	89	99
Stock Status (Spawning biomass)	in 2019	is less than 30%	3	7	8	9	11
		is less than 20%	<1	<1	<1	<1	<1
	in 2020	is less than 30%	2	7	10	13	21
		is less than 20%	<1	<1	<1	<1	1
	in 2021	is less than 30%	1	10	17	23	37
		is less than 20%	<1	<1	<1	1	2
Fishery Trend (TCEY)	in 2019	is less than 2018	<1	55	73	80	89
		is 10% less than 2018	<1	38	63	76	82
	in 2020	is less than 2018	<1	59	75	81	91
		is 10% less than 2018	<1	45	67	77	84
	in 2021	is less than 2018	<1	63	76	83	93
		is 10% less than 2018	<1	52	70	78	86
Fishery Status (Fishing intensity)	in 2018	is above $F_{46\%}$	0	50	72	80	87

(Source: IPHC 2018, Ian Stewart, Feb. 19, 2018)

Table 7 **Catch table projected for Alternative 2 showing relationship of TCEY and FCEY. Commercial Catch Limits shown in blue highlighted text, and charter allocations in Areas 2C and 3A shown in yellow highlighted text**

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
O26 Non-FCEY									
Commercial discards	0.02	0.15	NA	NA	0.18	0.06	0.03	0.02	0.46
Bycatch	0.11	0.23	0.02	1.01	0.45	0.29	0.20	1.96	4.26
Recreational (+ discards)	NA	NA	1.43	1.86	0.01	0.02	0.00	0.00	3.31
Subsistence	NA	0.41	0.44	0.22	0.01	0.01	0.00	0.05	1.14
Total Non-FCEY	0.13	0.78	1.89	3.09	0.65	0.37	0.23	2.04	9.18
O26 FCEY									
Commercial discard	NA	NA	0.07	0.32	NA	NA	NA	NA	0.39
Recreational (+ discards)	0.48	0.97	0.81	1.79	NA	NA	NA	NA	4.05
Subsistence	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Commercial Landings	0.69	5.35	3.57	7.35	2.62	1.37	1.05	1.58	23.57
Total FCEY	1.19	6.32	4.45	9.45	2.62	1.37	1.05	1.58	28.04
TCEY	1.32	7.10	6.34	12.54	3.27	1.74	1.28	3.62	37.21
U26									
Commercial discards	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.05
Bycatch	0.00	0.02	0.00	0.42	0.44	0.11	0.01	0.79	1.79
Total U26	0.00	0.03	0.00	0.43	0.46	0.12	0.01	0.79	1.83
Total Mortality	1.32	7.13	6.34	12.97	3.73	1.86	1.29	4.41	39.04

(Source: IPHC 2018a)

Table 8 Commercial catch limits and resulting IFQ and CDQ allocations, and Area 2C and 3A charter allocations under each alternative

Alternative	IFQ and Charter Allocations in Areas 2C, and 3A IFQ allocations in Area 3B					Total in all Areas 2C- 4
	Area 2C IFQ	Area 2C Charter allocation	Area 3A IFQ	Area 3A Charter allocation	Area 3B IFQ	
Alt 1 – 2017 Status Quo	4,212,000	915,000	7,739,000	1,890,000	3,140,000	
Alt 2 – U.S. Commissioner Endorsed	3,570,000	810,000	7,350,000	1,790,000	2,620,000	
Alt 3. – $F_{46\%}$ SPR	3,010,000	690,000	6,990,000	1,700,000	1,950,000	
Alternative	**IFQ Allocations in Area 4A IFQ and CDQ allocations in Areas 4B, 4C, and 4D CDQ allocations in Area 4E**					
	Area 4A IFQ	**Area 4B IFQ**	**Area 4C IFQ/CDQ**	**Area 4D IFQ/CDQ**	**Area 4E CDQ**	
Alt 1 – 2017 Status Quo	1,390,000	1,140,000	752,000	752,000	196,000	22,126,000
Alt 2 – U.S. Commissioner Endorsed	1,370,000	1,050,000	733,500	733,500	113,000	20,140,000
Alt 3. – $F_{46\%}$ SPR	1,320,000	990,000	631,500	631,500	97,000	18,010,000

Source: Alternative 1, 2017 Annual Management Measures, Sections 11 and 28; Alternative 2, (IPHC, 2018d); Alternative 3, Table 3 in IPHC 2018

Table 6 shows that based on the best available scientific information available from the IPHC, the spawning biomass and the harvestable yield of halibut are projected to decline under status quo (Alternative 1) catch limits and assuming that all other sources of removals (unguided sport, bycatch) also remain at status quo (i.e., the same as 2017). The potential risk of reduced spawning biomass and fishery yield decreases in future years under Alternatives 2 and 3.

Under Alternative 1, the catch limits and charter management measures would be expected to result in fishery harvest rate of $F_{38\%}$ on a coastwide basis. Harvest rates of $F_{38\%}$ are expected to result in overall removals that are in excess of an $F_{40\%}$ harvest rate. NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries, including flatfish species, that are managed under FMPs off Alaska.

Alternative 1 would be expected to substantially increase the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternatives 2 and 3. As shown in Table 6. Alternative 1 would nearly double the risk that the spawning stock biomass will decline by at least 5% in 2019 (34%), compared to Alternatives 2 (19%), and Alternative 3 (5%). Similarly, the catch limits and charter management measures under Alternative 1 would increase the risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below a specific level.

Alternative 1 would be expected to increase the probability that catch limits will continue to decline in future years relative to Alternatives 2 and 3. As shown in Table 6, under Alternative 1, there is 76% chance that the fishery yield (effectively catch limits) will be more than 10 lower in

2019, compared to Alternative 2 (63%), and Alternative 3 (38%). This same pattern holds for 2020 and 2021.

Alternative 1 would also result in harvests in specific Areas that are less proportionate to the best available information on the estimated biological abundance in each Area relative to Alternatives 2 and 3. As noted in Section 3.2, IPHC 2018b, and IPHC 2018c, the IPHC has distributed catch limits among Areas based on the distribution of O26 (over 26" fish) as estimated through survey and other data. Generally, the IPHC and NMFS have relied on these methods to help reduce the risk that harvests in a specific Area could cause localized depletion of that resource. Alternative 1 uses the estimated biological abundance in various Areas for 2017 rather than the most recent and best available IPHC estimates that are used in Alternatives 2 and 3.

Under Alternative 2, catch limits in 2018 in Areas 2C, 3A, 4A, 4B, 4C, 4D and 4E and the associated management measures for charter fisheries in Areas 2C and 3A would be those suggested by the U.S. Commissioners at the IPHC's 2018 Annual Meeting.

As with Alternative 1, the primary effect of Alternative 2 would be on the directed commercial IFQ, CDQ, and charter halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, there would also be indirect effects on the status of the halibut resource throughout its range, with the greatest longer-term impacts likely to accrue to directed halibut fisheries in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E because these areas encompass the largest overall proportion of the halibut biomass. Under this alternative catch limits would equate to 20,135,000 pounds in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E.

Overall, the stock biomass TCEY would be expected to decline in 2019, 2020, and 2021, the probability and amount of this decline would be expected to be less under Alternative 2 relative to Alternative 1, but would be greater than the decline projected for Alternative 1.

Under Alternative 1, the catch limits and charter management measures would be expected to result in fishery harvest rate of $F_{41\%}$ on a coastwide basis (see section 3.2). Section 3.2 of the Analysis describes that NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries managed under FMPs off Alaska. In comparison to standards applicable to groundfish species in the North Pacific, Alternative 2 would be expected to result in a harvest rate that is approaching the upper bound of removals considered sustainable.

Alternative 2 would be expected to decrease the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternative 1, but would increase the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternative 3. As shown in Table 6, Alternative 2 would result in a 19% chance that the spawning stock biomass will decline by at least 5 % in 2019, compared to a 34% chance under Alternative 1, and a 5% chance under Alternative 3. Compared to the most conservative alternative (Alternative 3), the catch limits and charter management measures under Alternative 2 would increase the risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below a specific level. However, this risk would be less under Alternative 2 as comparted to Alternative 1.

Alternative 2 would be expected to increase the probability that catch limits will continue to decline in future years relative to Alternative 3. As shown in Table 6, under Alternative 2, there is 63% chance that the fishery yield (effectively catch limits) will be more than 10 lower in 2019, compared to Alternative 1 (76%), and Alternative 3 (38%). This same pattern holds for 2020 and 2021.

Alternative 2 would also result in harvests in specific Areas that are more proportionate to the best available information on the estimated biological abundance in each Area relative to Alternative 1. In the Areas covered by this proposed action, Alternative 2 would effectively reduce harvests in Areas so that the resulting catch limits and CSP allocations in Areas 2C and 3A are roughly equal to an amount that is half-way between the catch limits and CSP allocations adopted in 2017 (Alternative 1), and the catch limits and CSP allocations that would result if the IPHC's current interim management procedure were implemented (Alternative 3).

Under Alternative 3, catch limits in 2018 in Areas 2C, 3A, 4A, 4B, 4C, 4D and 4E and the associated management measures for charter fisheries in Areas 2C and 3A would be based on the IPHC's current interim management procedure of $F_{46\%}$ SPR. Under this alternative catch limits would equate to 18,010,00 pounds in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E.

Table 6 summarizes the impact of Alternative 3. Overall, the stock biomass and total exploitable biomass (the term Total Constant Exploitation Yield – TCEY is used in the IPHC process) would be expected to decline in 2019, 2020, and 2021, the probability and amount of this decline would be expected to be less under Alternative 3 relative to Alternatives 2 and 3. A detailed description of the IPHC stock assessment process is provided in documents produced by the IPHC (IPHC 2018c, IPHC 2018a).

Under Alternative 3, the catch limits and charter management measures would be expected to result in fishery harvest rate of $F_{46\%}$ on a coastwide basis (see section 3.2). Section 3.2 of the Analysis describes that NMFS and the NPFMC consider an $F_{40\%}$ harvest rate conservative and sustainable for groundfish fisheries managed under FMPs off Alaska. In comparison to standards applicable to groundfish species in the North Pacific, Alternative 3 would be expected to result in a harvest rate that is considered sustainable, and would provide the greatest likelihood that removals do not exceed the $F_{40\%}$ harvest rate commonly used as an upper limit of sustainable harvest in groundfish fisheries off Alaska.

Alternative 3 would be expected to decrease the risk of declines in spawning stock biomass, and fishery yield over the foreseeable future relative to Alternatives 1 and 2. As shown in Table 6, Alternative 3 would result in only a 5% chance that the spawning stock biomass will decline by at least 5% in 2019, compared to a 34% chance under Alternative 1, and a 17% chance under Alternative 3. Alternative 3 represents the most conservative alternative, and would pose the lowest risk that the stock could be less than specific threshold levels adopted by the IPHC that restrict catch limits if the spawning biomass declines below a specific level. Section 3.2 of this Analysis, Hicks and Stewart (2017) provide a description of IPHC management of when stock threshold S$B_{30\%}$ and the limit reference point of $B_{20\%}$ are triggered.

Alternative 3 would be expected to decrease the probability that catch limits will continue to decline in future years relative to Alternatives 1 and 2. As shown in Table 6, under Alternative 3,

there is only a 38% that the fishery yield (effectively catch limits) will be more than 10 lower in 2019, compared to Alternative 1 (76%), and Alternative 2 (63%). This same pattern holds for 2020 and 2021.

Alternative 3 would also result in harvests in specific Areas proportionate to the estimated biological abundance in each Areas.

- **Cumulative Effects on Target Species**

NMFS has identified only two RFFAa as likely to have an impact target species within the action area and timeframe encompassed by this proposed action.

First, NMFS has identified that in 2019, and all future years, it is reasonable to foresee that the allocation of catch limits and applicable recreational management measures will be undertaken by the IPHC. In all years since 1990, the IPHC has recommended, and NMFS has implemented recommended catch limits and necessary recreational management measures through an annual management measures process. Given this long and consistent history of recommending catch limits, it is a reasonable to foresee that this process will be followed in future years.

Second, NMFS has identified regulations that would modify regulations governing the Halibut and Sablefish IFQ Program that may become effective during 2018. On February 23, 2018 (83 FR 8028) NMFS published a proposed rule that includes three actions. The first action would allow CDQ groups to lease (to receive by transfer) halibut IFQ in Areas 4B, 4C, and 4D in years of extremely low halibut commercial catch limits. This proposed action is necessary to provide additional harvest opportunities to CDQ groups and community residents, and provide IFQ holders with the opportunity to receive value for their IFQ when the halibut commercial catch limits may not be large enough to provide for an economically viable fishery for IFQ holders. The second action would remove an obsolete reference in the IFQ Program regulations. The third action would clarify IFQ vessel use cap regulations. Under the threshold of this proposed action, only Alternative 3 would result in catch limits that meet threshold that would allow IFQ transfers to CDQ groups. This proposed action would not increase or modify the total amount of IFQ that avialble for harvest. The primary impact of this proposed action is to authorize voluntary transfers, but it would not require transfers.

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.

3.4 Groundfish

3.4.1 Status

The groundfish fisheries in Federal waters off Alaska are managed under the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI FMP) and the Fishery Management Plan for Groundfish of the Gulf of Alaska (GOA FMP). In the GOA and BSAI, groundfish harvests are managed subject to annual limits on the amounts of each species of fish, or of each group of species, that may be taken. The annual limits

are referred to as "harvest specifications," and the process of establishing them is referred to as the "harvest specifications process." The U.S. Secretary of Commerce approves the harvest specifications based on the recommendations of the Council.

Annually, the Council's harvest specifications process is to apply the harvest strategy to the best available scientific information to derive annual harvest specifications. The Council's Groundfish Plan Teams and Scientific and Statistical Committee (SSC) use stock assessments to calculate biomass, overfishing levels, and acceptable biological catch (ABC) limits for each species or species group for specified management areas. Overfishing levels and ABCs provide the foundation for the Council and NMFS to develop the total allowable catch (TAC) for each species or species group. Overfishing levels and ABCs reflect fishery science, applied in light of the requirements of the FMPs. The TACs recommended by the Council are either at or below the ABCs. The sum of the TACs for each area is constrained by the optimum yield established for that area. The annual harvest specifications also set or apportion the prohibited species catch (PSC) limits.

The harvest strategy provides for orderly and controlled commercial fishing for groundfish; promotes sustainable incomes to the fishing, fish processing, and support industries; supports sustainable fishing communities; and provides a steady supply of fish products to consumers. The harvest strategy balances groundfish harvest in the fishing year with ecosystem needs such as non-target fish stocks, marine mammals, seabirds, and habitat.

Each year, the Council and NMFS prepare Stock Assessment and Fishery Evaluation (SAFE) reports. These reports provide detailed descriptions of the status of groundfish species. The most recent SAFE reports (NPFMC 2017a; 2017b) are incorporated by reference. Most relevant to this proposed action, no groundfish species in the BSAI or GOA are in an overfished status, or subject to overfishing, and no groundfish species exceeded the ABCs established for those species (NPFMC 2017a; 2017b). Based on the information in the SAFEs and other information provided through an annual review process, NMFS prepares harvest specifications to establish OFLs, ABCs, and TACs for the BSAI and GOA. The final 2018 and 2019 harvest specifications published in the *Federal Register* for the BSAI on February 27, 2018 (83 FR 8365), and for the GOA on March 1, 2018 (83 FR 8700).

3.4.2 Effects of the Alternatives

Under all of the alternatives, the primary impact is the potential variation in the amount of incidental catch of groundfish species under the alternative catch limits. This analysis estimates the impact of the various catch limits on incidental catch by first estimating the average amount of catch (retained and discarded catch) in the halibut IFQ and CDQ fisheries using the three most recent years (2015 through 2017). This three-year period was used because the incidental catch of groundfish can vary from year-to-year and using an average of the three most recent years would encompass possible variations in catch. NMFS then used GIS data to apportion incidental catch among Areas.

For this analysis, incidental groundfish catch in Areas 2C through 3B correspond to the GOA, and incidental groundfish catch in all of Area 4 corresponds to the BSAI. This average amount was multiplied by the proposed halibut commercial allocation for each Alternative to calculate an approximate of the total catch of groundfish for each Alternative. The amount of total catch of

groundfish for each Alternative was divided by the 2017 groundfish species group ABC for the GOA and for the BSAI. The resulting estimate of the total amount of incidental groundfish catch in the GOA and the BSAI for each of the alternatives in shown in Table 9. Table 9 also shows the percentage of the ABC for these groundfish species to provide the reader with context in terms of the total amount of incidental catch that could result from these alternatives as compared to the ABC established for these species. Table 9 does not include an estimate of the amount of potential discards on the sablefish fishery because many participants in the halibut IFQ fishery also hold sablefish IFQ and the two species are often harvested together. Overall discards of sablefish in the halibut IFQ fishery are considered *de minimus* for purposes of this proposed action.

Table 9 Estimated incidental catch of groundfish in the commercial IFQ and CDQ halibut fisheries under the proposed action based on average total incidental catch from 2015-2017 and compared to the percentage of groundfish using 2017 groundfish ABC by Area and species.

Areas 2C-3B						
Species	**Alternative 1**		**Alternative 2**		**Alternative 3**	
	Total catch (mt)	% ABC	Total catch (mt)	% ABC	Total catch (mt)	% ABC
Pacific cod	435	0.49%	401	0.45%	345	0.39%
Big skate	647	16.97%	597	15.65%	514	13.47%
Longnose skate	658	20.53%	607	18.93%	522	16.29%
Other skates	368	19.17%	339	17.69%	292	15.22%
Demersal Shelf rockfish	102	44.81%	94	41.33%	81	35.57%
Shortraker/Rougheye rockfish	139	5.32%	128	4.90%	110	4.22%
Thornyhead rockfish	51	2.61%	47	2.40%	41	2.07%
Other rockfish	150	0.40%	138	0.37%	119	0.31%
Sharks	910	20.15%	839	18.59%	722	15.99%
Flatfish	51	0.02%	47	0.02%	41	0.01%
All Other Species (except Sablefish)	186	0.08%	171	0.07%	147	0.06%
Total -- All Groundfish (except Sablefish)	3,696	0.56%	3,409	0.52%	2,934	0.45%
Area 4						
Species	**Alternative 1**		**Alternative 2**		**Alternative 3**	
	Total catch (mt)	% ABC	Total catch (mt)	% ABC	Total catch (mt)	% ABC
Pacific cod	220	0.08%	208	0.08%	191	0.07%
Skates	415	1.01%	393	0.96%	362	0.88%
Rockfish	17	0.13%	16	0.13%	15	0.12%
Sharks	79	3.29%	75	3.11%	69	2.86%
Flatfish	44	0.01%	42	0.01%	38	0.01%
All Other Species (except Sablefish)	126	0.04%	119	0.04%	110	0.04%

Areas 2C-3B						
Species	Alternative 1		Alternative 2		Alternative 3	
	Total catch (mt)	% ABC	Total catch (mt)	% ABC	Total catch (mt)	% ABC
Total -- All Groundfish (except Sablefish)	902	0.02%	853	0.02%	785	0.02%

(Source: NMFS)

This proposed action would be expected to have a very limited effect on the incidental catch of groundfish species in the charter fisheries in Areas 2C and 3A because the charter halibut fishery harvests very limited amounts of groundfish and the potential variation of groundfish harvests among these alternatives. Table 10 shows the annual average incidental harvests of groundfish in the charter halibut fisheries in Areas 2C and 3A from 2010-2016 (the latest year of complete data). Sport fishery catch for federally managed species is very low relative to ABCs. Halibut sport fisheries also catch state managed bottomfish species. These are managed under State of Alaska Regulations. Species commonly caught include pelagic and non-pelagic rockfish, lingcod, and sablefish. These species are carefully monitored, with both the sport and commercial fishery harvest controlled through regulatory measures (e.g., seasons, size limits, retention limits, mandatory use of rockfish compression devices, and area closures) established by the State of Alaska. This analysis assumes that under Alternative 1 a similar amount of incidental catch would occur, and that this amount of incidental catch would be slightly reduced under Alternatives 2 and 3, but would not differ substantially from the status quo.

Table 10 Incidental catch of groundfish in the charter fisheries in Areas 2C and 3A (2010 – 2016)

Species	Annual Average Catch (2010 – 2016) in mt
All Rockfish	5.56
Pacific cod	21.45
Sablefish	8.13
Shark	0.67

(Source: NMFS)

Under each of the alternatives, the amount of incidental catch of groundfish in the aggregate is a small proportion of total removals. Under all of the alternatives, incidental catch of groundfish is a small proportion of the ABC for those species, with the exception of sharks and some rockfish species in Areas 2C through 3B (i.e., GOA). However, in all cases, there is limited variation among the alternatives in terms of the absolute amount of incidental catch and the percentage of incidental catch relative to the ABC. In addition, under all alternatives the total amount of catch permitted from all sources is limited to the ABC. None of the groundfish species that are incidentally harvested by the halibut fishery have exceeded the ABCs in recent years, and none of the alternatives would be expected to have a substantive or differential impact on the management of the groundfish fisheries.

4 Regulatory Impact Review

This Regulatory Impact Review (RIR)[1] examines the benefits and costs of a proposed regulatory amendment to halibut catch limits and charter management measures in 2018. This RIR considers three alternatives.

- **Alternative 1 (status quo) --** Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.
- **Alternative 2 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A, as endorsed by the U.S. Commissioners but not recommended by the IPHC at the 2018 IPHC Annual Meeting.
- **Alternative 3 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.

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

[1] If the RIR/IRFA is a stand-alone document because the action qualifies for a CE, add this footnote:
"The proposed action has no potential to effect individually or cumulatively on the human environment. The only effects of the action are economic, as analyzed in this RIR/IRFA. As such, it is categorically excluded from the need to prepare an Environmental Assessment."

- 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

Halibut is managed pursuant to the Convention between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Convention), Mar. 2, 1953, 5 U.S.T. 5, and the Protocol Amending the Convention Between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Protocol), Mar. 29, 1979, 32 U.S.T. 2483. The IPHC has been established to assess the status of the halibut resource, and regulate halibut consistent with the Convention, Protocol, and applicable U.S. and Canadian law. As provided by the Northern Pacific Halibut Act of 1982 (Halibut Act) at 16 U.S.C. § 773b, the Secretary of State, with the concurrence of the Secretary of Commerce, may accept or reject, on behalf of the United States, regulations recommended by the IPHC in accordance with the Convention (Halibut Act, Sections 773-773k). The Halibut Act provides the Secretary of Commerce with the authority and general responsibility to carry out the requirements of the Convention and the Halibut Act. The Secretary of Commerce may implement regulations governing harvesting privileges among U.S. fishermen in U.S. waters that are in addition to, and not in conflict with, approved IPHC regulations, under the authority of Article 1 of the Protocol and sections 773b and 773c of the Halibut Act.

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

The halibut fishery in the EEZ off Alaska is managed under the provisions of the Convention, accompanying Protocol, and the Halibut Act. Groundfish fisheries are managed under the FMPs for Groundfish of the BSAI and GOA. The proposed action under consideration would amend Federal regulations at 50 CFR 300.

4.2 Purpose and Need for Action

The IPHC can recommend regulations that govern the Pacific halibut fishery, pursuant to the Convention between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Convention), Mar. 2, 1953, 5 U.S.T. 5, and the Protocol Amending the Convention Between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (Protocol), Mar. 29, 1979, 32 U.S.T. 2483. The International Pacific Halibut Commission (IPHC) has been established to assess the status of the halibut resource, and regulate halibut consistent with the Convention, Protocol, and applicable U.S. and Canadian law. As provided by

the Halibut Act at 16 U.S.C. § 773b, the Secretary of State, with the concurrence of the Secretary of Commerce, may accept or reject, on behalf of the United States, regulations recommended by the IPHC in accordance with the Convention (Halibut Act, Sections 773-773k). The Halibut Act provides the Secretary of Commerce with the authority and general responsibility to carry out the requirements of the Convention and the Halibut Act. The Secretary of Commerce may implement regulations governing harvesting privileges among U.S. fishermen in U.S. waters that are in addition to, and not in conflict with, approved IPHC regulations, under the authority of Article 1 of the Protocol and sections 773b and 773c of the Halibut Act.

At the IPHC's annual meeting in January 2018, the U.S. and Canada did not reach agreement on catch limits and other regulations for the management of charter halibut fisheries in U.S. or Canadian waters in 2018. Under the provisions of the Convention, catch limits and regulations in place in 2017 will remain in effect until superseded by regulations implemented by the IPHC, or through domestic regulations implemented by Canada or the U.S. Biological information presented by IPHC scientists at the annual meeting indicate that the total biomass, and specifically the total exploitable biomass, of halibut is projected to decline substantially over the next several years if catch limits are not reduced relative to 2017. Reductions in catch limits, and associated charter halibut management measures in IPHC Regulatory Area 2C (Southeast Alaska), Area 3A (Central Gulf of Alaska), Area 3B (Western Gulf of Alaska), and Area 4 (subdivided into 5 areas, 4A through 4E, in the Bering Sea and Aleutian Islands of Western Alaska) are necessary for 2018 to establish management measures that will better protect the declining halibut resource and enhance the conservation of Pacific halibut while taking into account the potential adverse socioeconomic impacts that may result from lower catch limits.

4.3 Alternatives

This Analysis considers three alternatives.

- **Alternative 1 (status quo) --** Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.
- **Alternative 2 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A, as endorsed by the U.S. Commissioners but not recommended by the IPHC at the 2018 IPHC Annual Meeting.
- **Alternative 3 --** Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.

For purposes of this analysis we provided the following clarifications:

First, under all of these alternatives, NMFS assumes that if catch limits were established for Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E that similar catch limits would apply in the two other Areas that are not directly regulated by this action – Area 2A (California, Oregon, and Washington), and Area 2B (British Columbia, Canada). For example, under Alternative 1, this analysis assumes that if status quo catch limits (2017 catch limits) are applied in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E, the same catch limits (2017 catch limits) would also apply in Areas

2A and 2B. This assumption is made for purposes of reducing complexity that could occur if there are multiple alternative catch limits selected for Areas 2A and 2B as compared to the catch limits selected for Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E. Overall, under this assumption the suite of alternatives in this analysis would capture the reasonable range of total catch limits that could occur. For example, Alternative 1 assumes that all Areas would have the same catch limit as established in 2017, the maximum limit permissible given the provisions of the Convention that limit the U.S. and Canada from adopting catch limits that are greater than those adopted by the IPHC, and Alternative 3 assumes that all Areas would apply the IPHC interim management procedure. If catch limits for Areas 2A and 2B varied from those in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D and 4E, the suite of alternatives under consideration captures the range of effects.

Second, this analysis also assumes that all other sources of mortality (e.g., natural mortality, recreational harvests, bycatch, subsistence, and Tribal harvests not managed under catch limits) not affected by catch limits (or the charter management measures in Areas 2C and 3A) remain at the same level as those observed in 2017. This assumption is supported by data from IPHC (IPHC 2018b) that shows that interannual variability of these other sources of mortality is not expected to change substantially. Section 3.1.1 provides references for the mortality from recreational, bycatch, subsistence, and Tribal harvests not managed under catch limits.

Third, under Alternative 3, the IPHC's interim management procedure seeks to maintain the total mortality of halibut across its range from all sources based on a reference level of fishing intensity so that the Spawning Potential Ratio (SPR) is equal to 46%. An $F_{46\%}$ SPR is reference point that seeks to allow a level of fishing intensity that is expected to result in approximately 46% of the spawning stock biomass to remain compared to an unfished stock (i.e., no fishing mortality). Lower values indicate higher fishing intensity.

Fourth, these three alternatives would modify charter management measures in Areas 2C and 3A to ensure that the charter harvests would be maintained within the allocations established by the Area 2C and 3A CSP. The Area 2C and 3A CSP was implemented in 2014 (NMFS/NMFS 2013a). Under Alternative 1, the CSP and charter management measures are identical to those implemented in 2017 because under the Convention management measures are maintained until superseded.

Fifth, the reader is reminded that the scope of this action is limited. These alternatives analyze the effects of establishing different catch limits and charter halibut management measures for Areas 2C, 3A, 4A, 4B, 4C, 4D, and 4E and only for one year, 2018. While this analysis notes that catch limits established in 2018 could have longer term impacts on the halibut resources over the reasonably foreseeable future (until 2021 based on the best available information from IPHC scientists – see IPHC 2018a), the alternatives considered under this action are intended to be of limited duration. Under the provisions of the Convention and Halibut Act, the IPHC has a specific authority to recommend catch limits and charter halibut management measures for 2019 and future years. Therefore, this analysis assumes that the impact of this action is limited to only the effects of modifying catch limits and charter halibut measures for 2018, and that the annual process used by the IPHC to recommend catch limits for adoption by the U.S. and Canada will be used in future years. This assumption is reasonable given the long history of the IPHC recommending, and NMFS implementing annual management measure regulations. NMFS has

documented only two instances, once in 1990 (62 FR 11929, March 30, 1990), and in 2018, when the IPHC has been unable to come to agreement on catch limits applicable to the U.S.

Sixth, none of the alternatives would modify the overall enforcement of the commercial or charter halibut fishery, or introduce new management measures that have not been used in past years. None of the alternatives would modify the methods that NMFS uses to issue commercial permits for fishing (i.e., individual fishing quota), reporting methods, or enforcement considerations relative to the status quo. None of the alternatives would introduce novel management measures for the charter fishery that have not been used in past years.

Because this action is limited in scope and duration, the potential impacts of the alternatives on other environmental factors such as habitat and groundfish resources would not be expected to differ substantially from the status quo since the alternatives under consideration would not extend beyond 2018, and would not appreciably change the overall conduct of the halibut fishery in Areas 2C, 3A, 4A, 4B, 4C, 4D, and 4E in terms of the areas fished, gear used, or other operational changes that would modify the conduct of the fishery. The following sections of this analysis provide the detailed support for that conclusion.

4.4 Methodology for analysis of impacts

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

This analysis was prepared using a combination of qualitative and quantitative sources. Qualitative data on landings is obtained from ADF&G/ CFEC fish tickets sourced through AKFIN using the Comprehensive Fish Ticket database, and the NMFS Alaska Region Restricted Access Management (RAM) IFQ landings database. Information about halibut QS holders and Charter Halibut Permit holders is derived from data provided by NMFS RAM. 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), (Goen and Erikson 2017), and ADF&G analysis of management options for 2018 (Meyer and Powers 2017). For a full list of references, see Section 7.

4.5 Description of Fisheries

This section provides relevant background information on the halibut user groups off Alaska, including Areas 2C, 3A, 3B, 4A, 4B and 4CDE. Specifically, information is provided on the management of commercial sector, guided recreational (charter) sector, commercial fishing sectors that catch halibut bycatch, the unguided recreational sector, and subsistence fishers. General statistics and trends are presented on harvest participants and harvest activity. To the

extent available, information is also provided on the processors, secondary service providers, and communities that depend on halibut for its economic impact in these fisheries and its cultural importance.

4.5.1 Allocations of Catch Limits

Each year, the IPHC estimates the exploitable biomass of halibut using a combination of harvest data from the commercial, sport, and subsistence fisheries, and information collected during scientific surveys and sampling of bycatch in other fisheries. This process is summarized in Section 3.2 of the Analysis. The IPHC calculates the Total Constant Exploitation Yield (TCEY, or the target level for total removals (in net pounds) for each area in the coming year, by multiplying the estimate of exploitable biomass by the harvest rate in that area. The IPHC subtracts estimates of other removals from the TCEY. Other removals include unguided sport harvest, subsistence harvest, and bycatch of halibut in non-target commercial fisheries.

The amount remaining after the other removals are subtracted, is the Fishery CEY (FCEY). The apportionment of the FCEY among users differs among Areas. This analysis first describes the allocation process of the FCEY for Areas 2C and 3A, and then provides additional detail on the allocation process in Areas 3B through 4.

4.5.1.1 Allocation of Catch Limits between Commercial and Charter Sectors in Areas 2C and 3A

The FCEY is the basis for the IPHC's determination of the annual combined catch limit (CCL) for Areas 2C and 3A. The IPHC considers the combined commercial and charter halibut Fishery CEY, staff analysis, harvest policy, and stakeholder input when it specifies the Area 2C and Area 3A annual CCL in net pounds.

Since the implementation of the Catch Sharing Plan (CSP) in 2014 (as further discussed in Section 4.5.3.1), the IPHC specifies a CCL for the commercial and charter halibut fisheries in Area 2C and for Area 3A at its annual meeting in January. Each area's annual CCL in net pounds is the total allowable halibut harvest for the directed commercial halibut fishery, plus the total allowable halibut harvest for the charter halibut fishery under the CSP, including an estimate of each sector's wastage. This process is illustrated in Figure 7.

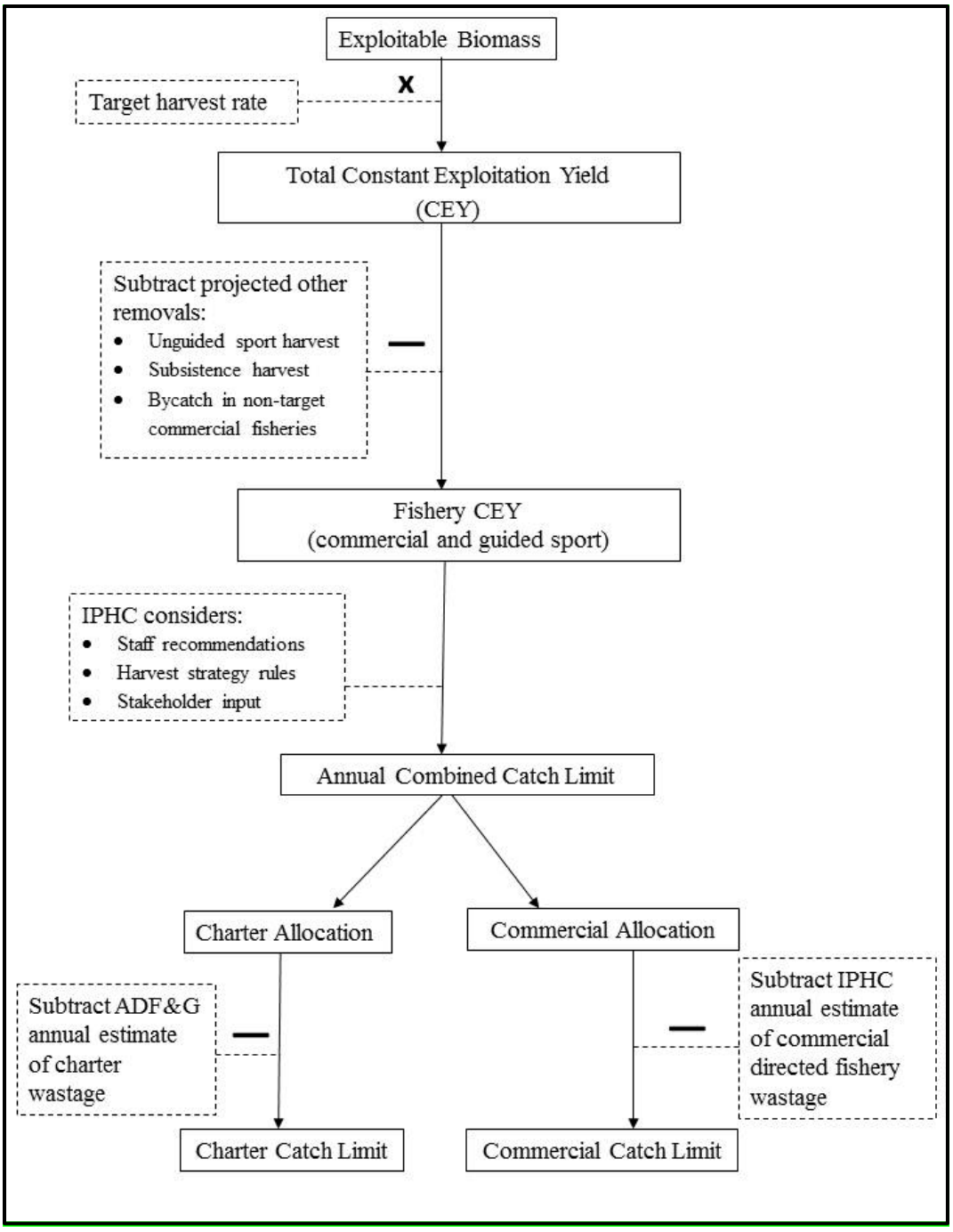

Figure 7 Process for Setting Annual Combined Catch Limits, Charter and Commercial Allocations, and Charter and Commercial Catch Limits for Area 2C and Area 3A under the Catch Sharing Plan

(Source: NMFS)

The annual CCL is separated into annual catch limits for the commercial and charter halibut fisheries pursuant to the CSP's allocation formulas. A fixed percentage of the annual CCL is allocated to each fishery at most levels of the CCL (Table 11 and Table 12). The fixed percentage allocation to each fishery varies with halibut abundance. The charter sector's relative

share is higher when the CCL is lower, but lower when the CCL is higher. This means the charter sector receives a smaller negative shock in bad years, and less of a windfall in the good years than the commercial sector. The charter halibut fishery receives a fixed poundage allocation at intermediate abundances to avoid a "vertical drop" in allocation as shown in Figure 8 and Figure 9. The CSP allocation percentages are applied to the annual CCL to calculate the commercial and charter halibut allocations in net pounds. Fishery-specific catch limits are calculated by deducting separate estimates of wastage from the commercial and charter halibut allocations (Figure 7). Under the typical annual process NMFS publishes the CCLs and associated allocations for the charter and commercial halibut fisheries in the *Federal Register* as part of the IPHC annual management measures pursuant to 50 CFR 300.62.

An overage by the charter or commercial sector in a year does not affect the other sector in that same year. An overage by any sector affects all users in the subsequent year, by increasing fishery removals that result in a lower estimated initial biomass. An overage is a removal greater than the fishery's catch limit. That higher removal in a fishing year means that biomass is incrementally lower at the end of that year than it would be otherwise. Underages have a similar effect on biomass but in the opposite direction, i.e., biomass estimation for the subsequent year begins at a higher level than it would otherwise, and all sectors will benefit from this.

The CSP establishes three allocation tiers for Area 2C as shown in Table 11 and Figure 8 below.

Table 11 Area 2C Catch Sharing Plan (CSP) allocations to the charter and commercial halibut fisheries relative to the annual Combined Catch Limit (CCL)

Area 2C annual CCL for halibut in net lb.	Charter halibut fishery CSP allocation (% of annual CCL or net lb.)	Commercial halibut fishery CSP allocation (% of annual CCL or net lb.)
0 to 4,999,999	18.30%	81.70%
5,000,000 to 5,755,000	915,000 lb.	Area 2C CCL minus 915,000 lb.
5,755,001 and up	15.90%	84.10%

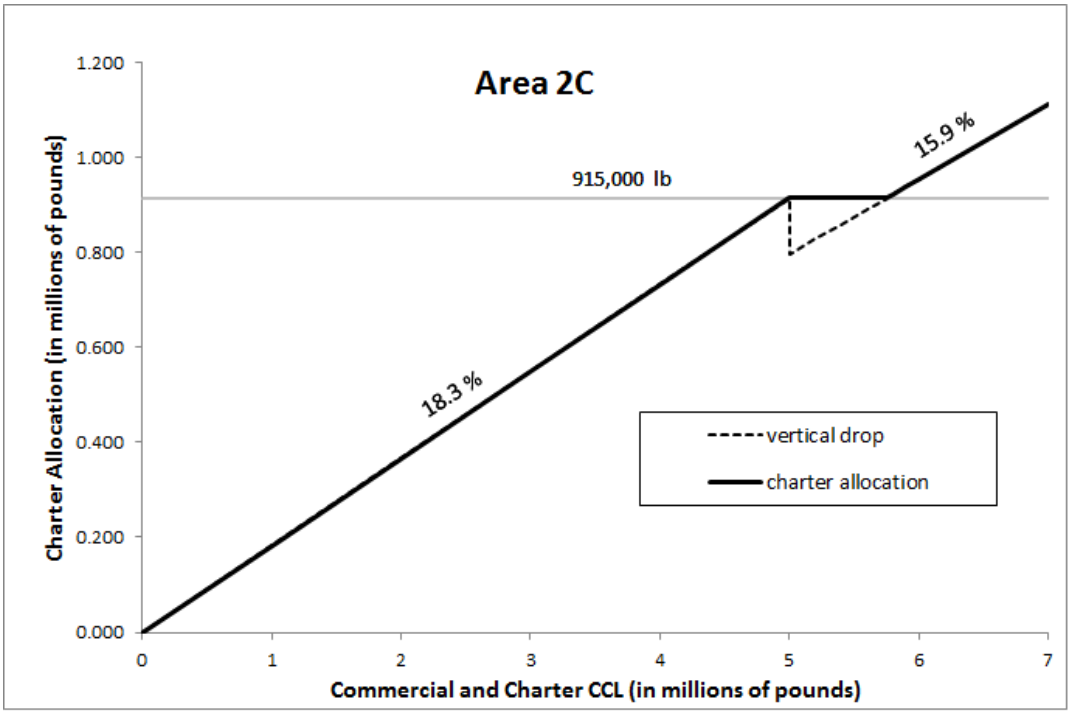

Figure 8 Area 2C charter allocations at varying levels of the annual Combined Catch Limit (CCL)

The CSP established five allocation tiers in Area 3A as shown in Table 12 and Figure 9 below.

Table 12 Area 3A Catch Sharing Plan (CSP) allocations to the charter and commercial halibut fisheries relative to the annual Combined Catch Limit (CCL)

Area 3A annual CCL for halibut in net lb.	Charter halibut fishery CSP allocation (% of annual CCL or net lb.)	Commercial halibut fishery CSP allocation (% of annual CCL or net lb.)
0 to 9,999,999	18.90%	81.10%
10,000,000 to 10,800,000	1,890,000 lb.	Area 3A CCL minus 1,890,000 lb.
10,800,001 to 20,000,000	17.50%	82.50%
20,000,001 to 25,000,000	3,500,000 lb.	Area 3A CCL minus 3,500,000 lb.
25,000,001 and up	14.00%	86.00%

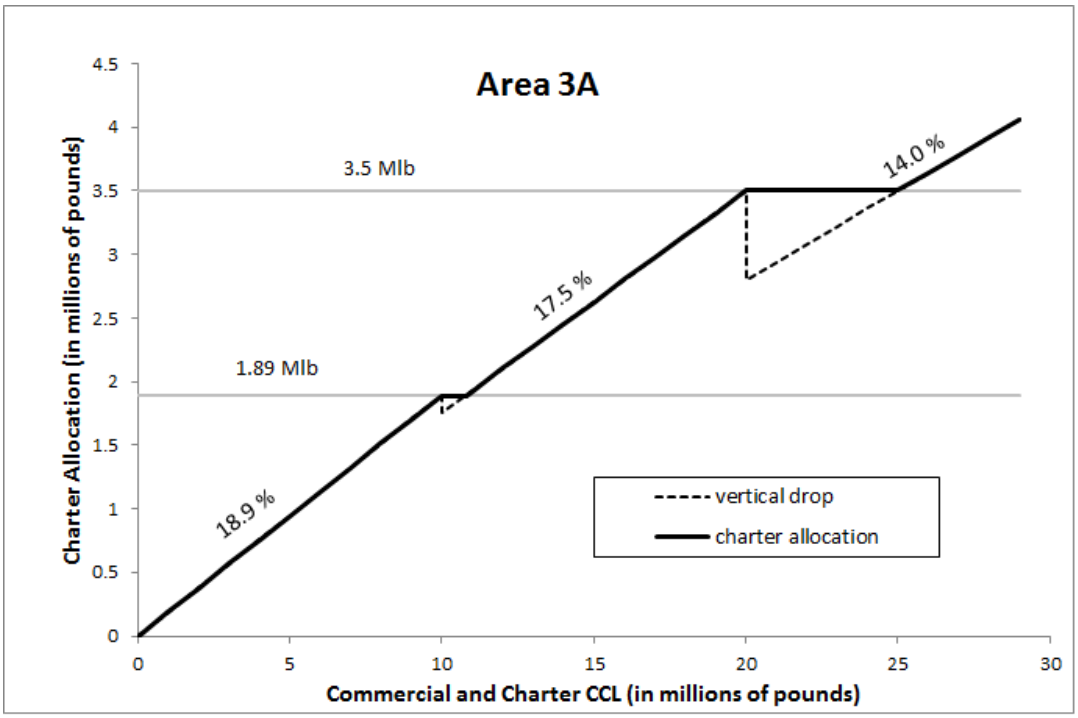

Figure 9 Area 3A charter allocations at varying levels of the annual Combined Catch Limit (CCL)

4.5.1.2 Allocation of Catch Limits between IFQ and CDQ in Areas 3B through 4

All of the commercial catch limits in Areas 2C through 4 are assigned either as IFQ or as CDQ. In Areas 2C and 3A the FCEY is divided among the charter and commercial sectors, and discard mortality (wastage) is deducted from the remaining portion of the commercial catch limit before it is allocated as IFQ. In all other Areas off Alaska (Areas 3B though 4) the FCEY is the commercial catch limit, and that amount is issued either as halibut IFQ or as CDQ halibut in Area 4. The relative percentage of the FCEY that is issued as either a charter allocation (Areas 2C and 3A only), as IFQ, or as CDQ based on existing regulations and using the 2017 catch limits (Alternative 1), for illustration, is shown in Table 13.

Table 13 Percentage of catch allocated as IFQ and CDQ in Areas 2C through 4

Allocation	Area 2C	Area 3A	Area 3B	Area 4A	Area 4B	Area 4C	Area 4D	Area 4E
Charter	17.8%	19.6%	-	-	-	-	-	-
IFQ	82.2%	80.4%	100%	100%	80%	50%	70%	-
CDQ	-	-	-	-	20%	50%	30%	100%

Note: In Areas 2C and 3A the proportion of charter and commercial allocations vary with the catch limit. Allocations shown here are based on the 2017 catch limits approved by the IPHC. Commercial discard mortality not shown as IFQ.

4.5.2 Commercial Halibut Fishery

This section provides some background information on the current management of the commercial halibut fisheries off Alaska, in Areas 2C, 3A 3B, 4A, 4B, and 4CDE. The commercial fishery is managed under a catch share program referred to as the Halibut and

Sablefish IFQ Program. In addition, there are two programs that are intended to provide for or help facilitate community commercial access to the halibut resource, the Community Quota Entity (CQE) Program in GOA and the CDQ in BSAI. In addition to a description of the management, this section also contains general statistics on the current operations in the fishery for these areas.

4.5.2.1 Halibut and Sablefish IFQ Program

In 1991, the Council recommended an IFQ program for the management of the fixed gear halibut and sablefish fisheries off 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 IFQ Program was implemented in response to growing concerns about issues that had emerged from management of the sablefish and halibut fisheries under the open access regime. In both fisheries, growth in fishing effort under open access had necessitated large reductions in length of the fishing seasons and caused a host of undesirable biological, economic, and social effects.

The fundamental component of the IFQ program is QS, originally issued to participants based on history in the fishery during specific qualifying years (1988-1990). QS Represents a percentage of the QS pool for a species-specific Area, which is translated into annual IFQ allocations in the form of fishable pounds. The amount of fishable pounds each QS holder receives depends on the specific catch limits set for that Area, typically carried out by the IPHC under the authority of the Halibut Act. Once the catch limits are established, NMFS Restricted Access Management (RAM) calculates the QS: IFQ ratio based on the total size of the QS pool (this number of QS units rarely changes) and the catch limits. NMFS RAM then issues IFQ to QS holders.

This IFQ specifies the area in which the IFQ derived from those shares may be harvested. These QS designations correspond to the Areas; with the exception of Area 4CDE. While the IPHC sets one combined catch limit for these subareas, the Council's Catch Sharing Plan for Area 4 (61 FR 11337, March 20, 1996) further disaggregated Area 4CDE for socio-economic reasons. The Catch Share Plan sets the combined Area CDE limits as: 46.43% to Area 4C, 46.43% to Area 4D, and 7.14% to Area 4E, when the total catch limit *does not exceed* 1,657,600 pounds. If the Area CDQ catch limit exceeds 1,657,600 pounds, then an addition fixed 80,000 pounds is set aside for Area 4E (CDQ), and the percentages are applied to the remainder.

There are several references that can provide more comprehensive and extensive background on the management of the IFQ Program, as well as statistical information on the fishery and its users. 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 2015).

4.5.2.2 CDQ Program

The CDQ Program is an economic development program associated with federally managed fisheries in the BSAI. Its purpose, as specified in the Magnuson-Stevens Act (§305(i)(1)(A)), 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 Magnuson-Stevens Act. Eligibility requirements for a community to participate in the western Alaska Community Development Program are identified in the Magnuson-Stevens Act at §305(i)(1)(D).

The six CDQ groups include:

- Aleutian Pribilof Island Community Development Association (APICDA)
- Bristol Bay Economic Development Corporation (BBEDC)
- Central Bering Sea Fisherman's Association (CBSFA)
- Coastal Villages Region Fund (CVRF)
- Norton Sound Economic Development Corporation (NSEDC)
- Yukon Delta Fisheries Development Association (YDFDA)

Figure 10 identifies the names and relative locations of the CDQ groups and the communities they represent.

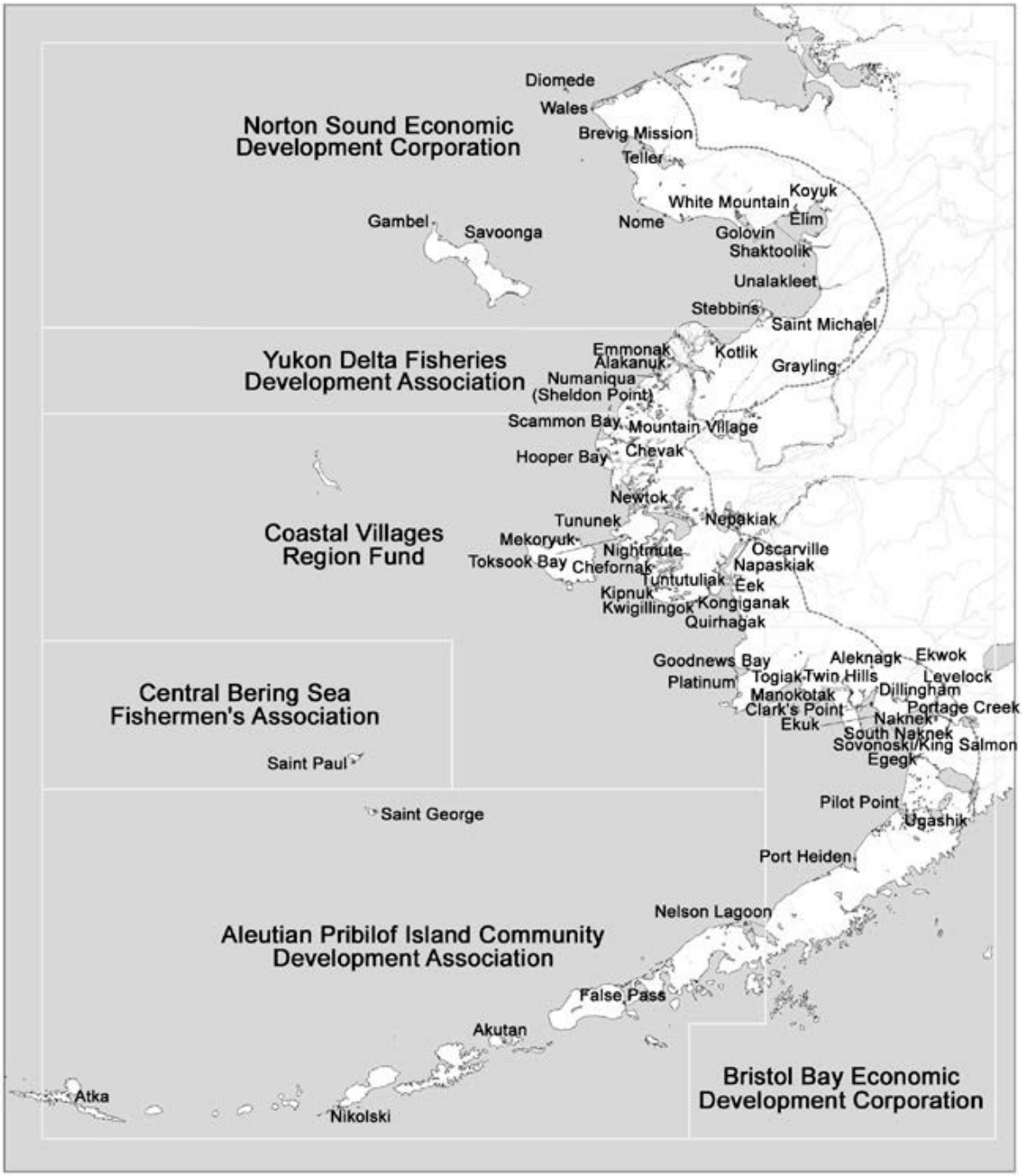

Figure 10 Western Alaska CDQ communities and groups

(Source: NMFS)

Halibut is allocated to CDQ groups, and is an important species for resident employment and income in many of the groups. Halibut is allocated to CDQ groups in four Areas: 4B, 4C, 4D, and 4E (see Figure 11 and Table 14).

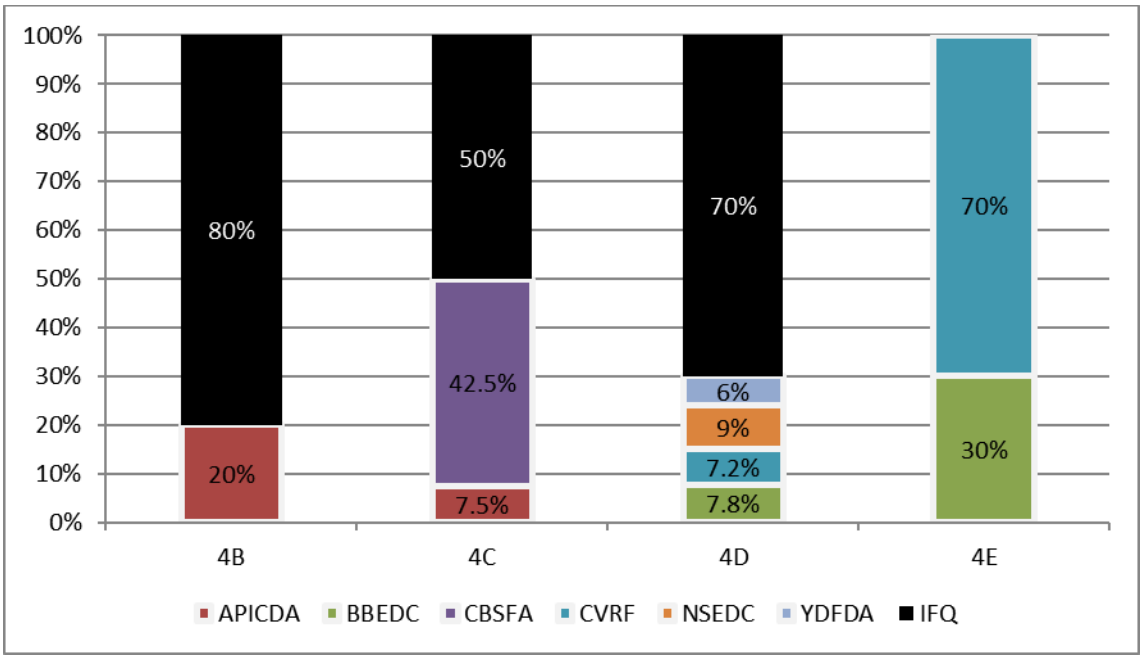

Figure 11 Halibut CDQ/ IFQ allocation in the regulatory Areas 4B, 4C, 4D and 4E

(Source: NMFS): https://alaskafisheries.noaa.gov/sites/default/files/reports/annualmatrix2017.pdf

Allocations of halibut quota are expected to provide CDQ groups real opportunities for small vessel fishing for their fleets, and area allocations of halibut CDQ are generally correlated with the location of the groups (refer to Figure 11). 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 14 demonstrates the pounds that these percentages have represented over time (2010 through 2017).

Table 14 Annual halibut CDQ allocation by Area (net pounds) -- 2010 through 2017

Area	Year	TAC	Program Allocations	APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA
4B	2010	2,164,000	20%	432,800	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

(Source: NMFS https://alaskafisheries.noaa.gov/sites/default/files/reports/annualmatrix2017.pdf

4.5.2.3 CQE Program

Although the IFQ Program has resulted in significant benefits for many fishermen with historical participation in the fishery, like other catch share programs, its implementation increased the cost of entry into or expansion in the commercial halibut and sablefish fisheries (NPFMC 2004; NPFMC 2010). Many QS holders in Alaska's smaller coastal communities have chosen to transfer their QS to others, for various reasons, or have moved out of these communities. Location, local conditions, and market forces were likely factors in the sale of QS originally held by residents of small communities. Some of these conditions and market influences include: the cost of access to markets is greater to fishermen landing fish in remote communities; fishermen based in remote communities tend to fish smaller amounts of QS using smaller, less efficient vessels, which result in lower profit margins than larger operations; fishing infrastructure in remote communities tends to be less complete; and residents with limited capital to purchase economically viable amounts of QS (McDowell Group 2005).

As a result of quota transfers, the total amount of quota held by residents of small, coastal communities and the number of IFQ holders, substantially declined since the inception of the IFQ Program. The Council recommended, and in 2004, NMFS implemented Amendment 66 to the Fisheries Management Plan (FMP) for GOA groundfish and associated regulations to revise the IFQ program to allow a distinct set of remote coastal communities' alternatives to purchase and hold catcher vessel halibut and sablefish QS (69 FR 23681; April 30, 2004).

Relevant to this proposed action, these regulations allowed non-profit entities representing specific rural communities located in Areas 2C, 3A, and 3B to purchase halibut QS. The specific communities that are eligible to hold QS are defined in regulation, currently there are 45 communities eligible to hold halibut and sablefish SQ in the GOA (Areas 2C, 3A, and 3B I for halibut). In 2014, NMFS implemented Amendment 102 for the Groundfish Fisheries Management Plan in the BS/AI expanded the program to include eligible communities in Area 4B (79 FR 8870, February 14, 2014). One additional community, 46 in total in Areas 2C, 3A, 3B, and 4B are eligible to purchase and hold QS under the CQE Program.

Eligible communities can form non-profit corporations called CQEs, to purchase catcher vessel QS, and the IFQ resulting from the QS must be leased to community residents annually. This action was implemented in order to help ensure access to and sustain participation in the commercial halibut and sablefish fisheries. The CQE Program was also intended as a way to promote ownership by individual residents, as individuals can lease annual IFQ from the CQE and gradually be in a position to purchase their own QS.

In some cases, the CQE is subject to the same limitations as individual users in the IFQ program, as if the CQE is simply another category of eligible person. For instance, the IFQ that a CQE group holds still includes an area designation that specifies the area in which the IFQ derived from those shares may be harvested. In other cases, the CQE is subject to less restrictive measures, in order to provide for the differing purpose and use of the QS when held by communities. In yet other cases, the CQE is subject to more restrictive measures than individuals, in part to protect existing holders and preserve entry-level opportunities for fishermen residing in other (non-eligible) fishery-dependent communities. For more details on the structure of the program and the rationale behind these decision points, see the final analysis

(NPFMC 2004) or the program review (NPFMC 2010). As of 2017, four communities have successfully acquired QS under the CQE Program: Hoonah (Area 2C); Old Harbor and Ouzinkie (Areas 3A and 3B), and Adak (Area 4B). Table 15 shows total QS holdings by these four CQEs and the amount of IFQ they received based on these QS holdings in 2017.

Table 15 Current CQE QS holdings

Entity	Community it represents	Area	Total QS units	2017 QS:IFQ ratio	Pounds of IFQ (2017)
Adak Community Development Corporation	Adak	4B	678,609	10.1807	66,656
Hoonah Community Fisheries Corporation	Hoonah	2C	114,232	14.1209	8,090
Cape Barnabas, Inc.	Old Harbor	3A	43,362	23.8911	1,815
		3B	151,234	17.2616	8,761
Ouzinkie Community Holding Corporation	Ouzinkie	3A	440,668	23.8911	18,445

Source: NOAA, RAM Program

4.5.2.4 Harvest, Harvesting Vessels, Diversification, and Value

The following section provides general background information on the allocations, catch, vessels, and value of the commercial halibut fishery in waters off Alaska. For more information, refer to the 20-year IFQ Program Review (NPFMC/NMFS 2016), IPHC's fishery statistics report (Goen and Erikson 2017), or consult NMFS Alaska region website, which provides updated catch and landings reports.[2]

Table 16, shows the commercial catch limit recommended by the IPHC and implemented by NMFS from 2008 through 2017. Table 16 shows the combined allocations to the IFQ fisheries CDQ fisheries. These allocations are further detailed in Section 4.5.2.2.

Table 16 Halibut commercial catch limits (IFQ and CDQ) by Area, 2008 through 2017

Year	2C	3A	3B	4A	4B	4CDE
2008	6,210,000	24,220,000	10,900,000	3,100,000	1,860,000	3,890,000
2009	5,020,000	21,700,000	10,900,000	2,550,000	1,870,000	3,460,000
2010	4,400,000	19,990,000	9,900,000	2,330,000	2,160,000	3,580,000
2011	2,330,000	14,360,000	7,510,000	2,410,000	2,180,000	3,720,000
2012	2,624,000	11,918,000	5,070,000	1,567,000	1,869,000	2,465,000
2013	2,970,000	11,030,000	4,290,000	1,330,000	1,450,000	1,930,000
2014	3,318,720	7,317,730	2,840,000	850,000	1,140,000	1,285,000
2015	3,679,000	7,790,000	2,650,000	1,390,000	1,140,000	1,285,000
2016	3,924,000	7,336,000	2,710,000	1,390,000	1,140,000	1,660,000
2017	4,212,000	7,739,000	3,140,000	1,390,000	1,140,000	1,700,000

Source: IPHC Pacific Halibut Regulations 2008 through 2017

The IFQ allocations are shown in Figure 12. This figure demonstrates an overall declining trend in the catch limits from 2004 through 2014, with a more consistence overall catch limit in 2015 through 2017.

[2] https://alaskafisheries.noaa.gov/fisheries-catch-landings

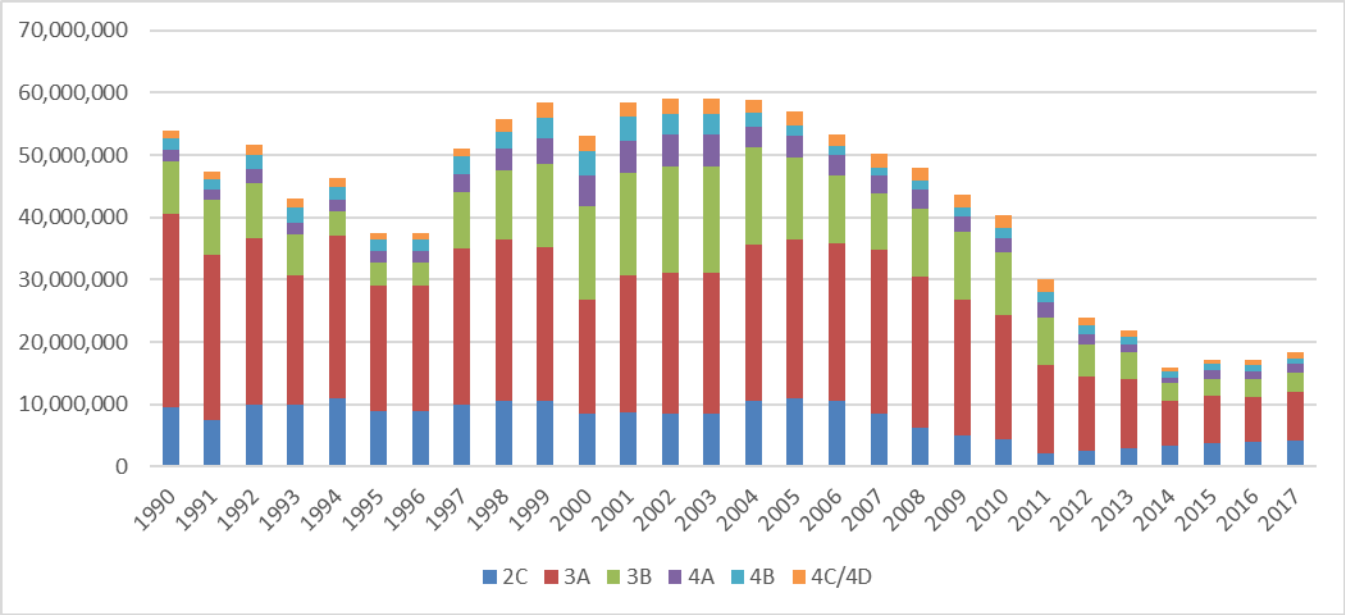

Figure 12 **Halibut IFQ commercial catch limits by Area, 1990 through 2017**

(Source: NMFS RAM Program)

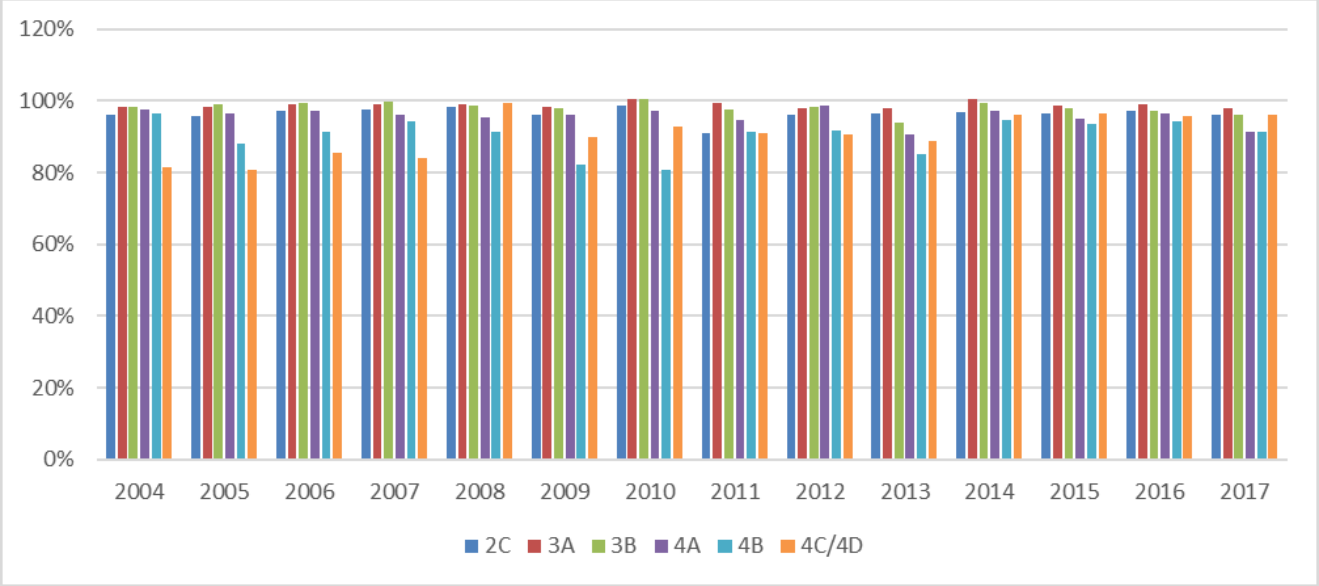

Figure 13 **Percent of the commercial halibut IFQ harvested by Area, 2004 through 2017**

(Source: RAM, NMFS)

Figure 13 shows that even as catch limits declined, the vast majority of the halibut IFQ continued to be harvested in each Area.

Table 17 shows the total amount of IFQ and CDQ halibut landed in Areas 2C – 4. Table 18 shows the value of these landings in terms of ex-vessel revenue. In 2017, halibut harvests of 18.6 M lb. generated $129 million of ex-vessel value.

Table 17 Halibut landings in waters off Alaska (net pounds)

Year	2C	3A	3B	4A	4B	4C	4D	CDQ	Total
2009	4,832,092	21,354,893	10,662,931	2,454,444	1,232,219	53,360	1,684,308	1,856,923	44,131,170
2010	4,350,002	20,092,309	9,965,054	2,267,000	1,394,752	106,338	1,703,278	1,968,437	41,847,170
2011	2,292,926	14,268,030	7,343,932	2,286,068	1,595,524	104,808	1,742,965	2,023,154	31,657,407
2012	2,527,243	11,688,285	4,990,671	1,544,024	1,370,408	82,051	1,125,000	1,446,764	24,774,446
2013	2,861,611	10,824,454	4,034,396	1,206,747	986,945	103,388	813,767	1,076,781	21,908,089
2014	3,215,413	7,353,833	2,823,737	827,075	864,227	108,758	579,467	787,404	16,559,914
2015	3,549,167	7,685,254	2,600,242	1,319,795	852,286	118,570	572,011	721,310	17,418,635
2016	3,811,086	7,258,022	2,637,157	1,343,260	861,167	82,127	760,805	851,889	17,605,513
2017	4,049,456	7,589,017	3,023,590	1,270,207	833,417	158,572	707,941	966,914	18,599,114

(Source: NMFS RAM, sourced through AKFIN)

Table 18 Ex-Vessel value of IFQ and CDQ halibut (Based on 2017 limits and 2016 prices (in M dollars)

Year	2C	3A	3B	4A	4B	4C	4D	CDQ	Total
2009	15.6	68.6	34.4	6.9	4.0	0.2	4.6	3.9	138.2
2010	21.9	101.9	49.1	10.7	6.4	0.5	8.3	7.0	205.7
2011	15.9	96.5	48.7	15.0	10.5	0.7	11.5	10.8	209.5
2012	16.6	71.9	29.3	8.4	7.3	0.4	6.3	7.2	147.4
2013	16.0	59.2	20.6	5.4	4.4	0.5	3.8	4.7	114.5
2014	22.1	50.5	18.4	5.2	4.9	0.6	3.6	3.6	109.0
2015	24.3	52.5	17.5	8.1	5.0	0.7	3.9	3.6	115.6
2016	27.6	52.2	18.5	8.6	5.4	0.6	4.9	4.5	122.3
2017	29.3	54.6	21.3	8.1	5.2	1.1	4.6	5.1	129.3

(Source: ADF&G/CFEC sourced through AKFIN)

Harvesting activity is illustrated in terms of number of participating vessels (Table 19) and length-overall of vessel (LOA; Table 20). Table 19 illustrates an overall trend of consolidation. In 2009, 1,329 vessels harvested halibut IFQ and CDQ in all areas, in 2016 the number of vessel was down to 921. This table also demonstrates a marked drop in the number of vessels harvesting CDQ between 2013 and 2014. Despite the slight increase in catch limits in some areas since 2014, the number of vessel participating in each area, has either stayed the same or continued to decline, with a few exceptions. Table 20 further disaggregates vessel participation by LOA.

Table 19 Vessels active in the halibut fishery by area and year

Year	Total	2C	3A	3B	4A	4B	4C	4D	CDQ
2009	1329	538	572	269	91	36	10	41	223
2010	1310	546	549	272	90	43	7	40	211
2011	1300	517	548	270	83	43	14	44	239
2012	1251	497	518	245	78	39	16	29	239
2013	1172	475	474	220	73	40	16	26	244
2014	1027	472	461	219	67	34	17	25	96
2015	943	440	458	201	67	32	18	28	65
2016	921	440	449	200	71	34	15	27	65

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

Table 20 Vessels active in the halibut fishery by length, year and area

Year	Length	Total	2C	3A	3B	4A	4B	4C	4D	CDQ
2009	<30	313	74	51	2	1		1	11	176
	30-59	904	443	445	205	60	18	8	14	45
	60-89	69	19	57	47	24	13	1	13	1
	90-119	25	1	13	9	2	3		2	1
	120-149	11		3	3	2	2		1	
	150-180	6		2	2	1				
2010	<30	309	87	43	2	1	3	1	11	167
	30-59	895	439	433	211	60	19	4	12	41
	60-89	66	18	56	46	23	16	2	14	3
	90-119	22	1	13	9	3	3		2	
	120-149	10		2	2	1	2		1	
	150-180	7		1	1	1				
2011	<30	335	85	44	1		3	1	10	194
	30-59	868	415	434	211	58	20	10	16	42
	60-89	59	15	53	45	18	14	3	12	1
	90-119	23	1	13	10	2	4		3	
	120-149	9		2	1	2	2		2	1
	150-180	5		1	1	2			1	1
2012	<30	305	80	39	2	1	3	2		184
	30-59	853	399	414	192	53	20	12	12	54
	60-89	57	16	51	41	17	13	2	10	
	90-119	21	1	11	8	3	3		4	
	120-149	9		2	1	2			2	
	150-180	5				1			1	1
2013	<30	321	83	32	2	1	5	2		202
	30-59	771	377	379	170	50	19	12	10	41
	60-89	52	14	50	39	18	12	2	12	
	90-119	19		10	6	1	4		2	
	120-149	6		2	2	2			2	1
	150-180	2								
2014	<30	187	84	33	4	2	4	5		62
	30-59	759	373	370	170	45	18	11	11	34
	60-89	49	14	46	37	16	10	1	10	
	90-119	20		10	6	1	2		2	
	120-149	8		1	1	2			2	
	150-180	3								
2015	<30	136	67	30	2	1	4	3		35
	30-59	738	358	374	158	46	16	12	13	29
	60-89	45	14	43	33	16	10	3	10	
	90-119	15		9	6	1	2		2	1
	120-149	6		1	1	2			2	
	150-180	2							1	
2016	<30	141	71	30	3	2	3	2		33
	30-59	711	356	366	156	49	20	9	12	31
	60-89	46	12	42	34	16	9	3	11	
	90-119	14		9	5	1	2		2	
	120-149	5		1	1	2			2	1
	150-180	3								

(Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN)

4.5.3 Charter Halibut Fishery

Sport fishing activities for Pacific halibut in Areas 2C and 3A are subject to different regulations, depending on whether those activities are guided or unguided. Guided sport fishing for halibut, commonly called "charter fishing" – and designated as such in this analysis, is subject to restrictions under Federal regulations that can be more restrictive than the regulations for unguided anglers. Charter regulations apply if a charter vessel guide is providing assistance, for compensation, to a person who is sport fishing, to take or attempt to take fish during any part of a charter vessel fishing trip. Unguided anglers typically use their own vessels and equipment, or they may rent a vessel and fish with no assistance from a guide.

This section details the current management and operations of the charter halibut fishing in Areas 2C and 3A, two areas that represent more than 99% of the charter halibut operations off the state of Alaska (ADF&G 2014).[3] For additional information on the management history of the charter sector see NPFMC (2013).

4.5.3.1 Charter Halibut Limited Access Program and Catch Sharing Plan

The Council and NMFS developed specific management programs for the charter halibut fishery to achieve allocation and conservation objectives for the halibut fisheries. These management programs are also intended to maintain stability and economic viability in the charter fishery by establishing 1) limits on the number of participants; 2) allocations of halibut that vary with abundance; and 3) a process for determining annual charter angler harvest restrictions to limit charter fishery harvest to the established allocations. The charter halibut fisheries in Areas 2C and 3A are managed under the Charter Halibut Limited Access Program (CHLAP) and the Catch Sharing Plan (CSP). The CHLAP limits the number of operators in the charter fishery, while the CSP establishes annual allocations to the charter and commercial fisheries and describes a process for determining annual management measures to limit charter harvest to the allocations in each management area.

The CHLAP was adopted by the Council in 2007 and NMFS published the final rule in January 2010 (75 FR 554, January 5, 2010). The CHLAP established Federal charter halibut permits (CHPs) for operators in the charter halibut fishery in Areas 2C and 3A. Since implementation of the CHLAP program in 2011, all vessel operators in Areas 2C and 3A with charter anglers on board must have an original, valid permit on board during every charter vessel fishing trip on which halibut are caught and retained. CHPs are endorsed for the appropriate Area and the number of anglers that may catch and retain halibut on a charter vessel fishing trip, ranging from 4 to 38. The CHLAP also issues a limited number of permits to non-profit corporations representing specified rural communities and to U.S. military morale programs for service members.

The Area 2C and 3A Catch Sharing Plan was implemented by NMFS in January 2014 (78 FR 75844, December 12, 2013). The CSP replaced the Guideline Harvest Level program that was in

[3] Halibut charter operations for Area 3B and Area 4 are not included in the CSP. According to 2013 ADF&G estimates, these operations represent less than 0.4% of the Alaska's charter/ non-charter recreational yield. For charter anglers in all IPHC regulatory areas in Alaska except Areas 2C and 3A, the regulations are the same as for unguided anglers.

place from 2004 through 2013 (68 FR 47256, August 8, 2003) as the method for setting pre-season specifications of acceptable annual harvests in the charter fisheries in Areas 2C and 3A. The CSP defines an annual process for allocating halibut between the charter and commercial halibut fisheries in Areas 2C and 3A (See Figure 7). The CSP also describes a public process by which the Council develops recommendations to the IPHC for charter angler harvest restrictions that are intended to limit harvest to the annual charter halibut fishery catch limit in each area.

4.5.3.2 Charter Halibut Management Measures for Area 2C and 3A

Prior to 2012, charter management measures were recommended by the Council and implemented by NMFS through proposed and final rulemaking or implemented by the IPHC without specific recommendation from the Council. The CSP provides a more systematic, timely, and responsive process to address harvest overages or underages, using the best available and most recent data. Annual management measures for implementation in the Area 2C and Area 3A charter halibut fishery are set each year through a public process.

Each October, the Council's Charter Halibut Management Committee meets to review harvest in the current year in relation to the charter catch limit, and to discuss and make recommendations from a number of management measures for Areas 2C and 3A to be analyzed for the coming year. ADF&G staff then conducts an analysis to predict harvest under single alternatives and combinations of measures. There are a variety of management measures that have been used or considered in the past to manage the charter and other recreational halibut fisheries. Some of these measures directly restrict the number or size of fish that can be retained. Examples include regulating:

- the number of halibut taken by an angler in a calendar day ("bag limit");
- the number of trips a charter operator may take in a calendar day ("trip limit");
- the number of halibut taken by an angler in a calendar year ("annual limit");
- the maximum size limit of halibut taken on a trip (for example, "U45", meaning a halibut must be under 45 inches);
- the minimum size limit of halibut taken on a trip (for example, "O68", meaning a halibut must be over 68 inches);
- a specified maximum/ minimum size limit halibut must fall outside of in order to be retained "reverse slot limit");

Some of these measures indirectly restrict in the number of halibut able to be retained by enforcing:

- a prohibition on charter fishing during selected day(s) of the week ("day of the week closure");
- a prohibition on skipper/ crew harvest (default under the CSP);

The Charter Halibut Management Committee considers combinations of these and possibly other measures and works with ADF&G to understand the projected impact given charter halibut trends as indicated in the logbook and port sampling data. Because regulations restricting the

number or size of halibut taken could apply to either some or all of the halibut taken during a trip or season, there are many combinations of possible alternatives. In December of each year, prior to Council consideration, ADF&G presents an analysis based on the combinations of management measures requested by the Committee. This analysis is based on a forecast of the upcoming year's harvest under the current year ("status quo") regulations and observed effects of various measures in past years. Projected harvests under alternative management measures are compared to the charter allocation associated with the IPHC's interim harvest policy for commercial and charter fisheries. The charter allocation is defined in relation to the magnitude of this combined catch limit. Management measures are not modified mid-season, therefore the Council recommends management measures intended to keep charter harvest within the charter sector allocation in each area.

In December, the Council also reviews the ADF&G analysis of the expected outcome from the potential charter management measures for Area 2C and Area 3A charter halibut fisheries for the upcoming fishing year. It is the Council's discretion how to balance Charter Management Committee recommendations, with possible enforcement or analytical challenges. The Council considers these recommendations, as well as those from its other advisory bodies. The Council then identifies the charter halibut management measures to recommend to the IPHC at its annual meeting that will most likely constrain charter halibut harvest for each area to its catch limit, while considering economic impacts on charter operations.

The IPHC takes into account Council recommendations, along with the analyses on which those recommendations were based, and input from its stakeholders and staff. The IPHC then adopts charter halibut management measures designed to keep charter harvest in Area 2C and Area 3A to the catch limits specified under the CSP given the adopted CCL. Once accepted by the Secretary of State with the concurrence of the Secretary of Commerce, NMFS publishes in the *Federal Register* the charter halibut management measures for each area as part of the IPHC annual management measures. This process provides many opportunities for public input along the way.

Table 21 and Table 22 demonstrate how the management measures have changed for Area 2C and Area 3A between 2012 and 2017. As demonstrated in these tables, the GHL was still in place in 2012 and 2013, and in 2014 the CSP management process began.

In Area 2C, charter anglers have only been allowed to harvest a bag limit of one halibut per person, per day, since June 5, 2009. This rule transpired after a sequence of years in which charter harvest exceeded the GHL in Area 2C (from 2004 through 2008). Implementation of a one-halibut daily bag limit was intended to keep the harvest of charter vessel anglers to approximately the GHL.

In 2012, a "reverse slot limit" (or "protected slot") was implemented as an annual management measure for Area 2C that limited the size of the retained halibut to less than or equal to 45 inches, or greater than or equal to 68 inches in length. This rule provided anglers with an opportunity to retain a trophy fish – a halibut larger than 68 inches in this case. The Charter Halibut Management Committee and charter fishery participants recommended the reverse slot

limit to keep total harvests in Area 2C charter fisheries within the IPHC's 2012 recommended GHL, while providing a reasonable charter fishing opportunity.

In 2014, the first year of the CSP, the Council maintained the one fish daily bag limit in Area 2C. In addition, the reverse slot limit was modified to require that the retained halibut must be less than or equal to 44 inches or greater than or equal to 76 inches in length. In 2015, the slot increased several inches on either side, requiring retained halibut to be either less than or equal to 42 inches or greater than or equal to 80 inches. This reverse slot limit translates into a halibut less than approximately 26 pounds and greater than 208 pounds, after the head and guts have been removed.

Table 21 Management type (guideline harvest level or catch sharing plan) and management measures for Area 2C charter halibut sector, 2012 through 2017.

Year	Mgmt Type	Charter Regulations
2012	GHL	One fish under 45 inches or over 68 inches (U45/O68)
2013	GHL	One fish under 45 inches or over 68 inches (U45/O68)
2014	CSP	One fish under 44 inches or over 76 inches (U44/O76)
2015	CSP	One fish under 42 inches or over 80 inches (U42/O80)
2016	CSP	One fish under 43 inches or over 80 inches (U43/O80)
2017	CSP	One fish under 44 inches or over 80 inches (U44/O80)

(Source: ADF&G)

For Area 3A, charter anglers fished under the same two-fish of any size bag limit as unguided anglers from 1995 until 2013. In 2014, under the first year of the CSP, the catch limit fell for Area 3A by almost one million pounds. Consistent with the CSP-specified process, the Charter Halibut Management Committee recommended, and the Council and IPHC supported, modifications to Area 3A annual management measures. While many 3A stakeholders maintained that the two-fish bag limit was vital to their operations, annual management measures in 2014 included a size restriction for one of the two halibut. In addition, the Federal regulations established a one-trip per calendar day limit for vessels and a prohibition against halibut retention by charter captain and crew.

In 2015, despite a small increase in Area 3A charter allocation, the Council approved stricter management measures because the analysis projected that 2015 charter harvest would increase slightly under the status quo management measures (2014 measures) and exceed the allocation. In 2015, an additional measure was established that would prohibit all halibut charter fishing activity on Thursdays during a specified time period (day of the week closure), and an annual limit of five fish per person. In 2016 and 2017 management measures continued to become more restrictive, with a drop in the annual limit per angler and an increase in the days of the week in which charter halibut fishing was prohibited.

Table 22 Management type (guideline harvest level or catch sharing plan) and management measures for Area 3A charter halibut sector, 2012 through 2017.

Year	Mgmt Type	Charter Regulations
2012	GHL	Two-fish bag limit (no size restrictions)
2013	GHL	Two-fish bag limit (no size restrictions)
2014	CSP	Two-fish bag limit (One fish under 29 inches), one trip per vessel per day
2015	CSP	Two-fish bag limit (One fish under 29 inches), one trip per vessel per day, 5-fish annual limit, Thursday closure (6/15-8/31)
2016	CSP	Two-fish bag limit (One fish under 28 inches), one trip per vessel and CHP per day, 4-fish annual limit, Wednesday closure
2017	CSP	Two-fish bag limit (One fish under 28 inches), one trip per vessel and CHP per day, 4-fish annual limit, Wednesday closure, closure of 3 Tuesdays

(Source: ADF&G, 2017)

4.5.3.3 Charter Halibut Permit Holders

Table 23 shows the current number of CHPs, CHP holders, and angler endorsements by fishing area and type of CHP. The total number of CHPs has changed since initial allocation. A number of CHPs were considered “interim”; some of which were later revoked upon completion of an appeals process. Additionally, the number of CHP holders continually changes as permits are transferred.

Additionally, CQEs and U.S. Military Morale, Welfare and Recreation Program (MWR) permits have been issued as part of the CHLAP. Community Charter Halibut Permits are issued at no cost to a CQE representing communities that may not have a fully developed charter halibut fleet. A CQE may apply at any time through NMFS for a community CHP. A charter vessel operator who is using a community CHP is required to either begin or end the charter vessel fishing trip within the community designated on the permit. A CQE in Area 2C may receive a maximum of four community CHPs to provide to an ADF&G licensed charter vessel operator. The operator must have a current ADF&G Saltwater Logbook in possession. A CQE in Area 3A may receive a maximum of 7 community CHPs.

Military Charter Halibut Permits are for any MWR program in Alaska operating a halibut charter vessel. The program must obtain a permit, which may be applied for through NMFS at any time at no cost. These permits are non-transferable, issued without angler endorsements, and may be used only in the Area designated on the permit. NMFS reserves the right to limit the number of these permits. The holding entities for MWR permits tend to be military entities, e.g. Eielson Air Force Base. Both CQE permits and MWR permits are subject to the same annual management measures as CHP holders.

As shown in Table 23, 266 unique entities currently hold 529 unique CHPs in Area 2C, and 290 unique entities currently hold 426 CHPs in Area 3A. For this calculation, all CHP holders were counted once per area, even if he or she holds multiple permits. Across both areas, almost 6,500 angler endorsements have been issued on CHPs (including community CHPs), suggesting this number is the maximum number of anglers that legally may charter fish for halibut each day. However, unless annual management measure state otherwise (as in Area 3A), multiple charter

trips per day per CHP may occur, increasing that maximum potential.[4] Conversely, not every angler endorsement on a CHP will be used each trip.

Table 23 Charter Halibut Permit Holders characteristics as of 2/10/18.

Area	Permit Type[1]	Count of unique permit holders[2]	Count of unique permits	Largest number of permits per holder	Average number of permits per holder	Total angler endorsements	Average angler endorsement
2C	CHP	266	529	25	2.0	2714	5.1
	CQE	12	48	4	4.0	288	6
	MWR	1	1	1	1.0	NA	NA
3A	CHP	290	426	5	1.5	3158	7.4
	CQE	8	56	7	7.0	336	6
	MWR	3	6	4	3.0	NA	NA

Notes: CHP represents Charter Halibut Permit, CQE is Community Quota Entity charter permit, and MWR is the U.S. Military Morale, Welfare and Recreation Program

(Source: NMFS RAM)

4.5.3.4 Charter Halibut Harvest

In Area 2C, the harvest limit has ranged from 931,000 to 761,000 pounds in the last seven years (see Table 24). Unlike Area 3A, Area 2C struggled to remain under the GHL during between 2004 and 2010, but has been more consistently under the harvest limit under the CSP. In 2011, a maximum size limit of 37 inches was added to the one-fish bag limit. This became the first year the charter sector's harvest was within their GHL since 2004, but the limit proved to be overly constraining and the charter sector harvest was well below the GHL.

When a reserve slot limit was implemented in 2012, the catch was still well below the harvest limit (69%). Since 2012 the reverse slot limit has been adjusted so that the Area 2C have been very close to its harvest limit. The sector exceeded the limit twice since 2012; once in 2014 by 9% and, based on preliminary estimates, exceeded its limit by 4% in 2017.

[4] From 2014 to 2017, Area 3A charter operators have been limited to one trip per day.

Table 24 Area 2C charter halibut allocation and harvest, 2010 through 2017.

Area 2C				
Year	Mgt type	Harvest Limit (M lb)	Guided Harvest (M lb)	Guided Harvest (% of harvest limit)
2010	GHL	0.788	1.086	138%
2011	GHL	0.788	0.344	44%
2012	GHL	0.931	0.605	69%
2013	GHL	0.788	0.762	97%
2014	CSP	0.761	0.827	109%
2015	CSP	0.851	0.814	96%
2016	CSP	0.906	0.839	93%
2017	CSP	0.915	*0.951*	*104%*

Note: 2017 harvest estimates are preliminary
(Source: ADF&G, 2017)

For Area 3A, the GHL was set at 3.56 M lb. from 2003 through 2012. During years in which Area 3A operated under a GHL, they were able to stay below or near the GHL in all years with a maximum overage of 10% in one year. Estimates show that Area 3A decreased overall yield from 2013 to 2014 by 15%; however, it still exceeded the charter allocation set for 2014 by 16%, given the simultaneous decrease in the harvest limit. In addition to management measures, many other factors can contribute to overall number and size of halibut harvested, including other biological factors of the stock (size and catchability), status of other popular recreational species (e.g., salmon) and management status of those fisheries (e.g., new permits), and the global economy all influence angler demand. ADF&G reported that fewer fish were landed in 2014, but they were larger than expected. Thus, average weight was higher than projected, which is one factor used to calculated total charter yield. This might not necessarily indicate that available halibut were larger, if fewer anglers decided to retain a second fish, then they may have high-graded their first fish, which did not have a size limit.

The Area 3A charter halibut fleet harvested approximately 11% over the harvest limit in 2015, 2016, and 2017. Again, this is likely due to a variety of factors that may be different each year. For instance, removals in Area 3A can be more difficult to predict due to the combination of measures in place and the difficulty in teasing apart the effect of each one. In particular, it can be difficult to analyze measures that have never been implemented and those which require the ADF&G analysts to consider human behavior in several dimensions. For example, if there is a day of the week closure for charter anglers in 3A, it is not clear if anglers will simply move effort by rebooking on a different day of the week, or if a reverse slot limit will that change average weight of retained fish. With a two-fish bag limit, only one of which is constrained by a size limit, there are more decision points for the angler in the number and size of fish they will retain. The combinations of angler response can complicate projections.

Table 25 Area 3A charter halibut allocation and harvest, 2010 through 2017.

Area 3A				
Year	Mgt type	Harvest Limit (M lb)	Guided Harvest (M lb)	Guided Harvest (% of harvest limit)
2010	GHL	3.65	2.698	74%
2011	GHL	3.65	2.793	77%
2012	GHL	3.103	2.284	77%
2013	GHL	2.734	2.514	92%
2014	CSP	1.782	2.066	116%
2015	CSP	1.89	2.094	111%
2016	CSP	1.814	2.021	111%
2017	CSP	1.89	*2.093*	*111%*

Note: 2017 harvest estimates are preliminary
(Source: ADF&G, 2017)

4.5.4 Communities Associated with Charter and Commercial Halibut Fishing

The impact of commercial and charter fishing activities on communities can be understood in many different ways. Typically impacts might be thought of in terms of where the harvesting or processing activities occur. However, the scope of communities under consideration expands extensively when also including the communities that QS or CHP holders live, the headquarters of a commercial or charter business, or even the communities that charter anglers are from. Community-level impacts of halibut industries may manifest in more than just coastal communities, where fisheries involvement is generally more visible. For example, in the commercial sector QS holders, vessel owners, captains, crew, processing and support sectors are not always located in the community nearest harvesting activity or even port of landing. Similarly, in the charter sector, the scope of community impacts related to fishing activity of this industry could reach captains, crew, all those involved in the business associated with charter operations, sport fishing processors and other support sectors, as well as other sectors in the community that rely on local tourism.

This section provides some relevant background information on communities associated with commercial and charter halibut fishing including QS and CHP holders by community, diversification of vessel revenue by vessel owner's community, a discussion of commercial processor activity, and ports of landing. This section concludes with information on the taxes generated by the commercial and charter sectors which can benefit both the state and local government.

Many additional resources provide information on community-level commercial halibut sector and halibut charter sector activities.[5] The limited scope of background presented here frames the available information directly relevant to the proposed action.

[5] Examples include AFSC Community Indices which provide commercial fisheries engagement indices, location quotient and regional quotient for the halibut and sablefish IFQ fisheries (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

4.5.4.1 Commercial Halibut Sector

Residents of dozens of communities throughout the U.S hold halibut QS. The 20-year review notes that based on QS holdings through 2015, approximately 63% of all halibut QS is held by residents of Alaska, 26% by residents of Washington, 7% by residents of Oregon, and 4% by residents of all other states (NPFMC/NMFS 2016). These broad trends of residency have been consistent since the IFQ Program was implemented in 1995 (NPFMC/NMFS 2016). NMFS relies on self-reported residency information to designate community residency. However, reported addresses may not necessarily represent the residency of QS holders; it could represent a business address or a PO Box. Additionally some QS holders may choose to define their community more narrowly than the municipal boundaries commonly used (e.g., a person defining "Auke Bay" or "Douglas" as their community of residence rather than "Juneau" even though all of these communities are located within the municipal boundaries of the City and Borough of Juneau). Table 26 shows the overall distribution of QS holders by community of residency. As Table 26 shows, any action that modifies catch limits would be expected to have impacts on QS holders who are broadly distributed among many communities. Table 26 does not further distinguish among the specific types of QS held in each community (e.g., vessel class (category) QS, or the specific Areas of QS). All of the alternatives would result in the same proportional impact on the amount of IFQ that would be issued (i.e., under Alternative 2 all QS holders would recieve the same reduction in IFQ per QS unit within their Areas). Table 26 provides a borad overview of the total QS held in communites to illustrate the range of potential effects within a community.

Appendix A to the EA/RIR/IRFA to the Catch Sharing Plan analysis (NPFMC/NMFS 2013a). 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 26 QS holdings by reported community residency (Top 15 Communities shown in Detail) (NMFS Alaska Region Restricted Access Management (RAM) division IFQ landings database sourced through AKFIN).

Community	Total Amount of QS Holdings	% of Total Halibut QS Holdings
KODIAK	45,331,573	13.67%
PETERSBURG	29,729,618	8.97%
SEATTLE, WA	20,811,338	6.28%
HOMER	20,490,852	6.18%
SITKA	17,588,657	5.30%
ANCHORAGE	11,551,469	3.48%
JUNEAU	9,469,983	2.86%
CORDOVA	8,059,348	2.43%
ASTORIA, OR	5,490,785	1.66%
PORT TOWNSEND, WA	5,259,400	1.59%
WRANGELL	5,224,288	1.58%
SEWARD	4,554,400	1.37%
ANOCORTES, WA	4,156,641	1.25%
KETCHIKAN	3,637,854	1.10%
WASILLA	3,560,255	1.07%
All Other Alaska Communities	47,199,669	14.22%
All Other Non-Alaska Communities	89,440,568	26.98%

The economic impacts of commercial halibut fishing on communities can be connected to more than just the QS holders. In some cases, the vessel owner is not the QS holder. Income generated from halibut fishing trips to a vessel owner can also have a multiplier effect throughout a 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. Communities that receive landings of halibut can also be impacted through the processing activity and tax revenues generated. These landings can also support secondary service providers in that region, such as businesses that sell bait, fuel, provision, gear, vessel parts and maintenance, etc.

Table 27, Table 28, and Table 29 demonstrate halibut landings and value by port. Because almost all halibut landings from Areas 2C through 4 occur in Alaska, only Alaskan ports are shown. Much of these data cannot shown due to confidentiality. Activity from ports with less than 3 active processors are not included to preserve confidentiality. The largest volume of halibut is landed in Homer, Kodiak, Seward, and Petersburg (between 2009 and 2016); however, smaller communities may also derive a significant proportion of their landed value from halibut, though a smaller total amount of value is landed in those communities (e.g., Hoonah, and Yakutat).

The IFQ Program review explained that the implementation of this program fundamentally changed processing needs in the IFQ fisheries, especially in the halibut fishery, which has shifted from a primarily frozen to a majority fresh market (NPFMC/NMFS 2016). This had extensive implications for existing halibut processors, many of which had previously invested in cold storage for the short, concentrated halibut seasons pre-IFQ. For processors previously active in the halibut fishery, this shift left them with excess capacity to make ice and freeze fish and increased competition for landings from new buyers, who did not need any infrastructure in the region. Many processors which were processing halibut or sablefish pre-IFQ, and have remained, have diversified into processing other species as well. For additional information on halibut processors, refer to Section 2.4.2 of the 20-year IFQ Program Review (NPFMC/NMFS 2016).

Table 27 Pounds of halibut landed by port, 2009 through 2016

Port	2009	2010	2011	2012	2013	2014	2015	2016
CORDOVA	1,061,988	1,011,977	904,190	557,259	606,309	430,114	413,682	385,342
CRAIG	*	*	74,106	*	*	*	67,322	93,205
DUTCH HARBOR	*	*	2,752,437	2,034,518	1,474,877	*	*	*
HAINES	12,267	*	*	*	*	*	*	*
HOMER	13,267,051	11,786,630	6,270,526	4,886,752	4,897,825	3,049,668	2,822,132	2,841,958
HOONAH	*	*	301,497	286,920	*	*	*	*
JUNEAU	*	*	*	*	*	*	*	1,108,553
KENAI	41,789	46,772	61,802	58,344	56,080	27,998	15,199	*
KETCHIKAN	*	*	167,637	130,710	*	135,394	185,519	147,974
KODIAK	7,372,960	6,324,180	5,577,825	4,896,462	3,399,140	2,525,926	2,772,104	2,567,963
PETERSBURG	1,642,281	1,609,064	955,339	1,048,691	1,065,529	1,220,561	1,069,432	1,457,563
SEWARD	4,779,462	5,054,984	3,696,811	2,708,590	2,911,312	1,864,151	2,056,059	2,052,419
SITKA	*	1,963,515	*	*	1,185,938	*	*	1,244,733
WHITTIER	169,642	76,940	34,911	*	69,412	59,693	*	*
YAKUTAT	*	*	*	*	818,386	509,519	628,972	663,407

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

Note: Includes shorebased processors and exporter buyers in communities with at least 3 active halibut processors

Table 28 Ex-vessel value of halibut landed by port, 2009 through 2016

Port	2009	2010	2011	2012	2013	2014	2015	2016
CORDOVA	3,506,979	4,677,200	5,768,176	3,380,057	3,185,115	2,744,427	2,721,600	2,544,311
CRAIG	*	*	429,491	*	*	*	413,858	582,944
DUTCH HARBOR	*	*	17,821,348	10,687,391	6,396,537	*	*	*
HAINES	42,957	*	*	*	*	*	*	*
HOMER	41,685,822	54,750,570	37,767,405	26,887,782	24,222,516	18,464,422	17,240,421	18,270,859
HOONAH	*	*	2,001,198	1,787,364	*	*	*	*
JUNEAU	*	*	*	*	*	*	*	7,487,807
KENAI	132,394	218,566	422,293	343,244	279,615	172,972	92,304	*
KETCHIKAN	*	*	1,109,544	800,175	*	828,507	1,137,489	1,003,021
KODIAK	22,476,749	30,614,304	36,213,226	27,593,359	16,590,194	15,954,540	17,265,632	16,945,599
PETERSBURG	5,061,283	7,611,519	6,176,093	6,368,376	5,517,698	7,615,843	6,976,227	9,796,262
SEWARD	14,622,290	23,521,866	23,195,010	15,797,826	14,771,671	11,563,930	12,757,766	13,269,333
SITKA	*	9,400,330	*	*	5,997,149	*	*	8,126,525
WHITTIER	527,564	315,381	204,753	*	351,364	380,018	*	*
YAKUTAT	*	*	*	*	4,262,154	3,234,882	4,072,595	4,324,721

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

Note: Includes shorebased processors and exporter buyers in communities with at least 3 active halibut processors

Table 29 Percent of total ex-vessel value derived from halibut by port, 2009 through 2016

Port	2009	2010	2011	2012	2013	2014	2015	2016
CORDOVA	7.70%	5.09%	6.97%	4.00%	3.19%	3.67%	3.66%	5.14%
CRAIG	*	*	4.32%	*	*	*	3.82%	9.29%
DUTCH HARBOR	*	*	7.41%	4.38%	2.94%	*	*	*
HAINES	7.06%	*	*	*	*	*	*	*
HOMER	77.98%	79.90%	75.56%	69.57%	70.58%	65.85%	64.20%	63.19%
HOONAH	*	*	28.64%	30.13%	*	*	*	*
JUNEAU	*	*	*	*	*	*	*	29.02%
KENAI	1.22%	1.16%	1.16%	1.24%	0.87%	0.70%	0.71%	*
KETCHIKAN	*	*	1.54%	1.00%	*	1.56%	2.95%	2.60%
KODIAK	21.02%	24.60%	20.71%	15.55%	10.20%	10.74%	11.78%	15.97%
PETERSBURG	16.55%	18.97%	7.99%	15.25%	7.54%	18.16%	18.56%	25.03%
SEWARD	41.87%	42.20%	39.66%	29.36%	27.48%	28.40%	26.92%	34.97%
SITKA	*	11.98%	*	*	8.93%	*	*	13.76%
WHITTIER	9.94%	3.21%	2.71%	*	3.71%	4.09%	*	*
YAKUTAT	*	*	*	*	29.59%	24.50%	32.88%	33.38%

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

Note: Includes shorebased processors and exporter buyers in communities with at least 3 active halibut processors

4.5.4.2 Charter Halibut Sector

Charter operations also interact with the communities they take place in in different ways. Some operations begin in one location, and transport the angler to the location of launch. Lodges providing guided sport fishing opportunities are often, but not always located outside of a community. These types of business may still source some goods and services from nearby communities, although some lodges may purchase much of their labor, supplies, and equipment from non-local sources.

Physical addresses of saltwater and freshwater sport fishing businesses and guides in 2014 indicated that 87% of the businesses reported Alaska residency, and 13% were nonresidents; 63% of the guides were residents, and 37% were nonresidents (Powers and Sigurdsson 2016). In 2014, records show that 83% of the angler-days of effort in the charter halibut fishery were conducted by nonresident anglers, compared with 16% by residents and 1% by crew members, comped anglers, or those of unknown residency (Powers and Sigurdsson 2016).

The majority of CHPs are registered to an Alaska address for both Area 2C and Area 3A. In Area 2C, 448 of the 534 CHPs or 84% are registered to an Alaskan address (Source: RAM NMFS database). In Area 3A, 400 of the 439 CHPs, or 91%, are registered to an Alaskan address (Source: RAM NMFS database). Area 2C also has notable representation from Washington (34 CHPs) and Utah (21CHPs). Area 3A has notable representation from Washington (11 CHPs). In Area 2C, CHPs are concentrated in several communities with residents of Sitka and Ketchikan each holding 29% of all CHPs (58% of all Area 2C CHPs), and residents of Craig holding another 10% of all Area 2C CHPs. In Area 3A, CHP residents are more broadly spread out among communities in Southcentral Alaska with residents of Homer, Kodiak, Seward, Anchorage, and Soldotna each holding roughly 10-15% of the total number of Area 3A CHPs (Source: RAM NMFS database). These data suggest that the impacts of actions to modify charter harvests will likely have a more concentrated impact on specific communities in Area 2C relative to the broader impacts in Area 3A.

CQEs in Area 2C are able to receive up to 4 community charter permits to be used by their residents. Area 3A CQE's can hold up to seven community CHPs. As demonstrated in Table 23, 12 CQEs in Area 2C have acquired 48 community charter permits and 9 CQEs in Area 3A have acquired 56 community CHPs.

Port site listed on charter logbooks presents a different perspective on where charter operations are occurring. Some of the port sites listed would not be considered communities (e.g., Deep Creek), but represent a landmark harbor, bay, or island that a charter operation relies on. This diversity also helps illustrate the point that charter operations interact differently with communities. If a launch location is community with retail, food, accommodation, sport fishing processors, and other support industries, the charter operation is more likely to have a direct effect on the community. If the charter operation is a lodge located on a remote island, charter anglers may still impact Alaskan communities while traveling to and from the lodge. However, while they are residing at the lodge, they may have less direct impact on the economy of neighboring communities.

To provide the reader with some context about the total distribution of charter fishing operations, the total unguided and charter halibut sport harvest levels from 2000 through 2016 are shown in Table 30 and Table 31. These tables show trips by the unguided sport sector, even though this sector is not constrained by a catch limit, and would not be affected by this action. The unguided sport data are left in these tables because these tables are drawn from other sources (ADF&G). Table 32 provides additional detail of charter trips by specific community.

Table 30 Area 2C guided and unguided recreational harvest of halibut, 2000 though 2016

Year	Charter			Non-charter			Total Sport Harvest		
	Harvest (no. fish)	Avg. Wt. (lb net)	Yield (Mlb)	Harvest (no. fish)	Avg. Wt. (lb net)	Yield (Mlb)	Harvest (no. fish)	Avg. Wt. (lb net)	Yield (Mlb)
2000	57,208	19.75	1.13	54,432	20.59	1.121	111,640	20.16	2.251
2001	66,435	18.1	1.202	43,519	16.56	0.721	109,954	17.49	1.923
2002	64,614	19.74	1.275	40,199	20.25	0.814	104,813	19.94	2.09
2003	73,784	19.13	1.412	45,697	18.52	0.846	119,481	18.9	2.258
2004	84,327	20.75	1.75	62,989	18.84	1.187	147,316	19.93	2.937
2005	102,206	19.1	1.952	60,364	14.01	0.845	162,570	17.21	2.798
2006	90,471	19.94	1.804	50,520	14.3	0.723	140,991	17.92	2.526
2007	109,835	17.46	1.918	68,498	16.51	1.131	178,333	17.1	3.049
2008	102,965	19.42	1.999	66,296	19.08	1.265	169,261	19.28	3.264
2009	53,602	23.31	1.249	65,549	17.29	1.133	119,151	20	2.383
2010	41,202	26.36	1.086	52,896	16.72	0.885	94,098	20.94	1.971
2011	36,545	9.4	0.344	42,202	16.24	0.685	78,747	13.07	1.029
2012	42,436	14.27	0.605	54,696	17.87	0.977	97,132	16.3	1.583
2013	52,675	14.47	0.762	78,078	17.43	1.361	130,753	16.24	2.123
2014	65,036	12.04	0.783	69,060	16.95	1.17	134,096	14.57	1.954
2015	65,656	11.69	0.768	73,816	17.97	1.327	139,472	15.02	2.094
2016	66,147	11.93	0.789	66,714	18.68	1.246	132,861	15.32	2.035

Source: ADF&G Informational handout (ADF&G 2017)

Table 31 Area 3A guided and unguided recreational harvest of halibut, 2000 though 2016

Year	Charter			Non-charter			Total Sport Harvest		
	Harvest (no. fish)	Avg. Wt. (lb net)	Yield (Mlb)	Harvest (no. fish)	Avg. Wt. (lb net)	Yield (Mlb)	Harvest (no. fish)	Avg. Wt. (lb net)	Yield (Mlb)
2000	159,609	19.67	3.14	128,427	16.86	2.165	288,036	18.42	5.305
2001	163,349	19.18	3.132	90,249	17.09	1.543	253,598	18.43	4.675
2002	149,608	18.2	2.724	93,240	15.86	1.478	242,848	17.3	4.202
2003	163,629	20.67	3.382	118,004	17.34	2.046	281,633	19.27	5.427
2004	197,208	18.6	3.668	134,960	14.35	1.937	332,168	16.88	5.606
2005	206,902	17.83	3.689	127,086	15.61	1.984	333,988	16.98	5.672
2006	204,115	17.95	3.664	114,887	14.57	1.674	319,002	16.73	5.337
2007	236,133	16.95	4.002	166,338	13.71	2.281	402,471	15.61	6.283
2008	198,108	17.05	3.378	145,286	13.37	1.942	343,394	15.49	5.32
2009	167,599	16.31	2.734	150,205	13.47	2.023	317,804	14.97	4.758
2010	177,460	15.2	2.698	124,088	12.79	1.587	301,548	14.21	4.285
2011	184,293	15.16	2.793	128,464	12.57	1.615	312,757	14.09	4.408
2012	173,582	13.16	2.284	113,359	11.83	1.341	286,941	12.64	3.626
2013	199,248	12.62	2.514	121,568	11.94	1.452	320,816	12.36	3.966
2014	174,351	11.67	2.034	127,125	12.06	1.533	301,476	11.83	3.568
2015	163,632	12.63	2.067	136,225	11.86	1.616	299,857	12.28	3.682
2016	158,212	12.67	2.004	128,582	11.96	1.538	286,794	12.35	3.542

Source: ADF&G Informational handout (ADF&G 2017)

Table 32 Charter trips by landing port from 2011 through 2014

Port Site	Total Trips	Port Site	Total Trips	Port Site	Total Trips	Port Site	Total Trips
Southeast		Southeast Continued		Southeast Continued		Southcentral Continued	
Sitka	24,946	Tenakee	213	Hidden Inlet Lodge	5	Lowell Point	331
Ketchikan	8,335	Orr Island	189	Limestone Bay	5	Seldovia	268
Waterfall	6,826	False Island	180	Douglas	3	Raspberry Island	228
Craig	5,442	Shelter Island	177	Outer Point	3	Port Ashton	167
Gustavus	4,032	Cannery Cove	168	Rocky Point	3	Iliamna Bay	77
Elfin Cove	3,459	Gull Cove	163	Baranof	2	Ellamar	74
Auke Bay	3,307	Dove Island Lodge	127	Farragut Bay	2	Spruce Island	71
Yakutat	2,843	Sea Otter Sound	121	Hawk Inlet	2	Silver Salmon	62
Yes Bay	2,599	Sunnyside	109	Hood Bay	2	Williamsport	52
Petersburg	2,270	Sealing Cove	91	Snug Harbor	2	Chenega Bay	52
Angoon	1,803	Whalers Cove	85	Kodiak		Port Fidalgo	50
Klawock	1,603	Loring	73	Kodiak	3,276	Whiskey Gulch	42
Sportsman Cove	1,287	Keku Strait	68	Larsen Bay	1,387	Amalik Bay	39
Juneau	1,213	Shelter Cove Lodge	60	Port Lions	832	Icy Bay Lodge	23
El Capitan Lodge	1,174	Gut Bay	59	Old Harbor	822	Iliamna	20
Warm Springs Bay	1,101	Killisnoo	56	Seal Bay (Sc)	372	Anton Larsen Bay	17
Thorne Bay	1,058	Pybus Bay	50	Kiliuda Bay	281	Kukak Bay	14
Pybus Point	1,035	Kuiu Island	40	Uganik Bay	242	Eshamy Bay	8
Pelican	983	Gambier Bay	39	Zachar Bay	193	Kasitsna Bay	5
Hoonah	797	Funter Bay	34	Ugak Bay	188	Sheep Bay	3
Salmon Falls	772	Salmon Landing	30	Saltery Cove	166	Anchor River	3
Knudson Cove	707	Deep Cove	28	Port Wakefield	163	Tutka Bay	2
Apple Island	670	Holkham Bay	23	Parks Cannery	154	Sitkoh Bay	2
Wrangell	482	Boardwalk	18	Port Vita	132		
Point Baker	405	Saginaw Bay	17	Amook Pass	122		
Port St Nicholas	397	Kake	16	Uyak Bay	29		
Clover Pass	394	Crescent Harbor	15	Kaflia Bay	28		
Coffman Cove	389	Freshwater Bay	15	Amook Island	7		
S Kaigani Bay	388	Cosmos Cove	14	Southcentral			
Steamboat Bay	370	Portage Bay	14	Homer	19,626		
Port Alexander	312	Naukati	10	Seward	15,655		
Pybus Point Lodge	293	Phonograph Cove	10	Deep Creek	11,633		
Bay Of Pillars	282	Security Bay	10	Anchor Point	4,943		
Sarkar Cove	262	Excursion Inlet	9	Whittier	2,344		
Whale Pass	256	Morne Island	9	Valdez	2,179		
Clover Bay	241	Cedars Lodge	8	Ninilchik	1,289		
Kelp Bay	236	Hobart Bay	7	Happy Valley	1,045		
Haines	228	Port Walter	7	Iron Creek	415		
Bartlett Cove	213	Hobbit Hole	6	Cordova	339		

Source: ADF&G Saltwater Charter Logbooks, sourced through AKFIN
Table notes: Only ports where at least two landings were made are included.

4.5.4.3 Taxes Generated by the Commercial and Charter Halibut Fisheries

Both the commercial halibut sector and the charter halibut sectors are responsible for taxes and fees from different aspects of their operations, which can benefit the state of Alaska, as well as municipalities and boroughs as an important source of revenue. Some of the taxes and fees are assessed based on volume of harvest (e.g., fisheries business tax, raw fish tax, fish box tax). Others of these taxes and fees are based on the number of participating vessels or anglers in that sector (e.g., vessel registration fees, CFEC permit fees, passenger-for-hire fees, sales tax on charter trips, etc.). Table 33 provides a qualitative list of taxes and fees directly related to the harvest of halibut in each sector.

In addition to IFQ Program cost recovery fees and observer fees, there are other taxes and fees associated with halibut IFQ landings. For example, state fisheries business tax (also known as the raw fish tax) is levied on fishery processors, or on the export of unprocessed fish from Alaska at a rate of 3% of the ex-vessel price paid to fishermen. The burden of this fee is assumed to be shared with the harvesters. Half of the revenues from the fisheries business tax contribute to the state's General Fund and the remaining 50% is shared with the city and borough where the processing occurred. Thus, the landing and processing of halibut IFQ in a community can benefit that community by providing funding for public services, roads, schools, etc.

Many of the fees the charter sector pays are municipality or borough-specific. In many municipalities/boroughs, anglers pay a sales tax as a percentage of their trip cost, and sometimes as a percentage of their halibut processing (see DOC 2016, for specific municipalities/ boroughs rates). As in the commercial halibut sector, the charter sector also contributes to local sales tax revenue through the purchase of goods and services necessary for the harvest of halibut. The charter sector may contribute indirectly as well, as out-of-town clients, drawn to the community by the opportunity to halibut fish, spend money on local goods and services. In addition to sales tax, some municipalities/boroughs levy a fish box tax, a per-passenger harbor tax, and/or fees associated with picking up/ dropping of clients at the airport. To the extent out-of-town clients, drawn to the community by the opportunity to halibut fish, chose to spend the night in town, the charter sector may also contribute indirectly to revenues collected from a municipal/ borough bed tax (DOC 2016). The benefits from these types of fees may be particularly connected to the opportunity to go charter halibut fishing in the case of a charter lodge that is required to pay these associated fees.

There are a number of taxes that impact both sectors such as motor fuel taxes, corporate income tax, property tax, dock and harbor fees, parking fees, commercial vessel launch fees, moorage fees, boat storage fees, and associated state permits/ licenses (e.g. crew license or sport fishing license). These fees may not be equal between the sectors and operations; each fishing operator is subject to these types of fees relative to the size of their operations.

Table 33 Taxes directly related to the harvesting of halibut in the commercial or charter sector

COMMERCIAL TAXES	CHARTER TAXES
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.[1]	Some boroughs or municipalities levy a **fish box tax**, from which revenues flow directly to the community. This is a sales tax levied on fish charter customers for packaged fish and/or seafood caught or taken and retained by the fish charter customers as part of a fish charter. For the city and borough of Sitka, as well as the municipality of Gustavus, this sales tax is levied at a flat rate of $10 per fish box.
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.[2]	Similar to the commercial halibut sector, the charter sector contributes to boroughs- or municipality-level **sales tax**. In these communities, sales tax revenues can be directly linked to the charter sector as anglers will pay sales tax as a percentage of the charter trip price. Also, like the commercial sector, revenues are collected through the sale of goods and services necessary in order to harvest halibut on a charter vessel (e.g. bait and gear). Sales tax percentages are listed by municipality or borough in Alaska Taxable.[2]
A **Seafood Marketing Assessment** is levied by the state at a rate of 0.5% of the value of seafood processed products first landed in, or exported from Alaska. The Seafood Marketing Assessment is based upon the first wholesale value of seafood products. Appropriation of these funds may be legislated to the Alaska Seafood Marketing Institute, which can provide benefits to both commercial harvesters and processors by the promotion of Alaskan Seafood.	Some boroughs levy **passenger-for-hire fees** on each charter client. For example, in addition to the commercial boat launch fee (for which both sectors would be accountable for) the City and Borough of Juneau Docks and Harbors requires a base fee ($400 for inspected vessels in 2016) then $1.50 per passenger each calendar day.[3]
Some boroughs or municipalities levy a **sales tax**, of anywhere from 1% to 7%. Revenues are collected through the sale of goods and services necessary in order to harvest halibut on a commercial vessel (e.g. bait and gear). Sales tax percentages are listed by municipality or borough in Alaska Taxable.[2]	On Aug. 9, 1950, the Federal Aid in Sport Fish Restoration Act was passed. This act is commonly referred to as the **Dingell-Johnson Act tax on sport fishing gear** (D-J tax). The D-J Act placed a 10% excise tax on fishing rods, reels and tackle. This tax is collected from the manufacturers by the U.S. Treasury and is transferred to the U.S. Fish and Wildlife Service for distribution to the states. Each state's share is based 60% on its licensed sport fishermen and 40% on its land and water area.
Operator pays for **commercial fishing vessel registration fees**	If a charter operation includes transporting passengers to or from the airport, some municipalities/ boroughs levy a **commercial vehicle access fee** per vehicle per year.[4]
Crew or operator pays for commercial **crew license fees**	Anglers pay the state for a **sport fishing license**
CFEC permit fees are based on estimates of average ex-vessel earnings, and are issued to skippers (IFQ holders) who deploy gear. In 2016, CFEC halibut permit fees were $450 for permits used on vessels <60', and $1,200 for permits on vessels >= 60'. If the permit holder holds less than 8,000 lb. of IFQ, they qualify for a reduced fee of $75.[5]	Charter businesses pays the state for a **charter business license**
In addition, participants of either sector may contribute to the revenues derived from motor fuel taxes, corporate income tax, property tax, dock and harbor fees, parking fees, commercial vessel launch fees, moorage fees, and boat storage fees.[6]	

1 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

2 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/dcra/DCRARepoExt/RepoPubs/Taxable/2015%20Full.pdf

3 These rates are different for inspected and non-inspected vessels and are subject to changes each year. City and borough of Juneau, 05 CBJAC 20.080:

https://www.municode.com/library/ak/juneau/codes/code_of_ordinances?nodeId=PTIVADCORE_TIT05DOHA_CH20SMBOHAFECH_05_CBJAC_20.060REBOLAFE

4 For example, Juneau:

http://www.juneau.org/law/regulations/documents/2016-05-02-Title07-Ch10_JIA_Rates_and_Fees.pdf

5 20 AAC 05.245 and permit fees at: https://cfec.state.ak.us/mnu_Forms.htm#vesselforms

6 (UFA 2015)

4.5.5 Other Halibut User Groups

This proposed action would not be expected to affect the overall amount of halibut bycatch incidentally taken in groundfish fisheries, the amount of subsistence harvest likely to occur, or the number of unguided sport fishing trips (or unguided sport harvests) in 2018. As noted in the description of the alternatives (Section 4.3), this analysis also assumes that all other sources of mortality (e.g., natural mortality, recreational harvests, bycatch, subsistence, and Tribal harvests not managed under catch limits) not affected by catch limits (or the charter management measures in Areas 2C and 3A) remain at the same level as those observed in 2017. This assumption is supported by data from IPHC (IPHC 2018b) that shows that interannual variability of these other sources of mortality is not expected to change substantially. Section 3.1.1 provides references for the mortality from recreational, bycatch, subsistence, and Tribal harvests not managed under catch limits. Section 4.3 also notes that this proposed action would not modify existing regulations applicable to the management of bycatch in the groundfish fisheries, subsistence harvests, or unguided sport fisheries. Bycatch, subsistence harvest, and unguided recreational harvest are not managed under a catch limit established by this proposed action. In addition, the scope of this action is limited to only one year (2018), and no changes in the management of bycatch, subsistence harvest, or unguided recreational harvest is anticipated in this timeframe. Therefore, for purposes of this proposed action, no additional analysis of the groundfish fisheries, subsistence, or unguided sport fisheries is required.

4.6 Analysis of Impacts: Alternative 1, No Action

Under the no action alternative, commercial catch limits and charter management measures in waters off Alaska (*i.e.*, Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E) would be maintained at catch levels equal to those recommended by the IPHC in 2017. Retaining the 2017 catch limits for commercial and charter fisheries would be expected to maintain similar social and economic conditions for halibut user groups in waters off Alaska (i.e., Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E), at least in the short-run. Taking no action to reduce the catch limits in 2018 mitigates many of the negative socio-economic impacts lower catch limits can produce (described in Section 4.7). These negative impacts that would be produced from lowering catch limits are most direct for harvesters in the commercial sector and for charter operators, as their harvest levels are directed influenced by the catch limits specified under the CSP. For the commercial sector, Alternative 1 would produce the following status quo catch limits by area (Table 34).

Table 34 Commercial catch limits under Alternative 1 (status quo from 2017)

	Area 2C IFQ	Area 3A IFQ	Area 3B IFQ	Area 4A IFQ	Area 4B IFQ	Area 4C IFQ/CDQ	Area 4D IFQ/CDQ	Area 4E CDQ
Alt 1 – 2017 Status Quo	4,212,000	7,739,000	3,140,000	1,390,000	1,140,000	752,000	752,000	196,000

These commercial catch limits are allocated as either commercial IFQ or CDQ depending on the specific Area. NMFS RAM would issue this IFQ according to the percentage of the QS pool held by each QS holder, including CQEs. In Area 4A, 4B, 4C, 4D, and 4E the commercial catch limit are allocated between the IFQ holders and CDQ groups according to the percentages in Table 14.

Charter halibut participants Areas 2C and 3A are directly affected by any reduction in the catch limits and subsequent reduction in the charter allocation through the allocation process described in Figure 7.

Because the U.S. and Canadian IPHC Commissioners could not reach agreement on the specific catch limits in each area, the IPHC did not provide a recommendation to revise the CSP allocations for charter and commercial IFQ halibut fisheries in Areas 2C and 3A. Therefore, under Alternative 1, the charter catch limits would remain at the allocation specific in the 2017 Halibut Regulations (Table 35).

Table 35 Charter halibut allocation (harvest + removals) for Area 2C and 3A under Alternative 1

	Area 2C Charter allocation	Area 3A Charter allocation
Alt 1 – 2017 Status Quo	915,000	1,890,000

The IPHC Commissioners also did not reach an agreement on revised charter management measures in Areas 2C and 3A. Therefore, under Alternative 1 the management measures described in the Pacific Halibut Fishery Regulation for 2017 would be maintained.

Under Alternative 1, Area 2C would have a one-fish bag limit with a reverse slot limit of U44:O80 and no annual limit, consistent with the management measures from 2017. Note that the projected Area 2C charter removals (including release mortality) for 2018 under the status quo (2017) management measures was 0.97 M lb. (Meyer and Powers 2017). This is greater than the charter catch limit under 2017 FCEY (0.92 M lb.). Therefore, this alternative could generate harvest over the charter catch limit if removals matched (or exceeded) projections.

Under Alternative 1, Area 3A would continue to have two fish bag limit, including one fish any size and 28” maximum size limit on one fish, 4 fish annual limit, one trip per CHP per day, one trip per vessel per day, Wednesdays closed all year, 3 Tuesdays closed between

July 24 and August 7. The charter removals projected for 2018 with status quo management measures are estimated to be 1.855 M lb. (Meyer and Powers 2017).

While Alternative 1 would *temper* some of the negative social and economic effects from reducing the halibut catch limits for the commercial and charter sectors (as described in Section 4.7) in the year 2018, this harvest approach would greatly increase the risk that the halibut spawning biomass and fishery yield (effectively catch limits) would decline in the next three years (see Section 3.2).

As described more in Section 2.1, Alternative 1 would nearly double the risk that the spawning stock biomass will decline by at least 5% in 2019 (34%), compared to Alternatives 2 (19%), and Alternative 3 (5%). Similarly, the charter management measures under Alternative 1 are projected to exceed even the catch limits under Alternative 1 and would also increase the risk that the stock spawning biomass would decline.

Alternative 1 would be expected to increase the probability that catch limits will continue to decline in future years relative to Alternatives 2 and 3. Under Alternative 1, there is 76% chance that the fishery yield will be more than 10 lower in 2019, compared to Alternative 2 (63%), and Alternative 3 (38%). This same pattern holds for 2020 and 2021.

These future declines in spawning biomass and fishery yield projected under Alternative 1 would directly impact the same user groups that are described below in Section 4.7. Thus, the retention of 2017 commercial catch limits and charter management measures in 2018, may lead to similar types of social and economic impacts as described in Section 4.7 in future years.

Analysts do not have the data available to quantify the potential long-term economic impacts of Alternative 1 relative to Alternatives 2 and 3 because many factors are at play. First, under Alternative 1 there is an increased risk of further reductions in fishery yield (i.e., catch limits), relative to Alternatives 2 and 3, but it is not certain it will occur. Second, a wide range of factors affect fishery ex-vessel value (e.g., market conditions, competition from other products) or charter angler demand (e.g., general economic conditions) that cannot be reasonably predicted. Therefore, this analysis can only conclude that under Alternative 1 it is more probable that the increased yield in 2018 may be offset in future years (2019 through 2021) due to reduced fishery yield (catch limits) as compared to Alternatives 2 and 3.

4.7 Analysis of Impacts: Alternative 2 and 3, Reduce Halibut Catch Limits

Reducing the halibut catch limits from the 2017 levels, as established under Alternative 2 or Alternative 3 are both expected to produce negative economic and social impacts on the commercial halibut sector and the charter halibut sector in waters off Alaska relative to Alternative 1, in 2018. These alternatives could also have indirect impacts to processors, secondary services providers, and the communities associated with these industries. However, reducing halibut catch limits in the commercial and charter fisheries for 2018 are expected to reduce some of the risk of a decrease in halibut spawning biomass and fishery yield projected for

the following three years (2019 through 2021). Therefore, these alternatives could alleviate some of the future negative impacts to these user groups.
The following sub-sections discuss these expected impacts both qualitatively, and when possible, using quantitative examples.

4.7.1 Commercial Sector Impacts

Alternative 2 would reduce commercial IFQ and CDQ catch limits in waters off Alaska as suggested by, but not adopted by, the U.S Commissioners at the 2018 IPHC Annual Meeting. Alternative 3 would reduce the catch limits in in waters off Alaska consistent with the IPHC's interim harvest policy. The commercial catch limits resulting from these two alternatives are shown in Table 36.

Table 36 Commercial catch limits and resulting IFQ and CDQ allocations under each alternative (in net pounds) and percentage change in IFQ and CDQ allocations relative to Alternative 1.

Alternative	Area 2C IFQ (%)	Area 3A IFQ (%)	Area 3B IFQ (%)	Area 4A IFQ (%)	Area 4B IFQ/CDQ (%)	Areas 4C IFQ/CDQ (%)	Area 4D IFQ/CDQ (%)	Area 4E CDQ (%)	Total (%)
Alt.1 – Status Quo	4,212,000	7,739,000	3,140,000	1,390,000	1,140,000	752,000	752,000	196,000	19,321,000
Alt. 2. U.S. suggested limits	3,570,000 (-15.2%)	7,350,000 (-5.0%)	2,620,000 (-16.6%)	1,370,000 (-1.4%)	1,050,000 (-7.9%)	733,500 (-2.5%)	733,500 (-2.5%)	113,000 (-42.3%)	17,540,000 (-9.2%)
Alt. 3 – $F_{46\%}$ SPR	3,010,000 (-28.5%)	6,990,000 (-9.7%)	1,950,000 (-37.9%)	1,320,000 (-5.0%)	990,000 (-13.2%)	631,500 (-16.0%)	631,500 (-16.0%)	97,000 (-50.5%)	15,620,000 (-19.2%)

The differences in catch limit values between Alternative 2 and 3 and Alternative 1, are represented in Table 36. Adopting Alternative 2 would reduce the commercial catch limits ranging from a 1.4% decrease (Area 4A) to a 42.3% decrease (Area 4E) compared to the status quo (Alternative 1). Alternative 2 would reduce the total catch limits for commercial halibut fisheries off Alaska waters 9.2%. Reducing the catch limits to levels specified in Alternative 3 represents a decrease ranging from a 5% reduction (Area 4A) to a 50.5% reduction (in Area 4E). Alternative 3 would reduce the total catch limits for commercial halibut fisheries off Alaska waters 19.2%.

The reason for the substantial reduction in the Area 4E CDQ allocation under Alternatives 2 and 3 is primarily due to the allocation procedures for the Ares 4CDE catch sharing plan. As described in Section 3.2.2.3, Areas 4C and 4D each receive 46.43% of the IPHC's adopted catch limit for Area 4CDE, and Area 4E receives 7.14%. If the total catch limit for Area 4CDE exceeds 1,657,600 pounds, Area 4E receives 80,000 pounds off the top of the total catch limit before the percentages are applied. The combined 1,657,000 pound threshold is not met under either Alternatives 2 or 3, therefore there is a substantial reduction in the CDQ allocation.

For additional context, the commercial catch levels under Alternative 2 and Alternative 3 are not the lowest catch limit ever set for Areas 2C, 3A, 4A, or 4CDE. Table 37 shows past years in which the catch limits in an Area were lower than what is proposed under Alternative 2 (green cells) and what is proposed under Alternative 3 (dark green cells). The proposed catch limits under Alternative 2 and 3 would be the lowest ever set for Area 3B or 4B.

Table 37 Commercial catch limits set under Alternative 2 and Alternative 3 compared to historical catch limits

Year	2C	3A	3B	4A	4B	4CDE
2008	6,210,000	24,220,000	10,900,000	3,100,000	1,860,000	3,890,000
2009	5,020,000	21,700,000	10,900,000	2,550,000	1,870,000	3,460,000
2010	4,400,000	19,990,000	9,900,000	2,330,000	2,160,000	3,580,000
2011	2,330,000	14,360,000	7,510,000	2,410,000	2,180,000	3,720,000
2012	2,624,000	11,918,000	5,070,000	1,567,000	1,869,000	2,465,000
2013	2,970,000	11,030,000	4,290,000	1,330,000	1,450,000	1,930,000
2014	3,318,720	7,317,730	2,840,000	850,000	1,140,000	1,285,000
2015	3,679,000	7,790,000	2,650,000	1,390,000	1,140,000	1,285,000
2016	3,924,000	7,336,000	2,710,000	1,390,000	1,140,000	1,660,000
2017	4,212,000	7,739,000	3,140,000	1,390,000	1,140,000	1,700,000

Source: IPHC Pacific Halibut Regulations 2008 through 2017

Note: Dark green catch limits are lower than the levels proposed in Alternative 3, green cells represent catch limit lower than the levels proposed in Alternative 2.

Reducing the halibut catch limits would directly impact the commercial halibut sector, lowering their potential commercial landings. The marginal economic impact resulting from these three alternative catch limits can most easily be understood in terms of the foregone gross ex-vessel revenue the additional harvested halibut could have produced. Table 38 demonstrates gross ex-vessel that could have been earned under Alternative 1 (no action) compared to Alternative 2 and Alternative 3, which propose catch limit reductions. Ex-vessel prices used in the table are based on the ADF&G/ CFEC fish tickets from 2016. Assuming the commercial fishery is able to prosecute the whole catch limit, and depending on the ex-vessel price received for halibut in 2018, setting the commercial catch limit at levels specified under Alternative 1 could result in a total gross ex-vessel value of about $133 million in waters off Alaska. This is compared to Alternative 2's catch limits, which could bring the total gross ex-vessel value of the fishery down by $12.3 million or Alternative 3 which could bring the total gross ex-vessel value of the fishery down by $25.6 million.

Note that between 2009 and 2014 Alaska fisheries accounted for 79% of the global Pacific halibut production (AFSC 2016). The primary competing species to Pacific halibut, Atlantic halibut, only made up about 25% of the total halibut production in 2013; although with the declining Pacific halibut harvests, the Atlantic species is likely making up a greater proportion of total halibut harvests (AFSC 2016). Thus, the diminishing supply of Pacific halibut could increase the global price for halibut. Based on past trends of wholesale value, if this does occur, this additional value it is not likely to fully compensate for the loss in pounds able to be harvested.

Table 38 Estimated foregone gross ex vessel value of Alternative 2 and 3, compared to Alternative 1, using 2016 ex-vessel price

	Area 2C IFQ	Area 3A IFQ	Area 3B IFQ	Area 4A IFQ	Area 4B IFQ	Area 4C IFQ/CDQ	Area 4D IFQ/CDQ	Area 4E CDQ	Total Area 2C, Area 3 and Area 4
Ex-vessel price	$ 7.24	$ 7.19	$ 7.03	$ 6.37	$ 5.92	$ 6.16	$ 6.20	$ 5.03	$ 6.91
Potential ex-vessel value of the fishery under status quo	$ 30,511,641	$55,651,525	$22,082,100	$ 8,847,941	$ 6,745,865	$ 4,635,875	$ 4,665,051	$ 985,880	$ 133,448,868
Difference between Alt 2 and status quo (Alt 1) in Mlb	642,000	389,000	520,000	20,000	90,000	18,500	18,500	83,000	1,781,000
Forgone gross ex-vessel rev from Alt 2 compared to Alt 1	$ 4,650,635	$ 2,797,318	$ 3,656,908	$ 127,309	$ 532,568	$ 114,047	$ 114,765	$ 417,490	$ 12,301,249
Difference between Alt 3 and status quo (Alt 1) in Mlb	1,202,000	749,000	1,190,000	70,000	150,000	120,500	120,500	99,000	3,701,000
Forgone gross ex-vessel rev from Alt 3 compared to Alt 1	$ 8,707,263	$ 5,386,095	$ 8,368,694	$ 445,580	$ 887,614	$ 742,850	$ 747,525	$ 497,970	$ 25,562,562

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

In additional to a decrease in total gross revenues, there are other social and economic impacts associated with reductions in commercial halibut catch limits that are more difficult to quantify. Although this analysis seeks to differentiate the marginal cost and benefits of Alternative 1 *relative to* the management measures that would be in place under Alternative 2 and Alternative 3, these cumulative effects are important to discuss and understand in terms of how action may interact with current challenges in the fishery.

Indirect impacts from a reduction in catch limits of one species like halibut can be wide-reaching because they may be experienced cumulatively with other current factors. Reductions in the halibut fishery could have broad indirect impacts on the QS holders, skippers and crew, vessel owners, new entrants to the fisheries, individuals working to enter the fishery, residents of CQE and CDQ communities, processors and other registered buyers, communities of port, and communities these participants live and/ or spend their money, participants in other fisheries, as well as halibut consumers.

Harvesters

The most direct effect would be on the commercial participants (see Section 4.5.2.4 for a description of commercial halibut harvesters). The effects of the action alternatives depend partly on how operators react to the reduced catch limits. There may be some QS holders whose QS results in *de minimus* amounts of IFQ that they no longer deem worth the costs (including opportunity cost) to harvest. In this case the QS holder may choose to sell the QS or the IFQ derived from that QS may go unfished. It is worth noting that, despite the declines in halibut catch limits over the past decade, landings still demonstrate high harvest rates relative to the catch limit (Figure 13). To the extent that a QS holder chooses to sell their QS, this could present an opportunity for a new entrant. It could also lead to consolidation among current QS holders, which could have downstream negative effects for communities that no longer have residents with access to QS.

If a given QS holder does not sell the QS, the QS holder may conduct fishing operations with the same number of crew, with a possible reduction in the amount of time it takes to catch their IFQ. Some QS holders may seek out ways to further minimize operational costs by coordinating with other harvesters. Increased use of QS holders "walking-on" other vessels to harvest their IFQ can decrease crew expenses and other variable costs like fuel. This of course, can create the negative impact by limiting crew jobs available. Some of this type of consolidation may be temporary, with employment opportunities increasing in years when the halibut catch limits increase. Some consolidation may be "sticky". For instance, if a QS holder sells her vessel and walks on to another vessel in order to harvest her halibut IFQ while minimizing vessel costs, she may continue to walk-on other vessels even if the halibut catch limit rebound.

As in most catch share programs, entry opportunities continue to be a challenge in IFQ fisheries. The allocation of halibut QS addressed many of concerns of the derby-style commercial halibut fishery (as described in the 20-year program review; NPFMC/NMFS 2016); however, there are social and economic implications of these barriers to entry. The transaction costs of buying and selling IFQ makes it more difficult to move in and out of fisheries as the stock status changes.

Purchasing halibut QS is usually a long-term investment and many new entrants finance this expense over many years.

Lower halibut catch limits can intensify these challenges to entry. They can make it more difficult to finance a new loan and they can make it difficult to make payments on an existing loan. If entry opportunity is further limited, communities experience these effects in a number of ways. For communities that have historically been home to fishery participants (e.g. crew, vessel owners, QS holders), if young people cannot find opportunity and employment in these areas, they may choose to move away. A decrease in employment opportunities can also lead to the rise in other type of social issues.

The negative social and economic effects can be exacerbated by other challenges for these participants and in these communities. For example, the recent (2018) decline in Pacific cod total allowable catch (TAC), both in GOA and the BSAI means that individuals who participate in both fisheries will experience cumulative negative impact as their fishing options are further limited. This diminished fishing opportunity also constrains the options for crew looking to mitigate the negative impact decrease halibut catch limits may have and the effect can multiple into the communities these fishery participants are involved with. Because this specific action is limited to only one year, it is difficult to predict the overall impact of the alternatives on business plans that prospective entrants may have. Analysts do not data available that could be used to provide a quantitative evaluation of the differential impacts of these alternatives on entry into the halibut fishery.

CQE and CDQ

As participants in the commercial halibut fisheries, CDQ groups and CQE residents may also experience negative effects from the lowered catch limits suggested in Alternative 2 and Alternative 3. Section 4.5.2.2 through 4.5.2.4 describes these community-based management programs. CQE residents are likely to be impacted in a similar way to other commercial participants. Total gross revenue under Alternative 2 and 3 would be expected to be lower, there may be reductions in crew jobs, and continued challenges with entry opportunities.

For some of the CDQ group residents, the halibut CDQ allocation provides direct harvest opportunity. For some of the groups, the halibut CDQ allocation is leased out and the revenue from that harvest provides other types of economic opportunities and social benefits for CDQ residents. Thus, a decrease in halibut catch limits can affect these communities in a number of ways, through the many types of programs that are provided.

Processors

The decrease in the catch limits could also impact processors and other registered buyers for halibut (see Section 4.5.4 for a description of halibut processors). 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. Processor representatives noted that margins essentially disappeared for processing halibut following IFQ implementation, and that some

processors continue to process halibut to “keep the lights on”, covering operating costs, maintaining a market for the fish for vessels with which they have relationships in other fisheries, and providing a longer employment season for their processing workers (NMFPC/NMFS 2016).

There are some operational distinctions for processors that may contribute to the magnitude of impacts the business experiences from Alternative 2 and 3. Larger, more diversified processors, especially ones that are off road system, may feel less of a negative impact from the decrease in halibut catch limits. Registered buyers of fresh product that are on the road system and that specialize in halibut or few other products may be more negatively impacted by a decrease in halibut catch limits.

Communities and the Multiplier Effect

Section 4.5.4 highlights the many ways that communities can be a part of and involved in commercial fishing. Impacts are often considered where harvesting or processing activities occur, but the impacted communities can also include the communities in which QS holders, vessel owners, captains, or crew live and spend money. The impact of reduced commercial halibut catch limits can create a shock to a local economy, creating a multiplier effect for associated businesses. Businesses that specialize in bait, fishing gear, fuel, vessel maintenance, and other types of support sectors may be able to feel an impact from a reduction in the halibut catch limits.

Reduction in Risk to the Halibut Resource

However, as previously noted in Section 3.2, IPHC scientists indicated that the total biomass, and specifically the total exploitable biomass, of halibut is projected to decline substantially over the next several years if harvests are not reduced relative to 2017. Reducing the commercial halibut catch limits for 2018 is expected to reduce some of the risk of a decrease in halibut spawning biomass and fishery yield projected for the next three years. Therefore, these alternatives could alleviate the some of the same types of negative social and economic impacts to commercial halibut fishery participants, associated businesses, and communities, as projected for the next three years.

4.7.2 Charter Sector Impacts

For the charter halibut sector in Area 2C and 3A, Alternative 2 would modify charter management measures as suggested by, but not adopted by, the U.S Commissioners at the 2018 IPHC Annual Meeting. Alternative 3 would modify charter management measures in Areas 2C and 3A consistent with the IPHC’s interim management procedure. The charter halibut allocation (total removals) resulting from these two alternatives are shown in Table 39.

Table 39 Charter halibut allocation under 3 alternatives

	Area 2C Charter allocation	Area 3A Charter allocation
Alt 1 – 2017 Status Quo	915,000	1,890,000
Alt 2 – U.S. Commissioner Suggestion	810,000	1,790,000
Alt 3. – F46% Reference SPR	690,000	1,700,000

The charter halibut allocation provides the reference point for setting annual charter halibut management measures. Recommended charter halibut management measures should be expected to keep the total charter removals under the catch limit for that Area.

The charter catch limit is not known when the Charter Halibut Management Committee and the Council are expected to make their recommendations on management measures through the CSP process (*i.e.*, at the December Council meeting; see Section 4.5.3.2 for more description of this process). Therefore, the analysis produced by ADF&G provided information to stakeholders and the Council to assist them in selecting management measures, or combinations of measures, by reporting the total charter removals projected. These projections can be compared to different scenarios of allocations. ADF&G used the reference level of SPR identified at the IPHC interim meeting (Alternative 3) to highlight candidate measures that result in projected charter removals that are within the reference SPR allocations. However, the tables covered a broad enough suite of projected removals to demonstrate what measures could be adopted if the catch limits were set higher or lower than the reference SPR allocations identified at the interim IPHC meeting.

Using the tables provided, the Council included contingencies to accommodate adoption of higher and lower combined catch limits. As a result, the Charter Halibut Management Committee and the Council were able to be clear about their recommended management measures under Alternative 2 (US Commissioners recommendations) as well. Specifically, the direction from the Charter Halibut Management Committee, as adopted and recommended by the Council was as follows:[6]

> **Area 2C**
> The Council recommends the following management measures be implemented with an one-fish bag limit.
>
> If the allocation is 0.69 million pounds:
>
> - U35:O80 no annual limit.
>
> If the allocation is below 0.69 million pounds:

[6] Council motion on charter halibut management measures for 2018: http://npfmc.legistar.com/gateway.aspx?M=F&ID=fbb03c25-d4f1-4238-9301-a8e24530acbc.pdf

- 4 fish annual limit, U35:O80, and if necessary 3 fish annual limit, U35:O80

If the allocation is above 0.69 million pounds:

- No annual limit, and increase lower slot limit as allowed to stay within allocation.

Table 40 provides guidance on how a lower slot limit would adjust to different allocations above 0.69 million pounds.[7]

[7] Excerpt from Analysis of Management Options for the Area 2C and 3A Charter Halibut Fisheries for 2018 (Meyer and Powers 2017)

Table 40 Projected charter removals (Mlb) for Area 2C in 2018 under reverse slot limits ranging from U35O50 to U50O80 with no annual limit.

No annual limit, harvest = 75,430 halibut

	Upper Length Limit (in)															
Lower Limit (in)	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
35	1.348	1.259	1.191	1.114	1.059	1.010	0.941	0.874	0.836	0.806	0.777	0.756	0.728	0.712	0.711	0.698
36	1.385	1.298	1.231	1.155	1.100	1.052	0.983	0.917	0.879	0.850	0.820	0.800	0.772	0.756	0.754	0.742
37	1.407	1.321	1.255	1.180	1.126	1.077	1.009	0.943	0.905	0.876	0.847	0.826	0.799	0.783	0.781	0.769
38	1.441	1.356	1.291	1.217	1.163	1.115	1.047	0.982	0.945	0.916	0.886	0.866	0.839	0.823	0.821	0.809
39	1.466	1.383	1.318	1.244	1.191	1.144	1.076	1.012	0.974	0.945	0.916	0.896	0.868	0.853	0.851	0.839
40	1.487	1.404	1.340	1.267	1.215	1.167	1.100	1.036	0.999	0.970	0.941	0.921	0.894	0.878	0.876	0.864
41	1.512	1.431	1.368	1.295	1.243	1.196	1.130	1.066	1.029	1.000	0.971	0.951	0.924	0.908	0.907	0.895
42	1.528	1.448	1.386	1.314	1.262	1.216	1.150	1.086	1.049	1.021	0.992	0.972	0.945	0.929	0.928	0.916
43	1.547	1.468	1.406	1.335	1.284	1.238	1.172	1.109	1.072	1.044	1.015	0.995	0.968	0.952	0.951	0.939
44	1.574	1.496	1.435	1.365	1.314	1.268	1.203	1.140	1.103	1.075	1.047	1.027	1.000	0.984	0.983	0.971
45	1.602	1.526	1.466	1.397	1.346	1.301	1.236	1.174	1.138	1.110	1.081	1.061	1.035	1.019	1.017	1.005
46	1.621	1.546	1.487	1.418	1.368	1.323	1.259	1.197	1.161	1.133	1.105	1.085	1.058	1.043	1.041	1.029
47	1.647	1.573	1.515	1.447	1.398	1.353	1.289	1.228	1.192	1.164	1.136	1.116	1.090	1.074	1.073	1.061
48	1.666	1.593	1.535	1.468	1.419	1.375	1.311	1.250	1.214	1.187	1.158	1.139	1.112	1.097	1.095	1.083
49	1.697	1.625	1.568	1.502	1.453	1.410	1.346	1.286	1.250	1.223	1.195	1.176	1.149	1.134	1.132	1.120
50	1.718	1.647	1.592	1.526	1.478	1.435	1.372	1.312	1.277	1.250	1.222	1.202	1.176	1.161	1.159	1.147

Alt 3

Alt 2

Alt 1

Source: (Meyer and Powers 2017)

Notes: All values in the table include corrections for 2012- 2017 errors in estimation of average weight and an additional 5.4% release mortality by weight.

Area 3A

Status quo measures include two fish bag limit, including one fish any size and 28" maximum size limit on one fish, 4 fish annual limit, one trip per CHP per day, one trip per vessel per day, Wednesdays closed all year, 3 Tuesdays closed between July 24 and August 7.

If the allocation is 1.70 million pounds:

- Status quo measures plus close 7 additional Tuesdays as outlined in the Table 41 (June 19-Aug 21).

If the allocation is higher or lower than 1.70 million pounds:

- Increase or decrease Tuesday closures to remain within the allocation, as described in Table 41.[8]

Table 41 Estimated Potential havest reductions and projected removals associated with status quo management measures combined with additional Tuesday closures during June through August of 2018.

Number of Closed Tuesdays	Beginning and Ending Dates	Percentage reduction in harvest relative to status quo	Projected Harvest (no. Fish)	Projected Removals (Mlb)	
3 (Status quo)	Jul 24 - Aug 07	0.0%	136,734	1.855	Alt 1
4	Jul 17 - Aug 07	-1.3%	134,986	1.830	
5	Jul 17 - Aug 14	-2.5%	133,298	1.808	
6	Jul 10 - Aug 14	-4.1%	131,068	1.777	Alt 2
7	Jul 03 - Aug 14	-5.5%	129,257	1.752	
8	Jul 03 - Aug 21	-6.4%	127,977	1.736	
9	Jun 26 - Aug 21	-7.6%	126,313	1.712	
10	Jun 19 - Aug 21	-8.8%	124,686	1.689	Alt 3
11	Jun 19 - Aug 28	-9.5%	123,794	1.677	
12	Jun 12 - Aug 28	-10.4%	122,449	1.659	
13	Jun 05 - Aug 28	-11.2%	121,391	1.645	
47 (all season)	Feb 01 - Dec 31	-13.2%	118,749	1.608	

Source: (Meyer and Powers 2017)

Note: Status quo measures include one fish of any size, 28-inch maximum on second fish, four fish annual limit, vessel and permit trip limits, Wednesday closure, and Tuesday closed three days. Projections include corrections for errors in estimation of average weight and an additional 1.2% release mortality by weight. Shaded values represent projections that do not exceed the 1.70 Mlb allocation associated with the reference SPR.

Thus, the variable factor for Area 2C is the lower size limit of the reverse slot and the variable factor for Area 3A is the number of Tuesday closures (in addition to status quo measures):

Alternative 2:

Under an allocation of 810,000 lb., Area 2C would have a one-fish bag limit with a reverse slot limit of U38:O80 and no annual limit.

With an allocation of 1,790 000 lb., Area 3A would have a two fish bag limit, including one fish any size and 28" maximum size limit on one fish, 4 fish annual limit, one trip per CHP per day, one trip per vessel per day, Wednesdays closed all year, 6 Tuesdays closed between July 10 and August 14.

[8] Excerpt from Analysis of Management Options for the Area 2C and 3A Charter Halibut Fisheries for 2018 (Meyer and Powers 2017)

Alternative 3:

Under an allocation of 690,000, Area 2C would have one-fish bag limit with a reverse slot limit of U35:O80 and no annual limit.

With an allocation of 1,700,000 lb., Area 3A would have a two-fish bag limit, including one fish any size and 28" maximum size limit on one fish, 4 fish annual limit, one trip per CHP per day, one trip per vessel per day, Wednesdays closed all year, 10 Tuesdays closed between June 19 and August 21.

Charter Operators and Anglers

These alternatives to lower charter catch limits, and ultimately provide for more restrictive management measures in Area 2C and 3A charter halibut fisheries are expected to impact charter operators and anglers.

In Area 2C, an increasingly restrictive reverse slot limit, as suggested in Alternative 2 and 3 could negatively impact angler demand. If the charter halibut opportunity looks less desirable due to the size of fish able to be harvested, new or long-time anglers may choose not to charter fish. This could lead to a decline in revenue for charter operations, and a decrease in or possible loss of employment. It is possible impacts could be offset if angler demand was compensated by some external factor; for example, if there was a national increase in interest in charter fishing.

In Area 3A, the combination of different types of management measures add complexity in teasing out the impacts of marginal changes. However, the shifting factor under the three alternative is the number of day-of-the-week closures. In additional to Wednesdays closures included in each option, Alternative 1 would close three Tuesdays during peak season, Alternative 2 would close six Tuesdays during peak season, and Alternative 3 would close ten Tuesdays during peak season. It is challenging for ADF&G to predict the precise change in harvest due to these measures because it is difficult to model the angler's response to a day-of-the week closure. Based on past angler activity, ADF&G estimates demonstrate the maximum reduction in harvest, assuming anglers are not able to rebook a trip on a different day of the week. For certain types of anglers (e.g. cruise ship passengers or other non-residents whose time is limited) this may be a fair assumption. Other types of anglers, for example locals, may be able to rebook on a different day if the charter fleet has available capacity. The more days of the week that are eliminated the more difficult it will likely be for anglers to find opportunity to fish on a different day, and the more accurate the estimates are expected to become.

The loss of fishing opportunity on one or two days of the week has an economic effect on charter operators. Focusing on the effects from these differences in the three alternatives, Table 42 displays the projected effort for Area 3A (in terms of angler-days of bottomfishing) and the proportion of angler-days that took place each Tuesday in 2016, to project the number of trips that would occur on each combination of Tuesdays in 2018 if there were no Tuesday closures. As demonstrated, Alternative 2 could result in a potential $1.25 million in foregone gross revenue from three additional Tuesday closures, compared to the status quo. Based on Table 42, Alternative 3 could result in a potential $2.58 million in foregone gross revenue from three

additional Tuesday closures, compared to the status quo. These losses would be lower if charter anglers were able to re-book on a different day of the week or the anglers chose to book a trip targeting a different species.

Table 42 Potential marginal forgone gross revenue from alternative day-of-the-week closures at $300 per angler

	Number of Closed Tuesdays	Beginning and Ending Dates	Estimated angler-days	Number of angler-days less than Alt 1 (status quo)	At $300/ person
Alternative 1	3 (Status quo)	Jul 24 - Aug 07	4,498	0	$ -
	4	Jul 17 - Aug 07	5,837	1,339	$ 401,818
	5	Jul 17 - Aug 14	7,055	2,557	$ 767,234
Alternative 2	6	Jul 10 - Aug 14	8,656	4,158	$ 1,247,415
	7	Jul 03 - Aug 14	9,919	5,421	$ 1,626,169
	8	Jul 03 - Aug 21	10,774	6,276	$ 1,882,654
	9	Jun 26 - Aug 21	11,941	7,443	$ 2,232,786
Alternative 3	10	Jun 19 - Aug 21	13,104	8,606	$ 2,581,807

Source: (Meyer and Powers 2017) and ADF&G 2/13/18

Note: The example price of $300 was chosen to represent the price per angler for a full day of halibut fishing during peak season. This price was approximately the average of a short sampling of Area 3A charter halibut operators.

It is difficult to quantify the economic impact on angler from a management change like the day of the week closure. Some anglers may be able to rebook on another day and some may be just as satisfied charter fishing for a different species. This negative impact may be small and in the form of an inconvenience in their schedule. However, some anglers will be more negatively impacted from the diminished opportunity to charter halibut fish. It is likely that a proportion of anglers that were specifically willing to pay for *halibut* charter fishing will not have the opportunity to fish given the additional day of the week closure. It would be difficult to attempt to measure the number of anglers effected by the day of the week closures in this way. It would possibly require tracking potential anglers, inquiring about booking a charter, and following up with a survey on the outcome of their efforts. In lieu of more quantifiable data, we can simply say that some portion of anglers will be displaced from the fishery. Measures that displace anglers from the fishery or have a negative effect on angler demand can also negatively affect connected services (like sport processors), other businesses connected to tourism, and communities in general.

Reduced opportunity in the charter halibut sector in both Area 2C and 3A will likely lead to more anglers and operators finding ways to adapt and to diversify. Anglers may choose to charter fish for other species including salmon, rockfish, and lingcod. It could also lead to more anglers choosing to rent a vessel and fish on their own, as they would fall under the unguided recreational halibut limit of two fish of any size. Similarly, more restrictive measures as well as management measures that are disproportionate with the unguided sector could incentive charter business that traditionally relied on halibut fishing to become more creative in attracting clients. Charter business may seek to diversify the species they target or diversify in the services they offer (*e.g.* glacier and wildlife view tours, rental boats, water taxi service).

Testimony at Council meetings as well as discussions at Charter Halibut Management Committee meetings have indicated these types of impacts have already been felt in the charter sector. There have been socio-economic implications from the decline of the halibut stock, from the switch from the GHL management to the CSP, and from the many other influences outside of the management measures that may lead to changes in harvest, average weight and harvest per unit effort. Although the decision point presented in this analysis seeks to differentiate the marginal cost and benefits of these management measures suggested in Alternative 1 *relative to* the management measures that would be in place under Alternative 2 and Alternative 3, these cumulative effects are important to understand in terms of how future action may exacerbate current challenges in the fishery.

There could be breaking point, in which management measures become so restrictive that long-time anglers no longer choose to return to a particular charter operation. It is unclear what that breaking point may be, and it is likely different among anglers. Many charter operators have a sense for the types of measures that would most negatively impact their anglers. Consequently, their contributions have been vital in the Charter Halibut Management Committee's discussion of which measures to impose when harvest reductions are needed. This process allows for the consideration of the economic trade-offs in the adoption of different management measures, provided that the expected charter removal remains below the catch limit.

Processors and Communities

Similar to the discussion about the impacts from a reduced commercial catch limit in the previous sections, a negative economic impact to the charter halibut sector can have downstream effects on the support sectors, complimentary industries (like tourism and lodging), and communities as a whole. Potentially impacted sectors could include, for example: sport fishing processors, shops for bait fuel and gear, restaurants, gift and souvenir shops, businesses that run other types of adventure tours, and lodging. Communities could also lose out from a decrease in taxes that could have been collected (*e.g.* sales taxes, fish box tax, passenger for hire fees) levied by the municipality or borough (see Section 4.5.4). As described previously, day of the week closure in particular could impact a community if out of town visitors time their visits primarily around the opportunity to charter halibut fish.

These types of negative effects are expected to be distributional. For some larger, more economically diversified communities, these impacts may not be as acute. Some charter operations are located at remote lodges and may not have as large of an impact on a local economy. It would also be inappropriate to contribute all tourism-related economic activity in a community to halibut charter fishing, as there are often many other substitute activities. However, for some communities, charter halibut fishing plays an important connecting role in the local summer economy.

Reduction in Risk to the Halibut Resource

As previously noted in Section 3.2, and in Table 6, IPHC scientists indicated that the total biomass, and specifically the total exploitable biomass, of halibut is projected to decline substantially over the next several years if harvests are not reduced relative to 2017. More

stringent charter halibut management measures in 2018 may reduce some of the risk and magnitude of a decrease in halibut spawning biomass and fishery yield projected for the next three years. Therefore, these alternatives could alleviate the some of the same types of negative social and economic impacts to charter halibut fishery participants, associated businesses, and communities, as projected for the next three years.

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

As described in this RIR, reduction of commercial and charter catch limits for 2018, as proposed under Alternative 2 and 3, would be expected to have negative social and economic effects for participants in these fisheries, as well as businesses (including processors) and communities that are associated with these types of fishing.

The magnitude of these effects differ by area as proposed reductions range from a 1.4% decrease (in Area 4A) to a 42.3% decrease (in Area 4E) in Alternative 2 compared to the status quo (Alternative 1). Under Alternative 3, the reductions range from a 5% (Area 4A) to a 50.5% reduction (Area 4E). The Area 4E catch limit is allocated entirely to the CDQ groups, and the coastal residents that may rely on this allocation for both harvest opportunity and revenue to fund economic and social program in the communities, may be especially disadvantaged by this reduction.

In addition, some commercial halibut operators are more prepared to weather out these types of changes in the halibut stock. Stabilizing factors can be both economic and social. Diversification in other fisheries, having other opportunities for onshore employment, having a spouse that also contribute income to the family, are examples of factors that may dissipate some of the negative economic impacts from a lowered commercial catch limit.

In the charter sector, the diversity in the types of charter operations, types of anglers, opportunities for business diversification, and the different proposed management measures for each area means that there will be a spectrum of negative distributional impacts for charter businesses and anglers. Some business plans may be less affected if, for example, they are able to diversify into more salmon and rockfish charters. Some businesses may be more affected if, for example, halibut fishing is the main draw for getting non-local anglers to town and the increase in day of the week closures (for Area 3A), means less tourism two days per week.

Effects from the marginal difference in proposed alternatives could also be felt cumulatively with other social and economic pressures on the commercial fisheries, charter fisheries, communities, and associated businesses. The RIR list some examples such as the recent decline in Pacific cod TAC in the BSAI and GOA, as well as several years of increasing restrictive management measures for the charter fisheries.

This shock to the commercial harvesters and charter operations could create a multiplier effect for associated businesses, including halibut processors and register buyers, and for communities. As fisheries off Alaska are a primary component of the global market for halibut, a decrease in catch limits may also impact the price of halibut for consumers.

However, failure to reduce commercial and charter catch limits in response to the recent stock assessment would also be expected to impact the same user groups, potentially prolonging the negative impact. As previously noted in Section 3.2 and Table 6, IPHC scientists indicated that the total biomass, and specifically the total exploitable biomass, of halibut is projected to decline substantially over the next several years if harvests are not reduced relative to 2017. Therefore, reducing halibut catch limits for 2018 could alleviate some of the future negative impacts to these same user groups in addition to other halibut user groups that rely on halibut for economic, recreational, and cultural value. Given the importance of halibut to many user groups and communities along the Pacific coast, the as well as the importance of Pacific halibut to the National halibut market, it is possible that decreasing catch limits in 2018 could provide a small net benefit to the Nation in the long-run.

5 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.

This analysis considers three alternative catch limits and their impacts on the halibut resource and halibut fishery:

- **Alternative 1** (status quo) -- Maintain catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and charter management measures in Areas 2C and 3A equal to those adopted by the IPHC in 2017.
- **Alternative 2** -- Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A, as suggested by, but not adopted by, the U.S Commissioners at the 2018 IPHC Annual Meeting.
- **Alternative 3** -- Reduce catch limits in Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, and modify charter management measures in Areas 2C and 3A consistent with the IPHC's interim management procedure.

Under the Halibut Act, the Secretary of Commerce has the authority to implement 2018 catch limits in Areas: 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E, a CSP for charter and commercial IFQ halibut fisheries in Areas 2C and 3A, charter halibut management measures in Areas 2C and 3A, and a CSP for the commercial IFQ and CDQ halibut fisheries in Areas 4C, 4D, and 4E that are necessary to carry out the purposes and objectives of the Convention.

Adherent to the Halibut Act, this action does not discriminate by residents of different states. For instance, under Alternative 2, catch limits would be reduced for all QS holders regardless of home state. This action also maintains current allocations as determined through multiple types of halibut management programs established through the Council (*i.e.*, the catch sharing plan between the commercial and the charter sectors in Area 2C and 3A, the Community Quota Entity

Program in GOA, the Community Development Quota Program, and the catch sharing plan for Area 4CDE).

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