DRAFT

Environmental Assessment/Regulatory Impact Review for Proposed Amendment 16 to the Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska

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Abstract: This Environmental Assessment/Regulatory Impact Review analyzes proposed management measures to address management of salmon fishing in the Cook Inlet EEZ. The *Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska* (FMP) manages the salmon fisheries in the United States Exclusive Economic Zone (EEZ; 3 nautical miles to 200 nautical miles offshore) off Alaska. The North Pacific Fishery Management Council developed this FMP under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). In 2012, the Council comprehensively revised the FMP to comply with the recent Magnuson-Stevens Act requirements, such as annual catch limits and accountability measures, and to more clearly reflect the Council's policy with regard to State of Alaska management authority for commercial and sport salmon fisheries in the EEZ. A portion of this was challenged, and in response to a 2016 United States Court of Appeals Ninth Circuit ruling, the Council took final action in December 2020 to amend the FMP to manage the commercial salmon fishery that occurs in the EEZ waters of Cook Inlet that had been removed from Federal management with the 2012 revisions to the FMP. This action, Amendment 14 to the Salmon FMP, implemented Federal management of the EEZ waters of Cook Inlet and closed them to commercial salmon fishing. NMFS implemented Amendment 14 (86 FR 60568, November 3, 2021), but on June 21, 2022, the U.S. District Court for the District of Alaska vacated the implementing regulations for Amendment 14. NMFS is now considering new management measures to comply with Magnuson-Stevens Act requirements for the Cook Inlet salmon fishery in the EEZ, such as status determination criteria, annual catch limits, and accountability measures in response to both the 2016 Ninth Circuit ruling and the 2022 summary judgment opinion of the Alaska District Court in *UCIDA et al. v. NMFS*.

List of Acronyms and Abbreviations

Acronym or Abbreviation	Meaning
1954 Act	North Pacific Fisheries Act of 1954
1992 Stocks Act	North Pacific Anadromous Stocks Act of 1992
AAC	Alaska Administrative Code
ABC	acceptable biological catch
ACL	annual catch limit
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADOR	Alaska Department of Revenue
AFSC	Alaska Fisheries Science Center
AIS	Automated Information System
AKFIN	Alaska Fisheries Information Network
AKRO	NMFS Alaska Regional Office
AM	accountability measure
AMMOP	Alaska Marine Mammal Observer Program
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
APA	Administrative Procedure Act
AS	Alaska Statute
BEG	biological escapement goal
BiOp	biological opinion
BLS	U.S. Bureau of Labor Statistics
BOF	Alaska Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CFEC	Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
COAR	Commercial Operator Annual Reports
Convention	International Convention for the High Seas Fisheries of the North Pacific Ocean between Canada, Japan, and the United States
Council	North Pacific Fishery Management Council
CPUE	catch per unit effort
CWT	coded-wire tag
DCCED	Department of Commerce, Community, and Economic Development
DNR	Alaska Department of Natural Resources
DPS	distinct population segment
E.O.	Executive Order
EA	Environmental Assessment
EDPS	Eastern Distinct Population Segment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FFP	Federal Fisheries Permit

Acronym or Abbreviation	Meaning
FMA	Fisheries Management Area
FMP	fishery management plan
FMU	fishery management unit
FONSI	Finding of No Significant Impact
FR	Federal Register
Ft	foot or feet
GOA	Gulf of Alaska
GSI	genetic stock identification
IRFA	initial regulatory flexibility analysis
LOA	length overall
M	meters
MFMT	maximum fishing mortality threshold
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSC	Marine Stewardship Council
MMPA	Marine Mammal Protection Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA OLE	NOAA Office of Law Enforcement
NPFMC	North Pacific Fishery Management Council
NS	National Standard
OEG	optimal escapement goal
OFL	overfishing limit
OY	optimum yield
PBF	physical or biological feature
PBR	potential biological removal
PCFA	principal components factor analysis
PPI	Producer Price Index
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SBRM	Standardized Bycatch Reporting Methodologies
SDC	Status Determination Criteria
Secretary	Secretary of Commerce
SEG	sustainable escapement goal
SFHS	Alaska Sport Fishing Harvest Survey
SSC	Scientific and Statistical Committee
State	State of Alaska
TAC	total allowable catch
UCI	Upper Cook Inlet
UCIDA/CIFF	United Cook Inlet Drift Association and Cook Inlet Fishermen’s Fund
U.S.	United States
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VMP	vessel monitoring plan
VMS	vessel monitoring system
WDPS	Western Distinct Population Segment

Executive Summary

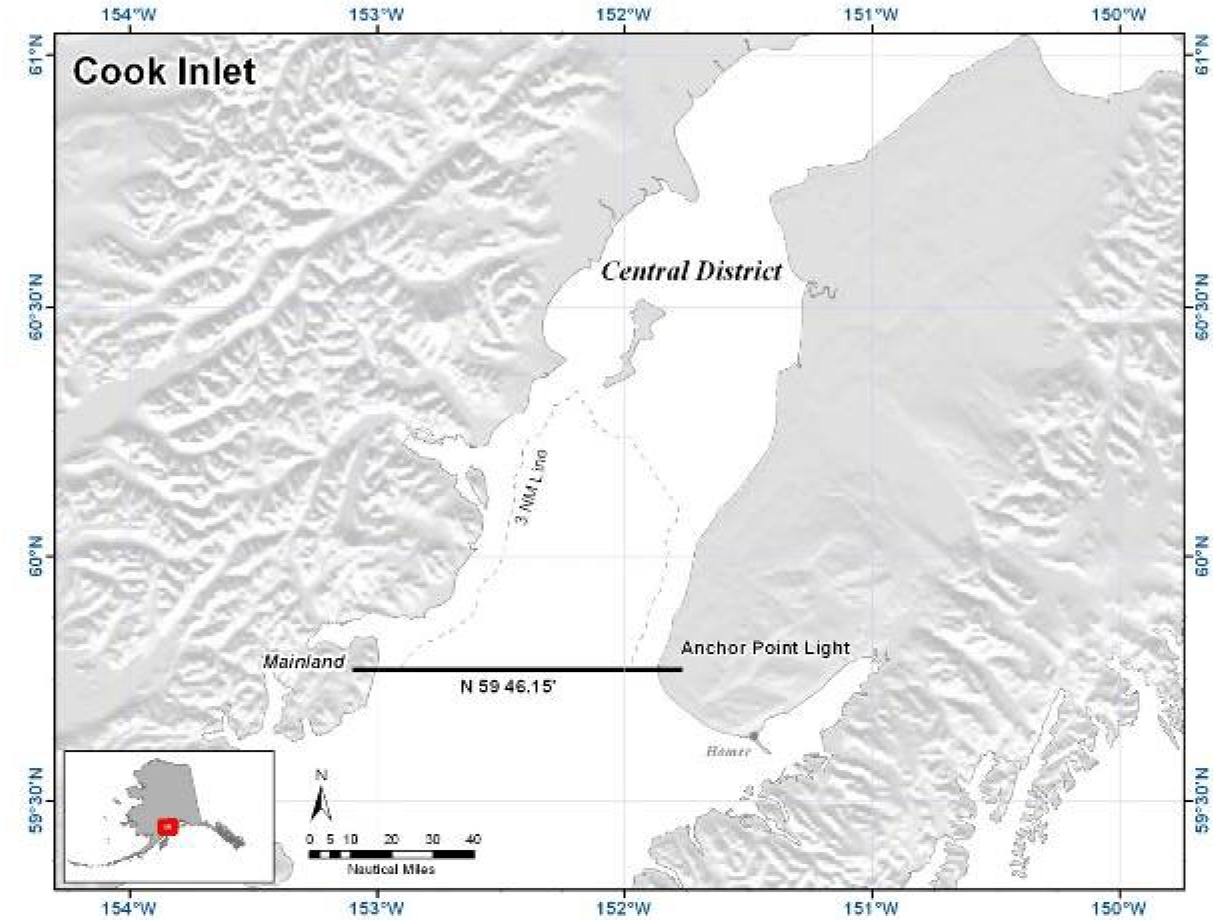
NMFS is considering an action that would amend the *Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska* (FMP) to manage the salmon fisheries that occur in Federal (EEZ) waters of Cook Inlet. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA) directs the Council to prepare a fishery management plan for each fishery under its authority that requires conservation and management. The fisheries under the authority of the Council are those fisheries that occur in the United States Exclusive Economic Zone (EEZ), which is 3 nautical miles to 200 nautical miles off the coast of Alaska. The Magnuson-Stevens Act requires that each fishery management plan be consistent with the ten national standards and contain specific conservation and management measures.

The FMP was approved in 1979 and comprehensively revised in 1990 (NPFMC 1990b) and in 2012 (NMFS 2012c). The FMP conserves and manages the Pacific salmon fisheries that occur in the EEZ off Alaska. The FMP establishes two management areas, the East Area and the West Area, with the border between the two areas at the longitude of Cape Suckling (Figure ES-1). The FMP manages commercial and sport salmon fisheries differently in each area. In the East Area, the FMP includes all EEZ waters, delegates management of the commercial troll salmon fishery and the sport salmon fishery to the State of Alaska (State) and prohibits commercial salmon fishing with net gear. In the West Area, the FMP includes most of the EEZ waters and prohibits commercial salmon fishing in the West Area. Three defined traditional net fishing areas—Cook Inlet, the Alaska Peninsula, and Prince William Sound—were removed from the West Area by Amendment 12 to the FMP and the State manages the salmon fisheries in these areas.

The FMP's unique functions—closing the vast majority of the EEZ to salmon fishing and facilitating State management of the few salmon fisheries in the EEZ—reflect the salmon life cycle. Salmon have a complex life cycle that involves a freshwater rearing period, followed by a period of ocean feeding prior to their spawning migration back to freshwater. Most salmon stocks are vulnerable to harvest by numerous commercial and sport fisheries in marine areas. Salmon from individual brood years can return as adults to spawn over a two to six-year period. As a result, a single year class can be vulnerable to fisheries for several years. Salmon migrate and feed over great distances during their marine life stage. While there is great diversity in the range and migratory habits among different species of salmon, there also is a remarkable consistency in the migratory habit within stock groups, which greatly facilitates stock-specific fishery planning. Salmon are also taken in rivers and streams during their spawning migration by subsistence, sport, commercial, and personal use fisheries.

The FMP's closure of the West Area also recognizes that the State is the authority best suited for managing Alaska salmon fisheries given the State's existing infrastructure, expertise, and authority to facilitate harvests closest to each salmon stock's natal streams (i.e., from inland waters out to 3 nautical miles from the coast). The State manages Alaska salmon stocks throughout their range using a management approach that is specifically designed to address the life cycle of salmon, the nonselective nature of fishing in a mixed stock fishery, and the fact that a given salmon stock is subject to multiple fisheries through its migration from marine to fresh waters. Additionally, Chinook salmon harvested in the East Area are managed under provisions of the Pacific Salmon Treaty, an international agreement with Canada that provides for an abundance-based management regime that takes into account the highly mixed stock nature of the harvest.

Figure ES-1 Map showing the upper Cook Inlet EEZ that would be addressed by the proposed action.



Prior to Amendment 12 to the FMP, no comprehensive consideration of management strategy or scope of coverage had occurred since 1990. State fisheries regulations and Federal and international laws affecting Alaska salmon had changed since 1990 and the Magnuson-Stevens Act (as amended since 1990) expanded the requirements for Federal fishery management plans. Additionally, the 1990 FMP was vague with respect to management authority for the three traditional net fishing areas that occur in the West Area. The Council determined that the FMP must be updated in order to comply with the current Magnuson-Stevens Act requirements and that the FMP should be amended to more clearly reflect the Council's policy with regard to the State of Alaska's continued management authority over commercial fisheries in the West Area, the Southeast Alaska commercial troll fishery, and the sport fishery.

With Amendment 12, the Council revised the FMP both to reflect its policy for managing salmon fisheries and to comply with Magnuson-Stevens Act. In developing Amendment 12, the Council considered (1) alternatives for defining the scope of the FMP and determining where Federal conservation and management is required, and (2) options for the specific management provisions in the FMP that apply to the fisheries managed under the FMP. The Council recommended, and National Marine Fisheries Service (NMFS) implemented, Amendment 12 to the FMP in 2012. The FMP, as amended by Amendment 12 (2012 FMP), maintained the delegated management structure in the East Area, and modified the West Area to specifically exclude three traditional net commercial salmon fishing areas and the sport fishery from the FMP, and updated the FMP. This was done to collaboratively utilize State expertise and salmon management infrastructure to manage these fisheries, which at the time was also determined to be consistent with the Magnuson-Stevens Act.

Cook Inlet commercial salmon fishermen and seafood processors filed a lawsuit in Federal district court challenging Amendment 12 and its implementing regulations. The lawsuit focused on Amendment 12's removal of the Cook Inlet Area from the FMP. The Ninth Circuit determined that Magnuson-Stevens Act Section 302(h)(1) clearly and unambiguously requires a Council to prepare and submit FMPs for each fishery under its authority that requires conservation and management and that no other provision in the Magnuson-Stevens Act creates an exception to this statutory requirement, or supported NMFS's arguments that this requirement applies to fisheries that require *Federal* conservation and management. Because the Council and NMFS concluded that the Cook Inlet salmon fishery requires conservation and management by some entity, the Ninth Circuit found that the Cook Inlet portion of the EEZ salmon fishery must be included in the FMP given the statutory language of the Magnuson-Stevens Act. Under the Ninth Circuit's decision, it was determined that the Council and NMFS must amend the FMP to include Cook Inlet EEZ waters within its fishery management unit and apply federal management to commercial salmon fishing in those waters.

To be responsive to the Ninth Circuit's decision and apply Federal management to the Cook Inlet EEZ, the Council worked on developing management alternatives from 2017 to 2020, taking final action at its December 2020 meeting to recommend a preferred alternative. The Council's recommended management alternative was implemented by NMFS as Amendment 14, which incorporated the Cook Inlet EEZ into the Salmon FMP's West Area. This brought the Cook Inlet EEZ and the commercial salmon fisheries that occurred within it under Federal management by the Council and NMFS. Amendment 14 applied the prohibition on commercial salmon fishing that is currently established in the West Area to the newly added Cook Inlet EEZ Subarea.

Amendment 14 was challenged by Cook Inlet commercial salmon fishermen shortly after implementation. On June 21, 2022, the U.S. District Court for the District of Alaska vacated the implementing regulations for Amendment 14.[1] The Court found that the final rule was arbitrary and capricious, in part because NMFS failed to include management measures for the Cook Inlet EEZ recreational fishery in the FMP and because the Court determined the rule still implicitly deferred too much management authority to the State of Alaska without formally delegating such authority.

As a result, there are currently no federal regulations governing salmon fishing in the Cook Inlet EEZ. Any vessel fishing for salmon in Cook Inlet is regulated by the State under the laws of the State of Alaska, as was the case before the implementation of Amendment 14. NMFS notified the State of Alaska of this via letter on June 22, 2022. For 2022, the State managed the Cook Inlet salmon fishery, including commercial salmon fishing in the Cook Inlet EEZ, with their longstanding pre-Amendment 14 management plan and authorities.

However, this management regime is temporary because the Ninth Circuit previously held that NMFS cannot continue to exclude the Cook Inlet EEZ from the FMP and defer management to the State of Alaska. The District Court established a May 1, 2024 deadline to implement a compliant FMP amendment.

At its October 2022 meeting, the Council passed a motion to develop an analysis for a new amendment to the Salmon FMP for initial review at its December 2022 meeting. This considered management measures that comply with Magnuson-Stevens Act requirements for the Cook Inlet salmon fishery in the EEZ, such as status determination criteria, annual catch limits, and accountability measures in response to both the

[1] Decision listed in its entirety in Appendix 10.

2016 Ninth Circuit ruling and the 2022 summary judgment opinion of the Alaska District Court in UCIDA et al. v. NMFS.

The Council's October 2022 motion created the following purpose and need statement for managing the salmon fishery in the Cook Inlet EEZ.

> **Purpose and Need**
>
> The Council intends to amend the Salmon FMP to manage salmon fishing in the Federal waters of upper Cook Inlet. Federal management must be consistent with the Magnuson-Stevens Act, including the required provisions for an FMP specified in section 303(a). This proposed action is necessary to bring the Salmon FMP into compliance with the Magnuson-Stevens Act consistent with the 2016 Ninth Circuit decision and the recent summary judgment opinion of the Alaska District Court in UCIDA et al. v. NMFS.

The Council's motion did not identify specific alternatives but requested that staff should update the previous final review draft considered by the Council in December 2020 to reflect recent events and identify possible variations on the alternatives analyzed in that document that meet the purpose and need.

Of particular note, the FMP amendment must now include management measures for the recreational fishery that also occurs in the Cook Inlet EEZ. The saltwater recreational fishery sector and the drift gillnet commercial fishery sector represent all salmon fishing that occurs in the Cook Inlet EEZ.

At its December 2022 meeting, the Council tasked staff with analyzing four alternatives in the public review draft for final action. These are described below. It is noted that Alternative 1 (No Action) has not been modified because it is required under NEPA for analytical purposes. Alternative 4, which was the Council's recommended action in December 2020, has also not been modified because, as implemented, it was found contrary to law.

The Council reviewed the EA/RIR at its April 2023 meeting and failed to take necessary action to recommend management measures for the Cook Inlet EEZ salmon fishery. As a result, NMFS initiated a Secretarial FMP Amendment to develop and implement a suitable FMP amendment by the District Court's deadline. NMFS adopted the purpose and need statement and Alternatives developed by the Council with a minor revision reflecting NMFS's revised role in the process.

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Alternatives

Alternative 1: No Action. No amendment to the Salmon FMP. This alternative would maintain the existing management regime, which excludes the Cook Inlet EEZ and the commercial salmon fishery within it from Federal management under the FMP. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.

Alternative 2: Federal management of the fishery in the EEZ with specific management measures delegated to the State. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit and establish a Federal management regime for the salmon fishery that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the MSA and Ninth Circuit ruling. Alternative 2 would identify the management measures that would be managed by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.

Alternative 3 (Preferred): Federal management of the fishery in the EEZ. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit and apply Federal management to the salmon fishery that occurs in the EEZ.

Alternative 4: Federal management of the commercial fishery in the EEZ with the EEZ closed to commercial fishing. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management by applying the existing West Area prohibition on commercial salmon fishing in the EEZ to the Cook Inlet EEZ.

Fishery Impact Statement

Section 303(a)(9) of the Magnuson-Stevens Act requires that a fishery impact statement be prepared for each FMP or FMP amendment. A fishery impact statement is required to assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts of the conservation and management measures on, and possible mitigation measures for, (a) participants in the fisheries and fishing communities affected by the plan amendment; (b) participants in the fisheries conducted in adjacent areas under the authority of another Council; and (c) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery.

The EA/RIR prepared for this plan amendment will constitute the fishery impact statement. The likely effects of the alternatives are analyzed and described throughout the EA/RIR. The effects on participants in the fisheries and fishing communities are analyzed in the RIR chapter of the analysis (Section 4.7). The effects of the alternatives on safety of human life at sea are evaluated in Section 4.7.4, and above under NS 10, in Section 5.1.

Environmental Assessment

Chapter 3 considers impacts to the human environment under a range of alternative approaches for applying Federal management to commercial salmon fishing in the Cook Inlet EEZ. The EA provides the best available information on the status of the salmon stocks in Cook Inlet, and interactions between the EEZ and State water salmon fisheries and ESA-listed Pacific salmon, marine mammals, seabirds, and habitat. Including the Cook Inlet EEZ in the FMP would also require NMFS to conduct ESA § 7 consultations on salmon fishing activities in the EEZ, and potential impacts to listed species and marine mammals are also discussed in this chapter.

Alternative 1 would take no action and maintain the status quo. Under this alternative, State management is expected to continue within recently observed ranges. No significant environmental impacts are anticipated as a result. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.

Alternative 2 would implement Federal management of salmon fishing in the Cook Inlet EEZ and delegate certain management measures to the State of Alaska. Available information indicates that State management of the Cook Inlet EEZ fisheries, including the addition of the recreational fishery, is within proposed Federal reference points, and that no significant changes to salmon removals are expected. No significant environmental impacts are anticipated as a result.

Alternative 3 would implement Federal management of salmon fishing in the Cook Inlet EEZ. Under Alternative 3, some reduction in EEZ harvest is anticipated as a result of increased management uncertainty and reduced federal management flexibility that necessitates more conservative management of the Cook Inlet EEZ. However, this action is expected to maintain significant Cook Inlet EEZ fishing opportunity and any decrease in Cook Inlet EEZ salmon removals would be expected to be offset by increased salmon removals in State water salmon fisheries. As a result, no significant environmental impacts are anticipated.

Alternative 4, which is also not considered viable, would institute Federal management of the Cook Inlet EEZ and prohibit commercial salmon fishing, which would result in all commercial salmon fishing in Cook Inlet occurring in State waters. It is expected that salmon harvests in the Cook Inlet EEZ would be reduced, however, harvests in the State waters of Cook Inlet by all salmon users would be expected to increase and offset some reductions in overall Cook Inlet salmon harvest as a result of the EEZ closure. This alternative is not expected to change salmon management in a way that would result in significant environmental impacts.

Regulatory Impact Review

Chapter 4 summarizes the existing socioeconomic conditions in UCI salmon fisheries and evaluates the potential socioeconomic impacts of potential changes to the federal regulations implementing the FMP. Regulations implementing the FMP are at § 679.1 Purpose and Scope, § 679.2 Definitions, § 679.3 Relation to other laws, § 679.4 Permits, and § 679.7 Prohibitions.

Alternative 1 would not amend the FMP and would maintain all existing conditions within the fishery.

Alternative 2 would implement Federal management of the Cook Inlet EEZ and delegate specific management measures to the State of Alaska. To implement Alternative 2, Federal regulations at § 679.2 Definitions would be revised to modify the definition of Salmon Management Area at § 679.2 to include the Cook Inlet EEZ. This action would also revise Figure 23 to part 679 consistent with the revised definition of the Salmon Management Area at § 679.2. Management measures not delegated to the State of Alaska would have to be added to Federal regulations at § 679.

Alternative 2 would be expected to maintain many existing conditions in the fishery. However, it would add additional Federal management costs to agencies and participants. This would result in increased costs of additional monitoring, recordkeeping, and reporting measures to small entities participating in the drift gillnet fishery. No additional monitoring, recordkeeping, or reporting measures are proposed for the small recreational fishery in the Cook Inlet EEZ. The additional Federal management measures and processes implemented under Alternative 2 are not likely to result in significant changes relative to current State management of Cook Inlet salmon stocks under the status quo.

Alternative 3 (Preferred) would implement Federal management of the Cook Inlet EEZ. To implement Alternative 3, Federal regulations at § 679.2 would be revised to modify the definition of Salmon Management Area at § 679.2 to include the Cook Inlet EEZ. This action would also revise Figure 23 to part 679 consistent with the revised definition of the Salmon Management Area at § 679.2. All management measures for the Cook Inlet EEZ would have to be added to Federal regulations at § 600 and § 679.

Alternative 3 may result in reductions in EEZ drift gillnet harvest in some years and would result in substantial additional costs to State and Federal management agencies, as well as fishery participants. For the commercial fishery, additional burden includes logbooks, a VMS requirement, eLandings reporting, and buyer permits for entities receiving deliveries of salmon from the Cook Inlet EEZ. No additional monitoring, recordkeeping, or reporting measures are proposed for the small recreational fishery in the Cook Inlet EEZ.

Under Alternative 3, some harvest of Cook Inlet salmon stocks in the EEZ by the UCI drift gillnet fishery may be restricted, though annual harvest totals in the EEZ are expected to be fairly consistent with historical averages. As significant harvest in the Cook Inlet EEZ would be maintained, it is likely that the small amount of possible foregone harvest could be substantially offset by increased drift gillnet harvests in State waters as both harvesters and managers adjust to EEZ restrictions. Given the extremely small harvest of the recreational salmon fishery in the Cook Inlet EEZ, combined with their ability to avoid or release weak stocks, it is unlikely recreational harvests would change significantly. In any case, it is likely that salmon surplus to escapement needs are expected to be harvested in State water salmon fisheries. Depending on the reduction in EEZ harvest in a given year, lower harvests by the UCI drift gillnet fleet may increase harvests of other user groups of Cook Inlet salmon, primarily Northern District and Upper Subdistrict set gillnet, Susitna and Matanuska river sport and personal use, and Kenai and Kasilof commercial set net, sport, and personal use fisheries. It is not possible to estimate the magnitude of the harvest benefits to these other user groups because of the complexities of Upper Cook Inlet mixed-stock fisheries and intertwined State management/allocation plans.

Alternative 4, which is not considered viable, would amend the FMP to extend the West Area to the EEZ waters of Cook Inlet, including prohibition on commercial salmon fishing. To implement this action, Federal regulations at § 679.2 Definitions would be revised to modify the definition of Salmon Management Area at § 679.2 to redefine the Cook Inlet Area as the Cook Inlet EEZ Subarea and incorporate it into the West Area. This action would also revise Figure 23 to part 679 consistent with the revised definition of the Salmon Management Area at § 679.2. As part of the West Area, the Cook Inlet EEZ Subarea would be subject to the prohibition on commercial fishing for salmon at § 679.7(h)(2).

The impacts of Alternative 4 on salmon harvests by individual UCI salmon drift gillnet vessels would be proportional to the extent they rely on the EEZ for target fishing. The entire active UCI salmon drift gillnet fleet likely fishes in the EEZ at some time during each fishing season, but over the season, vessels differ with respect to their level of economic dependency on fishing grounds in the EEZ. Those UCI salmon drift gillnet vessels displaced by a permanent EEZ closure would have the options of ceasing to fish or relocating their commercial salmon fishing activities to State waters in Upper Cook Inlet, but a number of factors may potentially make it difficult for some vessels to offset the loss of EEZ harvests.

Lower harvests by the UCI drift gillnet fleet are likely to increase harvests of other user groups of Cook Inlet salmon, primarily Northern District and Upper Subdistrict set gillnet, Susitna and Matanuska river sport and personal use, and Kenai and Kasilof commercial set net, sport, and personal use fisheries. Reduced EEZ harvest may be offset by avoiding substantial increases in management complexity and cost associated with the other legally tenable alternatives. It is not possible to estimate the magnitude of the harvest benefits to these other user groups because of the complexities of Upper Cook Inlet mixed-stock fisheries and intertwined State management/allocation plans.

Decreases in the harvest by the UCI drift gillnet fleet under Alternative 4 would also have the potential to differentially affect communities, including those associated with the UCI drift gillnet fishery and those associated with other salmon user groups. It is anticipated, however, that community level distributive impacts would not substantially affect net benefits to the nation.

Under Alternative 4, no small entities would incur the costs of additional monitoring, recordkeeping, and reporting measures. Additionally, fishery management costs at or near existing levels for the State of Alaska would be maintained.

Table ES-1 Summary of Alternatives and their elements

	Alternative 1 No Action/Status Quo	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3 (Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management/ Prohibit Commercial Fishing
Who can fish?	• Persons holding limited entry permits issued by CFEC	• Commercial fishery ○ Persons with CFEC permits allowed by the State, consistent with FMP criteria ○ FFP endorsed for salmon ○ FFP for groundfish retention • Recreational fishery ○ Persons holding a State of AK sport fishing license	• Commercial fishery ○ Persons landing fish in AK must have applicable CFEC permits, consistent with FMP criteria ○ FFP required • Recreational fishery ○ Anyone ○ Persons landing fish in AK must be in compliance with State requirements including State recreational fishing license ○ No Federal license	• Commercial salmon fishing prohibited in the EEZ
When can they fish?	• Times allowed by ADF&G/BOF	• Times allowed by ADF&G, consistent with FMP criteria	• Times allowed by the FMP and Federal regulations ○ **Option 1 (preferred): Mondays and Thursdays 7:00 am to 7:00 pm, closed before TAC is projected to be met** ○ Option 2: Define other Federal fishing days and times, closed before TAC is projected to be met ○ **Suboption 1 (preferred): Fix an EEZ commercial fishery closure date of August 15. If the TAC is not reached and the fishery closed prior to the scheduled closure date, the fishery would close automatically on the specified date.**	• n/a
Where can they fish?	• Areas allowed by ADF&G/BOF	• Areas allowed by ADF&G, consistent with FMP criteria	• All Federal waters of Upper Cook Inlet	• n/a

	Alternative 1 No Action/Status Quo	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3** **(Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management/ Prohibit Commercial Fishing

How much can the fishery catch?	• Amount allowed by open times/areas, set by BOF	• Amount allowed by open times/areas or bag limits set by BOF, while allowing at least the lower bound of the escapement goal to be met and consistent with SDC for the EEZ	• **Commercial fishery**
			  ○ **Up to TAC set by the Council**
			• Recreational fishery
			  ○ Option 1: If delegated to the State of Alaska, up to bag limits established by the State, consistent with the MSA
			  ○ **Option 2: Up to Federal bag and possession limits**
				• Zero commercial salmon catch in the Cook Inlet EEZ

How are fish allocated between State and Federal waters?	• n/a	• As allowed by ADF&G/BOF, consistent with FMP criteria and the MSA	• Federal TAC would be set after accounting for uncertainty and all other projected removals in both State and Federal waters	• All commercial salmon harvests in Cook Inlet would occur in State waters
Can groundfish be retained by EEZ drift gillnet vessels	• No	• Option 1: Yes, all catch must be retained and delivered for accounting. Halibut and non-retention groundfish must be released. • Option 2: No, all discards must be recorded in logbook and reported at the time of landing	• Optional retention of groundfish	• n/a

Mixed commercial deliveries of EEZ and State waters harvests allowed?	• Yes	• Yes, with accounting of State/EEZ harvest proportion through logbooks and reporting at the time of landing	• Commercial fishery
			  ○ No, fish caught in the EEZ and State waters may not be onboard together in the same day
			• Recreational fishery
			  ○ Recreational bag and possession limits from both areas combined could not exceed State water limits or Federal recreational bag limits
				• n/a

Legal commercial gear	• Gillnet gear allowed by State regulations	• Gillnet gear allowed by State regulations, consistent with FMP criteria	• Gillnet gear allowed by Federal regulations	• n/a
How are commercial vessels monitored?	• Enforcement patrols	• Enforcement patrols	• **Enforcement patrols** • **VMS (commercial only)**	• n/a

	Alternative 1 No Action/Status Quo	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3 (Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management/ Prohibit Commercial Fishing
What records do commercial vessels and processors have to complete?	• Fish tickets	• Paper fish tickets or eLandings • Logbook • State requirements consistent with the FMP	• **eLandings (processor or catcher/seller)** • **Federal processor permit (processor)** • **Federal salmon buyer permit (processor or catcher/seller)** • **Logbook (vessel)**	• n/a
How are marine mammal and seabird interactions monitored?	• Self-reporting	• Self-reporting	• Self-reporting	• n/a

How are catch, bycatch and discards accounted for? (SBRM)	• Fish tickets, only if landed	• Commercial Fishery
		  ○ Paper fish tickets or eLandings with separate State and EEZ reporting areas
		  ○ Logbook
		• Recreational Fishery
		  ○ SWHS
		  ○ creel surveys
		  ○ Saltwater Guide Logbooks
			• **Commercial Fishery**
			  ○ **eLandings with EEZ reporting**
			  ○ **Logbook**
			• **Recreational Fishery**
			  ○ **SWHS**
			  ○ **creel surveys**
			  ○ **Saltwater Guide Logbooks**
				• n/a

What happens if ACLs are exceeded (Accountability Measures)	• n/a	• Postseason ACL - ACL reduction in future seasons	• Preseason ACL - NMFS inseason authority to close fishery • Postseason ACL - Management review, future closures, or other management actions as needed	• The ACL for the Cook Inlet EEZ Subarea is zero and no additional accountability measures are required

	Alternative 1 No Action/Status Quo	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3** **(Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management/ Prohibit Commercial Fishing

Process for determining the status of stocks	• State review of realized escapements relative to escapement goals
	• stocks of concern system
		• Option 1: SSC and Council process
		  ○ review of realized escapements relative to escapement goals
		  ○ review OFL/ABC
		  ○ similar to BSAI crab specs
		• Option 2: Peer review/SSC/State/Council process
		  ○ Uses same reference points as Option 1
		  ○ Annually reviewed by Peer review process
		  ○ Triennial SSC review of changes to State management targets on EEZ SDC
		•
			• SSC and Council process
			  ○ review of realized escapements relative to escapement goals
			  ○ preseason determination of OFL/ABC/TAC
			  ○ post-season evaluation of SDC
			  ○ Proposed and final harvest specifications in the *Federal Register*
			  ○ similar to groundfish harvest specifications
			  ○ A multi-year harvest specification process is allowed but not considered viable due to a lack of Federal expertise with salmon management
			• Option 1: Establish a Salmon Plan Team to complete the assessments and make recommendations to the SSC and Council
			• **Option 2: Do not establish a plan team. NMFS would develop assessments for the SSC and Council**
				• n/a

How is overfished/overfishing determined?	• n/a	• Status is based on comparison to quantities summed over one salmon generation time
		• Overfishing = EEZ MFMT exceeded
		  ○ Catch/Run > Max Yield/Run
		  ○ Overfished = Escapements below ½ of goal over a generation
			• Status is based on comparison to quantities summed over one salmon generation time
			• Overfishing = EEZ MFMT exceeded
			  ○ Catch/Run > Max Yield/Run
			• Overfished = Escapements below ½ of goal over a generation
				• n/a

	Alternative 1 No Action/Status Quo	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3 (Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management/ Prohibit Commercial Fishing

How is OY determined?	• n/a	• Option 1
		  ○ OY = Range of sum fishery catches within escapement goals
		• Option 2
		  ○ OY = Range of sum EEZ fishery ACLs
		• Option 3
		• Range between the 3 year average highest and lowest EEZ average catches
			• Option 1
			  ○ OY = Range of sum fishery catches within escapement goals
			• Option 2
			  ○ OY = Range of sum EEZ fishery ACLs
			• **Option 3**
			  ○ **Range between the 3 year average highest and lowest EEZ average catches**
				• Range of sum fishery catches in Cook Inlet, which results in a post-harvest abundance within the escapement goal range for stocks with escapement goals, and below the historically sustainable average catch for stocks without escapement goals, except when management measures required to conserve weak stocks necessarily limit catch of healthy stocks.

How are MSA consistency issues resolved?	• n/a for the West Area	• First to the State, then to NMFS	• n/a	• n/a

Table ES-2 Actions and events that would contribute on a continuing basis to the annual Federal management process for drift gillnet fishery in the Cook Inlet EEZ. Differential considerations under Alternatives 2, 3 and 4 are also provided.

Timing	Lead	Action	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3** **(Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management / Prohibit Commercial Fishing
Nov -Jan	**ADF&G**	**Run forecast Advisory Announcements:** -Run forecasts -Harvest projections -Methods	Include EEZ harvest considerations	Forecast total run and State/EEZ harvests, plan harvest specifications	n/a
Nov -Jan	**ADF&G**	**Annual Management Reports:** -Commercial salmon fishery -Price, average weight, and participation -Salmon enhancement -Stock status and outlook -Subsistence and personal use fisheries -Educational fisheries -Personal use salmon fishery -Season data -Historical data -Salmon outlook and forecast	Include EEZ harvest report	State report only covers fisheries operating in State waters.	n/a
Annually pending availability of State data (Jan. to Feb.)	**Salmon Plan Team or Agency**	**SAFE or management report (Abbreviated)** R**ecommend** -OFL/ABC -Year Y-1 Postseason ACLs, Year Y Preseason ACLs -Accountability Measures, as needed **Review, comments on** -Run, harvest estimates from previous year -Current year fishery performance relative to EGs -Technical improvements	Plan team or State would develop SAFE or management report so that it provides comprehensive view of stocks including Federal fishery reference points and considerations	NMFS would develop SAFE to provide information needed for management of EEZ fishery including Federal fishery reference points and considerations	n/a

Timing	Lead	Action	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3** **(Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management / Prohibit Commercial Fishing
Annually following Salmon Plan Team or State management meeting	**SSC or Peer Review**	**Determine** -Stock status -OFL/ABC -Year Y-1 Postseason ACLs, -Year Y Preseason ACLs -*TAC, TAC buffer that will prevent ACL overage (Alt 3 only)* **Review/Recommend:** -Accountability Measures, as needed -Run, harvest estimates from previous year -Current year fishery performance relative to EGs -Technical improvements	Opportunity for SSC to maintain productive technical / analytical dialog with the State in addition to ensuring review of Federal reference points for ACL overages, overfishing, and overfished determinations	Emphasis on management uncertainty, estimating State water harvest, appropriate buffers on preseason ACL and TAC for Federal waters	n/a
Annually following SSC or Peer Review meeting	**Council**	**Approve**: -OFL/ABC -Year Y-1 Postseason ACLs -Year Y Preseason ACLs -Accountability Measures, as needed -TAC, TAC buffer that will prevent ACL overage (Alt 3 only)	Initiating any appropriate Federal responses to ACL overages, overfishing, overfished	Initiating appropriate Federal responses to ACL overages, overfishing, overfished	n/a

Timing	Lead	Action	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3 (Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management / Prohibit Commercial Fishing
***Every 3 years, in coordination with the State's Escapement Goal Review Cycle**	**Salmon Plan Team or Agency**	**SAFE (Comprehensive)** **Recommend:** - Stock status - OFL/ABC - Year Y-1 Postseason ACLs, Year Y Preseason ACLs - Accountability Measures, as needed *- TAC, TAC buffer that will prevent ACL overage (Alt 3 only)* - Technical discussions with State * Tier changes * Revisions to management objectives, reference points * Discussions with State scientists on escapement goal analyses, models that relate mixed-stock impacts to stock-specific objectives and reference points	State or SPT coordinates review of Federal reference points based on any new information from State EGR reviews	NMFS would incorporate any new information from State EGR or other available information into assessments (reference points) and SDC.	n/a

Timing	Lead	Action	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3 (Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management / Prohibit Commercial Fishing
***Every 3 years, …**	**SSC**	**Determine** - Stock status - OFL/ABC - Year Y-1 Postseason ACLs, -Year Y Preseason ACLs *- TAC, TAC buffer that will prevent ACL overage (Alt 3 only)* **Recommend:** - Accountability Measures, as needed - Run, harvest estimates from previous year - Comments on fishery performance relative to EGs - Technical discussions with State scientists * Tier changes * Revisions to management objectives, reference points * Discussions with State scientists on escapement goal analyses, models that relate mixed-stock impacts to stock-specific objectives and reference points	Opportunity for SSC review of Federal reference points and technical dialogue with State	Review of Federal reference points	n/a
***Every 3 years, …**	**Council**	**Approve**: -OFL/ABC -Year Y-1 Postseason ACLs -Year Y Preseason ACLs -Accountability Measures *-TAC, TAC buffer that will prevent ACL overage (Alt 3 only)* -Revisions to management objectives, reference points	Possible use of Joint Protocol Committee for overfished stocks	Federal review of Cook Inlet EEZ management and associated conditions in State waters	n/a

Timing	Lead	Action	**Alternative 2** Federal Management/ Delegation to the State	**Alternative 3 (Preferred)** Federal Management/ No Delegation to the State	**Alternative 4** Federal Management / Prohibit Commercial Fishing
Annually (effective by season opener in June)	**NMFS**	**Rulemaking (Alt 3 only)-** Proposed and final salmon harvest specifications in the Federal Register	Rulemaking not necessary except for FMP and federal regulatory amendments.	Proposed and final harvest specifications effective before fishery opens. Other FMP and regulatory adjustments made through FMP amendment and rulemaking.	n/a
Annually (Jun-Aug)	**ADF&G**	**Inseason Management** **Monitor:** runs and harvest **Adjust:** time/area access	Manages EEZ existing methodology, consistent with FMP criteria and MSA requirements	ADF&G communicates with NMFS about ongoing management of State waters	n/a
Annually (Jun-Aug)	**NMFS**	**Inseason Management** **Monitor:** catches **Adjust:** access - fishery closure	Data collection and reviewing any requests for consistency with MSA.	Monitoring catch and inseason EEZ closure to avoid exceed TAC	n/a

Table ES-3 State of Alaska escapement goal review cycle and relevance to action.

State of Alaska Multi-Year Escapement Goal Review Cycle			Considerations relative to future Council process
Year 1	**ADF&G and the Board of Fisheries**	**Jan-Feb** - Publication of escapement goal report. **Feb-Mar-** Board of Fisheries (BOF) area mtg. Includes detailed escapement goal and stock of concern presentations. BOF makes regulatory changes as needed, adopts stocks of concern and develop action plans, adopt OEGs/in-river run goals. **Apr** - Directors' memo adopting the recommended escapement goal changes. Escapement goal changes implemented for that year's fishing season.	Joint Protocol Committee meeting, other means of enhancing Council-BOF communication may be necessary
Year 2	**ADF&G**	**Oct-Nov**- Formation and first meeting of interdivisional escapement goal review team (typically set assignments of which goals will be reviewed and analyses needed) **Nov-Dec -** Biologists and biometricians work on analyses, periodic escapement goal review team meetings to review ongoing analyses, etc.	Potential for early input or review from the SPT on EGR preparation and/or analyses.
Year 3	**ADF&G and the BOF**	**Jan-Feb** - Biologists and biometricians work on analyses, periodic escapement goal review team meetings to review ongoing analyses, etc. **Mar** - Escapement goal memo sent to CF and SF Directors and provided to BOF and public in time for public proposal submission for the BOF area meeting. **Feb-Dec** - Escapement goal report authors draft report and escapement goal review team meets as necessary. **Sept** - Stock of concern memo from ADF&G Directors submitted to BOF with recommendations for listing or delisting stocks. **Oct** - BOF work session - overview presentation of escapement goal and stock of concern recommendations from ADF&G.	SPT and SSC review/comment on impacts of escapement goal changes and Stock of Concern designations to Federal reference points.

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1. Introduction

The Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska (FMP) manages the salmon fisheries in the United States Exclusive Economic Zone (EEZ; 3 nautical miles to 200 nautical miles offshore) off Alaska. The North Pacific Fishery Management Council (NPFMC or Council) developed this FMP under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA). In 2012, the Council comprehensively revised the FMP to comply with the recent Magnuson-Stevens Act requirements, such as annual catch limits and accountability measures, and to more clearly reflect the Council's policy with regard to State of Alaska management authority for commercial and sport salmon fisheries in the EEZ. Now, in response to a United States Court of Appeals Ninth Circuit ruling and a U.S. District Court ruling, NMFS is considering how to revise the FMP to manage the salmon fisheries that occur in the EEZ waters of Cook Inlet that had been removed from Federal management with the 2012 revisions to the FMP. NMFS is considering new management measures that comply with Magnuson-Stevens Act requirements for the Cook Inlet commercial salmon fishery in the EEZ, such as status determination criteria, annual catch limits, and accountability measures.

1.1. History of the Salmon FMP

The North Pacific Fishery Management Council's (Council's or NPFMC's) *Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska* manages the Pacific salmon fisheries in the United States Exclusive Economic Zone (EEZ) from 3 nautical miles to 200 nautical miles off Alaska. The Council developed this fishery management plan (FMP) under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA). Upon approval by the Secretary of Commerce (Secretary), the FMP became effective in 1979 (1979 FMP) and was comprehensively revised in 1990 (1990 FMP, NPFMC 1990b) and in 2012 (FMP).[2]

The 1979 *Fishery Management Plan for the High Seas Salmon Fishery off the Coast of Alaska East of 175 Degrees East Longitude* established the Council's authority over all five species of Pacific salmon and the fisheries for those salmon in the EEZ, then known as the U.S. Fishery Conservation Zone. The five species of Pacific salmon managed by the FMP are:

Chinook salmon (king), *Oncorhynchus tshawytscha*;
Coho salmon (silver), *Oncorhynchus kisutch*;
Pink salmon (humpy), *Oncorhynchus gorbuscha*;
Sockeye salmon (red), *Oncorhynchus nerka*; and
Chum salmon (dog), *Oncorhynchus keta.*

The Council excluded from FMP coverage the Federal waters west of 175° east longitude (near Attu Island) because the salmon fisheries in that area were under the jurisdiction of the *International Convention for the High Seas Fisheries of the North Pacific Ocean*.

The Council divided the U.S. Fishery Conservation Zone covered by the plan into a West Area and an East Area with the boundary between the two areas at Cape Suckling, at 143°53.6' W. longitude. It authorized sport salmon fishing in both areas, prohibited commercial salmon fishing in the West Area (except in three traditional net fishing areas managed by the State of Alaska [State]),[3] and authorized commercial troll fishing only in the East Area. These prohibitions maintained the 1952 prohibition on commercial net salmon fishing and the 1973 prohibition on commercial troll salmon fishing in the West Area. The 1979 FMP's primary management measure was to limit entry in the commercial troll fishery in

[2] The Salmon FMP is available at https://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMP.pdf

[3] These areas are Cook Inlet, Prince William Sound, and South Alaska Peninsula.

the East Area. Most of the other management measures for the salmon fisheries in the U.S. Fishery Conservation Zone were equivalent to State regulations in the adjacent State waters.

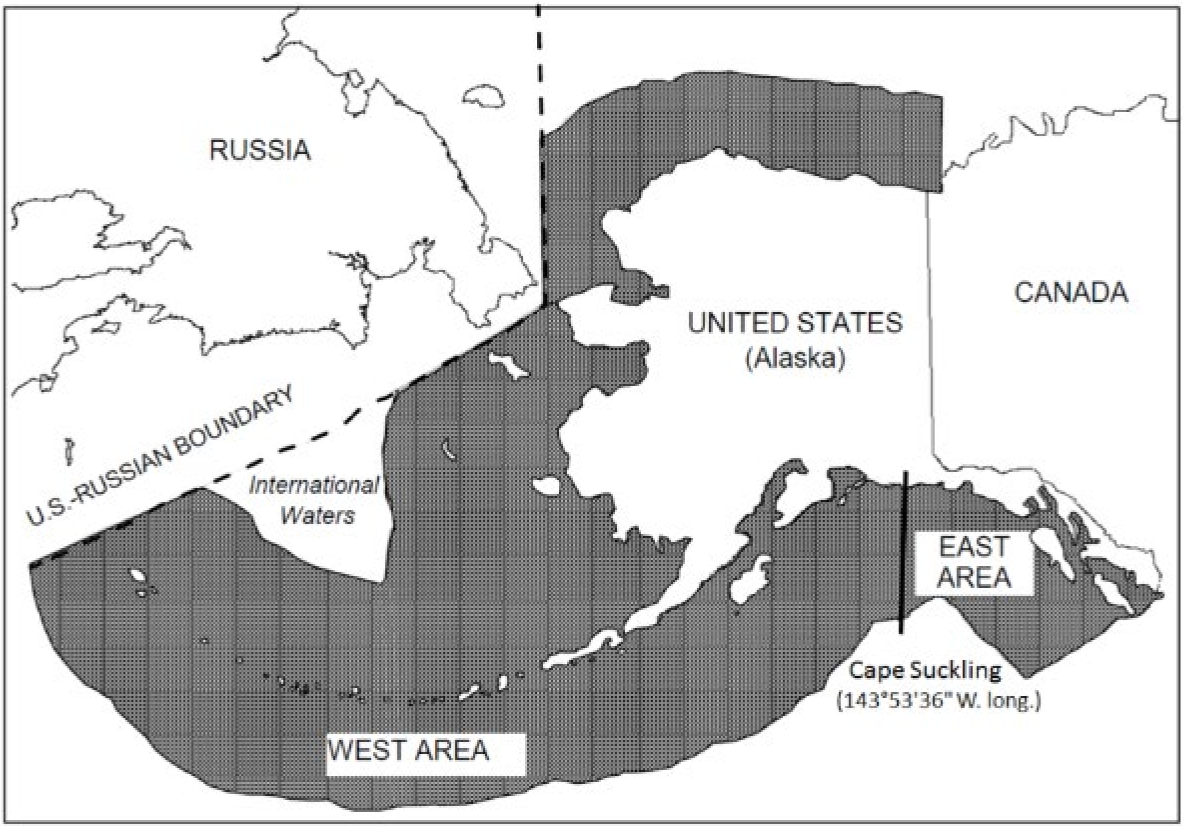
The 1979 FMP did not extend the general fishing prohibition in the West Area to the three traditional net fishing areas because, as the 1979 FMP notes, fishing was authorized by other Federal law, specifically the *International Convention for the High Seas Fisheries of the North Pacific Ocean*, as implemented by the *North Pacific Fisheries Act of 1954* (1954 Act). Under the authority of the 1954 Act, NMFS issued regulations that set the outside fishing boundaries for salmon net fishing in Alaska as those set forth under State regulations and provided that the Federal regulations for any fishing conducted in legal waters outside of State jurisdiction shall be conducted under fishing regulations promulgated by the State.[4]

With time, the 1979 FMP became outdated and some of Alaska's management measures had changed. In 1990, the Council amended the FMP to update it, correct minor errors, and remove itself from routine management of the salmon fisheries in the East Area. Also, a provision of the MSA required that any plan amendment submitted after January 1, 1987, consider fish habitat and accommodate vessel safety. Finally, the 1979 FMP needed to incorporate the Pacific Salmon Treaty's restrictions on Alaskan salmon fisheries. The 1990 FMP included these changes in a reorganized and shortened document with a more appropriate title, *Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska*.

In the 1990 FMP, the Council reaffirmed its decision that existing and future salmon fisheries occurring in the EEZ require varying degrees of Federal management and oversight. The 1990 FMP (1) continued to authorize commercial hand-troll and power-troll salmon fishing in the East Area, (2) allowed sport fishing in the EEZ in the East and West Areas, (3) delegated regulation of the sport and commercial fisheries in the East Area to the State, (4) retained the general prohibition on salmon fishing with nets in the EEZ, with the exception of commercial net salmon fisheries that occur in three delineated areas of the EEZ, (5) retained the prohibition on commercial salmon fishing in the West Area, with the exception of commercial net salmon fisheries that occur in three delineated areas of the EEZ, and (6) expanded the scope of the 1990 FMP to include the EEZ waters west of 175° east longitude (see Figure 1-1).

[4] 35 FR 7070, May 5, 1970. 50 CFR 210.1.

Figure 1-1 The 1990 FMP's management area, showing the East and West Areas.



Description of the East Area under the 1990 FMP

The East Area is that portion of the EEZ off Alaska east of Cape Suckling.[5] Under the 1990 FMP, the Council delegated the regulation of the commercial troll and sport salmon fisheries in the East Area to the State of Alaska, pursuant to the MSA. The Southeast Alaska commercial salmon troll fishery was the only commercial fishery authorized in the East Area. The Southeast Alaska commercial troll fishery in the EEZ is a mixed-stock, mixed-species fishery that primarily targets Chinook and coho salmon; pink, chum, and sockeye salmon are also taken. The 1990 FMP set forth the Council's management goals and objectives for the salmon fisheries in the East Area, which accordingly focused on the Southeast Alaska commercial troll fishery.[6] The 1990 FMP deferred management of the Southeast Alaska troll fishery to the State. Commercial salmon fishing with net gear was prohibited in the East Area.

The troll fishery operates in both State and Federal waters, although the majority of the catch and effort occurs in State waters. The State collects fisheries information from the troll fishery as a whole and does not separate the fishery in the EEZ from the State-waters fishery. The troll fishery harvests less than 1% of the total harvest of pink, chum, and sockeye salmon occurring in southeast waters. The troll fishery has two seasons, the winter season, October 11 through April 30, and the summer season, May 1 through September 30. The winter troll fishery is limited to within State waters; the summer troll fishery occurs in Federal and State waters. More information on this fishery is provided in the EA for Amendment 12.

[5] Note that the East Area is outside of Alexander Archipelago and does not include the waters between the islands and the mainland, per MSA § 306(a)(2)(C).
[6] 1990 FMP, section 4.2, including subsections.

Description of the West Area under the 1990 FMP

The 1990 FMP defined the West Area as that portion of the EEZ off Alaska west of Cape Suckling. It includes the EEZ in the Bering, Chukchi, and Beaufort Seas, the Arctic Ocean, and North Pacific Ocean west of Cape Suckling. The 1990 FMP prohibited commercial salmon fishing in most of the West Area but permitted commercial fishing for salmon with nets in three small areas of the EEZ adjacent to State net fisheries. The 1990 FMP described these areas in Section 2.2.2 and Appendix C of the 1990 FMP as the Alaska Peninsula area, the Prince William Sound area, and the Cook Inlet area.

The 1990 FMP was vague on the function of the FMP in the three areas. Although the FMP broadly included these three areas and the salmon and fisheries that occur there within the fishery management unit (FMU) and stated that management of these areas was left to the State under other Federal law, the 1990 FMP did not explicitly delegate management of these salmon fisheries to the State.[7] The 1990 FMP did not contain any management goals or objectives for these three areas or any provisions with which to manage salmon fishing. The 1990 FMP only refrained from extending the general fishing prohibition to those areas, where, as the 1990 FMP notes, fishing was authorized by other Federal law, specifically the *International Convention for the High Seas Fisheries of the North Pacific Ocean* as implemented by the *North Pacific Fisheries Act of 1954* (1954 Act).[8]

Changes since 1990

On October 29, 1992, Congress repealed the 1954 Act and implemented the *North Pacific Anadromous Stocks Act of 1992* (1992 Stocks Act).[9] The 1992 Stocks Act implements the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, which replaced the International Convention for the High Seas Fisheries of the North Pacific Ocean. However, the 1992 Stocks Act and the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean differ from the 1954 Act and International Convention for the High Seas Fisheries of the North Pacific Ocean in that they do not extend into the U.S. EEZ. Therefore, the other Federal law that authorized State management of the net fisheries, in lieu of the 1990 FMP, no longer existed. In 1995, as a result of this change in Federal law, NMFS repealed the regulations at 50 CFR 210.1 because they were without statutory basis.[10] At that time, the 1990 FMP was not amended to reflect these changes in international law.

In 2010, the Council began a comprehensive review of the 1990 FMP and consideration of its management strategy and scope of coverage. Since 1990, State fishery regulations and Federal and international laws affecting Alaska salmon had changed and the reauthorized MSA expanded the requirements for fishery management plans. The Council also recognized that the 1990 FMP was vague with respect to management authority for the three directed commercial salmon fisheries that occur in the West Area. The Council decided to update the 1990 FMP to comply with the current MSA requirements and to more clearly reflect the Council’s policy with regard to the State of Alaska’s management authority over commercial fisheries in the West Area, the commercial troll fishery in the East Area, and the sport fishery.

In December 2010, Council staff presented a discussion paper on the FMP that described the scope of the 1990 FMP and identified options for, and discussed the issues with, modifying the scope of the FMP (NPFMC 2010). The discussion paper also presented options for updating the 1990 FMP to comply with the MSA and the National Standard (NS) 1 Guidelines requirements for annual catch limits (ACLs) and accountability measures for stocks managed under an FMP. In December 2010, the Council unanimously

[7] 1990 FMP, section 2.2.2.
[8] 1990 FMP, section 2.2.2.
[9] The North Pacific Anadromous Stocks Act of 1992, Public Law 102-567, is codified at 16 USC. §§ 5001-5012.
[10] 60 FR 39272, August 2, 1995.

passed a motion that directed staff to initiate analysis of updates to the 1990 FMP based on the Council's draft problem Statement, alternatives, and options.

In April 2011, the Council reviewed a preliminary document that, along with a draft of the FMP that combined the 1990 FMP with all of the subsequent amendments, provided a thorough review of the amended 1990 FMP and a basic discussion of how and to what degree Federal requirements were addressed in the amended 1990 FMP. That document also provided some preliminary options for modifying FMP provisions and highlighted areas where the Council may want to recommend changes to the FMP's management measures. With this background and suite of possible options, the Council gave further direction on how to move forward with revising and analyzing the FMP and identified a preliminary preferred alternative.

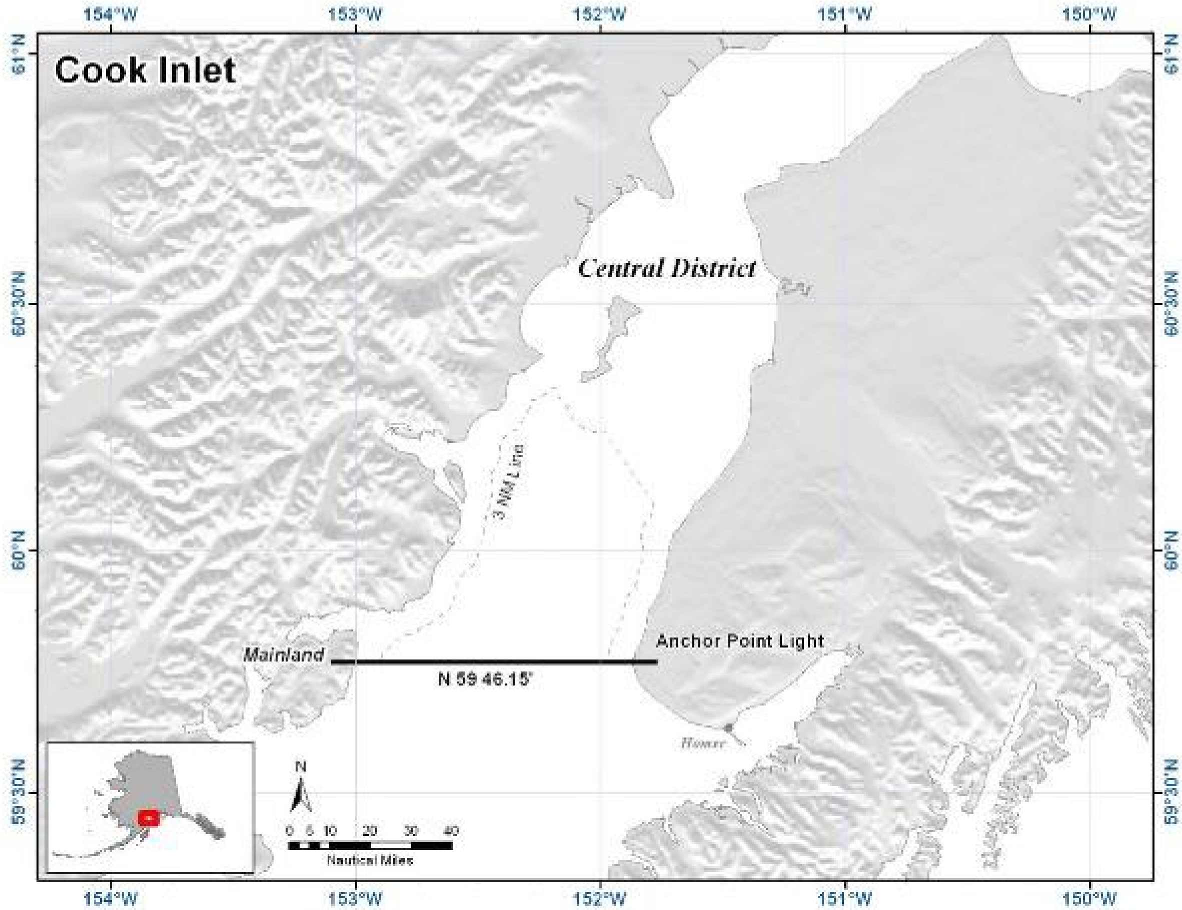
In September 2011, the Council reviewed an initial review draft analysis and a working draft FMP and received public comments on both documents. In December 2011, the Council took final action to recommend Amendment 12.

Amendment 12 retained the same fishery management unit for the East Area as the 1990 FMP and retained the delegation of the regulation of the commercial troll and sport salmon fisheries in the East Area to the State of Alaska, pursuant to the MSA. Amendment 12 also retained the five species of Pacific salmon in the EEZ in the FMU.

Amendment 12 retained the commercial salmon fishing closure for the vast majority of the EEZ west of Cape Suckling. The primary difference in the FMU for the West Area is that instead of keeping the three traditional net areas in the FMU, imposing Federal management on the salmon fisheries in these three traditional areas, and delegating management to the State, Amendment 12 removed these areas from the FMU, thereby allowing the State to manage these fisheries independently and not through a Federal delegation of management authority under an FMP.

Figure 1-2 shows the Cook Inlet EEZ area. The EA prepared for Amendment 12 provides a detailed comparison of the changes from the 1990 FMP to the FMP with Amendment 12. This section focuses on a comparison of the three traditional net fishing areas.

Figure 1-2 The Cook Inlet EEZ area that would be managed by this proposed action.



Removing these three areas from the Salmon FMP's management area excluded the salmon fisheries that occur in those areas from Federal fisheries management. Any commercial fishing for salmon by State registered vessels in the EEZ in these three areas is managed by the State. The Salmon FMP continued to prohibit commercial salmon fishing in the redefined West Area. Amendment 12 also removed the sport fishery in the West Area from Federal management. Any sport fishing for salmon by State registered vessels in the EEZ west of Cape Suckling is managed by the State.

Removing the three traditional net fishing areas from the Salmon FMP resulted in pockets of EEZ waters where commercial salmon fisheries occur but are not managed under the FMP. The State continues to manage salmon fisheries in these three traditional net fishing areas, including the portion of the fisheries within EEZ waters. Management of these fisheries is not delegated to the State under the Salmon FMP as there was no assertion of Federal authority over the commercial fisheries in these areas that could be delegated. The State has the authority to regulate State registered vessels and there is no Federal management scheme for these areas or the sport fishery in the West Area.

In developing Amendment 12, the Council considered Federal management of the three traditional net fishing areas and the salmon fisheries that occur within them, but determined that (1) the State was managing the salmon fisheries within these three area consistent with the policies and standards of the MSA, (2) the Council and NMFS did not have the expertise or infrastructure to manage Alaska salmon fisheries, and (3) Federal management of these areas would not serve a useful purpose or provide additional benefits and protections to the salmon fisheries within these areas. The Council recognized that salmon are best managed as a unit throughout their range and parsing out a portion of a fishery because it occurred in Federal waters and applying a separate management structure on that piece of the fishery would not be the optimal way to manage salmon. The Council also recognized the State's long-standing expertise and infrastructure for salmon management and the fact that the State has been adequately managing the salmon fisheries in Alaska since Statehood. The Council determined that the Salmon FMP maintained the Council's policy for salmon management established with the original FMP in 1979.

NMFS published a notice of availability for Amendment 12 on April 2, 2012 (77 FR 19605) and a proposed rule on April 11, 2012 (77 FR 21716). The proposed rule to implement Amendment 12 revised specific regulations and removed obsolete regulations in accordance with the modifications proposed by Amendment 12. NMFS approved Amendment 12 on June 29, 2012 and published the final rule on December 21, 2016 (77 FR 75570).

On August 12, 2021, the Secretary of Commerce approved Amendment 14 (86 FR 60568, November 3, 2021). In December 2020, the Council recommended Amendment 14 to modify the scope of the FMP and federal management. Amendment 14 included the Cook Inlet EEZ Subarea, which was previously removed from the FMP through Amendment 12, and applies the West Area's prohibition on commercial salmon fishing to the newly incorporated Cook Inlet EEZ Subarea. The history and development of Amendment 14 is chronicled in Sections 1.2 and 1.3. As described in the executive summary, Amendment 14 was vacated.

The *Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska*, as amended through Amendment 15, is referred to as the Salmon FMP in this document.

Table 1-1 details each of the fourteen amendments to the FMP since 1979.

Table 1-1 Amendments to the Salmon FMP.

Amendment	Year Approved	Pertinent Function(s)	*Federal Register* document citation
FMP for the High Seas Salmon Fisheries off the Coast of Alaska East of 175 Degrees East Longitude	1979 - 1981	• Establishes Council and NMFS authority over the salmon fisheries in Federal waters from 3 to 200 miles seaward. • Excluded waters west of 175°E. long. from FMP.	
Amendment 1	1980	• Makes several changes to conform the FMP and implementing regulations to State regulations.	45 FR 34020 May 21, 1980
Amendment 2	1981	• Makes several changes to conform the FMP and implementing regulations to State regulations. • Modifies the objectives of the plan. • Reduces the ABC and OY for Chinook salmon in the East Area by 15 percent.	46 FR 57299 November 23, 1981
Amendment 3 *FMP for the Salmon Fisheries in the EEZ off the Coast of Alaska*	1990	• Extends jurisdiction of FMP to EEZ west of 175°E. long. • Defers regulation of sport and commercial fisheries to State. • Effectively removes Council and NMFS from routine management but expressly maintained Federal participation, oversight, and final authority.	55 FR 47773 November 15, 1990
Amendment 4 *(modified by Amend 6)*		• Provides a definition of overfishing, as required by National Oceanic and Atmospheric Administration (NOAA) regulations at 50 CFR 602.	56 FR 12385 March 25, 1991
Amendment 5 *(superseded by Amend 7)*	1998	• Implements Essential Fish Habitat (EFH) provisions contained in the MSA and 50 CFR 600.815. • Describes and identifies EFH fish habitat for anadromous fish. • Describes and identifies fishing and non-fishing threats to salmon EFH, research needs, habitat areas of particular concern, and EFH conservation and enhancement recommendations.	64 FR 20216 April 26, 1999
Amendment 6 *Revise Definitions of Overfishing, MSY, and OY*	2002	• Updates the FMP with new definitions of overfishing in compliance with the MSA, consistent with the NS Guidelines and State and Federal cooperative management and based on the State's salmon management and the Pacific Salmon Treaty. • Implements a maximum sustainable yield control rule, maximum fishing mortality rate, and minimum stock size threshold for the Southeast Alaska troll fishery	67 FR 1163 January 9, 2002
Amendments 7 and 8 *Essential Fish Habitat and Habitat Areas of Particular Concern*	2006	• Amendment 7 supersedes Amendment 5 • Updates descriptions of EFH and Habitat Areas of Particular Concern (HAPC) within the FMP • Makes conservation and enhancement recommendations for EFH and HAPCs • Identifies and authorizes protection measures for EFH and HAPCs	71 FR 36694 June 28, 2006
Amendment 9 *Aleutian Islands Habitat Conservation Area*	2008	• Revises the boundaries of the Aleutian Islands Habitat Conservation Area described in the FMP	73 FR 9035 February 19, 2008
Amendment 10 *Permit Fees*	2012	• Establish a system to collect fees for permits	77 FR 75570 December 21, 2012
Amendment 11 *Essential Fish Habitat*	2012	• Updates description of EFH impacts from non-fishing activities, and EFH conservation recommendations for non-fishing activities. • Revises the timeline associated with the HAPC process to a five-year timeline. • Updates EFH research priority objectives.	77 FR 75570 December 21, 2012
Amendment 12 *Revise Salmon FMP*	2012	• Updates FMP to comply with the MSA • Redefines the FMU in the West Areas to remove Cook Inlet, Prince William Sound, and the South Alaska Peninsula. • Renames the FMP to "Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska."	77 FR 75570 December 21, 2012
Amendment 13 *Essential Fish Habitat*	2018	• Updates EFH descriptions • Replaces existing marine EFH maps in the FMP with the model-based maps for each species and life stage, as available.	83 FR 31340 July 5, 2018
Amendment 14 *West Area modifications* **[IMPLEMENTING REGULATIONS VACATED]**	2021	• Incorporates the Cook Inlet Area into the West Area as the Cook Inlet EEZ Subarea and applies the West Area prohibition on commercial salmon fishing thereto.	86 FR 60568 November 3, 2021
Amendment 15 *Standardized Bycatch Reporting*	2021	• Identified standardized bycatch reporting methodologies for fisheries managed under the Salmon FMP.	86 FR 51833 September 17, 2021

1.2. Salmon FMP litigation

The final rule implementing Amendment 12 was published in the *Federal Register* on December 21, 2012 (77 FR 75570). On January 18, 2013, Cook Inlet commercial salmon fishermen and seafood processors filed a lawsuit in Federal district court challenging Amendment 12 and its implementing regulations. *United Cook Inlet Drift Association, et al, v. NMFS*, 2014 WL 10988279 (D. Alaska 2014).

The lawsuit focused on Amendment 12's removal of the Cook Inlet Area from the Salmon FMP. Plaintiffs argued that removal of the Cook Inlet Area from the Salmon FMP violated Section 302(h)(1) of the MSA. Section 302(h)(1) states "Each Council shall…for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary (A) a fishery management plan, and (B) amendments to each such plan that are necessary from time to time..." Because the Council and NMFS had determined that the salmon fishery in the EEZ requires conservation and management, Plaintiffs argued that Section 302(h)(1) required the Salmon FMP to include all areas of the EEZ, including Federal waters in Cook Inlet, Prince William Sound, and the South Alaska Peninsula, in which the fishery requires conservation and management. Plaintiffs did not agree with NMFS's arguments that provisions of the MSA and the National Standard Guidelines provided the Council and NMFS with discretion in determining the scope of an FMP and that the FMP could exclude areas of the EEZ when the fishery in those areas was being adequately managed by another entity (i.e., the State of Alaska) and when the Council and NMFS determined that Federal management under an FMP would serve no useful purpose or provide additional conservation or management benefits. Plaintiffs also argued that Amendment 12 violated several provisions of the MSA, including NS 3 and 7, the Administrative Procedure Act (APA), and the National Environmental Policy Act (NEPA) because NMFS: (1) should have prepared an Environmental Impact Statement, rather than an Environmental Assessment, for Amendment 12; (2) failed to consider a reasonable range of alternatives; and (3) failed to adequately consider the impacts of its action. Shortly after the lawsuit was filed, the State of Alaska intervened as a defendant in the lawsuit.

In September 2014, the district court ruled in favor of NMFS and the State of Alaska. The district court concluded that the MSA was ambiguous as to whether NMFS could remove the Cook Inlet Area from the Salmon FMP and thereby defer management of the fishery within the Cook Inlet Area to the State of Alaska, but determined NMFS's interpretation of the MSA was reasonable. The district court also determined that NMFS had not violated other provisions of the MSA, NEPA, or the APA.

In November 2014, Plaintiffs appealed the district court decision, reiterating the arguments they made before the district court. *United Cook Inlet Drift Association, et al., v. NMFS*, 837 F.3d 1055 (9th Cir. 2016). In September 2016, the Ninth Circuit issued its decision, reversing the district court decision and ruling in favor of the Plaintiffs. The Ninth Circuit's decision focuses solely on Section 302(h)(1), determining that the language of Section 302(h)(1) clearly and unambiguously requires a Council to prepare and submit FMPs for each fishery under its authority that requires conservation and management. The Ninth Circuit found that no other provision in the MSA creates an exception to this statutory requirement or supports NMFS's arguments that this requirement applies to fisheries that require *Federal* conservation and management. The Ninth Circuit noted that when a Regional Fishery Management Council wants to opt for State management of a fishery that requires conservation and management, it can do so under Section 306(a)(3)(B) of the MSA, which authorizes delegation of management authority to a State under an FMP. Because the Council and NMFS concluded that the Cook Inlet salmon fishery requires conservation and management by some entity, the Ninth Circuit found that the Cook Inlet Area portion of the salmon fishery must be included in the FMP given the statutory language at Section 302(h)(1) of the MSA. For these reasons, the Ninth Circuit concluded that Amendment 12 was contrary to law to the extent that it removed Cook Inlet Area from the FMP. Because the Ninth Circuit determined that Amendment 12 violated Section 302(h)(1) of the MSA, it did not have to rule on any of Plaintiffs' other claims. The State of Alaska filed a request for rehearing, but the request was denied in November 2016.

On February 27, 2017, the State of Alaska filed a petition of writ of certiorari with the U.S. Supreme Court, asking the Court to hear the case. After briefing, the Supreme Court denied the State's petition on October 2, 2017.

Because the Ninth Circuit's decision is now final,[11] the Council and NMFS must amend the FMP to bring it into compliance with the Ninth Circuit's decision, the provisions of the MSA, and other applicable law. The Ninth Circuit's decision focuses on the Cook Inlet Area because that was the only net fishing area challenged by Plaintiffs. However, the Council and NMFS' record and rationale for excluding the Cook Inlet Area from the FMP are the same for the Alaska Peninsula Area and Prince William Sound Area. Therefore, the FMP will ultimately have to be amended to address all three traditional net fishing areas.

In response to the Ninth Circuit's decision, the Council and NMFS developed Amendment 14. This process is described in Sections 1.3 and 1.4.

Shortly after implementation, there were two legal challenges to Amendment 14 brought at the U.S. District Court for the District of Alaska.

In the first challenge, UCIDA argued that Amendment 14 violated the MSA, was not consistent with the Ninth Circuit's decision, and was arbitrary and capricious. Ultimately, the U.S. District Court for the District of Alaska found that NMFS's decision to exclude the recreational salmon fishery in the Cook Inlet EEZ Area from the FMP was arbitrary and capricious. The judge indicated that the Ninth Circuit determined that the Cook Inlet is a fishery within NMFS's jurisdiction requiring conservation and management pursuant to the MSA, and did not distinguish between the commercial and recreational interests. A reasoned explanation for its decision to exclude the recreational sector from the FMP for the Cook Inlet salmon fishery was not included.

The court also found that Amendment 14 implicitly delegated management of the Cook Inlet salmon fishery to the State of Alaska in a manner that was inconsistent with the Magnuson-Stevens Act by relying on State management measures to achieve OY without federal oversight.

The second legal challenge against Amendment 14 argued that the rule should be vacated as unconstitutional because the Council's members wield significant executive authority but were not properly appointed. The Court found in favor of the U.S. on this challenge on June 21, 2022.

As a result of the issues identified by the court, the implementation of the final rule for Amendment 14 was vacated and remanded to the agency for further proceedings.

1.3. Amending the FMP to address the 2016 Ninth Circuit Court's decision and the 2022 Alaska District Court decision

At its April 2017 meeting, the Council was presented with a discussion paper that provided a preliminary review of the steps needed to impose Federal jurisdiction over portions of three traditional salmon net fishing areas currently managed by the State of Alaska. These net areas include Federal waters in Cook Inlet, Prince William Sound, and the South Alaska Peninsula. The April 2017 discussion paper provided

[11] On August 3, 2017, the Alaska district court ordered a judgment that had been jointly submitted by the parties to the litigation. The judgment order 1) states that Amendment 12 is in effect for the three traditional net areas until superseded by FMP amendments that incorporate those areas into the Salmon FMP, 2) requires NMFS to file tri-annual status reports with the district court, and 3) establishes a process for the completion of a new amendment for the Cook Inlet EEZ that is complementary to the process set forth in the Magnuson-Stevens Act.

information on (1) the MSA requirements for the three traditional net areas that are not addressed in the FMP, (2) State salmon management in the three traditional net fishing areas, (3) the Pacific Council's and NMFS West Coast Region's complex process for establishing optimum yield, maximum sustainable yield, allowable biological catch, overfishing limits, minimum stock size thresholds, and annual catch limits for the salmon stocks caught in West Coast salmon fisheries, and (4) additional issues, such as fishery interactions with marine mammals and seabirds, to be analyzed in the Environmental Assessment prepared for the proposed action and its alternatives.

In April 2017, the Council developed preliminary alternatives for FMP management in the three traditional net fishing areas. The alternatives included an alternative that would delegate specific management measures to the State to use existing State salmon management to the extent possible and an alternative that would directly federally manage the fisheries occurring within the EEZ portion of these areas. The Council also directed staff to develop a range of options for the conservation and management measures required under 303(a) of the MSA and related MSA provisions.

> ***April 2017 Preliminary Purpose and Need***
>
> *The Council intends to amend the Salmon FMP to manage the three traditional net fishing areas that occur in Federal waters; Cook Inlet, Prince William Sound, and South Alaska Peninsula. Federal management in an FMP must meet the Magnuson-Stevens Act required provisions for an FMP in Section 303(a) and related Magnuson-Stevens Act provisions. This proposed action is necessary to bring the Salmon FMP into compliance with the Magnuson-Stevens Act consistent with the recent Ninth Circuit ruling (UCIDA et al. v. NMFS).*
>
> ***Preliminary Alternatives***
>
> ***Alternative 1****: Status quo – no amendments to the 2012 Salmon FMP.*
>
> ***Alternative 2****: Amend the Salmon FMP to include three traditional net fishing areas in the FMP's fishery management unit in the West Area and establish cooperative management for these salmon fisheries that delegates specific management measures to the State of Alaska, to use existing State salmon management to the extent possible, in compliance with the Magnuson-Stevens Act and Ninth Circuit ruling. Alternative 2 would identify those management functions that would be under Federal jurisdiction or delegated to the State and the process for delegation and cooperative management.*
>
> ***Alternative 3****: Amend the Salmon FMP to include three traditional net fishing areas in the FMP's fishery management unit in the West Area and apply Federal management to those portions of the fisheries that occur in the EEZ.*
>
> *Options for Alternative 2 and Alternative 3: Direct staff to develop a range of options for the conservation and management measures required under 303(a) of the Magnuson-*

Stevens Act and related Magnuson-Stevens Act provisions. Staff should prioritize their work on the following requirements —

- *management policy and objectives,*
- *conservation and management measures,*
- *status determination criteria,*
- *annual catch limits and accountability measures,*
- *methods to report bycatch and measures to minimize bycatch and the mortality of unavoidable bycatch,*
- *a salmon plan team or other process for annually determining status of the stocks and providing stock assessment and fishery evaluation information, and*
- *the process for review and appeal of State management measures applicable under the FMP.*

The Council also announced that it intended to form a workgroup comprised of stakeholders from Cook Inlet, Prince William Sound, and the South Alaska Peninsula, as well as the East Area to ensure that the affected public has appropriate input in the development of a new Salmon FMP amendment. The composition, scope, and schedule for a stakeholder workgroup was determined at subsequent meetings.

At its October 2017 meeting, the Council received an update from staff on preliminary development of a Salmon FMP amendment that would extend Federal management authority to the three traditional net fishing areas that are located in Federal waters but are currently exempt from the FMP. The expanded discussion paper presented at the October 2017 meeting provided potential options under the alternative management approaches currently under consideration. The expanded discussion paper addressed options for addressing specific MSA requirements for Federal FMPs. The options were developed by NMFS, State, and Council staff to address management policy and objectives, conservation and management measures, status determination criteria, annual catch limits and accountability measures, methods to report bycatch and measures to minimize bycatch and the mortality of unavoidable bycatch, a Fishery Impact Statement, the salmon plan team or other process for annually determining status of the stocks and providing stock assessment and fishery evaluation information, and the process for Federal oversight and review of State management measures applicable under the FMP.

Council and NMFS staff conducted an outreach meeting to gather input from interested salmon stakeholders before the Council discussed this agenda item. Information was gathered for the purpose of informing the Council on stakeholder opinion about the appropriate scope of a workgroup that would be involved in the development of an amendment that addresses the salmon fisheries in the Federal waters of Cook Inlet, Prince William Sound, and the Alaska Peninsula. Specifically, the panel was interested in stakeholder viewpoints on (1) specific issues the workgroup should focus on to be most effective, (2) the appropriate composition of the stakeholder workgroup, and (3) any other concerns stakeholders may have at present. Attendance at the meeting was approximately 30, including approximately 20 salmon stakeholders and 10 attendees from various government entities, including Council members.

At the October 2017 meeting, the Council decided to amend the Salmon FMP to manage the commercial salmon fishery in the Cook Inlet EEZ. Throughout this document, the term “Cook Inlet EEZ” refers to the traditional net fishing area north of the Anchor Point line[12] within Federal waters. While Cook Inlet also encompasses EEZ waters south of the Anchor Point line (considered the Lower Cook Inlet), commercial salmon fishing has not traditionally occurred in this portion of the EEZ, has been expressly prohibited in the FMP since 1979, and is not under consideration in this action. Furthermore, the Council determined

[12] This line at 59°46.15’ N. latitude is the boundary between ADF&G’s Upper and Lower Cook Inlet Management Areas.

that focusing on adding the Cook Inlet EEZ to the FMP first allows the Council to design a fishery management regime for the Cook Inlet EEZ that recognizes the complex issues in Cook Inlet. The Council intends to consider an FMP amendment to address the salmon fisheries in the EEZ of Prince William Sound and South Alaska Peninsula under a separate and subsequent action.[13]

In October 2017, the Council modified the preliminary purpose and need to read as follows.

> ***October 2017 Preliminary Purpose and Need***
>
> *The Council intends to amend the Salmon FMP to manage the traditional net fishing area that occurs in Federal waters of Cook Inlet. Federal management in an FMP must meet the Magnuson-Stevens Act required provisions for an FMP in Section 303(a) and related Magnuson-Stevens Act provisions. This proposed action is necessary to bring the Salmon FMP into compliance with the Magnuson-Stevens Act consistent with the recent Ninth Circuit ruling and the Judgement of the District Court in UCIDA et al., v. NMFS.*

The Council also directed NMFS and Council staff to continue to work with the State of Alaska to develop options for the conservation and management measures required under 303(a) of the MSA and related MSA provisions and prioritize their work on the following requirements:

- management policy and objectives,
- conservation and management measures,
- status determination criteria,
- annual catch limits and accountability measures,
- methods to report bycatch and measures to minimize bycatch and the mortality of unavoidable bycatch,
- the salmon plan team or other process for annually determining status of the stocks and providing stock assessment and fishery evaluation information, and
- the process for review and appeal of State management measures applicable under the FMP.

The Council also announced the formation of a Salmon Committee for stakeholders to address the required provisions for an FMP amendment to manage the commercial salmon fishery in the Federal waters of Cook Inlet.

As part of the Council and NMFS' ongoing process of direct engagement with Cook Inlet salmon stakeholders, and to develop the scope of work for the Salmon Committee, the Council solicited written proposals from the public to help the Council identify the specific required conservation and management measures under 303(a) of the MSA and related MSA provisions where a committee would assist in the evaluation of information relevant to the development of options for a fishery management plan amendment and serve a useful purpose.

At its April 2018 meeting, the Council reviewed stakeholder proposals on management of the commercial salmon fishery and used that information to develop an initial scope of work for a Salmon Committee and

[13] For its April 2018 meeting, NMFS provided the Council with a letter recommending that the Council also initiate a determination as to whether the salmon sport fishery in the West Area requires conservation and management under the Salmon FMP in light of the Ninth Circuit's decision on Amendment 12. (See here) NMFS explained that this determination is needed because the rationale for its removal was the same rationale for the removal of the three traditional net areas, which the Ninth Circuit found to be inconsistent with the MSA. NMFS advised that although this determination for the sport fishery in the West Area should be undertaken by the Council, it could be undertaken at a later time, possibly in tandem with the Council's plan for a separate and subsequent FMP amendment to address the commercial salmon fisheries in the EEZ of Prince William Sound and the South Alaska Peninsula. The Council took action to proceed with development of a Salmon FMP amendment applicable only to the commercial salmon fishery in the Cook Inlet EEZ at the April 2018 meeting.

solicited nominations for committee membership. Council staff held a call for nominations from April 12, 2018 to June 1, 2018. The Council received 33 nominations for individuals to be members of the Cook Inlet Salmon Committee.

At its December 2019 meeting, the Council clarified Alternative 2, emphasizing that if adopted, the FMP would establish Federal management of salmon fisheries in the Cook Inlet EEZ, with specific management measures being delegated to the State. Thus, the draft Purpose and Need and Alternatives were:

> ***December 2019 Draft Purpose and Need***
>
> *The Council intends to amend the Salmon FMP to manage the traditional net fishing area that occurs in Federal waters of Cook Inlet. Federal management in an FMP must meet the Magnuson-Stevens Act required provisions for an FMP in Section 303(a) and related Magnuson-Stevens Act provisions. This proposed action is necessary to bring the Salmon FMP into compliance with the Magnuson-Stevens Act consistent with the recent Ninth Circuit ruling and the Judgement of the District Court in UCIDA et al., v. NMFS.*
>
> ***Draft Alternatives***
>
> ***Alternative 1:*** *No Action. No amendment to the Salmon FMP. This alternative would maintain status quo. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.*
>
> ***Alternative 2:*** *Federal management with specific management measures delegated to the State. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and establish a Federal management regime for these salmon fisheries that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the Magnuson-Stevens Act and Ninth Circuit ruling. Alternative 2 would identify the management measures that would be managed by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.*
>
> ***Alternative 3:*** *Federal management. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management to those portions of the fisheries that occur in the EEZ.*

At its June 2020 meeting, the Council affirmed the following alternatives and moved the analysis forward for initial review at the October 2020 meeting. Additionally, they requested consideration of the Cook Inlet Salmon Committee's recommendations, which were not included in the existing alternatives.

> ***June 2020 Purpose and Need***
>
> *The Council intends to amend the Salmon FMP to manage the traditional net fishing area that occurs in Federal waters of Cook Inlet. Federal management in an FMP must meet the Magnuson-Stevens Act required provisions for an FMP in Section 303(a) and related Magnuson-Stevens Act provisions. This proposed action is necessary to bring the Salmon FMP into compliance with the Magnuson-Stevens Act consistent with the recent Ninth Circuit ruling and the Judgement of the District Court in UCIDA et al., v. NMFS.*

Alternatives

> ***Alternative 1:*** *No Action. No amendment to the Salmon FMP. This alternative would maintain status quo. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.*
>
> ***Alternative 2:*** *Federal management with specific management measures delegated to the State. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and establish a Federal management regime for these salmon fisheries that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the Magnuson-Stevens Act and Ninth Circuit ruling. Alternative 2 would identify the management measures that would be managed by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.*
>
> ***Alternative 3:*** *Federal management. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management to those portions of the fisheries that occur in the EEZ. At this time, the Council anticipates it will be able to take final action by December 2020. This schedule should provide the Council with sufficient time to develop its preferred alternative for the FMP amendment and allow NMFS to complete Secretarial review of the FMP amendment by the start of the 2022 fishing season.*
>
> The Council is not moving the Cook Inlet Salmon Committee's (Committee's) recommended alternative forward for analysis, but staff will include it in the section on alternatives considered but not analyzed further. The Council has been clear on its intent to manage the commercial salmon fishery in the EEZ, and not in State waters outside its jurisdiction. The Council requests staff evaluate the recommended management measures that may be applicable to the Council's alternatives and analyze the implications of incorporating these recommendations in the current suite of alternatives.

At its October 2020 meeting, the Council conducted its initial review of the analysis, affirmed the existing purpose and need statement, and recommended releasing the Initial Review Draft for public review. The Council also added Alternative 4, Federal management with the Cook Inlet EEZ closed to commercial salmon fishing. The alternative was added to differentiate closures that could occur under Alternative 3 based on stock status or when information needed for management is absent. Finally, the Council also modified Alternatives 2 and 3 to clarify that Federal management would only be applied to the commercial salmon fisheries.

October 2020 Alternatives

> ***Alternative 1:*** No Action. No amendment to the Salmon FMP. This alternative would maintain status quo. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.
>
> ***Alternative 2:*** Federal management of the commercial fishery in the EEZ with specific management measures delegated to the State. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and establish a Federal management regime for the salmon fishery that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the Magnuson-Stevens Act and Ninth Circuit ruling. Alternative 2

would identify the management measures that would be managed by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.

Alternative 3: Federal management of the commercial fishery in the EEZ. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management to the portion of the fishery that occurs in the EEZ.

Alternative 4: Federal management of the commercial fishery in the EEZ with the EEZ closed to commercial fishing. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management by extending the existing West Area prohibition on commercial salmon fishing in the EEZ to the Cook Inlet EEZ.

At its December 2020 meeting, the Council took final action on Cook Inlet salmon by selecting Alternative 4 - Federal management with the Cook Inlet EEZ closed to commercial salmon fishing, as its preferred alternative. The Council also passed a deeming motion to facilitate transmittal of the Council's action to NOAA Fisheries. NMFS implemented this recommendation as Amendment 14 (86 FR 60568, November 3, 2021).

After legal challenges, on June 21, 2022, the U.S. District Court for the District of Alaska vacated the implementing regulations for Amendment 14 to the Salmon FMP. At its October 2022 meeting, after receiving a litigation update from the NOAA Office of General Counsel, the Council requested that staff develop an analysis for a new amendment to the Salmon FMP for initial review at the December 2022 Council meeting with the following purpose and need statement. The Council indicated that staff should update the previous final review draft considered by the Council in December 2020 to reflect recent events and identify possible variations on the alternatives analyzed in that document that meet the purpose and need. This action is necessary now to make timely progress and allow for NMFS to implement an FMP amendment before June 2024.

October 2022 Purpose and Need

The Council intends to amend the Salmon FMP to manage salmon fishing in the Federal waters of upper Cook Inlet. Federal management must be consistent with the Magnuson-Stevens Act, including the required provisions for an FMP specified in section 303(a). This proposed action is necessary to bring the Salmon FMP into compliance with the Magnuson-Stevens Act consistent with the 2016 Ninth Circuit decision and the recent summary judgment opinion of the Alaska District Court in UCIDA et al. v. NMFS.

At its October 2022 meeting, the Council's motion did not identify specific alternatives, but requested that staff should update the previous final review draft considered by the Council in December 2020 to reflect recent events and identify possible variations on the alternatives analyzed in that document that meet the purpose and need. This is because the District court's remedy judgment, which had not yet occurred, could have impacted the timing and content of the eventual amendment, as well as the process to be used to develop the amendment. This was intended accommodate potential required modifications to the alternatives in the event further direction is provided by the court prior to the December Council meeting.

Based on District court's order, as well as the 2016 Ninth Circuit ruling, staff proposed the following modifications to the existing alternatives, which the Council adopted. It is noted that Alternative 1 (No

Action) has not been modified because it is required under NEPA for analytical purposes, and Alternative 4 was also not been modified because, as implemented, it was found contrary to law.

Draft Alternatives

Alternative 1: *No Action. No amendment to the Salmon FMP. This alternative would maintain the existing management regime, which excludes the Cook Inlet EEZ and the commercial salmon fishery within it from Federal management under the FMP. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.*

Alternative 2: *Federal management of the ~~commercial~~ fishery in the EEZ with specific management measures delegated to the State. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in ~~the West Area~~ and establish a Federal management regime for the ~~commercial~~ salmon fishery that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the MSA and Ninth Circuit ruling. Alternative 2 would identify the management measures that would be managed by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.*

Alternative 3: *Federal management of the ~~commercial~~ fishery in the EEZ. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit ~~in the West Area~~ and apply Federal management to the ~~commercial~~ salmon fishery that occurs in the EEZ.*

Alternative 4: *Federal management of the commercial fishery in the EEZ with the EEZ closed to commercial fishing. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management by applying the existing West Area prohibition on commercial salmon fishing in the EEZ to the Cook Inlet EEZ.*

Each Alternative contains elements that address:

- management policy and objectives,
- conservation and management measures,
- status determination criteria,
- annual catch limits and accountability measures,
- methods to report bycatch and measures to minimize bycatch and the mortality of unavoidable bycatch,
- a process to annually determine the status of the stocks and provide stock assessment and fishery evaluation information, and
- the process for Federal oversight and review of State management measures applicable to the commercial salmon fishery in the Cook Inlet EEZ and implemented under the authority delegated to the State by the FMP.
- monitoring, recordkeeping, and reporting requirements.

The Council's December 2022 action and current set of alternatives are fully described in Section 2.

1.4. NPFMC Cook Inlet Salmon Committee

The Council established the ad hoc Cook Inlet Salmon Committee (Committee) at its October 2017 meeting to assist in the development of measures necessary to amend the Salmon FMP to include the traditional net-fishing area in the EEZ adjacent to Cook Inlet in the FMP. The Council envisioned the Committee's primary tasks as (1) reviewing and providing comments on specific, Council-identified issues; (2) developing options for fishery management measures for specific, Council-identified management needs, and (3) providing perspectives on potential social and economic impacts of proposed fishery management measures.

At its June 2018 meeting, the Council appointed five members to the Committee. The Council tasked the Committee with review of issues related to the commercial drift gillnet salmon fishery in the Cook Inlet EEZ, and accordingly, that sector comprised most of the Committee's membership. When making initial appointments to the Committee, the Chairman of the Council stated that input from the commercial drift gillnet sector would be the major focus of the Committee, but also that other stakeholder groups could be added as the Council's needs of the Committee developed. Following the initial appointments, representatives from the salmon processing sector[14] and recent entrants[15] to the Cook Inlet commercial salmon drift gillnet fishery were added to the Committee.

Council solicitation of stakeholder involvement in the Committee was consistent with standard Council practice[16] and the Council SOPPs,[17] and so individuals were nominated from the public for appointment by the Council Chairman who announces any appointments to committees and other subsidiary bodies at the end of each Council meeting. Appointment of the initial Cook Inlet Salmon Committee membership was done in June 2018, just as the salmon drift gillnet season was beginning. The timing was intended by the Chairman to allow the appointees adequate time to prepare for their review of an initial FMP analysis in the fall of 2018. Additionally, when the Committee was formed, a "Scope of Work and Guiding Principles"[18] was provided to assist Committee members in participating effectively.

In 2018, the Council solicited and received written proposals from the public to help the Council identify the specific required conservation and management measures under 303(a) of the MSA and related MSA provisions where a committee would assist in the evaluation of information relevant to the development of options for a fishery management plan amendment and serve a useful purpose. The Council received proposals from individuals representing themselves and individuals representing both the United Cook Inlet Drift Association and Cook Inlet Fishermen's Fund (UCIDA/CIFF), the Cook Inlet Aquaculture Association, the Matanuska-Susitna Borough Fish and Wildlife Commission, the Community of Nikolaevsk, and the Kenai River Sportfishing Association.

A total of six Committee meetings were held from 2018 to 2020. All Committee meetings were announced according to Federal public noticing procedures[19] including publication in the *Federal Register*. Prior to each meeting, an agenda was prepared by the Committee Chairs and Council staff and was then reviewed by the members of the Committee for further refinement. Subsequently, the agenda and any meeting documents, including those suggested or prepared by Committee members was provided to the public via the Council's website.[20] At the Committee meetings, the Chairs provided generously for

[14] https://www.npfmc.org/call-for-nominations-5/
[15] https://www.npfmc.org/call-for-nominations-6/#CISC1
[16] https://npfmc.org/wp-content/PDFdocuments/membership/Brief_Guide_to_NPFMC_Committees.pdf
[17] https://www.npfmc.org/wp-content/PDFdocuments/membership/Council/NPFMC_SOPP_October2019.pdf
[18] https://www.npfmc.org/wp-content/PDFdocuments/membership/CISC/CISC_Scope_of_work_and_organizing_principles.pdf
[19] 5 U.S.C §552b
[20] https://www.npfmc.org/

comment and participation by any members of the public in attendance, including impromptu presentations as allowed by the rest of the Committee.

Following each meeting, Committee members reviewed the draft meeting report and provided edits, as necessary, which were incorporated into the final meeting report. At the Council meeting following a given Committee meeting, the Council reviewed the final Committee meeting report, discussed meeting outcomes with the Committee Chair, Council staff and any Committee members providing public testimony, and took action as necessary.

Management measure recommendations to the Council, in fulfillment of the intended purpose of the Committee, were slow to develop as reflected in the timeline of Committee Reports provided on the Council's webpage.[21] Most stakeholder members of the Committee had little or no previous involvement with the Council process, so staff provided ongoing guidance to Committee members on procedure, the primacy of their role in developing viable management approaches, and the jurisdictional limits of Federal fisheries management. For example, it was pointed out that the MSA addresses State jurisdiction explicitly, stating that nothing in the MSA should be construed as "extending or diminishing the jurisdiction or authority of any State within its boundaries." Nevertheless, the issue of jurisdiction was brought up at every Committee meeting, with many members strongly adhering to a perspective that the Federal FMP could supersede the State of Alaska on its management of salmon fisheries occurring solely within State waters, and also direct State decisions on setting salmon escapement goals under these circumstances. Additionally, many Committee members and public attendees considered past State salmon management decisions that resulted in less than maximum harvest to have violated the MSA by allowing "underfishing" and felt the Federal FMP was the appropriate tool to correct this.

After debate over these issues at several meetings constrained productive action by the Committee, the Council instructed the Committee to meet prior to the April 2020 Council meeting to develop final recommendations on management measures. The Committee held a two-day meeting on February 25-26, 2020 in Anchorage. Subsequent cancellation of the April 2020 Council meeting in response to the COVID-19 pandemic allowed for an additional Committee meeting, which was held online on May 26, 2020.

Committee development of management mechanisms for achieving their desired outcomes occurred primarily at the February and May 2020 Committee meetings. Up to and including those Committee meetings, stakeholders both on the Committee and those in public attendance indicated opposition to Alternative 3 as described in the analysis for the action at that meeting, because they felt it would reduce harvest opportunities in the Cook Inlet EEZ largely due to the need for precautionary management in the absence of a Federal salmon infrastructure in Alaska. Alternative 2, on the other hand, was expected to utilize the State of Alaska's widespread salmon data collection capabilities and was less likely to reduce harvest potential. In preparation for the February 2020 meeting, Committee members were provided with online tools for overwriting draft management measures developed by staff for Alternative 2 and replacing it with their preferred measures. The Reports from the February and May 2020 Committee meetings reflect a decision by staff to facilitate full expression of the Committee's desired outcomes by suspending any discussion of the legality of their recommendations. All Committee Reports, Committee meeting agendas and materials, and additional information is available on the Council web page for the Committee.[22]

[21] https://www.npfmc.org/

[22] https://www.npfmc.org/committees/cook-inlet-salmon-committee/

1.4.1. Cook Inlet Salmon Committee's Recommendations

A summary of the Committee's recommendations is provided below in order to facilitate review, while the Committee's full recommendations are provided in the May 2020 Committee Report (available on the Council's web page, see footnote 21).

1.4.1.1. Collaborative Federal and State Data Collection in Support of Salmon Management, Including Availability of Federal Resources

The Committee recommended that the Alaska Department of Fish and Game (ADF&G) and NMFS work in collaboration to provide information on which to base fishing regulations. Additionally, Federal resources could be provided to obtain the best scientific information available when determining Cook Inlet salmon stock assessment, both in river and for the offshore test boat fishery. This recommendation, provided by the Committee at the February 2020 Committee meeting, was provided separately from the Committee's Alternative 2 – Expanded Scope recommendation, which is summarized below.

1.4.1.2. Summary of the Committee's recommended Alternative 2 – Expanded Scope

The Committee's other recommendation was for an Alternative 2 – Expanded Scope (Alt 2-ES), a wholly new approach to Cook Inlet salmon management based on Federal jurisdictional override. The Committee recommended the Council accept Alt 2-ES for analysis and have it replace the existing Alternative 2 (i.e., that it not be added as a fourth alternative). At the June 2020 Council meeting, the Council chose not to include the Committee's recommend alternative in the range of alternatives analyzed, as discussed in detail in Section 2.7, Alternatives Considered but not Moved Forward for Analysis.

Revise the Management Objectives in the FMP

1. Prevent overfishing and achieve optimum yield
    a. Add preventing *underfishing* and achieve maximum sustainable yield (*MSY)*
2. Manage salmon as a unit throughout their range.
    a. Allow the Federal FMP to apply management throughout "the EEZ offshore of Alaska and all State waters including the benthic, estuarine and freshwater habitats necessary to salmon for spawning, breeding, feeding, or growth to maturity."
3. Minimize bycatch and bycatch mortality
    a. Add prohibitions on
        i. all fishing activities in salmon spawning areas during spawning activities,
        ii. catch and release fishing for returning/spawning salmon in estuaries or freshwater,
        iii. snagging of naturally spawning salmon stocks in sport fisheries.
4. Maximize economic and social benefits to the nation over time (minor edits)
5. Protect wild stocks and fully utilize hatchery production
    a. Add MSY
6. Promote safety (minor edits)
7. Identify and Protect Salmon Habitat (NEW Objective)

Revise the "Procedures for Implementation" under Alternative 2

Category 1 measures (Federal management measures that are fixed in the FMP, implemented by Federal regulation, and require an FMP amendment to change).

1. Create a *Salmon Technical Team* to set escapement goals under Federal law rather than allow the State to do this.
    a. The State could close seasons or areas to ensure that escapement goals are met.
2. *Legal Gear*
    a. Salmon in Cook Inlet are taken with a variety of gear types. The FMP would not authorize the State to change the types of legal net gear fishermen are permitted to use when harvesting salmon in Cook Inlet nor to modify gear specifications.

Category 2 management measures criteria (Management measures delegated to the State of Alaska). The following provides possible criteria for the Category 2 management measures.

1. Fishing Seasons
    a. Achieve stability in openings and ensure efficiency in fishing operations to achieve MSY
    b. Abundance-based management informed by historic management, balancing practices to provide flexibility to harvest fish in excess of MSY-based escapement goals, under-utilized stocks, and that considers relative run strength for all stocks, and that achieves MSY.
2. Closed Waters
    a. Achieve stability in areas open to fishing and ensure efficiency in fishing operations to achieve MSY
3. Inseason Management
    a. Goal is to achieve a long-term average harvest level between MSY and 90% of MSY.
4. Management Area, District, Subdistrict, Section, and Statistical Area Boundaries
    a. Consider revision of management boundaries to reflect historic and current data on salmon distribution and salmon harvest effort
5. Recordkeeping and Reporting
    a. Develop alternative reporting mechanisms for timely reporting of harvest by all user groups including electronic reporting for recreational and personal use fisheries

Revise the "Annual Process for Determining the Status of the Stocks"

1. Salmon Plan Team
    a. Add that the Plan Team would also make recommendations *on State waters fisheries.*
2. Salmon Technical Team
    a. Create this group
    b. Function
        i. Set the State escapement goals
        ii. Review inseason management actions and fishery performance relative to achieving MSY.
        iii. Review of appeals

c. Composition

i. Stakeholders from all Cook Inlet salmon fisheries, ADF&G, NMFS, Salmon Commission, Universities

Revise the Appeal Process for all Salmon Fisheries in the EEZ

Remove major sections of this process to allow for a petition to NMFS for any objection someone may have to a State decision.

Revise the Scope of the FMP

Section 2 of the FMP would be revised to reflect that the FMP's authority would extend to all State waters west of Cape Suckling including "all benthic, estuarine and freshwater habitats necessary to salmon for spawning, breeding, feeding, or growth to maturity." Further, the FMP would apply "Magnuson-Stevens Act, policies, regulations and practices and directs management of these areas and the salmon fisheries that occur there in compliance with the MSA and the Pacific Salmon Treaty and other applicable Federal law."

1.5. Public Input

When a Secretarial FMP Amendment is being developed, according to section 304(c)(2)(A) of the Magnuson-Stevens Act, the Secretary must ''conduct public hearings, at appropriate times and locations in the geographical areas concerned, so as to allow interested parties an opportunity to be heard in the preparation and amendment of the plan and any regulations implementing the plan.'' In addition to the opportunities for public input at two Council meetings, NMFS published a notice of public hearing (88 FR 25382) on April 26, 2023 and held a public hearing on May 18, 2023. This public hearing was held virtually maximize accessibility, and written public comments were also accepted at any time from April 26, 2023 until May 25, 2023.

NMFS began by providing opening remarks and an informational presentation. NMFS answered questions on the presentation before opening the floor for public comments. All attendees had the opportunity to provide at least one comment. As there was still time remaining, previous commenters were offered the opportunity to provide additional comments, which many did. There were generally between 30 and 40 members of the public in attendance throughout the hearing. Nearly all commenters were participants in the Cook Inlet drift gillnet fishery. One commenter represented non-commercial salmon harvesters from the Northern part of Cook Inlet. The public hearing lasted approximately two and one-half hours and was ended 15 minutes after no attendee had any additional comments.

Nearly all commenters emphasized the importance of NMFS implementing an FMP amendment for the Cook Inlet salmon fishery that is consistent with the MSA. Many commenters felt that the measures contained within the analysis were inadequate to do so for a wide variety of reasons. These included perspectives that Federal managers must achieve MSY under the MSA, and could not with the federal management measures under consideration as a result of the current escapement goals. Commenters also expressed concern about management measures that would limit the commercial harvest of Kenai and Kasilof origin sockeye, as well as other coho, chum, and pink salmon stocks, based on their perception that there are no weak stocks of concern in Cook Inlet that should lead managers to limit harvest of co-occurring abundant stocks. Commenters cited previous time periods when escapement for many Cook Inlet salmon stocks was lower while harvests were significantly higher. Several commenters also opined that having separate State and Federal fisheries in Cook Inlet would not sufficiently manage salmon stocks throughout their range.

Many commenters requested that NMFS spend more time with commercial fishermen to get input for and develop regulations, and that what had been done so far was unreasonable, had taken too long to develop, and did not incorporate the public input that had been received.

Another central topic of public comment was a commercial fishery closure date of July 15 that was under consideration. This was universally opposed by drift gillnet fishery participants. Commenters indicated that this closure date would have severe impacts on their harvest of salmon and would further reduce or eliminate the economic viability of the Cook Inlet drift gillnet fishery. Commercial fishermen also felt this would have unwarranted allocative implications because this closure date is typically before the peak of salmon runs in Cook Inlet when most fish are caught. Some commenters also highlighted that in recent years the overall run timing of Cook Inlet salmon has been later than average, which they felt would exacerbate the issue.

Regarding specific management measures, most drift gillnet stakeholder requested that Cook Inlet EEZ waters be open to commercial salmon fishing 2 or 3 days per week through September or October.

Other comments were concerned about the adverse impacts that current and potential future federal management would have on permit values.

Commenters also focused on the use of a TAC to implement annual catch limits required for the fishery. Generally, many expressed the view that a preseason catch limit is not an appropriate way to manage salmon. Escapement-based management or catch per unit effort approaches were suggested as preferred potential options.

One commenter encouraged NMFS to consider the impacts of management to other salmon users in Cook Inlet, and to maintain management measures that close or reduce commercial fishing time the Cook Inlet EEZ at times to help ensure passage of Northern District salmon stocks into the Northern District.

1.6. Tribal Consultation and Engagement

NMFS invited tribes and tribal groups in the Cook Inlet region to consult under Executive Order (E.O.) 13175 after the December 2023 Council meeting. NMFS conducted three tribal consultations as of July 2023. All tribal consultations began with an informational presentation from NMFS staff and an opportunity for tribes to ask any questions.

1.6.1. Tribal Consultations

NMFS received requests for 3 tribal consultations. These are government to government meetings where tribes provide feedback on proposed federal actions. A summary of these tribal consultations can be found below with additional details on the Alaska Fisheries Tribal Consultation Documents and Workgroup. [23]

Tribal Consultation Summary #1

The tribal entity was concerned about the decreasing salmon populations originating in Cook Inlet. They highlighted that there have been numerous, identified ‘stocks of concern’ designated by the State of Alaska. There are also other salmon populations that have dramatically declined but are not specifically managed by the State of Alaska.

The tribal entity requested an indigenous set-aside for salmon harvests that has priority over other fisheries. They indicated that personal use, educational fishery, and the few available subsistence permits

[23] https://www.fisheries.noaa.gov/alaska/consultations/alaska-fisheries-tribal-consultation-documents-and-workgroup

are how Tribal citizens harvest fish currently in Cook Inlet. It was indicated this current opportunity, and emphasized that these opportunities are not adequate for tribal needs.

The tribal entity was interested in maintaining or expanding management measures that would allow Northern District salmon stocks to pass through the EEZ and into State waters.

The tribal entity opposed salmon management that included the State. They stated that any management decisions federal agencies delegate to the State cuts Tribal governments out of government-to-government discussions about fishery management.

The tribal entity highlighted that the Administration has required all federal agencies to work on co-stewardship and co-management plans with Tribal governments, and requested that these efforts be expanded.

The tribal entity requested that Cook Inlet tribes be invited to be peer reviewers as NMFS and the Council's SSC consider the scientific information used to manage the fishery. They also requested that regional tribes have actual authority and real input into decision-making in the federal waters of Cook Inlet.

Tribal Consultation Summary #2

The tribal entity was concerned about Chinook salmon populations. They do not see as many king salmon returning to the area as before. They were interested in solving the dwindling Chinook salmon issue in the area.

The proposed July 15 commercial fishery closure date proposed at the Council was a concern for the tribal entity. They indicated this is near the time that the stocks are beginning to reach the peak of the run. Members stated that it is counterintuitive to close the proposed fishery at the peak of the season. The Tribe stated that the sockeye salmon need to be caught because there's too many in the system for the river to support, and that drift gillnet fishing in the ocean is the best solution. The Tribe did not feel there is a strong rationale to close the fishery in mid-July, which they felt would cause adverse economic impacts to their tribal members and communities.

The Tribe also opposed any regulatory closure date set before the season starts, because it doesn't take real time data of what is happening into account and seems arbitrary. The tribal entity mentioned, based on information from the native people of the Cook Inlet, that they have been fishing a beach for many generations. From this information, they said the fish hit the beach between July 19th and 23rd. A tribal member indicated that August 1 or August 15 may be more reasonable closure dates, if required. Members also confirmed that Chinook salmon are not caught in the EEZ drift gillnet fishery but can migrate through the area.

Salmon fishing is culturally important to the tribal entity and a family tradition. The Tribe historically fishes through July and into the month of August and wants to continue to this.

The tribal entity emphasized the need to find a solution for the dwindling Chinook stocks and appreciated the involvement of tribes in the Federal fishery. The Tribe was hopeful to enjoy and rejuvenate Chinook salmon. The Tribe has looked at a number of options and is working with the Quinault Indian Nation, exploring a system of aquaculture operated by the high school. They have become a follower of that hatchery system, which is simple and involves teaching kids. This hatchery system involves creating an incubation system and injecting fish into the stream. The Tribe asked NMFS to help them revitalize ecosystem to favor Chinook salmon. The Tribe wants to see indigenous salmon survive and become healthy again. The Tribe's grant proposal was recently turned down. Chinook salmon are disappearing throughout their rivers and system. They want to develop a hatchery program.

Tribal Consultation Summary #3

The tribal entity requested that a subsistence fishery and tribal set-aside be established for the Cook Inlet EEZ and all other Federal waters off Alaska. This would allow for co-management and fisheries in the area that could meet all tribal needs including subsistence and trading. The tribal entity stated that other Federal laws mandate subsistence rights. NMFS staff requested more information about how the tribal entity would like to have their proposed fishery implemented.

The tribal entity requested additional information to develop a proposal for a tribal fishery within the Court's available timeframe.

The tribal entity also requested that there be additional management of trawl fisheries to limit adverse impacts on salmon stocks. They cited NMFS's responsibility and authority to manage fisheries and stated that NMFS should use their voice on the Council to do so.

The tribal entity requested that there be additional tribal representation on the Council and provided an overview of how tribal groups had been historically disadvantaged and excluded from government decisions.

The tribal entity requested additional information on aquaculture opportunities related to redeveloping their historical cultural use and cultivation of dentalium shells.

NMFS staff concluded by requesting any additional information that tribal members had on their historical participation in Cook Inlet EEZ fisheries.

Other tribal comments in response to NMFS outreach for tribal consultation on this action:

At least two tribes said that the amount of time that NMFS provided for tribal consultation was inadequate, that NMFS tribes should be consulted earlier in the FMP amendment development process.

NMFS may receive requests for and conduct additional tribal consultations until a decision is made to approve, partially approve, or disapprove, adopt and implement the FMP amendment.

1.6.2. Tribal Engagement

NMFS received requests from tribal representatives to present information at three tribal fora. These were sessions focused on providing information and answering questions about the proposed action. NMFS provided these sessions at the Tikahtnu Forum on February 24, 2023, the Kenaitze & Salamatof Hunting Fishing and Gathering Commission meeting on March 7, 2023, and to the Cook Inlet Tribal Fisheries group meeting on March 30, 2023. Between 5 and 40 people attended each session.

NMFS staff provided an overview presentation at each meeting summarizing the management alternatives under consideration and answered questions about the proposed management under each alternative.

While these tribal engagement sessions were not formal tribal consultations under E.O. 13175, NMFS did receive input at these meetings which is summarized here. NMFS also provided information about how any interested tribe could initiate formal tribal consultation. There were a wide variety of tribal groups and participants that attended each meeting. Questions and comments covered a broad variety of topics, but generally focused on the following themes.

At every meeting, participants universally agreed on the cultural importance of salmon to regional tribes. All groups were users of salmon and had concerns about the health of salmon stocks in Cook Inlet. Different groups and individuals participated in different fisheries throughout Cook Inlet and focused on harvest of different salmon stocks. There were commercial, subsistence, recreational, and cultural/traditional users of salmon represented.

There were questions about how each management alternative would function, and how this would impact different salmon users in Cook Inlet. There was frequently agreement that Kenai and Kasilof sockeye salmon stocks were healthy and could support additional fishing. However, most participants expressed significant concern about the health of Chinook salmon stocks in Cook Inlet. Individuals and representatives of groups closer to the Cook Inlet EEZ generally supported maintaining or increasing salmon harvests in the area. For users farther up Cook Inlet, there tended to be more support for conservative management of the Cook Inlet EEZ to allow for salmon passage and harvestable surplus in the Northern District and up into interior freshwaters.

There was generally support for Alternative 3 or Alternative 4. There was no support for Alternative 2 expressed at any of the outreach meetings. There was also discussion about what levels of salmon harvest are required to meet different tribal needs, and how this may be different for commercial fishing when compared to subsistence and cultural use. It was acknowledged that Cook Inlet salmon management is difficult, but that there should be Federal involvement as required by the Ninth Circuit Court decision.

1.7. Magnuson-Stevens Fishery Conservation and Management Act

The MSA contains three primary sections that govern the development and contents of fishery management plans: (1) Section 302(h); (2) the 10 national standards in Section 301; and (3) required contents of fishery management plans in Section 303(a). MSA Section 303(b) identifies discretionary provisions that a council may include in an FMP. These sections are excerpted below.[24] Additionally, NMFS published National Standard Guidelines (NS Guidelines; 50 CFR 600.305-600.355) to provide comprehensive guidance for the development of FMPs and FMP amendments that comply with the MSA and the national standards.

> **SEC.3. DEFINITIONS**
>
> (5) The term "conservation and management" refers to all of the rules, regulations, conditions, methods, and other measures
>
> (A) which are required to rebuild, restore, or maintain, and which are useful in rebuilding, restoring, or maintaining, any fishery resource and the marine environment; and
>
> (B) which are designed to assure that—
>
> (i) a supply of food and other products may be taken, and that recreational benefits may be obtained, on a continuing basis;
>
> (ii) irreversible or long-term adverse effects on fishery resources and the marine environment are avoided; and
>
> (iii) there will be a multiplicity of options available with respect to future uses of these resources.
>
> **SEC. 301. NATIONAL STANDARDS FOR FISHERY CONSERVATION AND MANAGEMENT**

[24] The complete Magnuson-Stevens Fishery Conservation and Management Act is available at http://www.nmfs.noaa.gov/sfa/magact/MSA_Amended_2007%20.pdf.

(a) IN GENERAL. —Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the following national standards for fishery conservation and management:

(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

(2) Conservation and management measures shall be based upon the best scientific information available.

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

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

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

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

SEC. 302. REGIONAL FISHERY MANAGEMENT COUNCILS

(h) FUNCTIONS. —Each Council shall, in accordance with the provisions of this Act—

(1) for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary (A) a fishery management plan, and (B) amendments to each such plan that are necessary from time to time (and promptly whenever changes in conservation and management measures in another fishery substantially affect the fishery for which such plan was developed);

(2) prepare comments on any application for foreign fishing transmitted to it under Section 204(b)(4)(C) or Section 204(d), and any fishery management plan or amendment transmitted to it under Section 304(c)(4);

(3) conduct public hearings, at appropriate times and in appropriate locations in the geographical area concerned, so as to allow all interested persons an opportunity to be heard in the development of fishery management plans and amendments to such plans, and with respect to the administration and implementation of the provisions of this Act (and for purposes of this paragraph, the term "geographical area concerned" may include an area under the authority of another Council if the fish in the fishery concerned migrate into, or occur in, that area or if the matters being heard affect fishermen of that area; but not unless such other Council is first consulted regarding the conduct of such hearings within its area);

(4) submit to the Secretary such periodic reports as the Council deems appropriate, and any other relevant report which may be requested by the Secretary;

(5) review on a continuing basis, and revise as appropriate, the assessments and specifications made pursuant to Section 303(a)(3) and (4) with respect to the optimum yield from, the capacity and extent to which United States fish processors will process United States harvested fish from, and the total allowable level of foreign fishing in, each fishery (except as provided in section subsection (a)(3)) within its geographical area of authority;

(6) develop annual catch limits for each of its managed fisheries that may not exceed the fishing level recommendations of its scientific and statistical committee, or the peer review process established under subsection (g);

(7) develop, in conjunction with the scientific and statistical committee, multi-year research priorities for fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes, that shall—

(A) establish priorities for 5-year periods;

(B) be updated as necessary; and

(C) be submitted to the Secretary and the regional science centers of the National Marine Fisheries Service for their consideration in developing research priorities and budgets for the region of the Council; and

(8) conduct any other activities which are required by, or provided for in, this Act or which are necessary and appropriate to the foregoing functions.

SEC. 303. CONTENTS OF FISHERY MANAGEMENT PLANS

(a) REQUIRED PROVISIONS. —Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery, shall—

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are—

(A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery;

(B) described in this subsection or subsection (b), or both; and

(C) consistent with the national standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law;

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any;

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

(4) assess and specify—

(A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3),

(B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing, and

(C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, charter fishing, and fish processing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, economic information necessary to meet the requirements of this Act, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors;

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery;

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under Section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under Section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

(9) include a fishery impact Statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for—

(A) participants in the fisheries and fishing communities affected by the plan or amendment;

(B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants; and

(C) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery;

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority—

(A) minimize bycatch; and

(B) minimize the mortality of bycatch which cannot be avoided;

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery, including its economic impact, and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors;

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate, taking into consideration the economic impact of the harvest restrictions or recovery benefits on the fishery participants in each sector, any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery and;

(15) establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.

Magnuson-Stevens Act § 303 note

EFFECTIVE DATES; APPLICATION TO CERTAIN SPECIES. —The amendment made by subsection (a)(10)[16]—

(1) shall, unless otherwise provided for under an international agreement in which the United States participates, take effect—

(A) in fishing year 2010 for fisheries determined by the Secretary to be subject to overfishing; and

(B) in fishing year 2011 for all other fisheries; and

(2) shall not apply to a fishery for species that have a life cycle of approximately 1 year unless the Secretary has determined the fishery is subject to overfishing of that species; and

(3) shall not limit or otherwise affect the requirements of Section 301(a)(1) or 304(e) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1851(a)(1) or 1854(e), respectively).

[16] Section 104(a)(10) of P.L. 109-479 added Section 303(a)(15).

1.8. Discussion of each of the MSA Requirements

This section discusses each of the MSA requirements as they apply to a Fishery Management Plan to manage the commercial salmon fishery in the Cook Inlet EEZ. Table 1-2 provides the Magnuson-Stevens Act § 303(a) requirements for the contents of Fishery Management Plans, considerations for including the required provisions in an FMP, and options (for Alternatives 2 and 3) for including certain required provisions in an FMP. Sections 1.8.1 through 1.8.8 provide additional discussion on the MSA required provisions in the context of the Salmon FMP.

Table 1-2 Magnuson-Stevens Act § 303 Contents of Fishery Management Plans and considerations and options under Alternatives 2, 3 and 4 to include the required provisions in an FMP for Cook Inlet

MSA § 303 Fishery Management Plan Contents: (a) REQUIRED PROVISIONS	Considerations to include required provisions in FMP	Options under Alternative 2 Federal Management/ Delegation to the State	Options under Alternative 3 Federal Management/ No Delegation to the State (Preferred)	Alternative 4 Federal Management/ Prohibit Commercial Fishing
(1) ***contain the conservation and management measures***, which are necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery.	What are the necessary conservation and management measures for the commercial salmon fishery in the EEZ? Which measures should be delegated to the State under *MSA § 306(a)(3)(B)(3)*? What is the process for delegating specific management measures to the State? Should the FMP establish categories like the Crab FMP?	Section 2.4.2 contains procedures for implementation and two categories of management measures: *Category 1 - Federal* *Category 2 - State* Conservation and management measures delegated to the State are in Section 2.4.3.	Conservation and management measures are developed under the options throughout Section 2.5.	Prohibit salmon harvest in the Cook Inlet EEZ consistent with the West Area.
(2) ***contain a description of the fishery*** (the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location), the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery.	Work with ADF&G to compile this information. Could be part of the Fishery Impact Statement.	Provided in the Fishery Impact Statement.	Would be based on the Fishery Impact Statement but modified to reflect changes to the fishery under Federal management.	Provided in the Fishery Impact Statement.
(3) ***assess and specify*** the present and probable future condition of, and ***the maximum sustainable yield and optimum yield (OY)*** from, the fishery, and include a summary of the information utilized in making such specification	Under *Magnuson-Stevens Act § 302(h)(5)*, the Council shall review on a continuing basis the assessment and specification of OY so that it is responsive to changing circumstances in the fishery. The *NS 1 guidelines* at *50 CFR (Code of Federal Regulations) 600.310* specify that assessment and specification of OY in the FMP should include: a summary of information utilized in making such specification; an explanation of how the OY specification will produce the greatest benefits to the nation and prevent overfishing and rebuild overfished stocks; and a consideration of the economic, social, and ecological factors relevant to the management of a particular stock, stock complex, or fishery.	MSY and OY are developed for the salmon stocks with escapement goals. (See Section 2.4.6.)	Would be based on the status determination criteria developed for Alternative 3. (See Section 2.5.2.)	MSY and OY are developed for the Cook Inlet EEZ Subarea portion of the West Area. (See Section 2.6.6)

MSA § 303 Fishery Management Plan Contents: (a) REQUIRED PROVISIONS	Considerations to include required provisions in FMP	Options under Alternative 2 Federal Management/ Delegation to the State	Options under Alternative 3 Federal Management/ No Delegation to the State (Preferred)	Alternative 4 Federal Management/ Prohibit Commercial Fishing
(4) assess and specify— (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing, and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States.	Addressed in Section 6.3 and 6.4 of the FMP.	No change identified at this time.	No change identified at this time.	No change identified at this time.
(5) ***specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, charter fishing, and fish processing in the fishery***, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, economic information necessary to meet the requirements of this Act, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors	What data does the Council need from the State? Should there be new recordkeeping and reporting requirements for fishery participants? How should the data be submitted to NMFS? *MSA § 313(h)* States that the North Pacific Council shall submit, and the Secretary may approve, consistent with the other provisions of this Act, conservation and management measures to ensure total catch measurement in each fishery under the Council's jurisdiction and such measures shall ensure the accurate enumeration, at a minimum, of target species, economic discards, and regulatory discards.	Option 1: SAFE Report prepared by the Salmon Plan Team Option 2: Expanded ADF&G annual management report prepared by State	Option 1: SAFE Report prepared by the Salmon Plan Team **Option 2 (preferred): Do not establish a plan team. NMFS would develop assessments for the SSC and Council**	No change identified at this time.

MSA § 303 Fishery Management Plan Contents: (a) REQUIRED PROVISIONS	Considerations to include required provisions in FMP	Options under Alternative 2 Federal Management/ Delegation to the State	Options under Alternative 3 Federal Management/ No Delegation to the State (Preferred)	Alternative 4 Federal Management/ Prohibit Commercial Fishing
(6) ***consider and provide for temporary adjustments***, after consultation with the Coast Guard and persons utilizing the fishery, ***regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery***; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery		Temporary adjustments are inseason management actions delegated to the State under Category 2. (See Section 2.4.3.)	NMFS inseason management actions.	No change identified at this time.
(7) ***describe and identify essential fish habitat*** for the fishery based on the guidelines established by the Secretary under Section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat	Revisions through EFH 5-year review process.	Revisions through EFH 5-year review process.	Revisions through EFH 5-year review process.	Revisions through EFH 5-year review process.
(8) ***assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan***	What scientific data does the Council and NMFS need to implement the FMP? How would the data be reported to the Council and NMFS?	Option 1: SAFE Report prepared by the Salmon Plan Team Possible Variation 2: Expanded ADF&G annual management report prepared by State, reviewed regularly by the peer review process and at specified intervals by the SSC	Option 1: SAFE Report prepared by the Salmon Plan Team **Option 2 (preferred): Do not establish a plan team. NMFS would develop assessments for the SSC and Council**	No change identified at this time.

MSA § 303 Fishery Management Plan Contents: (a) REQUIRED PROVISIONS	Considerations to include required provisions in FMP	Options under Alternative 2 Federal Management/ Delegation to the State	Options under Alternative 3 Federal Management/ No Delegation to the State (Preferred)	Alternative 4 Federal Management/ Prohibit Commercial Fishing
(9) include a ***fishery impact Statement*** for the plan or amendment which shall assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for— (A) participants in the fisheries and fishing communities affected by the plan or amendment; (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants; and (C) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery.	The FIS can also address the *MSA § 303(a)*'s related requirements for fishery information: (1) a description of the fishery, including the number of vessels, the type and quantity of fishing gear, the species of fish and their location, actual and potential revenues from the fishery, and any recreational interest in the fishery; (2) a specification of the present and probable future condition of the fishery, and include a summary of the information utilized in making such specification; and (3) a description of the commercial, recreational, and charter fishing sectors which participate in the fishery, its economic impact, and, to the extent practicable, quantify trends in landings of the managed fishery by the commercial, recreational, and charter fishing sectors (16 U.S.C. 1853(a)). *NS Guidelines* provide direction on the types of information to include in a FIS. For example, the NS 8 Guidelines state that FMPs must examine the social and economic importance of fisheries to communities potentially affected by management measures.	Provided in the RIR.	Provided in the RIR.	No change identified at this time.

MSA § 303 Fishery Management Plan Contents: (a) REQUIRED PROVISIONS	Considerations to include required provisions in FMP	Options under Alternative 2 Federal Management/ Delegation to the State	Options under Alternative 3 Federal Management/ No Delegation to the State (Preferred)	Alternative 4 Federal Management/ Prohibit Commercial Fishing
(10) ***specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished*** (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery.	FMP must have a process for specifying status determination criteria (overfishing and overfished) that comply with the *NS 1 guidelines (50 CFR 600.310), NS 2, and the review process at MSA 302(g) and (h.* *MSA 302(g)(1)(B)* "Each scientific and statistical committee shall provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch, preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices." *MSA § 304(e)(1)*, "NMFS reports annually to Congress and the Council on the status of the fisheries relative to the status determination criteria in the FMP."	Criteria are developed for three tiers of salmon stocks: *Tier 1: Salmon stocks with escapement goals and stock-specific catches.* *Tier 2: Salmon stocks managed as a complex.* *Tier 3: Salmon stocks with no reliable estimates of escapement.* (See Section 2.4.4.)	Criteria are developed for the salmon stocks with escapement goals. (See Section 2.5.2) Specify salmon status determination criteria using the Tier system described in Section 2.5.2 and a harvest limit in Federal waters of Cook Inlet through the Council's review process that includes recommendations of OFL/ABC by NMFS, and subsequent approval by the SSC/Council.	Prohibiting commercial salmon harvest in the Cook Inlet EEZ, which removes the need to establish other reference points.
(11) ***establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery***, and include conservation and management measures that, to the extent practicable and in the following priority— (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided	What would the standardized reporting methodology be for the salmon fishery to accurately account for catch and bycatch in the EEZ? What are the conservation and management measures necessary to minimize bycatch that comply with *50 CFR Subpart R—Standardized Bycatch Reporting Methodology*?	Fish tickets or eLandings and logbooks	eLandings and logbooks	No commercial salmon fishing is authorized and therefore no SBRM is needed.
(12) ***assess the type and amount of fish caught and released alive during recreational fishing*** under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish	Work with the ADF&G to compile this information for the FMP.	For the commercial fishery, required reporting at the time of landing and logbooks For the recreational fishery, the SWHS, creel surveys, and Saltwater Guide Logbooks	For the commercial fishery, required reporting at the time of landing and logbooks For the recreational fishery, the SWHS, creel surveys, and Saltwater Guide Logbooks	No change identified at this time.

MSA § 303 Fishery Management Plan Contents: (a) REQUIRED PROVISIONS	Considerations to include required provisions in FMP	Options under Alternative 2 Federal Management/ Delegation to the State	Options under Alternative 3 Federal Management/ No Delegation to the State (Preferred)	Alternative 4 Federal Management/ Prohibit Commercial Fishing
(13) ***include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery***, including its economic impact, and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors	Work with the ADF&G to compile this information for the FMP. Could be part of the Fishery Impact Statement.	Provided in the RIR.	Provided in the RIR.	No change identified at this time.
(14) ***to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate, taking into consideration the economic impact of the harvest restrictions or recovery benefits on the fishery participants in each sector, any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery***	Consider a process for allocating EEZ harvest fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery.	If a stock or stock complex is declared overfished or if overfishing is occurring, the Salmon Plan Team or ADF&G would propose rebuilding measures sufficient to comply with Magnuson-Stevens Act requirements.	If a stock or stock complex is declared overfished or if overfishing is occurring, a rebuilding plan would be prepared for Council review sufficient to comply with Magnuson-Stevens Act requirements.	No change identified at this time.
(15) ***establish a mechanism for specifying annual catch limits in the plan*** (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, ***including measures to ensure accountability***	What is the process for the Council to specify annual catch limits and accountability measures that comply with the *NS 1 guidelines (50 CFR 600.310)*? *MSA 302(h)(6)* Each Council shall develop annual catch limits for each of its managed fisheries that may not exceed the fishing level recommendations of its SSC or the peer review process established under subsection (g).	Establish an ABC and ACL using the three-tier system for salmon stocks caught in the Cook Inlet EEZ (See Section 2.4.4.)	Establish an ABC and ACL using the three-tier system for salmon stocks caught in the Cook Inlet EEZ (See Section 2.5.2.)	Establish an ACL of zero for the Cook Inlet EEZ Subarea portion of the West Area. (See Section 2.6.4)

1.8.1. Management Policy and Objectives

For Amendment 12, the Council developed a new management policy and six objectives that apply to both the East and West Areas. The FMP's management policy and objectives guide the development of the Council's management recommendations to the Secretary of Commerce (Secretary) and guide State management of the salmon fisheries in the East Area. In developing the management policy and objectives, the Council recognized that these objectives cannot be accomplished by an FMP alone. To that end, the FMP represents the Council's and NMFS' contribution to a comprehensive management regime for the salmon fishery that will be achieved in concert with actions taken by the Pacific Salmon Commission and the State. The Council and NMFS, in cooperation with the State, are committed to the long-term sustainable management of the salmon fishery off Alaska. The goal is to promote stable management and maintain the health of the salmon fishery resource and environment.

To expand Federal management to the Cook Inlet EEZ in the West Area, the Council will need to consider whether to develop a new management policy and objectives or revise the current management policy and the objectives to apply to the commercial salmon fishery in the Cook Inlet EEZ.

1.8.2. Procedures for FMP Implementation

To amend the FMP to manage the salmon fishery in the Cook Inlet EEZ, the FMP would need to establish the roles of the appropriate State and Federal agencies in implementing FMP management in that area and the management functions under State or Federal jurisdiction.

1.8.3. Status Determination Criteria (overfishing and overfished) and Annual Catch Limits

To amend the FMP to manage the salmon fishery in the Cook Inlet EEZ, the FMP would need to establish status determination criteria and annual catch limits.

To achieve NS 1—prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery—the MSA requires each FMP to (1) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished or overfishing is occurring, called SDC, and contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery (MSA § 303(a)(10)) and (2) establish mechanisms for specifying ACLs to prevent overfishing and include accountability measures (AMs) to prevent ACLs from being exceeded and to correct overages of the ACL if they do occur (MSA § 303(a)(15)).[25] MSA § 302(h)(6) requires each Council to develop ACLs for each of its managed fisheries, and the ACLs cannot exceed the fishing level recommendation of its Scientific and Statistical Committee (SSC) or the Council's peer review process established under MSA § 302(g). The NS 1 Guidelines provide guidance on how to meet these MSA requirements and describe fishery management approaches to meet the objectives of NS 1.[26] Under MSA § 304(e)(1), NMFS reports annually to Congress and the Council on the status of the FMP managed fisheries relative to the SDC in the FMP.

Amendment 6 to the FMP specified SDC for the East Area but did not specify SDC for the three traditional net fishing areas in the West Area because, at that time, it was thought that these fisheries were exempt from the FMP requirements. To expand Federal management to the Cook Inlet EEZ, the Council would need to develop SDC for the salmon stocks in the Cook Inlet area. The purpose of SDC is to monitor the status of the stock by comparing the results of stock assessments against the criteria to determine if overfishing is occurring or the stock is overfished.

[25] MSA §303(a)(15) States "Establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability."

[26] The final rule for the revised NS 1 Guidelines is available at https://alaskafisheries.noaa.gov/sites/default/files/81fr71858.pdf.

The NMFS Alaska Fisheries Science Center (AFSC) will review and certify the Council's proposed overfishing definitions in the FMP amendment for compliance with guidelines provided for NS 1 and 2 in 50 CFR part 600, including consideration of whether the proposed definitions (1) have sufficient scientific merit, (2) are likely to result in effective Council action to protect the stock from closely approaching or reaching an overfished status, (3) provide a basis for objective measurement of the status of the stock against the definition, and (4) are operationally feasible.

1.8.4. Accountability Measures

To amend the FMP to manage the commercial salmon fishery in the Cook Inlet EEZ, the FMP would need to establish accountability measures (AMs).

The NS 1 guidelines, at 50 CFR 600.310(g), define AMs as management controls to prevent ACLs, including sector-ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur. Overages are when catch exceeds the ACL. AMs should address and minimize both the frequency and magnitude of overages and correct the problems that caused the overage in as short a time as possible. NMFS identifies two categories of AMs—inseason AMs that try to keep catch within the ACL, and AMs for when the ACL is exceeded. The FMP should identify what sources of data will be used to implement AMs (e.g., inseason data, annual catch compared to the ACL, or multi-year averaging approach). Specifically applicable to this action, the guidelines at 50 CFR 600.310(g)(6), AMs for State-Federal Fisheries, state that:

> *For stocks or stock complexes that have harvest in State or territorial waters, FMPs and FMP amendments must, at a minimum, have AMs for the portion of the fishery under Federal authority. Such AMs could include closing the EEZ when the Federal portion of the ACL is reached, or the overall stock's ACL is reached, or other measures."*

1.8.5. Optimum Yield and Maximum Sustainable Yield

Maximum sustained yield (MSY) and optimum yield (OY) will need to be assessed and specified for salmon stocks in the Cook Inlet EEZ Area. MSA § 303(a)(3) requires that an FMP assess and specify the OY from the fishery and include a summary of the information utilized in making such specification. Consistent with MSA § 302(h)(5), the Council shall review on a continuing basis the assessment and specification of OY so that it is responsive to changing circumstances in the fishery. The NS 1 Guidelines provide guidance on how to meet the OY requirement. The MSA § 3(33) defines OY as the amount of fish which:

> (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
> (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and
> (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

The new NS 1 guidelines specify that the FMP's assessment and specification of OY should include: a summary of information utilized in making such specification; an explanation of how the OY specification will produce the greatest benefits to the nation and prevent overfishing and rebuild overfished stocks; and a consideration of the economic, social, and ecological factors relevant to the management of a particular stock, stock complex, or fishery.

1.8.6. Annual Process for Determining the Status of the Salmon Stocks

To amend the FMP to manage the commercial salmon fishery in the Cook Inlet EEZ, the FMP would need to establish an annual process for determining the status of the salmon stocks.

A key part of determining the status of salmon stocks on an annual basis is establishing an annual process for specifying the numeric values that represent the maximum fishing mortality threshold (MFMT), overfishing limit (OFL), and minimum stock size threshold (MSST)— the SDC required under NS 1 guidelines— and assessing the status of managed stocks relative to those criteria. The FMP's process for determining the status of salmon stocks must comply with § 302(g)(1)(B) of the MSA which specifies that each SSC shall provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch, preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices.

1.8.7. Standardized Bycatch Reporting Methodology

To amend the FMP to manage the commercial salmon fishery in the Cook Inlet EEZ, the FMP would need to establish a process or procedures that constitute the standardized bycatch reporting methodology for the commercial drift gillnet fishery in the Cook Inlet EEZ.

The MSA defines the term "bycatch" as fish which are harvested in a fishery, but which are not sold or kept for personal use, including economic discards and regulatory discards. For Cook Inlet, the FMP does not address MSA § 303(a)(11), which requires that an FMP establish a standardized reporting methodology to assess the amount and type of bycatch, and measures to minimize bycatch to the extent practicable and minimize the mortality of unavoidable bycatch. This requirement addresses NS 9. According to the NS 9 Guidelines, Councils must: (1) promote development of a database on bycatch and bycatch mortality in the fishery to the extent practicable; (2) for each management measure, assess the effects on the amount and type of bycatch and bycatch mortality in the fishery; (3) select measures that, to the extent practicable, will minimize bycatch and bycatch mortality; and (4) monitor selected management measures.[27]

On January 19, 2017, NMFS published new requirements to comply with MSA § 303(a)(11) and to provide guidance to councils and NMFS regarding the development, documentation, and review of such methodologies, commonly referred to as Standardized Bycatch Reporting Methodologies (SBRMs, 82 FR 6317).[28] **Section 600.1610(a)(1) requires every FMP to identify the required procedure or procedures that constitute the SBRM for the fishery, and states, "[*Such*] *procedures may include, but are not limited to, observer programs, electronic monitoring and reporting technologies, and self-reported mechanisms (e.g., recreational sampling, industry-reported catch and discard data).*"** Section 600.1610(a)(1) also requires Councils to explain in an FMP how the SBRM meets the purpose described in § 600.1600. The purpose of a standardized reporting methodology is to collect, record, and report bycatch data in a fishery that, in conjunction with other relevant sources of information, are used to assess the amount and type of bycatch occurring in the fishery and inform the development of conservation and management measures that, to the extent practicable, minimize bycatch and bycatch mortality. Under § 600.1610(a)(2), when establishing a standardized reporting methodology, a Council must address the following:

> *(i) Information about the characteristics of bycatch in the fishery*. Including, but not limited to, the amount and type of bycatch occurring in the fishery, the importance of bycatch in estimating the fishing mortality of fish stocks, and the effect of bycatch on ecosystems.
> *(ii) Feasibility.* The implementation of a standardized reporting methodology must be feasible from cost, technical, and operational perspectives. However, feasibility concerns do not exempt an FMP from the requirement to establish a standardized reporting

[27] 50 CFR 600.350(d).

[28] The final rule implementing SBRM is available at https://www.Federalregister.gov/documents/2017/01/19/2017-00405/standardized-bycatch-reporting-methodology.

> methodology. Recognizing that costs and funding may vary from year to year, a Council must also address how implementation of the standardized reporting methodology may be adjusted while continuing to meet the purpose described under § 600.1600.
> *(iii) Data uncertainty.* The standardized reporting methodology must be designed so that the uncertainty associated with the resulting bycatch data can be described, quantitatively or qualitatively. The Council should seek to minimize uncertainty in the resulting data, recognizing that different degrees of data uncertainty may be appropriate for different fisheries.
> *(iv) Data use.* How are data resulting from the standardized reporting methodology are used to assess the amount and type of bycatch occurring in the fishery? A Council must consult with its scientific and statistical committee and/or the regional NMFS science center on reporting methodology design considerations such as data elements, sampling designs, sample sizes, and reporting frequency. The Council must also consider the scientific methods and techniques available to collect, record, and report bycatch data that could improve the quality of bycatch estimates. Different standardized reporting methodology designs may be appropriate for different fisheries.

Finally, § 600.1610(a)(1) explains that, in addition to proposing regulations necessary to implement the standardized reporting methodology, a Council should provide in an FMP guidance to NMFS on how to adjust implementation of the methodology consistent with the FMP.

Additionally, MSA § 313(f) states that, in implementing § 303(a)(11) and this section, the North Pacific Council shall submit conservation and management measures to lower, on an annual basis for a period of not less than four years, the total amount of economic discards occurring in the fisheries under its jurisdiction. The Salmon FMP does not assess economic discards in the Cook Inlet commercial salmon fishery or contain measures to lower economic discards.

1.8.8. Process for Federal Oversight and Review

Depending on the alternative selected, the FMP may need to amend Chapter 9, or establish a new process, for review and appeal of State management measures governing the commercial drift gillnet fishery in the Cook Inlet EEZ.

Delegation of salmon fishery management authority to the State of Alaska requires the Council and NMFS to stay apprised of State management measures governing the delegated fishery and, if necessary, to review those measures for consistency with the FMP, the MSA, and other applicable Federal law. FMPs that delegate management to the State include a process to address MSA § 306(a)(3)(B). This section provides that, if at any time the Secretary determines that a State law or regulation applicable to a fishing vessel is not consistent with the fishery management plan, the Secretary shall promptly notify the State and the appropriate Council of such determination and provide an opportunity for the State to correct any inconsistencies identified in the notification. If, after notice and opportunity for corrective action, the State does not correct the inconsistencies identified by the Secretary, the authority granted to the State shall not apply until the Secretary and the appropriate Council find that the State has corrected the inconsistencies.

1.9. Endangered Species Act

The proposed action to manage the commercial salmon fishery in the Cook Inlet EEZ is a Federal action that may require NMFS to conduct a Section 7 consultation if the action may affect listed species or critical habitat in the action area. If a formal consultation is required and NMFS determines through that consultation that the action is not likely to jeopardize the continued existence of any listed species but is reasonably certain to result in the incidental take of listed species, it would issue a Biological Opinion that likely would including an incidental take Statement authorizing such take. The information on the interactions between the drift gillnet salmon fishery in Cook Inlet and ESA-listed Pacific salmon, marine mammals, and seabirds are provided in Section 3 of this document.

The Endangered Species Act of 1973 as amended (16 U.S.C. 1531 et seq.; ESA), provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The statute is administered by NMFS and by the U.S. Fish and Wildlife Service (USFWS). The designation of an ESA listed species is based on the biological health of that species. The status determination is either threatened or endangered. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine fish, plants, and mammals (except for walrus, polar bear, and sea otter) and anadromous fish species. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus, polar bear, sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

In addition to listing species under the ESA, the critical habitat of a newly listed species must be designated concurrent with its listing to the "maximum extent prudent and determinable" [16 U.S.C. § 1533(b)(1)(A)]. The ESA defines critical habitat as those specific areas that are essential to the conservation of a listed species and that may be in need of special consideration. Federal agencies are prohibited from undertaking actions that destroy or adversely modify designated critical habitat. Some species, primarily the cetaceans, which were listed in 1969 under the Endangered Species Conservation Act and carried forward as endangered under the ESA, have not received critical habitat designations.

The key section of the ESA relevant to Federal actions is Section 7, which outlines procedures for interagency cooperation to conserve listed species and designated critical habitat. Section 7 requires Federal agencies to consult to ensure that the actions are not likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. The State is also obligated under the ESA to ensure that it does not license operations to use fishing gear in a manner that is likely to result in a violation of the ESA.

For Federal fishery actions that may affect listed species or critical habitat, NMFS Sustainable Fisheries is the action agency that initiates Section 7 consultation. Such consultation may be informal if the action is not likely to adversely affect any listed species or critical habitat, or formal if adverse effects are likely. The determination of whether the action "is likely to jeopardize the continued existence of" endangered or threatened species or to result in the destruction or modification of critical habitat is the responsibility of the appropriate consulting agency (NMFS Protected Resources or USFWS). If the action is likely to result in jeopardy, the biological opinion (BiOp) includes reasonable and prudent alternatives that are necessary to alter the action so that jeopardy is avoided. If incidental take of a listed species is expected to occur incidental to an otherwise lawful action, an incidental take Statement is appended to the BiOp.

Prior to Amendment 12, Section 7 consultations had not been conducted for the FMP salmon fisheries in the three traditional net fishing areas, but these fisheries were included in the cumulative effects analysis for effects on ESA listed species under NMFS management in the 2010 North Pacific Groundfish Fishery BiOp (2010 BiOp, NMFS 2010). NMFS Sustainable Fisheries conducted a Section 7 consultation on the decision to approve Amendment 12.

2. Alternatives for amending the Salmon FMP to manage the commercial salmon fishery in the Cook Inlet EEZ

NMFS is now considering new management measures to comply with Magnuson-Stevens Act requirements for the Cook Inlet salmon fishery in the EEZ, such as status determination criteria, annual catch limits, and accountability measures in response to both the 2016 Ninth Circuit ruling and the 2022 summary judgment opinion of the Alaska District Court in *UCIDA et al. v. NMFS*.

A new management regime would need to be created and implemented for the salmon fishery in the Cook Inlet EEZ. Specific objectives and management measures would be required in the FMP to comply with the MSA. The MSA is the primary domestic legislation governing management of the nation's marine fisheries. The MSA requires FMPs to be consistent with a number of provisions with which all FMPs must conform and which guide fishery management. Section 303(a) of the MSA requires that a fishery management plan contain specific conservation and management measures. Section 301(a) of the MSA requires a fishery management plan to be consistent with 10 National Standards. Additionally, NMFS published National Standard Guidelines (NS Guidelines; 50 CFR 600.305-600.355) to provide comprehensive guidance for the development of FMPs and FMP amendments that comply with the MSA and its national standards, and these should be closely considered when developing options for meeting the MSA requirements. Currently, the FMP does not address any of these requirements for the commercial salmon fishery in the Cook Inlet EEZ, except for EFH.

Depending on the alternative selected, extensive exchanges of information and continued coordination among ADF&G, NMFS, and Council staff, as well as coordination with the Alaska Board of Fisheries (BOF) may be required. The FMP must be updated and revised to establish management measures that meet MSA requirements and NS Guidelines for the Cook Inlet EEZ. This chapter describes the Council's alternatives and options that are being considered to manage the commercial salmon fishery in the Cook Inlet EEZ.

The alternatives would clarify the FMP's management policy and objectives for the commercial salmon fishery in Cook Inlet EEZ. To address MSA provisions, Alternatives 2 and 3 contain new management measures that do not currently exist and would need to be developed for the commercial and sport salmon fisheries in the Cook Inlet EEZ, such as SDC, a mechanism for specifying annual catch limits, a mechanism for standardized bycatch reporting, and measures to minimize bycatch to the extent practicable. Additional Federal requirements for salmon vessels commercially fishing in the Cook Inlet EEZ, such as electronic monitoring requirements, recordkeeping and reporting requirements, or vessel monitoring systems would be required. Alternative 4 would apply the Council's existing West Area commercial salmon management approach by closing the Cook Inlet EEZ to commercial salmon fishing. Because the Salmon FMP and Federal regulations already deal with closing the West Area to commercial salmon fishing, only certain amendments, primarily for MSY, OY, and ACL, would be required to implement this approach.

Defining the FMP's role in the Cook Inlet EEZ will be key to amending the FMP. Some public comments submitted during the development and implementation of Amendment 12 expressed interest for the FMP's role to be limited to oversight of State management measures that apply to all of the salmon fisheries in the Cook Inlet region, including measures that only apply to salmon fisheries occurring exclusively in State waters. Specifically, these public comments requested oversight of escapement goals and decisions to allocate salmon among user groups (subsistence, personal use, sport, and the different commercial gear types). However, it is not possible to have an FMP that only serves an oversight function and does not contain management measures for FMP fisheries that address the Magnuson-Stevens Act requirements.

Additionally, FMP management cannot extend into State waters absent preemption under MSA § 306(b) and therefore would not be able to regulate State waters salmon fisheries or control harvests in State waters. In order to avoid overfishing, Federal management of the salmon fishery in the Cook Inlet EEZ would have to be responsive to salmon harvests in State waters. In other words, the salmon fishery in the Cook Inlet EEZ would only occur if there was a harvestable surplus after accounting for anticipated removals in State waters, just as is done in the case of Pacific cod, pollock, and other fisheries that are harvested in both State and Federal waters. In other instances where there is fishing for a species in both State and Federal waters, Federal management of fishing for that species within the EEZ is responsive to State management of fishing for that same species in State waters. An example of this occurs in the Pacific cod fisheries in the Gulf of Alaska (GOA) and Aleutian Islands. The Federal Pacific cod total allowable catch (TAC) takes into account the State guideline harvest level so that total catch of Pacific cod in Federal and State waters does not exceed the Pacific cod annual catch limit. Further, for some State waters fisheries, State regulations are structured such that the State waters fishery is concurrent with the Federal waters fishery (e.g., State parallel fisheries). However, other State waters fisheries that are managed by the State separately from the Federal waters fishery (i.e., State guideline harvest level fisheries) are still accounted and applied against Federal SDC and annual catch limits.

Pre-emption of State management in State waters

Per the MSA, FMP management would only apply to the Cook Inlet EEZ and the salmon fishery that occurs within the Cook Inlet EEZ. Under the MSA, an FMP only has authority to manage (i.e., directly regulate) the fisheries that occur in the EEZ. The MSA is clear that nothing in the MSA shall be construed as extending or diminishing the jurisdiction or authority of any State within its boundaries.[29] Absent formal preemption in accordance with MSA § 306(b), the MSA does not provide authority for the Council to manage fisheries in State waters, which would be required for the Council to change the State's escapement goals or to allocate more salmon to a specific gear group, or to direct the State to make these types of changes.

The MSA does provide the Secretary with the ability to preempt State management and assume responsibility for the regulation of a fishery in State waters under two conditions:

1. The fishery must occur predominantly within the EEZ.
2. The results of the State's action or inaction must substantially and adversely affect the carrying out of the fishery management plan.

Both of these criteria must be met for preemption of State management. If both these criteria were met, NMFS would need to determine how it would regulate the salmon fisheries in State waters and the information it would use to make management decisions. Federal fishery regulations require data, analysis, and an extensive process. The conditions required for preemption are not met for the salmon fisheries in the State marine waters of Cook Inlet.

2.1. Purpose and Need

At its October 2022 meeting, the Council requested that staff develop an analysis for a new amendment to the Salmon FMP for initial review at the December 2022 Council meeting with the following purpose and need statement. The Council indicated that staff should update the previous final review draft considered by the Council in December 2020 to reflect recent events and identify possible variations on the

[29] MSA § 306(a) IN GENERAL. – (1) Except as provided in subsection (b), nothing in this Act shall be construed as extending or diminishing the jurisdiction or authority of any State within its boundaries.

alternatives analyzed in that document that meet the purpose and need. This action is necessary now to make timely progress and allow for NMFS to implement an FMP amendment before June 2024.

At its December 2022 meeting, the Council reaffirmed the following purpose and need statement it adopted during its October 2022 meeting.

Purpose and Need

The Council intends to amend the Salmon FMP to manage salmon fishing in the Federal waters of upper Cook Inlet. Federal management must be consistent with the Magnuson-Stevens Act, including the required provisions for an FMP specified in section 303(a). This proposed action is necessary to bring the Salmon FMP into compliance with the Magnuson-Stevens Act consistent with the 2016 Ninth Circuit decision and the recent summary judgment opinion of the Alaska District Court in UCIDA et al. v. NMFS.

2.2. Alternatives

At its December 2022 meeting, the Council adopted the following set of alternatives.

Alternative 1: No Action. No amendment to the Salmon FMP. This alternative would maintain the existing management regime, which excludes the Cook Inlet EEZ and the commercial salmon fishery within it from Federal management under the FMP. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.

Alternative 2: Federal management of the fishery in the EEZ with specific management measures delegated to the State. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP’s fishery management unit and establish a Federal management regime for the salmon fishery that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the MSA and Ninth Circuit ruling. Alternative 2 would identify the management measures that would be managed by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.

Alternative 3: Federal management of the fishery in the EEZ. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP’s fishery management unit and apply Federal management to the salmon fishery that occurs in the EEZ.

Alternative 4: Federal management of the commercial fishery in the EEZ with the EEZ closed to commercial fishing. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP’s fishery management unit in the West Area and apply Federal management by applying the existing West Area prohibition on commercial salmon fishing in the EEZ to the Cook Inlet EEZ.

In addition, the Council requested that the following set of options under the specified alternatives be added.

Alternative 2: Federal management of the fishery in the EEZ with specific management measures delegated to the State. (References are to the December 2022 version of the analysis)

- Option 1: Delegate recreational salmon fishery management measures to the State (as described at Section 2.4.3, pg. 81) and include monitoring, recordkeeping, and reporting measures (as described at Section 2.4.8.2, pg. 97) as well as standardized bycatch reporting methodology for the recreational fishery (as described at Section 2.4.9, pg. 98).
- Option 2: Establish a peer review process that works in conjunction with the SSC as an option for an Annual Process for Determining the Status of the Stocks (as described in Section 2.4.7, pg. 91).
- Option 3: Streamline the process to determine the status of stocks and set harvest specifications as a sub-option for an Annual Process for Determining the Status of the Stocks (as described in Section 2.4.7, pg. 94).

Alternative 3: Federal management of the fishery in the EEZ.

- Option 1: Define optimum yield in terms of a range of annual catch limits (as described at Section 2.5.5, pg. 109).
- Option 2: Streamline the process to determine the status of stocks and set harvest specifications as a sub-option for an Annual Process for Determining the Status of the Stocks (as described in Section 2.5.6, pg. 111).
- Option 3: Adopt recreational salmon fishery management measures (as described at Section 2.5.9, pg. 113) and include monitoring, recordkeeping, and reporting measures (as described at Section 2.5.7.2, pg. 113) as well as standardized bycatch reporting methodology for the recreational fishery (as described at Section 2.5.8, pg. 113).
- Option 4: Fix a commercial salmon fishery closure date for the Cook Inlet EEZ as an option for establishing commercial fishing periods (as described in Section 2.5.11, pg. 94). Evaluate July 15 as a potential closure date, as well as a range of other potential closure dates in July.

NMFS adopted these alternatives as described in Section 2 for consideration for this Secretarial FMP amendment.

2.3. Alternative 1: No Action

Under Alternative 1, the Salmon FMP would not be amended to manage the salmon fishery in the Cook Inlet EEZ. This alternative would maintain status quo conditions. After the Alaska District court’s vacatur of Amendment 14, there is no Federal prohibition on commercial salmon fishing in the EEZ Cook Inlet. Any vessel fishing for salmon in Cook Inlet is regulated by the State under the laws of the State of Alaska, excludes the Cook Inlet EEZ. There is no applicable Federal management under the Salmon FMP. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative. This description of Alternative 1 explains the existing management regime currently in the Salmon FMP.

2.3.1. Management Policy and Objectives

The following are the Council's management policy and management objectives as stated in Sections 3.1 and 3.2 of the FMP.

2.3.1.1. Management Policy

The Council's salmon management policy is to facilitate State of Alaska salmon management in accordance with the Magnuson-Stevens Act, Pacific Salmon Treaty, and applicable Federal law. This FMP represents the Council's contribution to a comprehensive management regime for the salmon fishery that will be achieved in concert with actions taken by the Pacific Salmon Commission and the State. This policy ensures the application of judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations.

Under this policy, all management measures will be based on the best scientific information available. This management policy recognizes the need to balance many competing uses of marine resources and different social and economic objectives for sustainable fishery management, including protection of the long-term health of the resource and the optimization of yield. This policy uses and improves upon the Council's and State's existing open and transparent process of public involvement in decision-making.

2.3.1.2. Management Objectives

The Council has identified the following six management objectives to guide salmon management under the FMP. The Council, NMFS, and the State of Alaska will consider the management policy and the following management objectives in developing amendments to this FMP and associated management measures. Because adaptive management requires regular and periodic review, the management objectives identified in this section will be reviewed periodically by the Council. The Council, NMFS, and the State of Alaska will also review, modify, eliminate, or consider new management measures, as appropriate, to best carry out the management objectives for the FMP.

Objective 1 – Prevent overfishing and achieve optimum yield

Manage the commercial and sport salmon fisheries in the East Area in concert with the Pacific Salmon Commission, and in accordance with the conservation and harvest sharing goals of the Pacific Salmon Treaty, to prevent overfishing and obtain the number and distribution of spawning fish capable of producing the optimum yield on a sustained basis (wild and hatchery). Prevent overfishing and achieve optimum yield in the West Area by prohibiting the commercial harvest of salmon. Prohibiting commercial harvest enables the State to manage salmon fisheries to achieve escapement goals and maximize economic and social benefits from the fishery.

Objective 2 – Manage salmon as a unit throughout their range

Manage salmon fisheries in the EEZ in a manner that enables the State to manage salmon stocks seamlessly throughout their range. In the East Area, this objective is achieved by delegating management of the sport and commercial troll fishery to the State, to manage consistent with State and Federal laws, including the Pacific Salmon Treaty. In the West Area, this objective is achieved by prohibiting commercial fishing for salmon in the West Area so that the State can manage Alaska salmon stocks as a unit.

Objective 3 – Minimize Bycatch and Bycatch Mortality

To the extent practicable, manage salmon fisheries to minimize bycatch and minimize the mortality of unavoidable bycatch. Decrease, where possible, the incidental mortalities of salmon hooked and released, consistent with allocation decisions and the objective of providing the greatest overall benefit to the people of the United States.

Objective 4 – Maximize economic and social benefits to the Nation over time.

Economic benefits are broadly defined to include, but are not limited to, profits, income, employment, benefits to consumers, and less tangible or less quantifiable benefits such as the economic stability of coastal communities, recreational value, non-consumptive use value, and non-use value. To ensure that economic and social benefits derived from fisheries covered by this FMP are maximized over time, the following will be examined in the selection of management measures:

- Control of fishing effort and salmon catches.
- Fair and equitable allocation of harvestable surpluses of salmon.
- Economic impacts on coastal communities and other identifiable dependent groups (e.g., subsistence users).

This examination will be accomplished by considering, to the extent that data allow, the impact of management measures on the size of the catch during the current and future seasons and their associated prices, harvesting costs, processing costs, employment, the distribution of benefits among members of the harvesting, processing and consumer communities, management costs, and other factors affecting the ability to maximize the economic and social benefits as defined in this section. Other benefits are tied to economic stability and impacts of commercial fishing, as well as, unguided and charter recreational fishing associated with coastal communities, subsistence fishing supporting traditional social and cultural 'communities,' and passive-use 'communities.'

Objective 5 – Protect wild stocks and fully utilize hatchery production

Manage salmon fisheries to ensure sustainability of naturally spawning stocks, while providing access to hatchery production.

Objective 6 – Safety

Promote the safety of human life at sea in the development of fisheries management measures. Upon request, and from time to time as appropriate, the Council, NMFS, or the State may provide for temporary adjustments, after consultation with the U.S. Coast Guard and fishery participants, for vessels that are otherwise excluded because of weather or ocean conditions causing safety concerns while ensuring no adverse effect on conservation in other fisheries or discrimination among fishery participants.

2.3.2. Procedures for Implementation

Chapter 4 of the Salmon FMP establishes the roles of agencies in implementing the FMP. The FMP delegates most of the management of the commercial troll and all of the management of the sport salmon fisheries in the East Area to the State of Alaska. Under this delegation, the State of Alaska regulates the commercial troll and sport salmon fisheries and fishing vessels in the East Area as long as the State law and regulations for these fisheries in the East Area are consistent with the FMP, the MSA, and other applicable Federal law. Chapter 9 describes the ways in which the Council and NMFS will monitor State management measures for consistency and the process that will be followed if NMFS determines that a State management measure is inconsistent with the FMP, the MSA, or other applicable Federal law. In addition to this delegation, the FMP contains the required FMP measures under Section 303(a) of the MSA for the East Area.

The FMP directly manages the West Area, with the primary management measures being the closure of the West Area to commercial salmon fishing. Because the Cook Inlet EEZ is not under the FMP, the FMP does not directly manage, or delegate management of, the commercial salmon fishery that occurs in the Cook Inlet EEZ to the State and does not contain any procedures for implementing the FMP in the Cook Inlet EEZ.

2.3.3. Management Measures

The Salmon FMP does not contain management measures for the commercial or recreational salmon fishery in the Cook Inlet EEZ. The State manages State registered vessels fishing commercially or recreationally for salmon in the Cook Inlet EEZ, and an overview of State management measures for this fishery is provided in Sections 4.5.1.1.2 and 4.5.1.2.1.

Federal regulations for the commercial salmon fishery in the East Area include a prohibition on commercial fishing for salmon using any gear except troll gear.[30] Federal regulations at 50 CFR 679.2 also define the boundaries of the East and West Areas.

2.3.4. Status Determination Criteria

Chapter 6 of the FMP provides the SDC, which are specified in accordance with NS 1 of the MSA so that overfishing and overfished determinations can be made for stocks and stock complexes in an FMP and to provide for rebuilding of overfished stocks in the manner and timeframe required by the MSA. See Section 1.8.3 for more detail.

East Area

The status determination criteria in Section 6.1 of the FMP for the East Area are separated into three tiers for the purposes of status determination criteria. A maximum sustainable yield (MSY) control rule, an MFMT, and a MSST are established for each tier. Tier 1 stocks are Chinook salmon stocks covered by the Pacific Salmon Treaty. The overfishing definition is based on a harvest relationship between a pre-season relative abundance index generated by the Pacific Salmon Commission's Chinook Technical Committee and a harvest control rule specified in the Pacific Salmon Treaty. The Pacific Salmon Treaty also provides for an inseason adjustment to the harvest level based on an assessment of inseason data. In addition, decreases in the allowable catch are triggered by conservation concerns regarding specific stock groups. This abundance-based system reduces the risk of overharvest at low stock abundance while allowing increases in harvest with increases in abundance, as with the management of the other salmon species in the southeast Alaska salmon fishery.

Tier 2 and Tier 3 are salmon stocks managed by the BOF and ADF&G. Tier 2 stocks are coho salmon stocks. Tier 3 stocks are coho, pink, chum, and sockeye salmon stocks managed as mixed-species complexes, with coho salmon stocks as indicator stocks. Management of coho is based on aggregate abundance. Lack of a general coho stock identification technique prevents assessment of run strength of individual stock groups contributing to these early-season mixed stock fisheries. Information available on individual coho indicator stocks is considered in management actions. The southeast Alaska wild coho indicator stocks are Auke Creek coho, Berners River coho, Ford Arm Lake coho, and Hugh Smith Lake coho. The overfishing definitions, OY, and ACLs for Tiers 2 and 3 are based on the State of Alaska's MSY escapement goal policies. The present policies and SDC would prevent overfishing and provide for rebuilding of overfished stocks in the manner and timeframe required by the MSA.

For the East Area, the FMP does not establish a mechanism for specifying ACLs for Chinook salmon in the East Area because of the MSA exception from the ACL requirement for stocks managed under an international fisheries agreement in which the United States participates (§ 303 note). The FMP's mechanism for specifying ACLs for Tier 2 and 3 salmon stocks are the State of Alaska's scientifically

[30] 50 CFR 679.7(h) *Salmon fisheries.* (1) Engage in commercial fishing for salmon using any gear except troll gear, defined at §679.2, in the East Area of the Salmon Management Area, defined at §679.2 and Figure 23 to this part.

based management measures used to determine stock status and control catch to achieve the biomass level necessary to produce MSY. These provisions use the NS 1 guidelines alternative approach for satisfying the ACL requirements. The State's salmon management program is based on scientifically defensible escapement goals and inseason management measures to prevent overfishing. Accountability measures include the State's inseason management measures and the escapement goal setting process that incorporates the best available information on stock abundance.

West Area

The FMP prohibits commercial fishing in the West Area so that the State can manage the salmon fisheries in waters adjacent to the West Area. Salmon that spend part of their lifecycle in the West Area are subject to commercial salmon fisheries after they reach maturity and travel back to their natal rivers and streams. These directed commercial fisheries are managed by the State of Alaska and are not subject to this FMP. NS 1 is achieved by the State's scientifically based approach for controlling catch to achieve the biomass level necessary to produce MSY by ensuring that overfishing does not occur in the fishery. To ensure overfishing does not occur as a result of incidental catch of salmon by other fisheries not regulated under this FMP, this FMP relies on management measures adopted under Federal fishery management plans, together with the State's management program in waters adjacent to the West Area.

2.3.5. Annual Catch Limits and Accountability Measures

For the East Area, the FMP does not establish a mechanism for specifying ACLs for Chinook salmon because of the MSA exception from the ACL requirement for stocks managed under an international fisheries agreement in which the United States participates (§ 303 note). The FMP's mechanism for specifying ACLs for Tier 2 and 3 salmon stocks are the State of Alaska's scientifically based management measures used to determine stock status and control catch to achieve the biomass level necessary to produce MSY. These provisions use the NS 1 guidelines alternative approach for satisfying the ACL requirements. The State's salmon management program is based on scientifically defensible escapement goals and inseason management measures to prevent overfishing. Accountability measures include the State's inseason management measures and the escapement goal setting process that incorporates the best available information on stock abundance.

2.3.6. Optimum Yield

East Area

For the troll fishery in the East Area, several economic, social, and ecological factors are involved in the definition of OY. Of particular importance are the annual variations in the abundance, distribution, migration patterns, and timing of the salmon stocks; provisions of the Pacific Salmon Treaty; decisions of the Pacific Salmon Commission; allocations by the BOF; traditional times, methods, and areas of salmon fishing; and inseason indices of stock strength. Further, because the commercial troll fishery and the sport fishery take place in the EEZ and State waters without formal recognition of the boundary between these two areas, the OY should not and cannot be subdivided into separate parts for the EEZ and State waters.

MSY is established for each tier based on the MSY control rules in Section 5.1. For Chinook salmon stocks in Tier 1, an all-gear MSY is prescribed in terms of catch by the Pacific Salmon Treaty and takes into account the biological productivity of Chinook salmon and ecological factors in setting this limit. The portion of the all-gear catch limit allocated to troll gear represents the OY for that fishery and takes into account the economic and social factors considered by the BOF in making allocation decisions.

For stocks in tiers 2 and 3, MSY is defined in terms of escapement. MSY escapement goals account for biological productivity and ecological factors, including the consumption of salmon by a variety of marine predators. The OY for the troll fishery is that fishery's annual catch which, when combined with the catch from all other salmon fisheries, results in a post-harvest run size equal to the MSY escapement goal for each indicator stock. The portion of the annual catch harvested by the troll fishery reflects the biological, economic, and social factors considered by the BOF and ADF&G in determining when to open and close the coho salmon harvest by the troll fishery.

The MSA requires Regional Councils to “review on a continuing basis, and revise as appropriate, the assessments and specifications made ... with respect to the optimum yield.” In particular, OY may need to be respecified in the future if major changes occur in the estimate of MSY. Likewise, OY may need to be respecified if major changes occur in the ecological, social, or economic factors governing the relationship between OY and MSY.

West Area

The FMP prohibits commercial fishing in the West Area so that the State can manage the salmon fisheries in waters adjacent to the West Area. Salmon that spend part of their lifecycle in the West Area are subject to commercial salmon fisheries after they reach maturity and travel back to their natal rivers and streams. These directed commercial fisheries are managed by the State of Alaska and are not subject to this FMP. NS 1 is achieved by the State’s scientifically based approach for controlling catch to achieve the biomass level necessary to produce MSY by ensuring that overfishing does not occur in the fishery. To ensure overfishing does not occur as a result of incidental catch of salmon by other fisheries not regulated under this FMP, this FMP relies on management measures adopted under Federal fishery management plans, together with the State’s management program in waters adjacent to the West Area.

Commercial fishing is prohibited in the West Area; therefore, the directed harvest OY is zero. The West Area has been closed to commercial net fishing since 1952 and commercial troll fishing since 1973 and there has not been any yield from this area. This OY recognizes that salmon are fully utilized by State managed fisheries and that the State of Alaska manages fisheries based on the best available information using the State’s escapement goal management system. Additionally, management measures adopted under other Federal FMPs, together with the State’s scientifically-based management program in waters adjacent to the West Area, ensure that overfishing of salmon does not occur as a result of incidental catch of salmon by other EEZ fisheries not regulated under this FMP. This OY also recognizes that non-Alaska salmon are fully utilized and managed by their respective management authority when they return to their natal regions.

2.3.7. Annual Process for Determining the Status of the Stocks

Under Alternative 1, no annual process for determining the status of salmon stocks under the NS 1 guidelines would be established for the salmon stocks in Cook Inlet. The FMP currently prohibits commercial fishing in the West Area, which currently excludes the Cook Inlet EEZ. Because commercial fishing is prohibited in the entire West Area, the directed harvest optimum yield (OY) is zero. With a prohibition on commercial fishing and a directed harvest OY of zero for the West Area, there is no need for an annual process to determine the status of the salmon stocks. As explained earlier, Alternative 1 is not a viable approach given the decision by the Ninth Circuit.

Under Amendment 12, for the East Area, the Council chose to establish a peer review process in the FMP that utilizes existing State salmon expertise and review processes for the scientific information used to advise the Council about the conservation and management of the Southeast Alaska troll fishery. This ties into implementing the alternative approach for annual catch limits and the peer review process that utilizes existing State salmon expertise and review processes for the purposes of developing fishing level recommendations and providing scientific information to the Council. Using the State’s process as the peer review process recognizes the limited role of NMFS and the Council in salmon fishery management and the State’s existing expertise and infrastructure. The State, as the peer review body, works together with the Council to implement the provisions of the MSA. This enables the escapement goal recommendations from the State's peer review process instead of SSC recommendations on acceptable biological catch under MSA § 302(h)(6).

2.3.8. Standardized Bycatch Reporting Methodology

Under Alternative 1, no standardized bycatch reporting methodology exists or would be established for the West Area.

For the East Area, ADF&G fish tickets serve as the standardized bycatch reporting methodology. Vessels commercially trolling for salmon in EEZ waters are restricted to a Federal retainable percentage for federally managed groundfish species (http://www.alaskafisheries.noaa.gov/rr/tables/tabl10.pdf).

For recreational salmon fisheries off Alaska, the combination of the SWHS, creel surveys, and Saltwater Guide Logbooks constitute the standardized bycatch reporting methodology for the unguided and guided recreational salmon fishery.

2.3.9. Federal Oversight and Review Process for the East Area

The FMP includes a process for the Council and NMFS to oversee and review, and for the public to request that NMFS review, State salmon management actions for consistency with the FMP, the MSA, and other applicable Federal law. Review is limited to whether the State statute or regulation is consistent with the FMP, MSA, or other applicable Federal law, and does not include requests that seek a different policy outcome. Although the FMP has included a review process since the 1990 FMP, NMFS received the first, and so far only, stakeholder request for review under the FMP process in 2008. State management measures include measures adopted by the Pacific Salmon Commission and the BOF as well as other State laws, regulations, and inseason actions.

Under the FMP, the oversight and review process only apply to the East Area. The FMP Chapter 9 describes (1) how the Council and NMFS fulfill the oversight role, (2) the ways in which the Council and NMFS monitor State management measures that regulate salmon fishing in the East Area, (3) the process by which NMFS will review State management measures governing salmon fisheries in the East Area for consistency with the FMP, the MSA, and other applicable Federal law, (4) the process by which a member of the public can petition NMFS to review State management measures in the East Area for consistency with the FMP, the MSA, and other applicable Federal law, and (5) the process NMFS will follow if NMFS determines that State management measures in the East Area are inconsistent with the FMP, the MSA, or other applicable Federal laws.

2.3.10. Monitoring, Recordkeeping, and Reporting Requirements

The FMP currently places no monitoring, recordkeeping, or reporting requirements on the vessels commercial or recreational fishing for salmon in the EEZ of Cook Inlet.

The State does not place monitoring or recordkeeping requirements on commercial fishery participants but does require all processors (and fishermen selling to individual buyers "on the docks") to provide a summary report of the number of fish purchased by species and statistical area no later than 12:00 noon of the day following a fishery. For example, if a fishing period ends at 11:00 p.m., these reports are required no longer than 13-hours later.

The State has several data collection efforts in place for the saltwater sport fishery. These reporting instruments are not specific to the Cook Inlet EEZ, but could likely be used to develop estimates of recreational catch:

- The State does require that recreational anglers harvesting fish that have an annual limit established maintain a harvest record card. Currently, there is a 5 king salmon annual limit during the summer fishery in the salt waters of Cook Inlet, including the Cook Inlet EEZ. Because of this, anglers must record their harvest of these fish when they are brought onboard.

- The State also requires that all saltwater sport fishing charter/guide operators maintain, complete, and submit a logbook. This includes information on daily trips, the number of anglers, species caught, areas fished, fish harvested, and fish released. These are required to cover all saltwater guided fishing activities from January 1 through December 31.

- The State has a mail-out survey instrument called the State Wide Harvest Survey (SWHS). https://www.adfg.alaska.gov/sf/sportfishingsurvey/index.cfm?ADFG=area.home

Monitoring during the fishery is accomplished by aerial and vessel-based law enforcement patrols.

2.4. Alternative 2: Federal management with specific management measures delegated to the State.

Under Alternative 2, the Salmon FMP would be amended to include the Cook Inlet EEZ in the FMP's fishery management unit and establish a Federal management regime for the salmon fishery that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the MSA and Ninth Circuit ruling and the 2022 summary judgment opinion of the Alaska District Court in UCIDA et al. v. NMFS. Alternative 2 would identify the management measures that would be implemented by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.

Per Magnuson-Stevens Act 306(a)(3)(B), the Council would need to approve a delegation of management of the Cook Inlet EEZ salmon fishery to the State by a three-quarters majority vote of the voting members of the Council. Therefore, NMFS could not delegate management authority to the State through a Secretarial FMP amendment.

2.4.1. Management Policy and Objectives

Although the development of a new management policy and objectives specifically applicable to the Cook Inlet EEZ may be considered under this alternative, one option is to maintain the FMP's existing management policy and objectives and have them continue to apply to all areas managed by the FMP (the East Area and the West Area, and the Cook Inlet EEZ). This approach would require some modifications to the existing Management Objectives as follows:

New draft FMP language:

Management Policy

The Council's salmon management policy is to facilitate State of Alaska salmon management in accordance with the Magnuson-Stevens Act, Pacific Salmon Treaty, and applicable Federal law. This FMP represents the Council's contribution to a comprehensive management regime for the salmon fishery that will be achieved in concert with actions taken by the Pacific Salmon Commission and the State. This policy ensures the application of judicious and responsible fishery management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations.

Under this policy, all management measures will be based on the best scientific information available. This management policy recognizes the need to balance many competing uses of marine resources and different social and economic objectives for sustainable fishery management, including protection of the long-term health of the resource and the optimization of yield. This policy uses and improves upon the Council's and State's existing open and transparent process of public involvement in decision-making.

Management Objectives

The Council has identified the following seven management objectives to guide salmon management under the FMP. The Council, NMFS, and the State of Alaska will consider the management policy and the following management objectives in developing amendments to this FMP and associated management measures. Because adaptive management requires regular and periodic review, the management objectives identified in this section will be reviewed periodically by the Council. The Council, NMFS, and the State of Alaska will also review, modify, eliminate, or consider new management measures, as appropriate, to best carry out the management objectives for the FMP.

Objective 1 – Prevent overfishing and achieve optimum yield

Manage the commercial and sport salmon fisheries in the East Area in concert with the Pacific Salmon Commission, and in accordance with the conservation and harvest sharing goals of the Pacific Salmon Treaty, to prevent overfishing and obtain the number and distribution of fish capable of producing the optimum yield on a sustained basis.

Manage the salmon fishery in the Cook Inlet EEZ in concert with the State to prevent overfishing and obtain the number and distribution of spawning fish capable of producing the optimum yield on a sustained basis.

Prevent overfishing and achieve optimum yield in the West Area outside of the Cook Inlet EEZ by prohibiting the commercial harvest of salmon. Prohibiting commercial harvest in the West Area outside of the Cook Inlet EEZ enables the Council, NMFS, and the State to manage salmon fisheries to achieve escapement goals and maximize economic and social benefits from the fishery.

Objective 2 – Manage salmon as a unit throughout their range

Manage salmon fisheries in the EEZ in a manner that reflects the salmon life history by utilizing the State's existing salmon management infrastructure and expertise and enabling the State to manage salmon stocks seamlessly throughout their range. In the East Area, this objective is achieved by delegating specified aspects of management of the sport and commercial salmon fisheries to the State, to manage consistent with the FMP and with State and Federal laws, including the Pacific Salmon Treaty.

In the Cook Inlet EEZ, this objective is achieved by delegating specified aspects of management of the salmon fishery to the State to manage consistent with the FMP and with State and Federal laws.

In the West Area outside of the Cook Inlet EEZ, this objective is achieved by prohibiting commercial fishing for salmon so that the Council, NMFS, and the State can manage Alaska salmon stocks as a unit.

Objective 3 – Minimize Bycatch and Bycatch Mortality

To the extent practicable, manage salmon fisheries to minimize bycatch and minimize the mortality of unavoidable bycatch. Decrease, where possible, the incidental mortalities of salmon caught and released, consistent with allocation decisions and the objective of providing the greatest overall benefit to the people of the United States.

Objective 4 – Maximize economic and social benefits to the Nation over time.

Economic benefits are broadly defined to include, but are not limited to, profits, income, employment, benefits to consumers, and less tangible or less quantifiable benefits such as the economic stability of coastal communities, recreational value, non-consumptive use value, and non-use value. To ensure that economic and social benefits derived from fisheries covered by this FMP are maximized over time, the following will be examined in the selection of management measures:

- Control of fishing effort and salmon catches.
- Fair and equitable allocation of harvestable surpluses of salmon.
- Economic impacts on coastal communities and other identifiable dependent groups (e.g., subsistence users).

This examination will be accomplished by considering, to the extent that data allow, the impact of management measures on the size of the catch during the current and future seasons and their associated prices, harvesting costs, processing costs, employment, the distribution of benefits among members of the harvesting, processing and consumer communities, management costs, and other factors affecting the ability to maximize the economic and social benefits as defined in this section. Other benefits are tied to economic stability and impacts of commercial fishing, as well as, unguided and charter recreational fishing associated with coastal communities, subsistence fishing supporting traditional social and cultural 'communities,' and passive-use 'communities.'

Objective 5 – Protect wild stocks and utilize hatchery production

Manage salmon fisheries to prioritize and ensure the sustainability of naturally spawning stocks, while providing access to hatchery production.

Objective 6 – Safety

Promote the safety of human life at sea in the development of fisheries management measures. Upon request, and from time to time as appropriate, the Council, NMFS, or the State may provide for temporary adjustments, after consultation with the U.S. Coast Guard and fishery participants, for vessels that are otherwise excluded because of weather or ocean conditions causing safety concerns while ensuring no adverse effect on conservation in other fisheries or discrimination among fishery participants.

Objective 7 – Identify and Protect Salmon Habitat.

Use the best available science to identify and describe essential fish habitat pursuant to the MSA, and mitigate fishery impacts in the EEZ as necessary and practicable to continue the sustainability of managed species.

2.4.2. Procedures for FMP Implementation

For the Cook Inlet EEZ, Alternative 2 would delegate certain management functions to the State and specify the requirements associated with each delegated authority. The FMP would need to include transparent procedures governing the State's exercise of its delegated management authority of the salmon fishery in the Cook Inlet EEZ. Under Alternative 2, the Council and NMFS would continue to directly manage the West Area outside of the Cook Inlet EEZ under the FMP.

Under § 306(a)(3)(B) of the MSA, a State may regulate a fishing vessel outside the boundaries of the State when the FMP for the fishery in which the fishing vessel is operating delegates management of the fishery to a State and the State's laws and regulations are consistent with such fishery management plan. Since the FMP was in place on August 1, 1996 and the FMP did not explicitly delegate management of the salmon fishery in the Cook Inlet EEZ to the State on that date, the Council would need to approve a delegation of management of the Cook Inlet EEZ salmon fishery to the State by a three-quarters majority vote of the voting members of the Council. NMFS could not delegate management authority to the State through a Secretarial FMP amendment.

The proposed procedures to implement an FMP that delegates management of the Cook Inlet EEZ salmon fishery to the State are based on the division of management roles and functions established in the Fishery Management Plan for the Scallop Fishery off Alaska and the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. Under Alternative 2, the FMP would be amended to include the following procedures that would apply to the management of the salmon fishery in the Cook Inlet EEZ.

New draft FMP language:

Procedures for FMP Implementation (Federal/State) in the Cook Inlet EEZ

To achieve the Management Policy and Management Objectives, the FMP delegates certain specified management measures to the State. To the extent practicable, NMFS will coordinate with ADF&G to develop management measures for the salmon fishery in the Cook Inlet EEZ that are consistent with the FMP, the MSA, and other applicable Federal law.

The FMP establishes the following protocol which describes the roles of the Federal and State governments under a delegated management regime for the Cook Inlet EEZ:

1. The Council will develop and amend the FMP to govern management of the salmon fishery in the Cook Inlet EEZ, prescribing objectives and any management measures found by the Council and NMFS to be necessary for effective conservation and management. Under the authority delegated to it by the FMP, the State will promulgate regulations that apply to all vessels fishing for salmon in the Cook Inlet EEZ. State management measures must be consistent with the FMP, MSA, and other applicable Federal law.

   The FMP contains two categories of management measures:[31]

   Category 1: Federal management measures that are fixed in the FMP, implemented by Federal regulation, and require an FMP amendment to change.

[31] The same type of management measure can occur in both categories to allow for State and Federal measures pertaining to the topic. For example, a Category 1 measure generally authorizing nets as legal gear, and a Category 2 measure precisely defining the allowable configurations of legal net gear.

Category 2: General management measures delegated to the State for implementation consistent with the FMP, MSA, and other applicable law. The "Other" measure under Category 2 permits the State to implement management measures not specifically identified under Category 2, subject to constraints listed in the following paragraphs.

Category 1 (Federal)	Category 2 (State)
• Status Determination Criteria (optimum yield, overfishing and overfished) • Annual Catch Limits and Accountability Measures • Essential Fish Habitat • Standardized Bycatch Reporting • Recordkeeping and Reporting • Legal gear	• Escapement goals • Fishing Seasons • Closed Waters • Management Area, District, Subdistrict, Section, and Statistical Area Boundaries • Legal Gear • Inseason Management • Recreational Management • Limited Entry Permits • Recordkeeping and Reporting • Recreational bag limits • Other

2. Representatives from the Council, NMFS, and NOAA General Counsel will coordinate with the State in the development of regulations for salmon fishery management in the Cook Inlet EEZ for the purpose of assisting the State in determining the extent to which proposed management measures are consistent with the FMP, MSA, and other applicable Federal law. NMFS will review measures adopted by the State in accordance with FMP Chapter 9.

3. Under FMP Chapter 9, the Secretary will consider only those requests for Federal review asserting that a State law is inconsistent with the FMP, MSA, or other applicable Federal law. If necessary, NMFS will issue Federal regulations in the Cook Inlet EEZ to supersede any State laws or regulations that are inconsistent with the FMP, the MSA, or other applicable Federal law.

4. ADF&G will provide the information on which to base State fishing regulations and will consult with NMFS (Alaska Region and AFSC), NOAA General Counsel, and other fishery management or research agencies to prevent duplication of effort and assure consistency with the FMP, MSA, and other applicable Federal law.

5. The FMP provides that the Commissioner of ADF&G, or his designee, may open or close seasons or areas by means of emergency orders authorized under State regulations. Consistent with Chapter 9, interested persons may request Federal review of these actions for a determination that the emergency orders are consistent with the FMP, MSA, and other applicable Federal law. If NMFS determines that the State action is inconsistent with the above, NMFS will issue a Federal regulation to supersede the State emergency orders in the EEZ.

6. The State will provide written explanations of the reasons for its decisions concerning management of the salmon fishery in the Cook Inlet EEZ. For emergency orders, the current emergency orders written justification provided by the State meets this requirement.

7. ADF&G will participate in the Salmon Plan Team and assist in preparing the Stock Assessment and Fishery Evaluation Report for the Council which discusses the status of the stocks and economic status of the fishery. This report will be made available to the public and presented to the Council on an annual basis.

8. NOAA Office of Law Enforcement and the U.S. Coast Guard will work in cooperation with the State to enforce Federal regulations for the salmon fishery in the Cook Inlet EEZ.

2.4.3. Management Measures Delegated to the State of Alaska

The option presented in the previous section identifies types of management measures that could be delegated to the State in Category 2. As with other FMPs that delegate management to the State, criteria to guide the State for each type of management measure that is delegated would be needed. The following provides possible criteria for the Category 2 management measures identified above.

New draft FMP language:

Criteria for Category 2 management measures delegated to the State:

Escapement Goals – The FMP authorizes the State to set escapement goals under State regulations and policies. Escapement goals allow the State to make inseason management decisions based on current data. The State may close fishing periods or areas to ensure that escapement goals are met. The State sets the escapement goals for Cook Inlet salmon stocks using the best scientific information available to sustain salmon resources for future generations and maximize yield when practicable.

Fishing Seasons – The State adopts fishing seasons for salmon based on run timing of specific salmon species and stocks and to meet economic and social objectives, achieve stability, and ensure efficiency in fishing operations. The FMP authorizes the State to modify and adopt fishing seasons consistent with the FMP, the MSA, and other applicable Federal law.

Closed Waters – The FMP recognizes the State's need to close certain waters to salmon fishing for conservation purposes and authorizes the State to designate new closed water areas or expand or reduce existing State closed water areas to meet State subsistence requirements and to promote conservation and sustained yield management of a specific salmon species or stock.

Management Area, District, Subdistrict, Section, and Statistical Area Boundaries – The FMP authorizes the State to adjust management area, district, subdistrict, section, and statistical area boundaries to manage the salmon fishery in the Cook Inlet EEZ for sustained yield and to ensure accurate recordkeeping and reporting.

Legal Gear – Salmon in the Cook Inlet EEZ commercial salmon fishery are taken with drift gillnet gear. The FMP authorizes the State to change the configuration of legal gillnet gear that fishermen are permitted to use when harvesting salmon in the Cook Inlet EEZ and to modify gear specifications such as net length, marking, depth, and mesh size.

Inseason Management – The State manages commercial salmon fisheries in the Cook Inlet EEZ to meet escapement goals and management plan objectives established by the State and to achieve FMP Management Objectives. This is done primarily by inseason actions to adjust the time and area of commercial salmon fishing periods to either increase or decrease harvest of specific salmon species and stocks. The State establishes the time and area of openings in regulation, Advisory Announcements, or by emergency orders.

Limited Entry Permits – The Limited Entry Act was passed in 1973 to promote conservation and sustained yield management and improve health and stability of Alaska's commercial salmon fisheries by regulating the number of fishery participants. All commercial salmon fishing in the Cook Inlet EEZ occurs under auspices of the Limited Entry Act.

The FMP authorizes the State to continue to issue and transfer limited entry permits and to modify the terms of limited entry consistent with the FMP, the MSA, and other applicable Federal law. Any modifications by the State to the terms of limited entry in the Cook Inlet EEZ and decisions on limited entry permits will be subject to Council and NMFS oversight and the process described in Chapter 9 of the FMP.

Recordkeeping and Reporting – Recordkeeping and Reporting requirements for fishery participants are an important component in achieving Management Objectives described in the FMP. The FMP authorizes the State to establish recordkeeping and reporting requirements such as information required on fish tickets, methods of submitting fish tickets, and frequency of fish ticket submittal, as well as logbooks.

Recreational management – The State manages recreational salmon fisheries in the Cook Inlet EEZ. This is done primarily through bag limits that adjust the number and size of species that may be retained by recreational anglers. The State establishes size and bag limits in regulation or by emergency orders. The bag limits currently established for the Cook Inlet EEZ could not differ between Alaska residents and non-residents.

Recreational Possession limits and transport of fish through state waters. This part of the analysis is under development. However, the analysts note that fish caught in the EEZ would need to be landed and transported through State of Alaska waters. Some EEZ recreational fisheries, such as Albacore tuna off Washington require a state license, while others also require a NOAA license (e.g., Atlantic fisheries). Complications can arise with enforcement of bag and possession limits for the EEZ if they differ from ADF&G regulations.

Other – The State is delegated authority to implement management measures not specifically described in Categories 1 or 2. However, any State management measures that fall under "Other" must be consistent with the FMP, the MSA, and other applicable Federal laws, and may be implemented by the State only after consultation with the Council. Other management measures the State may implement are subject to the review and appeals procedures described in Chapter 9 of the FMP.

2.4.4. Status Determination Criteria and Annual Catch Limits for the Cook Inlet EEZ

SDC and ACLs are under *Category 1: Federal management measures that are fixed in the FMP, implemented by Federal regulation, and require an FMP amendment to change*. This section provides SDC and ACLs for specific salmon stocks harvested in the EEZ in Cook Inlet.

To address the requirements of the MSA, the proposed SDC are based on the unique life history of salmon and the large variations in annual stock abundance due to numerous environmental variables. They also take into account the uncertainty and imprecision surrounding the estimates of MSY, fishery impacts, and spawning salmon escapements. In recognition of the unique salmon life history, the criteria differ somewhat from the general guidance in the NS 1 Guidelines (§600.310).

The FMP would establish a tier system for annually determining the status of the salmon stocks in Cook Inlet. Presently, sufficient data are not available to develop SDC and ACLs for all salmon stocks within Cook Inlet. Each year, salmon stocks would be separated into three tiers based on the level of information available for each stock through the SDC process.

- Tier 1: salmon stocks with escapement goals and stock-specific catches
- Tier 2: salmon stocks managed as a complex, with specific salmon stocks as indicator stocks
- Tier 3: salmon stocks with no reliable estimates of escapement

The proposed SDC for each tier are based on the State of Alaska's escapement goal policies and are designed to prevent overfishing and provide for rebuilding of overfished stocks in the manner and timeframe required by the Magnuson-Stevens Act. As explained in more detail within each tier, an MSY control rule, an MFMT, an MSST, OFL, acceptable biological catch (ABC), and an ACL would be established for Tiers 1 and 2. In Tier 3, the OFL and ABC would be specified in terms of maximum catch value over an historical time period, unless the Salmon Plan Team or SSC recommends an alternative value based on the best scientific information available. Changes to the tier system must be made through an FMP amendment. However, the tier system is designed to incorporate the best scientific information available each year through the SDC process.

Developing appropriate SDC is highly scientific and requires time and analysis of available data and appropriate methods. The proposed criteria provided in this section provide a starting point for that ongoing scientific analysis through the SDC process. To inform the calculation of the MSY Control Rule, Overfishing, and ACLs, landings from EEZ waters would have to be accounted for separately from landings originating from State waters. This would account for removals of Cook Inlet salmon stocks from the commercial and recreational fishery sectors in the Cook Inlet EEZ.

It should be noted that information on recreational saltwater salmon catch is not generally available in season, and final harvest numbers are not available until the following year. As a result, recreational harvest estimates and projections would likely have to be used until final data is available. The exact approach to incorporate the recreational fishery sector removals into the SDC will be developed over time.

The recreational fishery does harvest Chinook, coho, sockeye, pink, and chum salmon stocks originating from Cook Inlet, information indicates that more than 75% of the Chinook harvested by the Upper Cook Inlet salt water recreational fishery originated from stocks outside of Cook Inlet (Barclay et al. 2016). The total annual estimated Upper Cook Inlet EEZ recreational harvest of Chinook salmon averages approximately 60 fish, or approximately 0.01% of salmon harvested in the Cook Inlet EEZ.

New draft FMP language for the Cook Inlet EEZ:

Tier 1: Salmon stocks with escapement goals and stock-specific catches

Each year, salmon stocks that have escapement goals and stock-specific catch estimates would be placed in Tier 1. The Salmon Plan Team or ADF&G would identify the Tier 1 stocks each year during the annual status determination process. For the Tier 1 stocks, the following calculations would be conducted each year to determine the status of the managed salmon stocks and set the appropriate biological reference points:

Overfishing

The fishing mortality rate (F) in the EEZ for a stock is expressed as an exploitation rate (catch/run), which is computed as a weighted average of run-specific exploitation rates observed for the stock over one average generation time in years (T), where t = return year, R = annual run size of a stock, and C_{EEZ} = annual EEZ catch of a stock in year i:

(1) $F_{EEZ,t} = \frac{\sum_{i=t-T+1}^{t} C_{EEZ,i}}{\sum_{i=t-T+1}^{t} R_i}$

The level of fishing mortality in the EEZ above which overfishing occurs (MFMT) for a stock is also based on a multi-year exploitation rate, in this case, the exploitation rate that corresponds to harvest at the F_{OFL} control rule each year for one generation time where Y = potential yield in the EEZ and G = escapement goal or target for a stock. G=lower bound of the established escapement goal is the default used in this tier system, however, the Salmon Plan Team, ADF&G, or SSC may recommend a different value (such as the midpoint of the escapement goal range or S_{MSY}) for G during the annual stock status determination process if deemed appropriate. Use of the lower bound of the escapement goal is consistent with Alaska regulatory policy as the point below which a concern occurs (similar to exceeding the OFL). It recognizes the fact that constant escapement cannot be achieved due to implementation errors associated with lags between fishing and the arrival of fish in the river for assessing escapement. :

(2) $Y_{EEZ,i} = max(0, R_t - G_t - C_{state,t})$

(3) $MFMT_t = \frac{\sum_{i=t-T+1}^{t} Y_{EEZ,i}}{\sum_{i=t-T+1}^{t} R_i}$

Should the fishing mortality rate (F_{EEZ}) exceed the MFMT in any year, it will be determined that a stock is subject to overfishing.

Overfished

Should a stock's productive capacity fall below the MSST in any year, the stock is overfished. This would occur when the summed escapements for one generation (T) are less than one-half of G across T years:

(4) $MSST_t = \frac{\sum_{i=t-T+1}^{t} G_i}{2}$; evaluated by comparing $\sum_{i=t-T+1}^{t} S_i$ with $MSST$, where S is spawning escapement in year i.

MFMT and MSST for a stock would be updated each year with the most current T years of G, R, C_{EEZ}, and S.

Annual Catch Limit

- Preseason, to inform harvest specifications, the ACL would be expressed as the sum of observed potential yields in the EEZ from the previous T-1 years and the preseason estimate of potential yield in the EEZ based on the preseason forecast of run size:

(5) $ACL_{preseason} = \sum_{i=t-T+1}^{t-1} Y_{EEZ,i} + \hat{Y}_{EEZ,t}$, where $\hat{Y}_{EEZ,t}$ is the preseason estimate of potential yield in the EEZ for year t and is calculated as:

(6) $\hat{Y}_{EEZ,t} = max(0, \hat{R}_t - G_t - \bar{F}_{state,t} * \hat{R}_t)$, where $\hat{R}_t$ is the predicted run size in year t based on a vetted preseason forecast method and $\bar{F}_{state,t}$ is the recent average harvest rate in State waters over the average generation time (T) for the species and stock.

- Postseason, all T years of realized runs would be used to determine if the ACL was exceeded.

The final ACL in the EEZ would be calculated postseason each year as the cumulative yield in the EEZ under the F_{OFL} control rule for the most recent T years, where $Y_{EEZ,i}$ are total removals of a stock in the EEZ over time period i:

(7) $ACL_t = \sum_{i=t-T+1}^{t} Y_{EEZ,i}$,

The ACL would need to be evaluated if the summed catches across those T years $\sum_{i=t-T+1}^{t} C_{EEZ,i}$ exceed the ACL even though escapement has been above G, i.e., $S_t \geq G_t$ during the same time span.

- While an ACL is not specified for all Cook Inlet waters or for Cook Inlet State waters, because Federal management is limited to the fishery under Federal authority (i.e., the fishery in the Cook Inlet EEZ), a theoretical ACL for all of Cook Inlet or for the fishery in State waters could be calculated by using the above approach in terms of total Cook Inlet salmon yield or State waters salmon yield.

Overfishing Limit and Acceptable Biological Catch

Specification of the OFL and ABC for the EEZ area are defined as follows:

- The lower bound of escapement goals are used as the basis for fishery management because they are thought to provide long-term yields near MSY and are precautionary due to uncertainties in the data and modeled estimates. Therefore, in this situation OFL = Max ABC=ABC. The SSC may consider an ABC < MaxABC to account for scientific uncertainty associated with the OFL, including changes in escapement goal methodology and other sources of uncertainty.

- An ABC at or below the MaxABC would be set each year during the annual harvest specification process based on the best scientific information available.

- For consideration in setting the ABC below Max ABC, the following equation could be considered as an example, noting that the SSC could establish an ABC <= MaxABC based on best scientific information available:

    - $ABC_{EEZ,t} = max(0, \hat{R}_t - \underline{\bar{F}}_{state,t} * \hat{R}_t - G_t)$, where $\widehat{R_t}$is the predicted run size in year *t* based on a vetted preseason forecast methodology, $\underline{F}_{state,t}$ is the average harvest rate in State waters over the average generation time T for the species and stock.

- ACL=ABC

Tier 2: Salmon stocks managed as a complex

Tier 2 stocks are salmon stocks managed as a complex, with specific salmon stocks designated as indicator stocks. An indicator stock is a stock for which sufficient data exist to allow for the development of measurable and objective status determination criteria and can be used as a proxy to manage and evaluate data poor stocks within the stock complex. Further, an indicator stock is representative of the typical vulnerabilities of stocks within the stock complex.

The Salmon Plan Team or ADF&G would identify the Tier 2 stocks each year during the annual status determination process.

In general, management of these stocks is based on aggregate abundance. Lack of a general stock identification technique (or logistical and economic constraints) for catches within Cook Inlet prevents assessment of run strength of individual stock groups contributing to this mixed stock fishery. Information on the individual indicator stock is used to inform management actions for the stock complex.

For the Tier 2 stocks, the following calculations would be conducted each year to determine the status of the salmon stocks and set the appropriate biological reference points.

Overfishing

(2) The Tier 1 formulas for *F* and MFMT would be used for Tier 2 indicator stocks. Whenever estimates of *F* or MFMT, as defined under Tier 1, are unavailable for each stock in a stock complex managed under this FMP, a list of "indicator" salmon stocks for a given stock complex will be established.

(3) Using the same definitions and criteria described under Tier 1, a determination that one or more indicator salmon stocks is being subjected to overfishing will constitute a determination that the respective stock complex is being subjected to overfishing, except as provided in the paragraph below.

(4) Overfishing of one or more stocks in a stock complex may be permitted, and may not result in a determination that the entire stock complex is being subjected to overfishing, under the following conditions established under NS 1 (50 CFR §600.310(l)), specifically:

> a) it is demonstrated by analysis that such action will result in long-term net benefits to the Nation;
>
> b) it is demonstrated by analysis that mitigating measures have been considered and that a similar level of long-term net benefits cannot be achieved by modifying fleet behavior, gear selection/configuration, or other technical characteristics in a manner such that no overfishing would occur; and

c) the resulting rate or level of fishing mortality will not cause any stock or stock complex to fall below its MSST more than 50% of the time in the long term.

(5) The productive capacity of a stock complex is measured as the sum of the indicator stocks' escapements from the most recent *T* years, where *T* is equal to the average generation time for the species and stocks being considered in terms of total age.

Overfished

(6) The MSST for a stock complex is equal to one-half the sum of the *G*s for the indicator salmon stocks from the most recent *T* years.

(7) Should a stock complex's productive capacity fall below the MSST in any year, it will be determined that the stock complex is overfished.

(8) The MSY for the stock complex could be listed as unknown, while noting that the stock complex is managed on the basis of one or more indicator stocks that do have stock-specific MSYs or suitable proxies.

Overfishing Limits, Annual Catch Limits & Acceptable Biological Catch

(9) The OFL, ACL, and ABC will be set for the indicator stock using the Tier 1 methodology.

Tier 3: Salmon stocks with no reliable estimates of escapement

Tier 3 salmon stocks have no reliable estimates of escapement, and OFL/ABC are based on reliable catch history for each species, similar to Tier 6 for federally managed groundfish species. Only an OFL and ABC would be set for these stocks and because it is not possible to set an MSST without an estimate of escapement.

The Salmon Plan Team or ADF&G would identify the Tier 3 stocks each year during the annual status determination process.

For the Tier 3 stocks, the following calculations would be conducted each year to determine the status of the salmon stocks and set the appropriate biological reference points.

Proposed OFL, Max ABC, and ACL/ABC:

- OFL = the maximum EEZ catch multiplied by *T* years, unless an alternative value is recommended on the basis of the best scientific information available.
- Max ABC < OFL * 0.9 to buffer for uncertainty. An ABC at or below the maximum ABC would be set each year during the annual stock status determination process based on the best available information.
- ABC=ACL

Decisions for the annual status determination process:

- Which stocks belong in Tier 3?
- What are the appropriate years to use for maximum catch?
- Does the best available scientific information indicate that an alternative value should be set for OFL?
- What is the appropriate buffer for uncertainty in setting the ABC?

Because the OFL is a limit on catch, using catch history for Tier 3 stocks is the most appropriate way to set the OFL when there are no reliable estimates of escapement or escapement data and forecasts are not available. Overfishing would occur when harvest exceeds the OFL. For salmon, the summary of catches can be reliably used as an OFL due to the multiple year nature of how the catch data are accumulated (e.g., 4 years for chum information). Methods that use CPUE (e.g., catch per delivery) would likely not provide sufficient information to judge whether catches had exceeded a level thought to cause overfishing, whereas a long period of sustained catches is evidence that overfishing is not occurring.

Rebuilding

If a stock or stock complex is determined to be overfished, NMFS will immediately notify the Council under Section 304(e) of the Magnuson-Stevens Act. Consistent with provisions of the Magnuson-Stevens Act, the Council would have two years from this notification to end overfishing and prepare a rebuilding plan.

If a stock or stock complex is declared overfished or if overfishing is occurring, the Council will request that the State of Alaska and/or Salmon Plan Team conduct a formal assessment of the primary factors leading to the decline in abundance and recommend management measures to prevent overfishing and rebuild the fishery. The Council and NMFS will assess these rebuilding measures for compliance with the Magnuson-Stevens Act, including the national standard guidelines. If the Council and NMFS deem the State of Alaska's proposed rebuilding measures sufficient to comply with Magnuson-Stevens Act requirements, the State rebuilding program may be adopted without an FMP amendment to assure timely implementation.

A proposed rebuilding plan could include:

1. an evaluation of the roles of fishing, marine and freshwater survival in the overfished determination;
2. any modifications to the SDC for determining when the stock has rebuilt;
3. recommendations for actions to rebuild the stock to MSY, including modification of control rules if appropriate, and;
4. a specified rebuilding period.

Based on the results of the State of Alaska and/or Salmon Plan Team's recommended rebuilding plan, the Council would recommend the rebuilding plan to the Secretary. Adoption of a rebuilding plan would require implementation either through an FMP amendment, Federal notice and comment rule making, or State action. Subject to Secretarial approval, the Council and the State would implement the rebuilding plan with appropriate actions to ensure the stock is rebuilt in as short a time as possible based on the biology of the stock but not to exceed ten years, while taking into consideration the needs of the commercial, recreational, personal use, and subsistence fishing interests and coastal communities.

If a stock is overfished, a rebuilding plan could include control rules or management measures that target spawning escapement at or above the level expected to produce MSY, provided sufficient recruits are available, and targeting a rebuilding period of one generation. As Chinook and sockeye generation times often vary more substantially than those of other salmon species (with an average of 5 years), in the context of rebuilding times "one generation" should be viewed in the context of the particular stock or average generation time within a stock complex. For any of the species, if the particular stock of concern typically exhibits a different life history than those generalized above, the Salmon Plan Team or ADF&G could use stock-specific expertise to determine the most appropriate generation time for the rebuilding timeline.

Because salmon are exploited in multiple fisheries, and because multiple salmon stocks may be exploited within the Federal waters of Cook Inlet, it is necessary to determine fishery specific contribution to the total exploitation rate to determine the actions necessary to end and prevent future overfishing. As the Council and NMFS have no jurisdiction over river and State-waters fisheries, it also may be necessary for other responsible entities to take action to end ongoing and prevent future overfishing. Furthermore, the BOF may proactively or reactively modify salmon harvests in State waters to account for removals in the EEZ.

Where available, the Salmon Plan Team or ADF&G would report postseason exploitation rates in the annual SAFE document and assess the mortality rates in fisheries impacting the stock of concern and report their findings.

In cases where no action within Council authority can be identified which has a reasonable expectation of contributing to the rebuilding of the stock in question, the Council will identify the actions required by other entities to recover the depressed stock, and these findings will be reported to the appropriate management entity. Due to a lack of data for some stocks, environmental variation, economic and social impacts, and habitat losses or problems beyond the control or management authority of the Council, it is possible that rebuilding of depressed stocks in some cases could take much longer than ten years. The Council may change analytical or procedural methodologies to improve the accuracy of estimates for abundance, harvest impacts, and reduce ocean harvest impacts when it may be effective in stock recovery. For those causes beyond Council control or expertise, the Council may make recommendations to those entities which have the authority and expertise to change preseason prediction methodology, improve habitat, modify enhancement activities, and re-evaluate management and conservation objectives for potential modification through the appropriate Council process.

2.4.5. Accountability Measures

The NS 1 guidelines, at 50 CFR 600.310(g), define accountability measures as management controls to prevent ACLs from being exceeded, and to correct or mitigate overages of the ACL if they occur. Overages occur when catch exceeds the ACL.

Some accountability measures would be implemented by ADF&G during the preseason planning process and inseason. Others are implemented postseason through monitoring and reporting requirements. Additional accountability measures would be implemented, as required, if the postseason ACL is exceeded in multiple years.

Overfishing would be addressed by restricting the fishery in subsequent years. Under the FMP, accountability measures would only apply to the fishery that occurs in the EEZ. Nevertheless, NMFS and ADF&G would have to consider all sources of harvest and adjust the EEZ harvest accordingly to prevent overfishing.

Inseason

The following are the types of measures that could be implemented during the season to avoid overages of the ACL.

- Inseason authority to manage the fishery allows ADF&G to close the fishery on short notice when ACLs are projected to be met or exceeded.
- Monitoring during the season allows projection of when ACLs will be met.

Post-season

Postseason accountability measures could be implemented through the assessment and review phases of the annual stock assessment process:

- Under Tier 1 and Tier 2, ADF&G would use the postseason ACL, using all *T* years of realized runs to determine if the ACL was met or not. If the ACL was exceeded, the AMs would be an overage adjustment that reduces the ACLs in the next fishing year.
- Salmon Plan Team - provides a forum for re-evaluation of management objectives, reference points, and modification of models that relate mixed-stock impacts to stock-specific objectives and reference points.
- Annual SAFE document - allows postseason assessment of objectives and performance.

If total catch is determined to be above the postseason ACL, the Salmon Plan Team or State would report on the catch overages and accountability measures in the annual reports. If it is necessary to correct problems in the assessment or management methods, such changes can be considered during the annual Salmon Plan Team process.

Repeated overages of ACL could trigger evaluation of the ACL/accountability measure approach in order to address any systemic bases for the overages.

2.4.6. Optimum Yield and Maximum Sustainable Yield

Under Alternative 2, OY and MSY must be defined for the Cook Inlet EEZ salmon fishery. The following section presents several options for MSY and OY definitions.

Maximum Sustainable Yield

MSY is specified as the largest long-term harvest or yield that can be taken from a stock or stock complex under prevailing conditions. MSY should be estimated on the basis of the best scientific information available. Where data are insufficient to estimate MSY directly, Councils should adopt other measures of reproductive potential that serve as reasonable proxies.

An ecosystem perspective suggests that the MSY of the fishery may change if an environmental regime shift occurs or if the present mix of stocks is altered substantially. Also, as new data are acquired and as statistical methodology evolves over time, it is to be expected that estimates of MSY will change, even if the ecosystem remains relatively stationary. Therefore, the proposed estimates of MSY contained in this section should be viewed in context, and are based on the best scientific information currently available. It is acknowledged that the MSY values specified here are representative of ecosystem conditions in the last

23 years. For other historical periods in the fishery with different ecosystem conditions, it is likely that MSY may have been specified differently.

The MSA requires Regional Councils to "review on a continuing basis, and revise as appropriate, the assessments and specifications made ... with respect to the optimum yield." OY may need to be re-specified in the future if major changes occur in the estimate of MSY. Likewise, OY may need to be re-specified if major changes occur in the ecological, social, or economic factors governing the relationship between OY and MSY.

Option 1: MSY could be defined in terms of "constant escapement" for the Cook Inlet EEZ. In other words, yield varies with run size each year to achieve a constant sustainable level of escapement, currently defined as the lower bound of the escapement goal range. If, in a particular year, run size falls below the escapement goal, then yield that year would be zero. The following equation is used to define MSY for the Cook Inlet EEZ:

$$MSY = Y_{EEZ} = max\left(0, R_t - G_t - C_{state,t}\right)$$

where t = return year, Y = potential yield within the EEZ, R = annual run size of a stock, C = catch, and G = escapement goal or target, which in this case is defined as the lower bound of the established escapement goal. Use of the lower bound of the escapement goal is consistent with Alaska regulatory policy as the point below which a concern occurs (similar to exceeding the OFL). It recognizes the fact that constant escapement cannot be achieved due to implementation errors associated with lags between fishing and the arrival of fish in the river for assessing escapement. Realized escapements are therefore distributed within the escapement goal range and are considered by policy to be the best expression of the number of spawning salmon that produce MSY over the long term.

Escapement goals account for MSY, biological productivity, and ecological factors, including the consumption of salmon by a variety of marine predators. The SSC and Salmon Plan Team or NMFS would identify the escapement goal target used to establish MSY. For salmon stocks without escapement goals, a suitable proxy would be used to estimate MSY, or would be left undefined if there is not information available to develop a suitable estimate of MSY.

Option 2: Alternatively, MSY could also be defined in terms of "constant escapement" for all waters of Cook Inlet. This approach would also define MSY in terms of yield, but not subdivide between State and EEZ waters in Cook Inlet. If, in a particular year, run size falls below the escapement goal, then yield that year would be zero. The following equation is used to estimate MSY for Cook Inlet salmon stocks:

For Tier 1 stocks, MSY is defined as the 1999 to 2021 median or 80th percentile of the following equation:

$$Y_t = max(0, R_t - G_t)$$

Where t = return year at median or 80th percentile, etc., Y = potential yield, R = annual run size of a stock, and G = **lower bound** of the escapement goal.

For Tier 2 stocks, MSY is defined with the same equation as Tier 1, but applied to the respective stock complexes instead of a single stock.

For Tier 3 stocks, which have no reliable estimates of escapement, maximum catch over the 1999 to 2021 time period is used as a proxy for MSY, since there is no other information available to estimate it.

Examples of point estimates of MSY for each stock and stock complex in the Cook Inlet salmon fishery using median, 80th percentile, and maximum estimates for each stock. These examples should be considered preliminary pending additional review.

Stock	MSY estimate (Median run - lower bound)	MSY estimate (80th percentile run - lower bound)	MSY estimate (Max run - lower bound)
Tier 1			
Kenai River late-run sockeye	2,792,442	3,510,679	5,513,091
Kasilof River sockeye	705,000	1,027,823	1,739,917
Kenai late-run Chinook	14,544	38,348	77,812
Tier 2			
Upper Cook Inlet coho	352,960	424,865	592,372
Upper Cook Inlet “other” sockeye	552,105	723,034	943,813
Tier 3			
Upper Cook Inlet chum	127,623	211,711	281,694
Upper Cook Inlet odd-year pink salmon	77,787	152,816	244,571
Upper Cook Inlet even-year pink salmon	395,430	490,034	703,285

As many of these MSY values are estimates or are based on proxies, they have varying degrees of uncertainty associated with them. The estimates for Tier 1 stocks are thought to have the lowest uncertainty, the estimates for Tier 2 stocks have moderate uncertainty, and the estimates for Tier 3 stocks have a very high degree of uncertainty. It is acknowledged that the estimates of MSY are for the entirety of these salmon stocks, which are also subject to multiple salmon fisheries in State waters and spawn entirely in State freshwaters. These factors are taken into account by the ABC/OFL control rule for the portion of the fishery under the jurisdiction of the Council. Because this option estimates MSY for individual stocks across the timeseries, estimates are likely to be from a mixture of different years.

As with Option 1, escapement goals account for MSY, biological productivity, and ecological factors, including the consumption of salmon by a variety of marine predators. The SSC and Salmon Plan Team or NMFS would identify the escapement goal target used to establish MSY. For salmon stocks without escapement goals, a suitable proxy would be used to estimate MSY, or would be left undefined if there is not information available to develop a suitable estimate of MSY.

Sub - Option (may be combined with Option 1 or 2): MSY could be established using the approaches outlined in the other options, but aggregating estimates at the species level, or even across species. For example, as a combined stock complex for each species of salmon with significant escapement goals (excludes pink and chum salmon).

By aggregating multiple Upper Cook Inlet stocks as a stock complex for the purpose of estimating MSY, this option would directly acknowledge that marine fisheries in Upper Cook Inlet harvest a mixture of stocks (e.g., Barclay and Chenoweth, 2021) while also taking into account the importance of spawning escapements in ensuring the achievement of MSY in future years. As stated in the National Standard 1: “Stocks may be grouped into complexes for various reasons, including where stocks in a multispecies fishery cannot be targeted independent of one another.” This option would produce an area-wide estimate of MSY, and in this respect would be directly comparable to annual harvests of each species for the entire Upper Cook Inlet. At the same time, this option would require summing across stocks in different tiers, such as spawning escapement goals thought to be coarse indices of abundance (e.g., tier 2 stocks for which escapement goals are set using the percentile approach) and those thought to more closely represent actual numbers of fish (e.g., tier 1 stocks for which escapement goals are set using a more complete accounting of spawners and subsequent recruits). As some of the existing escapement goals only have lower bounds, not ranges, this option uses the lower bound of escapement goals to be consistent. By subtracting the lower bound of escapement goals from total harvests for a given species, the resulting estimates of MSY for this option are likely to be substantially inflated compared to actual yields. As with other options considered, this definition of MSY would also not take into account salmon that are harvested prior to reaching Upper Cook Inlet (e.g., Shedd et al. 2016).

Optimum Yield

OY is a long-term desired yield from a stock, stock complex, or fishery that will provide the greatest overall net benefit to the Nation. It should be prescribed on the basis of MSY, as reduced by any relevant economic, social, or economic factor. Here, the options would define OY at the level of the Cook Inlet EEZ fishery. There may be some flexibility in how MSY is defined relative to the Cook Inlet EEZ salmon fishery. Each of these options would be prescribed on the basis of MSY in that all flow from the assumption that the maximum yield for each stock would be the total run of a stock minus the lower bound of its escapement goal range. However, because stocks cannot be targeted individually in the EEZ and are harvested in a mixed stock fishery, OY must be reduced to account for these ecological conditions and specified for the EEZ fishery as a whole. OY could include the following options and variations.

Option 1: The OY range for the Cook Inlet EEZ salmon fishery could be the fishery's catch which, when combined with the catch from all other salmon fisheries in Cook Inlet, results in a post-harvest abundance within the escapement goal range for each applicable stock or stock complex.

Option 2: The OY range for the Cook Inlet EEZ salmon fishery could be the range of sum ACLs established for the Cook Inlet EEZ fishery across years. ACLs incorporate the OFL control rule established for each stock as well as the yield potentially available to EEZ over time based on historical fishing patterns.

Option 3: The OY range for the Cook Inlet EEZ salmon fishery could be the range between the average of the three lowest years of total estimated EEZ salmon harvest and the three highest years of total estimated EEZ salmon harvest from 1999 to 2021. This period is when estimates of Cook Inlet EEZ harvest are available for, and represents a broad range of recent conditions in the fishery that may also be reasonably foreseeable in the future. This results in an OY range of approximately 291,631 to 1,551,464 salmon of all species.

> This OY reflects a range of harvests that have provided for a viable fishery in the Cook Inlet EEZ in both high and low salmon abundance years and balanced harvest opportunities for all other commercial and non-commercial salmon user groups in Cook Inlet across a wide range of ecological conditions and while also avoiding overfishing over the long term. Looking at average total EEZ salmon harvest in years of high and low abundance accounts for the fact that the different stocks and species of salmon will have varying abundance each year–a high abundance year for one species may be a low abundance year for another. It also acknowledges that the Cook Inlet EEZ commercial salmon fishery cannot individually target strong stocks of salmon without also harvesting other stocks that cannot support as much harvest. Optimum yield would be the range of expected EEZ harvest across all species that prevents overfishing on any one stock.

2.4.7. Annual Process for Determining the Status of the Stocks

Under Alternative 2, an annual process for determining the status of salmon stocks in the Cook Inlet EEZ must be defined in order to ensure that a scientifically based approach is used for controlling catch to maintain stock abundance at the level necessary to produce MSY and prevent overfishing from occurring in the fishery.

Option 1 – Establish a Salmon Plan Team

Establish a Salmon Plan Team that would function similar to the Crab Plan Team and the Scallop Plan Team. The Salmon Plan Team would produce a Stock Assessment and Fishery Evaluation (SAFE) Report and annually recommend OFL, ABC, ACL, and MSST as appropriate, using the Tier system in the Salmon FMP and the best available information. The SSC and Council would review the SAFE and set the OFL, ABC, ACL, and MSST, as appropriate.

The Council selects plan team members from agencies and organizations having a role in the research or management of the affected fisheries. Plan teams are designed to be small enough to work effectively but large enough to have expertise covering all the important aspects of a particular fishery. Individuals on the teams may be nominated by other members of the Plan Team, Council, SSC or Advisory Panel. Appointments to the team are approved by the Council.

Salmon SAFE

The annual SAFE report would provide the Council with a summary of the most recent biological condition of the salmon stocks and the social and economic condition of the fishing and processing industries. The SAFE report would summarize the best scientific information available concerning the past, present, and possible future condition of the salmon stocks and fisheries, along with ecosystem considerations/concerns. This would include recommendations of OFL, ABC, ACL, and MSST. All recommendations must be designed to prevent overfishing while achieving optimum yield (NS 1). All recommendations would also be scientifically based (NS 2), drawing upon the Plan Team's expertise in the areas of regulatory management, natural and social science, mathematics, and statistics. Finally, uncertainty would be taken into account wherever possible (NS 6).

The Salmon SAFE report would be scientifically-based, citing data sources and interpretations, and would provide information to the Council for determining annual harvest specifications, documenting significant trends or changes in the stocks, marine ecosystem, and fisheries over time; and assessing the relative success of existing State and Federal fishery management programs. The review by the SSC would constitute the official, scientific review for purposes of the Information Quality Act. Upon review and acceptance by the SSC, the Salmon SAFE and any associated SSC comments would constitute the best scientific information available for purposes of the MSA.

The Salmon SAFE could be structured like other Council SAFEs such that stock assessments, economic analyses, and ecosystem considerations comprise the three major themes of the SAFE document. The stock assessment section of the SAFE could contain chapters for each salmon stock, and a summary or "intro" chapter prepared by the Salmon Plan Team. To the extent practicable, each chapter would include estimates of all annual harvest specifications, all reference points needed to compute such estimates, and all information needed to make "overfishing" and "overfished" determinations based on the SDC. In providing this information, the Salmon SAFE would use an official time series of available historical catch for each salmon stock, which would be provided by the State of Alaska, including estimates of retained and discarded catch taken in the salmon fishery; bycatch taken in other fisheries; State commercial, recreational, personal use, and subsistence fisheries; and catches taken during scientific research.

The other two major SAFE sections would contain economic, social, community, essential fish habitat, and ecological information pertinent to the success of salmon management or the achievement of Salmon FMP objectives.

Option 2 – Establish a Peer Review Process that works in conjunction with the SSC

The existing peer review process in the FMP that utilizes existing State salmon expertise and review processes for the scientific information to advise the Council about the conservation and management of the salmon fisheries in the Cook Inlet EEZ could be expanded. This would, in part, utilize existing State salmon expertise and review processes for the purposes of developing fishing level recommendations and providing review scientific information used to manage the fishery. The State, as the peer review body, would work together with the Council and SSC to implement the provisions of the MSA. This could enable the harvest limit recommendations from the State's peer review process, which would work in conjunction with the SSC as described below.

Under this option, there would not be a Salmon Plan Team. State scientists would produce a management report meeting MSA requirements and annually recommend OFL, ABC, ACL, and MSST as appropriate, using the Tier system in the Salmon FMP and the best scientific information available. The peer review process would provide the required scientific review for the management report and recommend the OFL, ABC, ACL, and MSST, as appropriate. OFL and ABC would then be set based on these scientific recommendations. Consistent with other federally managed fisheries, the Secretary would still be responsible for making annual overfishing and overfished determinations based on the information provided from this process.

This peer review process would be combined with periodic SSC review to contribute to the review of scientific information used to manage the Cook Inlet EEZ salmon fishery. This could occur at some fixed interval (e.g., coincident with the State's triennial escapement goal review process, or triggered by some threshold change in management). At these intervals, the SSC would review the scientific information underlying Federal reference points used to manage the fishery in the Cook Inlet EEZ. This approach also recognizes that salmon escapement goals in Cook Inlet are not modified each year. Because of this, the federal reference points would not be expected to change significantly in every year, except for the inclusion of the most recent year's catch and escapement data. This periodic SSC review could be considered analogous to the SSC approving an assessment that is used to manage a groundfish or crab fishery for multiple years when there are no changes to the assessment methodology in that time period (i.e., biennial or triennial assessment cycles for blackspotted and rougheye rockfish or Pribilof Island golden king crab).

The National Standard 1 guidelines for a peer review process at 600.310(b)(2)(v) are excerpted for reference below.

> *(v) **Scientific advice.** The Magnuson-Stevens Act has requirements regarding scientific and statistical committees (SSC) of the Regional Fishery Management Councils, including but not limited to, the following provisions (paragraphs (b)(2)(v)(A) through (D) of this section). See the National Standard 2 guidelines for further guidance on SSCs and the peer review process (§ 600.315).*
>
> *(A) Each Regional Fishery Management Council shall establish an SSC as described in section 302(g)(1)(A) of the Magnuson-Stevens Act.*
>
> *(B) Each SSC shall provide its Regional Fishery Management Council recommendations for ABC as well as other scientific advice, as described in Magnuson-Stevens Act section 302(g)(1)(B).*
>
> *(C) The Secretary and each Regional Fishery Management Council may establish a peer review process for that Council for scientific information used to advise the Council about the conservation and management of a fishery (see Magnuson-Stevens Act section 302(g)(1)(E)). If a peer review process is established, it should investigate the technical merits of stock assessments and other scientific information to be used by the SSC or agency or international scientists, as appropriate. For Regional Fishery Management Councils, the peer review process is not a substitute for the SSC and both the SSC and*

peer review process should work in conjunction with each other. For the Secretary, which does not have an SSC, the peer review process should provide the scientific information necessary.

(D) Each Council shall develop ACLs for each of its managed fisheries that may not exceed the "fishing level recommendations" of its SSC or peer review process (Magnuson-Stevens Act section 302(h)(6)). The SSC recommendation that is the most relevant to ACLs is ABC, as both ACL and ABC are levels of annual catch.

The National Standard 2 guidelines for a peer review process at 600.315(b)(1) are excerpted in part below.

(b) ***Peer review process.*** *The Secretary and each Council may establish a peer review process for that Council for scientific information used to advise about the conservation and management of the fishery. [16 U.S.C. 1852(g)(1)(E)](). A peer review process is not a substitute for an SSC and should work in conjunction with the SSC (see [§ 600.310(b)(2)(v)(C)]()). This section provides guidance and standards that should be followed in order to establish a peer review process per Magnuson-Stevens Act section 302(g)(1)(E).*

(1) The objective or scope of the peer review, the nature of the scientific information to be reviewed, and timing of the review should be considered when selecting the type of peer review to be used. The process established by the Secretary and Council should focus on providing review for information that has not yet undergone rigorous peer review, but that must be peer reviewed in order to provide reliable, high quality scientific advice for fishery conservation and management. Duplication of previously conducted peer review should be avoided.

(i) ***Form of process.*** *The peer review process may include or consist of existing Council committees or panels if they meet the standards identified herein. The Secretary and Council have discretion to determine the appropriate peer review process for a specific information product. A peer review can take many forms, including individual letter or written reviews and panel reviews.*

(ii) ***Timing.*** *The peer review should, to the extent practicable, be conducted early in the process of producing scientific information or a work product, so peer review reports are available for the SSC to consider in its evaluation of scientific information for its Council and the Secretary. The timing will depend in part on the scope of the review. For instance, the peer review of a new or novel method or model should be conducted before there is an investment of time and resources in implementing the model and interpreting the results. The results of this type of peer review may contribute to improvements in the model or assessment.*

(iii) ***Scope of work.*** *The scope of work or charge (sometimes called the terms of reference) of any peer review should be determined in advance of the selection of reviewers. The scope of work contains the objectives of the peer review, evaluation of the various stages of the science, and specific recommendations for improvement of the science. The scope of work should be carefully designed, with specific technical questions to guide the peer review process; it should ask peer reviewers to ensure that scientific uncertainties are clearly identified and characterized, it should allow peer reviewers the opportunity to offer a broad evaluation of the overall scientific or technical product under review, as well as to make recommendations regarding areas of missing*

information, future research, data collection, and improvements in methodologies, and it must not change during the course of the peer review. The scope of work may not request reviewers to provide advice on policy or regulatory issues (e.g., amount of precaution used in decision-making) which are within the purview of the Secretary and the Councils, or to make formal fishing level recommendations which are within the purview of the SSC.

(2) ***Peer reviewer selection.*** *The selection of participants in a peer review should be based on expertise, independence, and a balance of viewpoints, and be free of conflicts of interest.*

(i) ***Expertise and balance.*** *Peer reviewers must be selected based on scientific expertise and experience relevant to the disciplines of subject matter to be reviewed. The group of reviewers that constitute the peer review should reflect a balance in perspectives, to the extent practicable, and should have sufficiently broad and diverse expertise to represent the range of relevant scientific and technical perspectives to complete the objectives of the peer review.*

(ii) ***Conflict of interest.*** *Peer reviewers who are federal employees must comply with all applicable federal ethics requirements. Potential reviewers who are not federal employees must be screened for conflicts of interest in accordance with the NOAA Policy on Conflicts of Interest for Peer Review Subject to OMB's Peer Review Bulletin or other applicable rules or guidelines.*

(A) Under the NOAA policy, peer reviewers must not have any conflicts of interest with the scientific information, subject matter, or work product under review, or any aspect of the statement of work for the peer review. For purposes of this section, a conflict of interest is any financial or other interest which conflicts with the service of the individual on a review panel because it: could significantly impair the reviewer's objectivity, or could create an unfair competitive advantage for a person or organization.

(B) No individual can be appointed to a review panel if that individual has a conflict of interest that is relevant to the functions to be performed. For reviews requiring highly specialized expertise, the limited availability of qualified reviewers might result in an exception when a conflict of interest is unavoidable; in this situation, the conflict must be promptly and publicly disclosed. Conflicts of interest include, but are not limited to, the personal financial interests and investments, employer affiliations, and consulting arrangements, grants, or contracts of the individual and of others with whom the individual has substantial common financial interests, if these interests are relevant to the functions to be performed.

(iii) ***Independence.*** *Peer reviewers must not have contributed or participated in the development of the work product or scientific information under review. For peer review of products of higher novelty or controversy, a greater degree of independence is necessary to ensure credibility of the peer review process. Peer reviewer responsibilities should rotate across the available pool of qualified reviewers or among the members on a standing peer review panel to prevent a peer reviewer from repeatedly reviewing the same scientific information, recognizing that, in some cases, repeated service by the same reviewer may be needed because of limited availability of specialized expertise.*

(3) ***Transparency.*** *A transparent process is one that ensures that background documents and reports from peer review are publicly available, subject to Magnuson-Stevens Act*

confidentiality requirements, and allows the public full and open access to peer review panel meetings. The evaluation and review of scientific information by the Councils, SSCs or advisory panels must be conducted in accordance with meeting procedures at § 600.135. Consistent with that section, public notice of peer review panel meetings should be announced in the Federal Register with a minimum of 14 days and with an aim of 21 days before the review to allow public comments during meetings. Background documents should be available for public review in a timely manner prior to meetings. Peer review reports describing the scope and objectives of the review, findings in accordance with each objective, and conclusions should be publicly available. Names and organizational affiliations of reviewers also should be publicly available.

(4) ***Publication of the peer review process.*** *The Secretary will announce the establishment of a peer review process under Magnuson-Stevens Act section 302(g)(1)(E) in the Federal Register along with a brief description of the process. In addition, detailed information on such processes will be made publicly available on the Council's Web site, and updated as necessary.*

Potential future streamlining of the process to determine the status of stocks and set harvest specifications

There is flexibility under the National Standard guidelines to modify the SDC and annual harvest specification processes to account for the needs of different fisheries. The complexity and burden of the annual processes associated with Alternative 2 were previously identified as challenging for both management agencies and the public. Analysts have identified several potential options that could be explored to potentially streamline the management cycle for the Cook Inlet EEZ. These options could not be fully developed given the time available, but they remain a longer-term management option that could be implemented through future actions.

- A multi–year approach to determine overfishing status.
- A multi-year plan to establish harvest specifications. This is referenced in section 303(a)(15) of the Magnuson–Stevens Act and refers to a plan that establishes harvest specifications or harvest guidelines for each year of a time period greater than 1 year. A multiyear plan must include a mechanism for specifying ACLs for each year with appropriate AMs to prevent overfishing and maintain an appropriate rate of rebuilding if the stock or stock complex is in a rebuilding plan. A multiyear plan must provide that, if an ACL is exceeded for a year, then AMs are implemented for the next year.
- Delegating authority to the State to establish catch limits, ABC, and OFL on an annual basis. This could allow the State to set catch limits, ABC, and OFL for the Cook Inlet EEZ based on reference point calculations that have been reviewed by the SSC.
- Flexibility in application of NS1 guidelines. There are limited circumstances that may not fit the standard approaches to specification of reference points and management measures set forth in these guidelines. These include, among other things, conservation and management of Endangered Species Act listed species, harvests from aquaculture operations, stocks with unusual life history characteristics (e.g., Pacific salmon, where the spawning potential for a stock is spread over a multi-year period), and stocks for which data are not available either to set reference points based on MSY or MSY proxies, or to manage to reference points based on MSY or MSY proxies. In these circumstances, Councils may propose alternative approaches for satisfying requirements of the Magnuson-Stevens Act other than those set forth in these guidelines. Councils must document their rationale for any alternative approaches in an FMP or FMP amendment, which will be reviewed for consistency with the Magnuson-Stevens Act.

2.4.8. Monitoring, Recordkeeping, and Reporting

2.4.8.1. Commercial Drift Gillnet salmon fishery sector

Currently, the salmon FMP does not contain management measures to monitor the Cook Inlet EEZ commercial salmon fishery or to measure total salmon catch or bycatch from EEZ waters. Under either action alternative, new monitoring, recordkeeping, and reporting measures would be required to comply with provisions of the MSA. MSA § 313(h) states that the North Pacific Council shall submit, and the Secretary may approve, consistent with the other provisions of this Act, conservation and management measures to ensure total catch measurement in each fishery under the Council's jurisdiction and such measures shall ensure the accurate enumeration, at a minimum, of target species, economic discards, and regulatory discards. Monitoring, recordkeeping, and reporting also inform many of the required provisions under § 303(a)(5) and related sections of the MSA. NMFS and the Council monitor federally managed fisheries with a number of approaches, including electronic submission of landing reports through eLandings, logbooks, certified scales to weigh catch at offload, vessel monitoring systems, observers, and electronic monitoring. Fishery monitoring may also be required to verify compliance with regulations. Implementation of these measures requires participants to have a Federal Fisheries Permit.

Under Alternative 2, the following fishery monitoring, recordkeeping, and reporting objectives must be addressed for the Cook Inlet EEZ drift gillnet salmon fishery:

- Accurate accounting of catch and discards of salmon, groundfish, and other species in the EEZ. (NS 1 & NS 9)
- Accounting of marine mammal and seabird interactions. (the Marine Mammal Protection Act [MMPA] & ESA)
- Monitoring to ensure compliance with fishery open times and areas, as well as accurate reporting of catch and discards.

Table 2-1 provides a summary of the available monitoring, recordkeeping, and reporting tools. A comprehensive discussion of these tools can be found in Appendix 8.

Table 2-1 Monitoring, recordkeeping, and reporting tools available

Monitoring, Recordkeeping, and Reporting Measure	Objectives Addressed
eLandings	SBRM Catch and bycatch Inseason management data
Electronic logbook (data available inseason)	Approximate effort and catch/bycatch by area
Paper logbook (data available post season or for enforcement)	Approximate effort and catch/bycatch by area
Electronic monitoring	Vessel location Catch accounting Compliance monitoring
VMS	Vessel location
Onboard observers	Catch and bycatch Marine mammals and seabird interactions Regulatory compliance Location of catch and effort
Remote observers	Catch and bycatch Marine mammals and seabird interactions Regulatory compliance Location of catch and effort

Options:

- *Option 1.* Require an FFP, fish tickets/eLandings use, and a logbook. This proposed set of measures are the minimum monitoring, recordkeeping, and reporting requirements recommended by NMFS to accurately account for catch and monitor the fishery. These measures are designed to balance agency data requirements with costs and impacts to vessel operations as well as administrative burden.

Under Alternative 2, inseason management of the Cook Inlet EEZ drift gillnet fishery is delegated to the State. The State has an existing process for timely entry of paper fish tickets into a catch reporting system that collects accurate catch information from the fishery. With the addition of reporting areas specific to the EEZ and a requirement to report all bycatch and discards, fish tickets/eLandings would satisfy MSA catch accounting requirements. If eLandings is not required, appropriate considerations must be made for timely paper fish ticket data availability to the scientific review process, NMFS, and the Council.

There has not previously been a requirement to report discards in the fishery. Therefore, the amount and type of bycatch/discards in the fishery are largely unknown. See Section 4.5.1.2.4 of the RIR for a discussion of non-salmon landings in the fishery. Requiring full retention of groundfish in the fishery may improve accounting of bycatch but would also result in potentially complex interactions with GOA groundfish regulations and could be logistically challenging to participants. Requiring discard of bycatch would address these concerns, but in order to obtain accurate self-reported data on discards at the time of landing, a simple logbook would be required. For example, without a logbook, it is unlikely that a minimal amount of bycatch encountered and discarded early in a fishing day would be accurately reported when a landing is made at the end of the day. If improved accounting demonstrates that there is an insignificant amount of bycatch in the fishery, monitoring and recordkeeping measures could be modified in the future. In addition to establishing accountability for self-reported discard data at landing, logbook data would inform improved estimates of catch in the EEZ.

For the purposes of inseason management, precisely determining which fish were harvested in the EEZ or State waters is not essential under Alternative 2. However, additional information about the approximate distribution of catch between EEZ and State waters is needed to inform the Salmon Plan Team or ADF&G when calculating ACLs and provide the Council with a more accurate assessment of removals by the fishery under its jurisdiction. The logbook already required to collect fishery discard information would provide this by collecting set start/end times and positions.

Table 2-2 Suite of Required Monitoring, Recordkeeping, and Reporting Measures for Alternative 2

Requirement	Objective(s) Addressed
Federal Fisheries Permit	Allow implementation of monitoring, recordkeeping, and reporting requirements
Fish tickets/eLandings with EEZ and State specific stat areas	Reporting of catch, bycatch, and discards by area. (NS 1, NS 9, SBRM)
Logbook	Recordkeeping of catch, bycatch, discards, and effort by area. (verification of reported discards, improved effort by area to inform the SDC/ACL calculations)

- *Option 2.* Recommend additional monitoring, recordkeeping, and reporting measures to obtain increased information from the fishery or improve the enforceability of fishery provisions. A detailed discussion of available tools is provided in Appendix 8.

- *Sub-option 1.* Require full retention of catch and reporting at the time of landing through fish tickets/eLandings. Halibut and any groundfish species in the Central GOA on non-retention status must be recorded in the logbook, discarded, and reported at the time of landing. May be combined with Option 1 or Option 2.

- *Sub-option 2.* No retention of bycatch, all discards must be recorded in the logbook and reported at the time of landing. May be combined with Option 1 or Option 2.

2.4.8.2. Recreational fishery sector

For the recreational salmon fishery, the existing recordkeeping and reporting requirements implemented by the State are expected to be sufficient to inform management and satisfy MSA requirements given the small scale and limited removals of the fishery sector. These include creel sampling, the SWHS, harvest records for annual limits, and the Saltwater Guide Logbooks.

2.4.9. Standardized Bycatch Reporting Methodology

Under Alternative 2, NMFS would require the use of logbooks and either eLandings or ADF&G paper fish tickets. This combination would serve as the SBRM for the Cook Inlet EEZ salmon drift gillnet fishery. Harvesters would be required to report any quantities of fish discarded at sea or retained for sale or personal use at the time of landing. There are already accommodations for discard information in both eLandings and fish tickets.

The SBRM would report information about the characteristics of bycatch in the fishery. Self-reporting would be feasible, in accordance with SBRM guidelines. The FMP would need to identify the data uncertainty resulting from the method and identify how the data would be used. In this instance, the data would be used to satisfy catch accounting requirements and provide improved information about an additional source of GOA groundfish removals. This information may also provide the data required to estimate bycatch quantities for the fishery in the future.

For recreational salmon fisheries in the East Area and West Area, the combination of the SWHS, creel surveys, and Saltwater Guide Logbooks constitute the standardized bycatch reporting methodology for the unguided and guided recreational salmon fishery. These measures could also serve as the SBRM for recreational salmon fishing in the Cook Inlet EEZ under Alternative 2.

2.4.10. Legal Gear

Under Alternative 2, commercial fishing with drift gillnet gear would have to be authorized for the Cook Inlet EEZ in the West Area as a Category 1 management measure. Current Federal regulations at 50 CFR 679.7(h) prohibit commercial fishing for salmon in the EEZ using any gear except troll gear.

> *Salmon fisheries*. (1) Engage in commercial fishing for salmon using any gear except troll gear, defined at §679.2, in the East Area of the Salmon Management Area, defined at §679.2 and Figure 23 to this part.
>
> (2) Engage in commercial fishing for salmon in the West Area of the Salmon Management Area, defined at §679.2 and Figure 23 to this part.

In addition, there are general provisions specified at 50 CFR §600.725 that only authorize hook and line gear for salmon fisheries covered under the FMP. Drift gillnet gear would have to be authorized for the Cook Inlet EEZ commercial salmon fishery covered under an FMP.

Legal gear could also be a Category 2 management measure delegated to the State. This would allow the State to determine the exact specifications of gillnet gear that would be legal in the fishery, within any criteria specified in the FMP.

2.4.11. Federal oversight and review process for all salmon fisheries in the EEZ

Under Alternative 2, the Federal oversight and review process in Chapter 9 of the FMP would need to be revised. First, Chapter 9 would need to be modified to also apply to the salmon fishery in the Cook Inlet EEZ. The following shows how Chapter 9 is proposed to be revised to include the salmon fishery in the Cook Inlet EEZ.

New draft FMP language:

CHAPTER 9 FEDERAL OVERSIGHT AND REVIEW OF STATE MANAGEMENT MEASURES APPLICABLE IN THE EEZ

Delegation of salmon fishery management authority to the State of Alaska requires the Council and NMFS to stay apprised of State management measures governing salmon fishing in the EEZ and, if necessary, to review those measures for consistency with the FMP, the Magnuson-Stevens Act, and other applicable Federal law. Under this FMP, NMFS delegates salmon fishery management authority in the EEZ to the State of Alaska for the entirety of the fishery management unit in the East Area, and for the salmon fishery in the Cook Inlet EEZ in the West Area. State management measures include measures adopted by the Pacific Salmon Commission (for the East Area) and the Alaska Board of Fisheries, as well as other State laws, regulations, and inseason actions. This chapter describes how the Council and NMFS fulfill this oversight role. Section 9.1 describes the ways in which the Council and NMFS monitor State management measures that regulate salmon fishing in the EEZ. Section 9.2 describes the process by which NMFS will review State management measures governing salmon fisheries in the EEZ for consistency with the FMP, the Magnuson-Stevens Act, and other applicable Federal law. Section 9.3 describes the process by which a member of the public can petition NMFS to review State management measures applicable in the EEZ for consistency with the FMP, the Magnuson-Stevens Act, and other applicable Federal law. Finally, Section 9.4 describes the process NMFS will follow if NMFS determines that State management measures in the EEZ are inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal laws.

9.1 Council and NMFS Receipt of Information on State Management Measures

The Council and NMFS receive information on, and stay apprised of, State management measures that regulate salmon fisheries in the EEZ, the Council and NMFS will receive reports from the State of Alaska at regularly scheduled Council meetings regarding applicable State management measures that govern commercial and sport salmon fishing in the East Area and salmon fishing in the Cook Inlet EEZ. Additionally, representatives of the Council, NMFS, and NOAA’s Office of General Counsel have the opportunity to participate in the State’s regulatory process the Board of Fisheries on proposed regulations applicable to East Area and Cook Inlet EEZ salmon fisheries. These Federal representatives also can advise the State or the Board, as needed or as requested by the State of the Board, about the extent to which proposed measures for the East Area or Cook Inlet EEZ salmon fisheries are consistent with the FMP, the Magnuson-Stevens Act, and other applicable Federal law. None of these Federal representatives, however, will vote on any proposals submitted to the Board or the State. NMFS representatives are also members of a number of advisory panels and technical committees of the Pacific Salmon Commission.

The purpose of receiving this information is two-fold. First, it provides the Council and NMFS with opportunities to consider its salmon fishery management policies relative to the State of Alaska’s exercise of its authority. Based on the information received, the Council can determine whether the FMP is functioning as intended from a fishery management policy perspective or whether changes to the fishery management policies contained in the FMP are warranted. Second, it provides the Council and NMFS with a means to ensure that the delegation of fishery management authority to the State is being carried out in a manner consistent with the policy and objectives established within the FMP.

9.2 NMFS Review of State Management Measures for Consistency with the FMP and Federal Laws

If NMFS has concerns regarding the consistency of State management measures with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, NMFS may initiate a consistency review of those management measures. NMFS may initiate this consistency review independently or at the request of the Council. During this review, NMFS will provide the Council and the State of Alaska with an opportunity to submit comments to NMFS that address the consistency of the management measures in question. Because NMFS's review is limited to whether the measures are consistent with the FMP, the Magnuson-Stevens Act and other applicable Federal law, NMFS will only consider comments that address consistency. NMFS may hold an informal hearing to gather additional information concerning the consistency of the measures under review if time permits and NMFS determines that such a hearing would be beneficial.

If NMFS determines after its review that the State management measures are consistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, NMFS will issue a written Statement to that effect, explaining the reasons for its conclusion and identifying the information NMFS used to support its finding. If NMFS determines after its review that the State management measures are inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, NMFS will follow the process set forth in Section 9.4.

NMFS's review under Section 9.2 is limited to consistency of State management measures applicable in the East Area and the Cook Inlet EEZ with existing provisions of the FMP, the Magnuson-Stevens Act, or other applicable law. NMFS will not initiate a consistency review under Section 9.2 resulting from a divergence of fishery management policy perspectives.

9.3 Public Request for NMFS to Review a State Management Measure or Decision for Consistency with the FMP and Federal Laws

Any member of the public may petition NMFS to conduct a consistency review of any State management measure that applies to salmon fishing in the East Area or the Cook Inlet EEZ if that person believes the management measure is inconsistent with the provisions of the FMP, the Magnuson-Stevens Act, or other applicable Federal law. Additionally, a member of the public may request NMFS to review a decision by the State concerning a limited entry permit for a salmon fishery occurring in the East Area or the Cook Inlet EEZ. Such a petition must be in writing and comply with the requirements and process described in this section. As with Section 9.2, NMFS's review under Section 9.3 is limited to consistency of the State management measure or limited entry permit decision with existing provisions of the FMP, the Magnuson-Stevens Act, or other applicable law. NMFS will not initiate a consistency review under Section 9.3 from petitions that merely object to a State management measure or limited entry permit decision, or argue that an alternative measure would provide for better management of the salmon fishery. A person with these types of policy concerns should present them to the Board, the State, or the Council.

Although the FMP provides an administrative process by which a person may seek Federal review of a State management measure or limited entry permit decision for consistency with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, the existence of the Federal process does not preclude or limit that person's opportunity to seek judicial review of State management measure or limited entry permit decision within the State of Alaska's judicial system as available under the provisions of the State's Administrative Procedure Act (Alaska Statue [AS] 44.62). Initiation of State judicial review of a challenge to a State management measure or limited entry permit decision is not required before a person may petition NMFS to conduct a consistency review.

What must a person do before submitting a petition to NMFS?

Prior to submitting a petition requesting a consistency review, a person must exhaust available administrative regulatory or adjudicatory procedures with the State of Alaska. For CFEC decisions on individual limited entry permits, NMFS will conclude that a person has exhausted available State administrative adjudicatory procedures if the person files a petition for reconsideration of a final adverse CFEC decision under 20 AAC 5.1850 and that petition for rehearing is denied. For State management measures that have broad applicability to the fishery, NMFS will conclude that a person has exhausted available State administrative regulatory procedures if the person can demonstrate that he or she: (1) submitted one or more proposals for regulatory changes to the Board of Fisheries during a Call of Proposals consistent with 5 AAC 96.610 and (2) received an adverse decision from the Board on the proposal(s). There are circumstances that may require regulatory changes outside the regular process set forth in 5 AAC 96.610, or when the process set forth in 5 AAC 96.610 is unavailable due to the timing of the action requested. Under these circumstances, NMFS also will conclude that a person has exhausted State administrative regulatory procedures if the person can demonstrate that he or she: (1) could not have followed the regular Call of Proposals requirements at 5 AAC 96.610, (2) submitted an emergency petition to the Board or ADF&G consistent with 5 AAC 96.625 or submitted an agenda change request to the Board consistent with 5 AAC 39.999, and (3) received an adverse decision from the Board or ADF&G on the emergency petition or agenda change request.

The FMP requires exhaustion of available State administrative procedures before petitioning NMFS for a consistency review for several reasons. Under this FMP, the Council and NMFS have delegated regulation of the salmon fisheries in the East Area and the Cook Inlet EEZ to the State of Alaska in recognition of its expertise and the State is in the best position to consider challenges, and make changes, to its management measures or limited entry permit decisions. The Council and NMFS also recognize the importance of public participation during the development of fishery management measures and exhaustion of State administrative procedures encourages the public to actively participate in and try to effectuate fishery management change through the State process. Finally, by requiring a person to exhaust the State's administrative regulatory procedures before petitioning NMFS, the State is presented with an opportunity to hear the challenge and take corrective action if the State finds merit in the challenge before Federal resources are expended.

What must be in a petition submitted to NMFS?

A petition must: (1) identify the State management measure or limited entry permit decision that the person believes is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law; (2) identify the provisions in the FMP, the Magnuson-Stevens Act, or other applicable Federal law with which the person believes the State management measure or limited entry permit decision are inconsistent; (3) explain how the State management measure or limited entry permit decision is inconsistent with the identified provisions of the FMP or Federal law; and

(4) demonstrate that the person exhausted available State administrative regulatory or adjudicatory procedures before submitting the petition to NMFS.

Petitions concerning the consistency of a State inseason action present some challenges for timely review given the short duration of inseason actions and the length of time it will take NMFS to review petitions. Although it is unlikely that NMFS will be able to issue a decision on a petition challenging an inseason action before the inseason action expires, NMFS recognizes that there may be an aspect of inseason actions that is capable of repetition. Therefore, persons may submit petitions to NMFS that challenge the consistency of a recurring aspect of a State inseason action. In addition to the four requirements listed above, a petition challenging a State inseason action must identify and explain the inconsistent aspect of the inseason action that is capable of repetition.

A petition with all supporting documentation must be submitted to the Regional Administrator, NMFS Alaska Region.

A person must submit a petition to NMFS no later than 30 days from (a) the last day of the Board of Fisheries meeting at which the measure in question was adopted by the Board, (b) the day a denial was issued on an emergency petition, (c) the day a denial was issued on an agenda change request, or (d) the day a petition for reconsideration is denied by the CFEC. Although NMFS will not initiate a consistency review under this section for petitions submitted after the 30-day deadline, NMFS may initiate a consistency review under Section 9.2.

What will NMFS do following receipt of a petition from the public?

Upon receipt of a petition, NMFS will immediately commence a review of the petition to determine whether it contains the information required for a consistency review. If NMFS determines that the petition fails to meet all of the requirements, NMFS will return the petition to the petitioner with an explanation that identifies the deficiencies. If NMFS determines that the petition meets all of the requirements, NMFS will initiate a consistency review and notify the petitioner that such a review has been initiated. NMFS will immediately provide a copy of the petition to the Council and to the Commissioner of ADF&G or the Commissioner of the CFEC. During its consistency review, NMFS will provide the Council and the State of Alaska with an opportunity to submit comments to NMFS that address the consistency of the measure or decision being challenged. Because NMFS's review is limited to whether the measure or decision in question is consistent with the FMP, the Magnuson-Stevens Act and other applicable Federal law, NMFS will only consider comments that address consistency. NMFS may hold an informal hearing to gather additional information concerning the consistency of the measure or decision under review if time permits and NMFS determines that such a hearing would be beneficial. NMFS will review a petition as quickly as possible but will take the time necessary to complete a thorough review of the consistency of the State management measure or decision being challenged before issuing its decision.

If NMFS determines after its review that the State management measure or decision is consistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, NMFS will issue a written Statement to that effect, explaining the reasons for its conclusion and identifying the information NMFS used to support its finding. If NMFS determines after its review that the State management measure or decision is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, NMFS will follow the process set forth in Section 9.4.

9.4 NMFS Process Following a Determination that a State Management Measure or Decision is Inconsistent with the FMP or Federal Laws

If NMFS determines that a State management measure or decision is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law after conducting a consistency review under Sections 9.2 or 9.3, NMFS will issue a written determination to that effect, explaining the reasons for its conclusion and identifying the information NMFS used to support its finding. NMFS will promptly notify the State of Alaska and the Council, and the petitioner if applicable, of its determination and provide the State with an opportunity to correct the inconsistencies identified in the notification. No specific amount of time is identified in this FMP in which corrective action must be taken because circumstances directly affecting what constitutes a reasonable opportunity for corrective action will likely vary. NMFS will evaluate the circumstances on a case-by-case basis to determine the amount of time that represents a reasonable opportunity for the State to take corrective action and will provide that information to the State in the notification of inconsistency.

While it is anticipated that the State of Alaska will expeditiously correct the inconsistencies identified by NMFS, it is possible that the State may disagree with NMFS's determination and choose not to correct the identified inconsistencies. In the case of State management measures, if the State does not correct the inconsistencies identified by NMFS in the time provided, NMFS will need to assess whether the State's overall management scheme is unaffected by removal of the inconsistent measure or whether the inconsistent measure is an integral part of the overall management scheme and that the overall management scheme would fail if the inconsistent measure is removed. NMFS also will need to determine whether Federal regulations are required in the EEZ given the absence of the State management measure. Once this assessment is completed, NMFS will issue a notice announcing the extent to which the authority delegated to the State to implement fishery management measures has been withdrawn and whether NMFS intends to issue Federal regulations that would govern salmon fishing in the East Area or the Cook Inlet EEZ. In the case of a limited entry permit decision, if the State does not correct the inconsistencies identified by NMFS in the time provided, NMFS may issue a permit that authorizes the activity in the Cook Inlet EEZ or the East Area that was denied by the State.

Any delegation of fishery management authority that is withdrawn under this section of the FMP will not be restored to the State until the Council and NMFS determine that the State has corrected the inconsistencies.

2.5. Alternative 3: Federal management (Preferred)

Under Alternative 3, the NMFS would amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit and apply Federal management to the salmon fishery that occurs in the EEZ. This entails creating a completely new Federal management regime for the salmon fishery in the Cook Inlet EEZ. To manage the salmon fishery in the Cook Inlet EEZ, NMFS would select the management measures for the FMP as described in this section. NMFS would implement these measures through Federal regulations, also as described in this section. The Council and NMFS would implement these Federal management measures following the MSA FMP Amendment and Federal rulemaking process.

2.5.1. Management Policy and Objectives

Under Alternative 3, NMFS would adopt management policy and management objectives in the FMP for the salmon fishery in the Cook Inlet EEZ. Under this alternative, the management policy and management objectives as stated in Sections 3.1 and 3.2 of the FMP for the East Area and the West Area would be combined with new elements addressing the Cook Inlet EEZ Area. Elements related to the East Area and the West Area would be unchanged. The draft management policy and management objectives provided below are adapted from those areas, with changes to reflect specific considerations for the Cook Inlet EEZ.

New draft FMP language for the Cook Inlet EEZ

Management Policy for the Cook Inlet EEZ

The Council's salmon management policy for the East Area and West Area is to facilitate State of Alaska salmon management in accordance with the Magnuson-Stevens Act, Pacific Salmon Treaty, and applicable Federal law. This FMP represents the Council's contribution to a comprehensive management regime for the salmon fishery that will be achieved in concert with actions taken by the Pacific Salmon Commission and the State of Alaska. This policy ensures the application of judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations.

The salmon management policy for the Cook Inlet EEZ is to ensure the application of judicious and responsible fishery management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of present and future generations. The management approach incorporates forward-looking and precautionary conservation measures that address differing levels of uncertainty. Recognizing that potential changes in productivity may be caused by fluctuations in natural oceanographic conditions, fisheries, and other, non-fishing activities, the Council should take appropriate measures to ensure the continued sustainability of the managed species. It will carry out this objective by considering reasonable, adaptive management measures, as described in the MSA and consistent with the National Standards and other applicable law.

Under these policies, all management measures will be based on the best scientific information available. This management policy recognizes the need to balance many competing uses of marine resources and different social and economic objectives for sustainable fishery management, including protection of the long-term health of the resource and the optimization of yield. This policy uses and improves upon the Council's and State's existing open and transparent process of public involvement in decision-making.

Management Objectives

The Council has identified the following seven management objectives to carry out the management policy for this FMP. The Council and NMFS will consider the following objectives in developing amendments to this FMP and associated management measures. Because adaptive management requires regular review, the management objectives identified in this section will be reviewed periodically by the Council. The Council and NMFS will also review, modify, eliminate, or consider new management measures, as appropriate, to best carry out the management objectives for this FMP.

Objective 1 – Prevent overfishing and achieve optimum yield

Manage the commercial and sport salmon fisheries in the East Areas in concert with the Pacific Salmon Commission, and in accordance with the conservation and harvest sharing goals of the

Pacific Salmon Treaty, to prevent overfishing and obtain the number and distribution of spawning fish capable of producing the optimum yield on a sustained basis (wild and hatchery). Prevent overfishing and achieve optimum yield in the West Area by prohibiting the commercial harvest of salmon. Prohibiting commercial harvest enables the State of Alaska to manage salmon fisheries to achieve escapement goals and maximize economic and social benefits from the fishery.

For the Cook Inlet EEZ Area, manage the salmon fishery to prevent overfishing and produce the number and distribution of spawning fish capable of achieving optimum yield on a continuing basis.

Objective 2 – Manage salmon as a unit throughout their range

Manage salmon fisheries in the EEZ in a manner that enables the State of Alaska to manage salmon stocks seamlessly throughout their range. In the East Area, this objective is achieved by delegating management of the sport and commercial troll fishery to the State of Alaska, to manage consistent with state and federal laws, including the Pacific Salmon Treaty. In the West Area, this objective is achieved by prohibiting commercial fishing for salmon in the West Area so that the State of Alaska can manage Alaska salmon stocks as a unit. In the Cook Inlet EEZ Area, this objective is achieved by using all pertinent salmon data in the process to establish status determination criteria and to coordinate management with the State of Alaska to the extent practicable.

Objective 3 – Minimize Bycatch and Bycatch Mortality

To the extent practicable, manage salmon fisheries to minimize bycatch and minimize the mortality of unavoidable bycatch. Decrease where possible the incidental mortalities of salmon hooked and released, consistent with allocation decisions and the objective of providing the greatest overall benefit to the people of the United States.

Objective 4 – Maximize economic and social benefits to the nation over time.

Economic benefits are broadly defined to include, but are not limited to, profits, income, employment, benefits to consumers, and less tangible or less quantifiable benefits such as the economic stability of coastal communities, recreational value, non-consumptive use value, and non-use value. To ensure that economic and social benefits derived for fisheries covered by this FMP are maximized over time, the following will be examined in the selection of management measures:

• Control of fishing effort and salmon catches.

• Fair and equitable allocation of harvestable surplus of salmon.

• Economic impacts on coastal communities and other identifiable dependent groups (e.g., subsistence users).

This examination will be accomplished by considering, to the extent that data allow, the impact of management measures on the size of the catch during the current and future seasons and their associated prices, harvesting costs, processing costs, employment, the distribution of benefits among members of the harvesting, processing and consumer communities, management costs, and other factors affecting the ability to maximize the economic and social benefits as defined in this section. Other benefits are tied to economic stability and impacts of commercial fishing, as well as, unguided and charter recreational fishing associated with coastal communities, subsistence fishing supporting traditional social and cultural ‘communities,’ and passive-use ‘communities.’

Objective 5 – Protect wild stocks and fully utilize hatchery production

Manage salmon fisheries to ensure sustainability of naturally spawning stocks while providing access to hatchery production.

Objective 6 – Promote Safety

Promote the safety of human life at sea in the development of fisheries management measures. Upon request, and from time to time as appropriate, the Council, NMFS, or the State of Alaska may provide for temporary adjustments, after consultation with the U.S. Coast Guard and fishery participants, for vessels that are otherwise excluded because of weather or ocean conditions causing safety concerns while ensuring no adverse effect on conservation in other fisheries or discrimination among fishery participants.

Objective 7 – Identify and Protect Salmon Habitat

Use the best available science to identify and describe essential fish habitat pursuant to the MSA, and mitigate fishery impacts in the EEZ as necessary and practicable to continue the sustainability of managed species..

2.5.2. Status Determination Criteria and Annual Catch Limits

Under Alternative 3, SDC would be established through the Federal process. SDC are measurable criteria used for identifying if a fishery is overfished or if overfishing is occurring. Assessment is done at the stock or stock complex level and takes into consideration total catch of salmon from all fisheries. This section provides an initial set of SDC for the salmon stocks harvested by the salmon fishery in the Cook Inlet EEZ. Developing appropriate SDC is highly technical and requires time and analysis of available scientific data and appropriate methods. The proposed criteria provided in this section provide a starting point for that ongoing scientific analysis. **To establish SDC, annual catch limits, and facilitate management of the Cook Inlet EEZ salmon fishery, landings from the Federal fishery occurring in the EEZ would have to be identified and accounted for separately from landings originating from the directly adjacent State waters salmon fishery.**

In establishing SDC and setting ACLs in the EEZ, NMFS must consider all sources of harvest and adjust the EEZ harvest accordingly to prevent overfishing. In addition to an inseason fishery closure if an OFL or ACL was exceeded, NMFS may apply accountability measures to prevent overfishing from occurring in the next year. NMFS would be able to apply those measures only to the fishery that occurs in the EEZ. So, preventing overfishing/exceeding an ACL would be addressed by restrictive measures on the fishery under the jurisdiction of the Council and NMFS.

Specify salmon status determination criteria and annual catch limits in Federal waters of Cook Inlet.

A tier system would be used to set annual SDC through the Council’s review process that includes recommendations of OFL/ABC by a Salmon Plan Team or NMFS, and subsequent review and adoption approval by the SSC and Council, respectively. As an additional step, the Council would also need to specify a TAC for each species. This option assumes NMFS is able to gather the necessary data to conduct the annual SDC process, which for Tier 1 and Tier 2 have inputs including salmon forecasts that have been historically prepared by ADF&G. In the event that data are not available to inform SDC for the Tier 1 and

Tier 2 approach, then Tier 3 which is based on historical catch would be used to specify SDC and ACLs until better information becomes available.

The SDC tier system is similar to what is proposed under Alternative 2 with several modifications reflecting Federal management.

New draft FMP language for the Cook Inlet EEZ:

Status Determination Criteria
Each year, the Cook Inlet salmon stocks will be separated into three tiers based on the level of information available for each stock through the SDC process.

- Tier 1: salmon stocks with escapement goals and stock-specific harvests
- Tier 2: salmon stocks managed as a complex, with specific salmon stocks as indicator stocks
- Tier 3: salmon stocks with no reliable estimates of escapement

A minimum stock size threshold (MSST) and a rule for defining overfishing based on comparing the stock-specific fishing mortality rate (FEEZ) with MFMT are established for Tier 1 and Tier 2 stocks. These reference points are generally established based on yield available to fisheries in the EEZ after accounting for required spawning escapement and harvest of exploited salmon stocks in other fisheries.

Tier 1: Salmon stocks with escapement goals and stock-specific harvest estimates
Each year, salmon stocks that have escapement goals and stock-specific harvest and escapement estimates would be considered for placement in Tier 1. The assessment authors and SSC would identify the Tier 1 stocks each year during the annual harvest specification process. For the Tier 1 stocks, the following calculations would be conducted each year to determine the status of the managed salmon stocks and set the appropriate biological reference points:

Overfishing
Overfishing occurs whenever a stock or stock complex is subjected to a level of fishing mortality or total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. The realized fishing mortality rate in the EEZ for a stock (FEEZ) is expressed as an exploitation rate (harvest/total run size), which is calculated for the stock over one generation (the average length of time between when an individual of that species is born and when it spawns) in years (T), weighted as informed by available data, where t = run year, R = annual run size of a stock, and CEEZ = annual EEZ catch of a stock in year t:

(1) $F_{EEZ,t} = \frac{\sum_{i=t-T+1}^{t} C_{EEZ,i}}{\sum_{i=t-T+1}^{t} R_i}$

The level of fishing mortality in the EEZ above which overfishing occurs (MFMT) for a stock is based on an exploitation rate assessed over one generation and is defined as: .

(2) $MFMT_t = \frac{\sum_{i=t-T+1}^{t} Y_{EEZ,i}}{\sum_{i=t-T+1}^{t} R_i}$, where
(3) $Y_{EEZ,i} = max\left(0, R_t - G_t - C_{state,t}\right)$

and $C_{state,t}$ is the harvest that occurred in state waters in year *t* and Y_{EEZ} is the potential yield in the EEZ and *G* = escapement goal or target for a stock. The lower bound of the established escapement goal range is the default used in this tier system; however, NMFS, or the SSC may recommend a different value during the annual stock status determination process based on the best scientific information available. NMFS or the SSC may also recommend additional buffers to account for uncertainty in harvests and escapement estimates. Due to uncertainty inherent to management, the realized yields (*Y*) are unlikely to be equal to the potential yields (Y).

Should F_{EEZ} exceed the MFMT in any year, it will be determined that a stock is subject to overfishing; this definition corresponds to the F_{OFL} control rule. MFMT for a stock would be assessed postseason each year with the most current *T* years of data.

Overfished
Should a stock's realized spawning escapements summed across a generation fall below the MSST in any year, the stock would be declared overfished. The MSST is defined as one half of the sum of the stock's spawning escapement goal summed across a generation:

(4) $MSST_t = \frac{\sum_{i=t-T+1}^{t} G_i}{2}$, evaluated by comparing $\sum_{i=t-T+1}^{t} S_i$ with MSST, where S is spawning escapement in year *i*.

MSST for a stock would be assessed postseason each year with the most current *T* years of data used to estimate MSST and S. NMFS or the SSC may recommend buffers to account for uncertainty in escapement estimates or spawning escapement goals.

Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL)
Specification for OFL, ABC, and ACL will occur as follows:

The Preseason estimates of MFMT would be calculated from the sum of potential yield in the EEZ from the previous *T*-1 years and the preseason estimate of potential yield in the EEZ based on the preseason forecast of run size, projected harvest in other fisheries, and the escapement goal in a given year, G_t using the following equation:

(5) $MFMT_{pre,t} = \frac{\sum_{i=t-T+1}^{t-1} Y_{EEZ,i} + \hat{Y}_{EEZ,t}}{\sum_{i=t-T+1}^{t-1} R_i + \hat{R}_{,t}}$

where $\hat{Y}_{EEZ,t}$ is the preseason estimate of potential yield in the EEZ for year *t* used to establish annual harvest specifications and is calculated based on:

(6) $\hat{Y}_{EEZ,t} = max(0, \hat{R}_t - G_t - \bar{F}_{state,t} * \hat{R}_t)$, where $\hat{R}_t$ is the predicted run size in year *t* based on a vetted preseason forecast method and $\bar{F}_{state,t}$ is the estimated harvest rate in State waters over the average generation time (*T*) for the species and stock. The Preseason estimates of F_{EEZ} is calculated from the sum of actual harvests in the EEZ from the previous *T*-1 years and the preseason estimate of potential yield in the EEZ based on the preseason forecast of run size:

(7) $F_{EEZ,pre,t} = \frac{\sum_{i=t-T+1}^{t-1} C_{EEZ,i} + \hat{Y}_{EEZ,t}}{\sum_{i=t-T+1}^{t-1} R_i + \hat{R}_{,t}}$

The OFL is the annual amount of harvest that corresponds to the preseason estimate of MFMT applied to each stock or stock complex's abundance at the time harvest specifications are established. The OFL would be set to the amount of harvest for the upcoming fishing season that results in $F_{EEZ,\ pre,t}$ being equal to $MFMT_{pre,t}$. The OFL is calculated by modifying equation 7 such that $F_{EEZ,\ pre,t}$ is replaced with the preseason estimate of the MFMT rate and then solving for $\hat{Y}_{EEZ,t}$ (now the OFL) as if it were unknown. As such, the OFL equation first takes the form of:

(8) $\frac{\sum_{i=t-T+1}^{t-1} C_{EEZ,i} + OFL_{EEZ,t}}{\sum_{i=t-T+1}^{t-1} R_i + \hat{R}_{,t}} = MFMT_{pre,t}$, which can then be reduced to:

(9) $OFL_{EEZ,t} = (\sum_{i=t-T+1}^{t-1} Y_{EEZ,i} + \hat{Y}_{EEZ,t}) - \sum_{i=t-T+1}^{t-1} C_{EEZ,i}$

Postseason, overfishing will be determined for each stock based on the F_{OFL} control rule as previously described.

The ABC control rule: ABC must be less than or equal to OFL. The SSC may recommend reducing ABC from OFL to account for scientific uncertainty, including uncertainty associated with the assessment of spawning escapement goals, forecasts, harvests, and other sources of uncertainty. The ACL will be established equal to ABC.

Tier 2: Salmon stocks managed as a complex
Tier 2 stocks are salmon stocks managed as a complex, with specific salmon stocks designated as indicator stocks. An indicator stock is a stock for which sufficient data exist to allow for the development of measurable and objective SDC and can be used as a proxy to manage and evaluate data poor stocks within the stock complex. Further, an indicator stock is thought to be representative of the typical vulnerabilities of stocks within the stock complex. The assessment authors and SSC would identify the Tier 2 stocks each year during the annual harvest specification process.

In general, management of Tier 2 stocks is based on aggregate abundance as previously described. Information on the individual indicator stock is used to inform management actions for the stock complex. For the Tier 2 stocks, the following calculations would be conducted each year to determine the status of the salmon stocks and set the appropriate biological reference points.

Overfishing
The Tier 1 formulas for F and MFMT would be used for Tier 2 indicator stocks. Whenever estimates of F or MFMT, as defined under Tier 1, are unavailable for each stock in a stock complex managed under this FMP, a list of indicator salmon stocks for a given stock complex will be established. Using the same definitions and criteria described under Tier 1, a determination that one or more indicator salmon stocks is subject to overfishing will constitute a determination that the respective stock complex is subject to overfishing, except as provided in the paragraph below.

Overfishing of one or more stocks in a stock complex may be permitted, and may not result in a determination that the entire stock complex is subject to overfishing, under the following conditions established under the National Standard 1 guidelines (50 CFR §600.310(l)):

a) it is demonstrated by analysis that such action will result in long-term net benefits to the Nation;
b) it is demonstrated by analysis that mitigating measures have been considered and that a similar level of long-term net benefits cannot be achieved by modifying fleet behavior, gear selection/configuration, or other technical characteristics in a manner such that no overfishing would occur; and
c) the resulting rate or level of fishing mortality will not cause any stock or stock complex to fall below its MSST more than 50% of the time in the long term.

Overfished
The MSST for a stock complex is equal to one-half the sum of the Gs for the indicator salmon stocks from the most recent T years. Should a stock complex's cumulative escapements for a generation fall below the MSST in any year, it will be determined that the stock complex is overfished.

OFL, ABC, and ACL
The OFL, ABC, and ACL will be set for the indicator stock using the Tier 1 methodology.

Tier 3: Salmon stocks with no reliable estimates of escapement
Tier 3 salmon stocks or stock complexes have no reliable estimates of escapement or total run size, therefore OFL and ABC are based on catch history. Tier 3 stocks may have escapement goals, but, relative to Tier 2 stocks, the goals and associated inseason assessment of escapement represent a coarse and/or unknown index of abundance rather than a true number of fish. The assessment author and SSC would identify the Tier 3 stocks each year during the annual harvest specification process.

Decisions for the annual status determination process:
Which stocks belong in Tier 3?

What are the appropriate years to use for reference catch?

Does the best available scientific information indicate that an alternative value should be set for OFL?

What is the appropriate buffer for uncertainty in setting the ABC?

Using catch history for Tier 3 stocks is the most appropriate way to set the OFL when there are no reliable estimates of escapement or escapement data and total run size cannot be estimated with a high degree of certainty. Because of this, MFMT and F_{EEZ} also cannot be calculated and the F_{OFL} control rule cannot be used to assess overfishing. For salmon, the summary of catches can be reliably used as an OFL due to the multiple year nature of how the catch data are accumulated over a generation time. Methods that use CPUE (e.g., catch per delivery) would likely not provide sufficient information to assess whether catches had exceeded a level thought to cause overfishing.

Overfishing
For tier 3 stocks or stock complexes, should the sum of harvest for the most recent generation (T years) be greater than the OFL, then it will be determined that the stock is subject to overfishing. Similar to Tiers 1 and 2, overfishing for Tier 3 stocks is assessed postseason after stock-specific harvest data become available; NMFS or the SSC may recommend additional buffers to account for uncertainty of estimates.

Overfished
For stocks or stock complexes with escapement goals, the MSST is calculated the same as for Tier 1 stocks. Should a stock or stock complex's cumulative escapements for a generation fall below the MSST in any year, it will be determined that the stock complex is overfished. Similar to Tier 1 and 2 stocks, when calculating MSST and comparing spawning escapements summed across the most recent generation, NMFS or the SSC may recommend buffers to account for uncertainty in estimates. For Tier 3 stocks or stock complexes without escapement goals, it is not possible to calculate MSST.

OFL, ABC, ACL
OFL = the maximum annual EEZ catch in the timeseries under consideration multiplied by the average generation time (*T* years), unless an alternative catch value is recommended by the SSC on the basis of the best scientific information available.

ABC = OFL* buffer (e.g., 0.9) to account for uncertainty As recommended by the SSC, ABC could be set lower by applying a more conservative buffer to the OFL (e.g., .75) to account for greater scientific uncertainty regarding the stock. ABC would be set each year during the annual stock status determination process based on the best available information.

ACL = ABC.

2.5.2.1. De Minimis Fishing Provisions

If a preseason forecast suggests that the lower bound of the escapement goal will not be achieved for a given stock, de minimis harvest on the stock may be allowed to reduce the risk of fishery restrictions that impose severe economic consequences to fishing communities without substantive management or conservation benefits. The maximum allowable de minimis harvest recommended by the SSC must target keeping the post-season fishing mortality rate below MFMT. When recommending the level of allowable de minimis catch in a given year, the SSC may also consider:

- recent and projected abundance levels;
- the predicted magnitude of harvest in the EEZ;
- the status of other stocks in the mixed-stock fishery;
- indicators of marine and freshwater environmental conditions;
- impacts from other fisheries;
- whether the stock is currently overfishing or approaching an overfishing condition;

- whether the stock is currently overfished or approaching and overfished condition; and
- any other considerations as appropriate.

Management measures and any required accountability measures necessary to implement a de minimis harvest provision and prevent overfishing or an overfished status will be established during the harvest specifications process.

2.5.2.2. TAC Setting

TACs are established to ensure fishery harvests remain below ACLs. Because salmon of the same species originate from separate stocks but cannot be visually distinguished, TACs may be set at the species level based on the cumulative estimated contribution by stock, unless inseason genetic information becomes available. The following approach will be used to specify TACs for every salmon stock or stock complex managed by the FMP:

1. Based on the tier system described above, the SSC recommends the ABCs and ACLs for each managed stock or stock complex, as well as any allowable de minimis harvest amounts. ABCs, ACLs, and allowable de minimis harvest amounts are based on scientific information in the SAFE.
2. After considering the AP's recommendation and public testimony, the Council would then recommend a TAC for each managed species or stock. The TAC must be less than or equal to the ABCs and ACLs established for each component stock(s) and their estimated proportional contribution to total catch, and account for allowable de minimis harvest amounts and projected removals from the recreational salmon fishery. The TAC may be reduced from ABC if warranted on the basis of concerns about the harvest of weak salmon stocks, bycatch considerations, management uncertainty, ecosystem requirements, or social and economic considerations.

2.5.2.3. Rebuilding

If a stock or stock complex is determined to be overfished, NMFS will immediately notify the Council under Section 304(e) of the Magnuson-Stevens Act. Consistent with provisions of the Magnuson-Stevens Act, the Council would have two years from this notification to end overfishing and prepare a rebuilding plan.

If a stock or stock complex is declared overfished or if overfishing is occurring, the Council will request that the Salmon Plan Team or NMFS conduct a formal assessment of the primary factors leading to the decline in abundance and recommend management measures to prevent overfishing and rebuild the fishery. The Council and NMFS will assess these rebuilding measures for compliance with the Magnuson-Stevens Act, including the national standard guidelines.

A proposed rebuilding plan could include:

1. an evaluation of the roles of fishing, marine and freshwater survival in the overfished determination;
2. any modifications to the SDC for determining when the stock has rebuilt;
3. recommendations for actions to rebuild the stock to MSY, including modification of control rules if appropriate, and;
4. a specified rebuilding period.

Based on the results of the Salmon Plan Team's or NMFS's recommended rebuilding plan, the Council would recommend the rebuilding plan to the Secretary. Adoption of a rebuilding plan would require implementation through an FMP amendment. Subject to Secretarial approval, the NMFS would implement the rebuilding plan with appropriate actions to ensure the stock is rebuilt in as short a time as possible based on the biology of the stock but not to exceed ten years, while taking into consideration the needs of the commercial, recreational, personal use, and subsistence fishing interests and coastal communities.

If a stock is overfished, a rebuilding plan could include control rules or management measures that target spawning escapement at or above the level expected to produce MSY, provided sufficient recruits are available, and targeting a rebuilding period of one generation. As Chinook and sockeye generation times often vary more substantially than those of other salmon species (with an average of 5 years), in the context of rebuilding times “one generation” should be viewed in the context of the particular stock or average generation time within a stock complex. For any of the species, if the particular stock of concern typically exhibits a different life history than those generalized above, the Salmon Plan Team or NMFS could use stock-specific expertise to determine the most appropriate generation time for the rebuilding timeline.

Because salmon are exploited in multiple fisheries, and because multiple salmon stocks may be exploited within the Federal waters of Cook Inlet, it is necessary to determine fishery specific contribution to the total exploitation rate to determine the actions necessary to end and prevent future overfishing. As the Council and NMFS have no jurisdiction over river and State-waters fisheries, it also may be necessary for other responsible entities to take action to end ongoing and prevent future overfishing.

The Salmon Plan Team or NMFS would report postseason exploitation rates in the annual SAFE document and assess the mortality rates in fisheries impacting the stock of concern and report their findings.

In cases where no action within Council authority can be identified which has a reasonable expectation of contributing to the rebuilding of the stock in question, the Council will identify the actions required by other entities to recover the depressed stock, and these findings will be reported to the appropriate management entity. Due to a lack of data for some stocks, environmental variation, economic and social impacts, and habitat losses or problems beyond the control or management authority of the Council, it is possible that rebuilding of depressed stocks in some cases could take much longer than ten years. The Council may change analytical or procedural methodologies to improve the accuracy of estimates for abundance, harvest impacts, and reduce EEZ harvest impacts when it may be effective in stock recovery. For those causes beyond Council control or expertise, the Council may make recommendations to those entities which have the authority and expertise to change preseason prediction methodology, improve habitat, modify enhancement activities, and re-evaluate management and conservation objectives for potential modification through the appropriate Council process.

2.5.2.4. Closing the Cook Inlet EEZ Salmon Fishery

One potential annual management outcome of Alternative 3 is that NMFS would close the Cook Inlet EEZ to commercial salmon fishing in a given year. Closure and/or restrictions may also be applicable to the recreational salmon fishery in the Cook Inlet EEZ. A closure would be responsive to one or more of the following conditions:

1. TAC amounts are too low to support fishery openings.
2. Opening the Cook Inlet EEZ salmon fishery would likely result in overfishing for one or more stocks.
3. Escapement, harvest, test fishery catches, or other salmon abundance indices that are significantly below historical values.
4. There is a significant environmental disaster. (e.g., no fishery occurred during the year of the Exxon Valdez oil spill)

Any one of these conditions would likely result in closing the Cook Inlet EEZ to commercial salmon fishing in that year. As soon as it is determined that an EEZ fishery could not occur, State salmon managers would be notified to allow them time to prepare and implement responsive management action in State waters. Historically, a complete closure of the Cook Inlet EEZ has only occurred once in response to the Exxon Valdez oil spill.

2.5.2.5. Data Needs Under Federal Management

The availability of sufficient data necessary for Federal management would have to be considered to enable Federal management under Alternative 3.

Timely and accurate reporting of salmon catches in the Cook Inlet EEZ would be critical for ensuring that the Federal OFL is not exceeded. The eLandings system is an interagency electronic reporting system for reporting commercial fishery landings in Alaska. The eLandings system is used to report landings and production data and includes landings data for salmon. The system also has a module called tLandings that is used to enter data on a tender vessel or at a truck taking deliveries on a beach that is using a laptop or a tablet without internet connectivity. These data are entered into tLandings and then provided to a shoreside processing facility where the information is uploaded into the eLandings database and available for use by agency staff. As a result, there is a delay between time of fish harvest and offload to a tender vessel (or truck) and upload of the data by the shoreside processor.

A landing report documents the offload or delivery of fish that were harvested in State or Federal waters off Alaska. Shoreside processing plants, tender vessels, and motherships can receive deliveries from properly licensed and registered catcher vessels. The landing report information is captured in a fish ticket that complies with ADF&G reporting requirements. Information such as the vessel ADF&G number, number of crew onboard, fishing trip dates, statistical areas, State and Federal fishing permits and species weights and dispositions are captured in this form. The current catch reporting system for Cook Inlet also does not separate landings between Federal and State waters, and would need to be modified to allow for separate accounting of salmon catch in Federal waters. Options for management measures focused on accounting for commercial harvest in the EEZ are described in Section 2.5.6.

Once the landings and production data are available in the eLandings database, they are transmitted electronically to the NMFS Alaska Region several times a day. This information is incorporated into the NMFS catch accounting system, is available to managers each day, and is annually made available to stock assessment authors through the Alaska Fisheries Information Network (AKFIN). The Alaska Region would need to modify its catch accounting system to accommodate this. However, if most catch was offloaded at a tender or a truck using tLandings, there would be a delay before a processor was able to submit reports into the eLandings database. Therefore, eLandings information alone may not include the most recent catch necessary to make closure decisions for fast paced fisheries. Regulations would have to be established to require the use of eLandings (including tLandings) and ensure timely reporting of catch to NMFS. From 2019–2021, approximately 94% of all Cook Inlet drift gillnet landings were reported using eLandings. See Section 4.7.2.2.8 for additional information. Under Alternative 3, all landings would be required to be entered into eLandings so they are available to NMFS.

2.5.2.6. Challenges Associated with a Separate Salmon Fishery in the EEZ

Alternative 3 would create new scientific and management uncertainty because the Federal TAC must be established preseason and Federal fishery managers do not have the same tools and flexibility available to State managers to quickly respond to updated in-season information about salmon runs that deviate from preseason estimates. This increases both the risks of overfishing and forgone yield.

Federal management requires that TACs be established preseason with opportunity for public notice and comment. Because of this, salmon forecasts, or historical catch amounts, would be used to establish the TAC before fishing begins. Forecasts vary widely in accuracy; thus, using them to set TACs would introduce significantly more scientific uncertainty when compared to escapement-based management.

The run size in previous years may have a poor relationship with the amount of salmon returning for the current fishing years. With either approach, TACs must also be set before fishing provides an index of run strength. As a result, TACs that the fishery is managed to will not be informed by harvest rates, test fishery indices, or escapement (*i.e.*, how the State currently manages the fishery). For example, if a salmon run is larger than expected and a Federal catch limit for a stock is reached, it may be difficult for Federal managers to adjust the TAC to provide for additional harvest in the Cook Inlet EEZ within the window of harvest opportunity. These salmon would later be available for harvest in State waters, but because of the uncertain timing of Federal closures, if a date certain closure is not specified, such closures may occur unpredictably and on short notice. This could make subsequent coordination to harvest these fish in State waters more challenging. While these are challenges, Federal managers would still monitor all inseason information and work to adjust management to the extent practicable in accordance with realized run conditions.

Conversely, if the run strength of one or more salmon stocks is weaker than expected, Federal managers would have less data to evaluate this, as well as a longer delay to close the fishery, increasing the risk of not meeting escapement goals and overfishing weaker or less abundant stocks. It is important to note that the Cook Inlet salmon fishery targets mixed stocks of salmon. The composition, abundance, and productivity of salmon stocks and species in the fishery varies substantially based on timing and location of fishing. The need to conserve weaker or less abundant stocks and avoid overfishing by reducing fishing effort sometimes results in foregone harvest from more productive stocks. This is of particular concern for salmon gillnet gear which cannot always target strong stocks while sufficiently limiting harvest on co-occurring weak or less abundant stocks. This problem is also compounded by the mixing of salmon stocks in EEZ waters. As salmon migrate Northward up Cook Inlet (i.e., into State waters) and move nearer to their natal streams, they separate into more homogenous groups that can be individually targeted by gillnet gear. This is not possible in EEZ waters where sockeye, coho, pink, and chum salmon stocks are mixed together, and there is no way to avoid catching multiple stocks, which often include weak or less abundant stocks that could not support the harvest needed to fully utilize strong stocks. In some instances, co-occurring stocks that are less abundant could support additional harvest in the EEZ, but this may result in less or no harvest opportunity for other user groups limited only to State waters (set-gillnet, recreational, and subsistence).

In addition, under the MSA, NMFS must manage the Federal fisheries under its jurisdiction to prevent overfishing, including accounting for all removals, even when the removals responsible for causing overfishing are outside of NMFS's jurisdiction. Therefore, if salmon removals increase in State waters, EEZ TACs would be reduced to prevent overfishing. Because of these factors and NMFS's overriding responsibility under the Magnuson-Stevens Act to prevent overfishing, the Cook Inlet EEZ TACs under Alternative 3 are likely to be more conservative than EEZ harvest levels under the status quo.

These practical considerations, combined with the preseason establishment of catch limits for each stock and stock complex, present significant challenges to consistently achieving appropriate harvest rates on all stocks under Alternative 3. As a result of limited data, increased management uncertainty, decreased management flexibility, and uncertainty about future State water harvest levels, NMFS expects that Alternative 3 may require smaller harvests in some years with high uncertainty to account for these factors and prevent overfishing.

2.5.3. Accountability Measures

Accountability measures are required for all stocks and stock complexes in the Salmon FMP that are required to have ACLs. Accountability measures are intended to prevent harvest exceeding ACLs or mitigate overages if they occur. Some accountability measures are implemented during the preseason planning process and are applicable to inseason management. Other accountability measures are implemented postseason through monitoring and reporting requirements. Additional accountability measures will be implemented as required.

If total harvest is determined to be above the postseason ACL, NMFS will report on the harvest overages in the SAFE report and make any recommendations on accountability measures to the SSC. If it is necessary to improve the science used in the assessment or methods used to manage TAC in the EEZ, such changes can be considered during the SSC and Council review process.

Repeated overages of ACL will trigger NMFS to evaluate and address any systemic bases for the overages. Possible outcomes could include increased buffers in the ACL to account for scientific or management uncertainty.

Accountability measures under this FMP apply only to the fishery that occurs in the EEZ. Nevertheless, NMFS must consider all sources of harvest, including harvest outside of the EEZ, to prevent overfishing.

The following accountability measures may be implemented during the preseason planning process or inseason to meet the intent of preseason management objectives and to help ensure compliance with ACLs.

- TACs specified at a level that is expected to address uncertainty in the ability to constrain catch to the ACL (management uncertainty).
- Inseason authority to manage fisheries allows NMFS to close fisheries prior to the TAC or ACL for a stock, stock complex, or species being exceeded.
- Mixed stock monitoring during the season allows projection of when each TAC may be met.
- Adjustments of times and areas open to fishing.
- Other provisions as needed.

The following are postseason accountability measures that could be implemented through the assessment and review phases of the salmon management process:

- Postseason evaluation of management objectives, reference points, and modification of models that relate mixed-stock impacts to stock-specific objectives and reference points.
- Annual SAFE document that includes a postseason assessment of objectives and performance.
- The Council and its SSC provide recommendations, including accountability measures, as appropriate, for future actions to prevent TAC and ACL overages.

2.5.4. Optimum Yield and Maximum Sustainable Yield

Under Alternative 3, OY and MSY must be defined for the Cook Inlet EEZ salmon fishery. The following section presents several options for MSY and OY definitions.

Maximum Sustainable Yield

MSY is specified as the largest long-term harvest or yield that can be taken from a stock or stock complex under prevailing conditions. MSY should be estimated on the basis of the best scientific information available. Where data are insufficient to estimate MSY directly, Councils should adopt other measures of reproductive potential that serve as reasonable proxies.

An ecosystem perspective suggests that the MSY of the fishery may change if an environmental regime shift occurs or if the present mix of stocks is altered substantially. Also, as new data are acquired and as statistical methodology evolves over time, it is to be expected that estimates of MSY will change, even if the ecosystem remains relatively stationary. Therefore, the proposed estimates of MSY contained in this section should be viewed in context, and are based on the best scientific information currently available. It is acknowledged that the MSY values specified here are representative of ecosystem conditions in the last 23 years. For other historical periods in the fishery with different ecosystem conditions, it is likely that MSY may have been specified differently.

The MSA requires Regional Councils to “review on a continuing basis, and revise as appropriate, the assessments and specifications made ... with respect to the optimum yield.” OY may need to be re-specified in the future if major changes occur in the estimate of MSY. Likewise, OY may need to be re-specified if major changes occur in the ecological, social, or economic factors governing the relationship between OY and MSY.

Option 1: MSY could be defined in terms of “constant escapement” for the Cook Inlet EEZ. In other words, yield varies with run size each year to achieve a constant sustainable level of escapement, currently defined as the lower bound of the escapement goal range. If, in a particular year, run size falls below the escapement goal, then yield that year would be zero. For this option, the following basic equation would be used to calculate MSY for the Cook Inlet EEZ:

$$MSY = Y_{EEZ} = max\left(0, R_t - G_t - C_{state,t}\right)$$

where t = return year, Y = potential yield within the EEZ, R = annual run size of a stock, C = catch, and G = escapement goal or target, which in this case is defined as the lower bound of the established escapement goal. Use of the lower bound of the escapement goal is consistent with Alaska regulatory policy as the point below which a concern occurs (similar to exceeding the OFL). It recognizes the fact that constant escapement cannot be achieved due to implementation errors associated with lags between fishing and the arrival of fish in the river for assessing escapement. Realized escapements are therefore distributed within the escapement goal range and are considered by policy to be the best expression of the number of spawning salmon that produce MSY over the long term.

Escapement goals account for MSY, biological productivity, and ecological factors, including the consumption of salmon by a variety of marine predators. The SSC and Salmon Plan Team or NMFS would identify the escapement goal target used to establish MSY. For salmon stocks without escapement goals, a suitable proxy would be used to estimate MSY, or would be left undefined if there is not information available to develop a suitable estimate of MSY.

Option 2 (Preferred): MSY could be defined in terms of maximum potential yield—numbers of returning fish in excess of identified spawning escapement goals. Escapement goals are developed through salmon stock assessment approaches with the purpose of, over the long term, ensuring a spawning population that will sustain the population, produce a harvestable surplus, and, when sufficient information about the stock is available, maximize future yields. Because there is uncertainty inherent to all of these estimated quantities, and because fishery management does not have the precision to achieve an exact number of spawning salmon, escapement goals are generally defined as a range with an upper and lower bound. Escapement goal analyses consider the minimum number of spawners expected to maintain the population and the range expected to produce the largest yields.

For salmon stocks harvested in the Cook Inlet EEZ Area, MSY is defined at the stock or stock complex level (as described below), consistent with National Standard 1 guidelines for establishing MSY. Because MSY cannot be defined at the fishery level, this definition of MSY does not subdivide between State and EEZ waters in Cook Inlet.

For Tier 1 stocks, MSY is defined with the following equation:

$$MSY = Y_t = max(0, R_t - G_t)$$

Where t = return year, Y_t = potential yield in year t, R_t = annual run size of a stock in year t, and G_t = **lower bound** of the escapement goal, or another value as recommended by the SSC based on the best scientific information available.

For Tier 2 stocks, MSY is defined with the same equation as Tier 1, but applied to the respective stock complexes instead of a single stock.

For Tier 3 stocks, which have no reliable estimates of escapement, maximum catch over a recent range of years that are representative of current biological and environmental conditions is used as a proxy for MSY, since there is limited other information available to estimate it.

The SSC will continue to evaluate and determine which escapement goal, or suitable proxy, for each stock or stock complex represents the best scientific information available..

Sub - Option (may be combined with Option 1 or 2): MSY could be established using the approaches outlined in either Option 1 or 2, but then estimates would be aggregated at the species level, or even across species.

By aggregating multiple Upper Cook Inlet stocks as a stock complex for the purpose of estimating MSY, this option would directly acknowledge that marine fisheries in Upper Cook Inlet harvest a mixture of stocks (e.g., Barclay and Chenoweth, 2021) while also taking into account the importance of spawning escapements in ensuring the achievement of MSY in future years. As stated in the National Standard 1: "Stocks may be grouped into complexes for various reasons, including where stocks in a multispecies fishery cannot be targeted independent of one another." This option would produce an area-wide estimate of MSY, and in this respect would be directly comparable to annual harvests of each species for the entire Upper Cook Inlet. At the same time, this option would require summing across stocks in different tiers, such as spawning escapement goals thought to be coarse indices of abundance (e.g., tier 2 stocks for which escapement goals are set using the percentile approach) and those thought to more closely represent actual numbers of fish (e.g., tier 1 stocks for which escapement goals are set using a more complete accounting of spawners and subsequent recruits). As some of the existing escapement goals only have lower bounds, not ranges, this option uses the lower bound of escapement goals to be consistent. By subtracting the lower bound of escapement goals from total harvests for a given species, the resulting estimates of MSY for this option are likely to be substantially inflated compared to actual yields. As with other options considered, this definition of MSY would also not take into account salmon that are harvested prior to reaching Upper Cook Inlet (e.g., Shedd et al. 2016).

Optimum Yield

OY is a long-term desired yield from a stock, stock complex, or fishery that will provide the greatest overall net benefit to the Nation. It should be prescribed on the basis of MSY, as reduced by any relevant economic, social, or economic factor. Here, the options would define OY at the level of the Cook Inlet EEZ fishery. For OY, there may be some flexibility in how it is defined relative to the Cook Inlet EEZ salmon fishery. Each of these options would be prescribed on the basis of MSY in that all flow from the assumption that the maximum yield for each stock would be the total run of a stock minus the lower bound of its escapement goal range. However, because stocks cannot be targeted individually in the EEZ and are harvested in a mixed stock fishery, OY must be reduced to account for these ecological conditions and specified for the EEZ fishery as a whole. OY could include the following options and variations.

Option 1: The OY range for the Cook Inlet EEZ salmon fishery could be the fishery's catch which, when combined with the catch from all other salmon fisheries in Cook Inlet, results in a post-harvest abundance within the escapement goal range for each applicable stock or stock complex.

Option 2: The OY range for the Cook Inlet EEZ salmon fishery could be the range of sum ACLs established for the Cook Inlet EEZ fishery across years. ACLs incorporate the OFL control rule established for each stock as well as the yield potentially available to EEZ over time based on historical fishing patterns in upper Cook Inlet.

Option 3 (Preferred): OY is defined at the fishery level and is specified for the Cook Inlet EEZ Area. OY considers what portion of the cumulative MSY can likely be harvested in years of both high and low abundance in the EEZ fishery without any stock or stock complex being subject to overfishing (fishing at a rate such that the lower bound of the escapement goal is consistently not met). It is therefore defined on the basis of MSY in that it considers how many salmon could be harvested while still meeting escapement goals, but is reduced from MSY to account for the mixed stock nature of the fishery, to protect weaker stocks that intermingle with strong stocks in the EEZ, and to account for removals outside of the EEZ that could also impact the ability of stocks to meet their escapement goals. The definition of OY also accounts for other ecological, social, and economic factors including food production, recreational opportunities, and the protection of marine ecosystems.

Therefore, the OY range for the Cook Inlet EEZ salmon fishery is specified as the range between the average of the three lowest years of total estimated EEZ salmon harvest and the three highest years of total estimated EEZ salmon harvest from 1999 to 2021. This results in an OY range of approximately 291,631 to 1,551,464 salmon of all species. This period represents a broad range of recent and reasonably foreseeable conditions in the Cook Inlet EEZ Area fishery. Data during this period are also thought to be relatively complete and collected in a consistent manner. EEZ salmon harvests at these levels have prevented overfishing and maintained a viable EEZ fishery while accounting for harvest of Cook Inlet salmon stocks in all other fisheries, weak stock management considerations, and management uncertainty. This OY range also accounts for the varying relative abundance of salmon stocks each year—a high abundance year for one species may be a low abundance year for another, resulting in associated management constraints.

The Magnuson-Stevens Act requires Councils to "review on a continuing basis, and revise as appropriate, the assessments and specifications made ... with respect to the optimum yield." OY may be revised as conditions change in Cook Inlet and/or additional data become available..

2.5.5. Process for Determining the Status of the Stocks

Under Alternative 3, the annual process for the Cook Inlet EEZ would be similar to the annual process established for the Bering Sea and Aleutian Islands (BSAI) and GOA groundfish FMPs. This is because specifying harvest specifications for federally managed fisheries involves the Federal rulemaking process. SAFE Reports contain the information necessary to set the harvest specifications and are a requirement under the National Standard 2 Guidelines at 50 CFR 600.315(d).

Options for preparing the SAFE Report:

Option 1: Establish a Salmon Plan Team to produce a SAFE Report.

Option 2 (Preferred): Do not establish a plan team. NMFS would prepare a SAFE Report.

The usual process is for the Council to form an FMP Plan Team to produce a SAFE Report and compile the SDC, which are calculated annually. Individual Plan Team members write the Stock Assessments and other SAFE chapters, and the Plan Team reviews those documents and compiles the SAFE. Most Plan

Team members are NMFS staff who are responsible for writing the stock assessments. Council staff usually works with Plan Team members to compile the SAFE executive summary from information in the stock assessments. Therefore, under either option, NMFS would write the SAFE Report.

The NS 2 guidelines provide flexibility in how SAFEs are prepared. The NS 2 guidelines at 50 CFR 600.315(d)(1) state that:

> *The Secretary has the responsibility to ensure that SAFE reports are prepared and updated or supplemented as necessary whenever new information is available to inform management decisions such as status determination criteria (SDC), overfishing level (OFL), optimum yield, or ABC values (§ 600.310(c)). The SAFE report and any comments or reports from the SSC must be available to the Secretary and Council for making management decisions for each FMP to ensure that the best scientific information available is being used. The Secretary or Councils may utilize any combination of personnel from Council, State, Federal, university, or other sources to acquire and analyze data and produce the SAFE report.*

Given the short amount of time between when the salmon data are available and when the SAFE needs to be presented to the SSC and Council for harvest specifications, an option is included that would have NMFS prepare the SAFE Report and calculate the SDC and provide it directly to the SSC instead of providing it first to a Plan Team. There is also concern that a Plan Team would be overly burdensome for this relatively small fishery. The benefit of Option 2 would be efficiency and timeliness because the Council would not need to form a team, go through the process of having a public meeting, compiling minutes, etc. While Option 2 could be a faster process, there would be less opportunity for public input because there may not be a public meeting prior to the public SSC meeting.

The harvest specification process and management cycle begins with the preparation of a SAFE report. The SAFE report would provide the SSC and Council with a summary of the most recent biological condition of the salmon stocks and the social and economic condition of the fishing and processing industries. The SAFE report would summarize the best available scientific information concerning the past, present, and possible future condition of the salmon stocks and fisheries, along with ecosystem considerations/concerns. This would include recommendations of OFL, ABC, ACL, and MSST designed to prevent overfishing while achieving optimum yield (NS 1) that are calculated following the tier system in the FMP and described in Section 2.5.2. All recommendations would also be based on the best scientific information available (NS 2), drawing upon expertise in the areas of regulatory management, natural and social science, mathematics, and statistics. Finally, uncertainty would be taken into account wherever possible (NS 6).

The Salmon SAFE report would provide information to the Council for determining harvest specifications, documenting significant trends or changes in the stocks, marine ecosystem, and fisheries over time; and assessing the relative success of the Federal fishery management program.

The long-term goal would be for the Salmon SAFE to be structured like other Council SAFEs such that stock assessments, economic analyses, and ecosystem considerations comprise the three major themes of the SAFE document. The stock assessment section of the SAFE could contain chapters for each salmon stock, and a summary or “intro” chapter prepared by the Salmon Plan Team or NMFS. To the extent practicable, each chapter would include estimates of all annual harvest specifications, all reference points needed to compute such estimates, and all information needed to make “overfishing” and “overfished” determinations based on SDC. In providing this information, the Salmon SAFE would use an official time series of historical catch for each salmon stock, including estimates of retained and discarded catch taken in the salmon fishery; bycatch taken in other fisheries; State commercial, recreational, personal use, and subsistence fisheries; and catches taken during scientific research.

The other two major SAFE sections could contain economic, social, community, essential fish habitat, and ecological information pertinent to the success of salmon management or the achievement of Salmon FMP objectives.

The SSC would review the SAFE and recommend OFL, ABC, and MSST. This SSC review would constitute the official scientific review for purposes of the Information Quality Act. Upon review and acceptance by the SSC, the Salmon SAFE and any associated SSC comments would constitute the best scientific information available for purposes of the MSA. The Council would then recommend TACs for the Cook Inlet EEZ salmon fishery to the Secretary of Commerce.

NMFS would publish proposed and final salmon harvest specifications and supporting NEPA analysis in the *Federal Register*. Under the Federal rulemaking process, the public is informed through the *Federal Register* of proposed rules and can comment on them and provide additional information to the agency. A final rule is then issued with modifications, as needed, and includes the agency responses to issues raised by public comments. This process takes time, and for the Council's groundfish fisheries, the Council recommends the proposed harvest specifications in October, based on the previous year's data, and NMFS publishes the proposed harvest specifications in November. Then, there is a separation of three months between the Council's final harvest recommendations (December) and publication and effective date of the final harvest specifications (March). As a result, the groundfish fisheries open on January 1 under the TAC established the previous year, and that TAC is then superseded when the final harvest specifications are published and effective for the current year. The length of this process is a result of the time it takes to conduct the stock assessments, review them through the Plan Team, SSC, and Council, establish the SDC, recommend the TAC, and then conduct notice and comment rulemaking under the Administrative Procedure Act.

Process and Timeline of Council Recommendations, Public Review, and Secretarial Decision

In consultation with the Council, the Secretary would establish salmon harvest specifications, including TACs, effective before the start of the fishing season of each year through publication in the *Federal Register*.

The exact sequence of events within the existing Council meeting schedule would depend on the timing of data from ADF&G. Two scenarios are envisioned for the availability of those data: (1) postseason data are immediately shared by ADF&G with the Salmon Plan Team or NMFS when they become available in November, or (2) postseason data are not available to the Salmon Plan Team or NMFS until February.[32] For either of the data timing scenarios, the Salmon Plan Team or NMFS would need to complete the Salmon SAFE so that it is available for SSC review at least three weeks before the SSC meeting.

Scenario 1

Under scenario 1, the Salmon Plan Team or NMFS would have access to ADF&G pre-season salmon forecasts in November or have developed suitable alternate stock-specific forecasts. Additionally, the Plan Team or NMFS would be able to complete the Salmon SAFE such that the information contained therein can be used by the SSC and Council for recommending OFL/ABC/TAC for the upcoming fishing season. Following the SSC and Council recommendations, NMFS would publish proposed harvest specifications. Like the groundfish process, which involves two Plan Team meetings and two Council meetings, salmon OFL/ABC/TAC could be considered at the February and April SSC and Council

[32] Commercial fishery data are available by November (Marston 2020), but sport and personal-use estimates are not available until much later. According to Hasbrouck (2020), preliminary personal-use and sport harvest data are typically not available until March and May of the following year.

meetings. If the Council established a Plan Team, the number of Plan Team meetings would not be prescribed in the FMP, and could be tailored depending on data timing and workload. Unlike groundfish, where new assessment information becomes available before the second of those meetings (December), no new information on salmon run size is expected between February and April, and final harvest specifications would not be expected to change compared to proposed harvest specifications. Because of this, publication and the effective date of the final harvest specifications may be accelerated and could be effective in time for the new fishing season.

At the February Council meeting, the SSC could review the SAFE and recommend SDC to the Council and the Council would then recommend harvest specifications to NMFS. The Council's recommendation would include the basis for each stock and stock complex's harvest specification. After considering the Council's recommended harvest specifications, NMFS would publish in the *Federal Register* a notice of proposed harvest specifications and make available for public review and comment all information regarding the basis for the harvest specifications. The notice of proposed harvest specifications would identify whether and how harvest specifications are likely to be affected by developing information unavailable at the time the notice is published. The public review and comment period on the notice of proposed harvest specifications would be a minimum of 15 days. As soon as practicable thereafter, NMFS would publish final harvest specifications.

If NMFS were to determine that the notice of final specifications would not be "a logical outgrowth" of the notice of proposed harvest specifications (i.e., the notice of proposed harvest specifications was inadequate to afford the public opportunity to comment meaningfully on the issues involved), NMFS would either: (1) publish a revised notice of proposed harvest specifications in the *Federal Register*, solicit public comment thereon, and publish a notice of final harvest specifications, as soon as is practicable; or (2) if "good cause" pursuant to the Administrative Procedure Act exists, waive the requirements for notice and comment and 30-day delayed effectiveness and directly publish a notice of final harvest specifications with a post-effectiveness public comment period of 15 to 30 days.

Scenario 2

Under scenario 2, the Salmon Plan Team or NMFS would not have advance access to ADF&G's salmon forecast or a suitable alternative forecasts. **Under scenario 2, therefore, harvest specifications would need to be developed using the Tier 3 approach, which would be expected to result in more conservative harvest levels.** The timing of the process would be the same as scenario 1**.** Potential example tables of applying a Tier 3 approach to Tier 1 and 2 stocks are provided in Appendix 9. However, post-season the SDC for these stocks could still be done at the Tier 1 or 2 level because escapement information from the previous fishing year is expected to be available.

2.5.5.1. Potential to streamline the process to determine the status of stocks and set harvest specifications

In response to the Council's December 2022 motion, analysts explored options to streamline the process to determine the status of stocks and set harvest specifications. This was in response to feedback from the Council, the public, and management agencies that the complexity and burden of the annual processes were challenging. Potential options evaluated included:

- A multi–year approach to determine overfishing status.
- A multi-year plan to establish harvest specifications. (Section 303(a)(15) of the MSA)
- Flexibility in application of NS1 guidelines. (50 CFR 600.310(h)(2))

NMFS determined that there is potential to implement one or more of these options, but that the initial challenges of establishing a new management regime under Alternative 3 would not be well suited to a less frequent review at first. As NMFS and the Council become more experienced with salmon management, the Council and SSC could re-evaluate whether these provisions are appropriate and useful for salmon management and amend the FMP as necessary in the future.

2.5.6. Commercial Monitoring, Recordkeeping, and Reporting

Alternative 3 would require monitoring and recordkeeping measures to provide data for NMFS to precisely deduct catches from the EEZ TAC and ensure compliance with EEZ fishery regulations. See Section 2.4.8 for a summary of required monitoring elements.

Options:

- ***Option 1 (Preferred).*** Require an FFP, an FPP, salmon buyer permit, eLandings use, a logbook, and VMS. Allow optional retention of non-salmon bycatch, all discarded or retained bycatch must be recorded in the logbook and reported at the time of landing. Prohibit discard of salmon species. This proposed set of measures is designed to balance agency information requirements with costs and impacts to vessel operations as well as administrative burden.

- *Option 2.* Recommend additional monitoring, recordkeeping, and reporting measures to obtain increased information from the fishery or improve the enforceability of fishery provisions. A detailed discussion of available tools is provided in Appendix 8.

Under option 1, the following set of tools would provide the information required for management:

Table 2-3 Suite of Required Monitoring, Recordkeeping, and Reporting for Alternative 3 under Option 1

Monitoring Measure	Needs Addressed
Federal Fisheries Permit	Allow implementation of monitoring, recordkeeping, and reporting requirements on harvesting vessels
Federal Processor Permit	Allow implementation of recordkeeping, and reporting requirements on salmon processors
Salmon buyer permit	Ensure recordkeeping and reporting requirements for landings data are met
eLandings (and tLandings)	Data stream for inseason management and the annual process.
VMS	Monitoring of compliance with the EEZ boundary to ensure catch is appropriately deducted from the EEZ TAC, real-time indication of fishing effort (number of vessels).
Logbook	Corroboration of catch, discards, and VMS spatial data.

Under Alternative 3, the Cook Inlet EEZ drift gillnet fishery would be managed separately from the adjacent State waters salmon drift gillnet fishery. Federal managers would require highly accurate, spatially explicit, rapidly reported, and complete catch accounting to accurately deduct salmon catches from the EEZ TAC. This would require prompt reporting through eLandings or tLandings including identification of fish harvested in EEZ waters. In order to ensure accurate accounting without additional monitoring measures, a vessel could not operate in the EEZ and State waters drift gillnet fishery within a single trip as a condition of the Federal Fisheries Permit (see Section 2.5.12 on prohibitions). Vessel operators would have to monitor their position and stay within the EEZ during a single trip. This would allow for the accurate accounting of catch against the EEZ TAC. There may be an incentive to maximize attributions of catches to State waters in order to maintain fishing opportunities in the EEZ for longer. Additionally, discarding of salmon species would be prohibited to avoid a situation where one or more salmon species could be discarded in an effort to prevent exceeding a TAC and closing the Cook Inlet EEZ to commercial salmon fishing.

In addition, any entity receiving deliveries of Cook Inlet EEZ salmon, or harvesting vessels conducting dockside sales of Cook Inlet EEZ salmon, would have to have either a Federal Processor Permit, or a Federal registered buyer permit similar to those that have been implemented for the Crab Rationalization and IFQ programs. This requirement for a permit would include entities that are currently defined as fish transporters by ADF&G if they are taking the initial delivery of salmon harvested in the EEZ. One of these federal permits is required to apply federal catch reporting requirements to obtain timely information for federal fishery managers. All EEZ salmon would be required to be reported through the eLandings system. Landing reports must be submitted by 1200 hours, A.l.t., of the day following completion of the delivery. Due to the use of fish transporters in this fishery and to ensure catch is reported, there will be a requirement to report the fish before fish are moved from the point of landing. The landing report must include an accurate count and weight of the fish received by species. Any entity receiving deliveries from the Cook Inlet EEZ salmon fishery that include groundfish would also have to have a FPP and meet all requirements applicable to federal groundfish landings.

Furthermore, spatially explicit monitoring through VMS would be required to ensure compliance with Federal fishery boundaries. Appropriate VMS ping rates would need to be determined as well as regulations requiring a vessel to remain within a certain proximity of their drift gillnet. VMS tracks vessel positions, however, it does not explicitly provide information about when fishing is occurring because drift nets are sometimes detached from the vessel. To allow for the use of VMS as an enforcement tool, a corresponding logbook would be required to verify fishing locations. Additionally, VMS would provide inseason managers with information about how many vessels were fishing so they could better project expected catch when making management decisions. The combination of these data would also allow for the development of VMS algorithms to monitor the salmon fishery.

Ensuring that vessels only participating in the State waters fishery do not enter EEZ waters is another important consideration. Federal requirements could not be imposed on vessels only registered and operating in the State waters drift gillnet salmon fishery. However, there is a concern about monitoring these vessels to ensure that they do not intentionally or inadvertently harvest fish in the EEZ. This could be most simply addressed by opening the EEZ drift gillnet fishery off-cycle with the State salmon drift gillnet fishery. If the EEZ fishery does occur concurrently with the State salmon drift gillnet fishery in Cook Inlet, additional enforcement patrols may be required to monitor if vessels operating in the State fishery enter EEZ waters to ensure accurate State/EEZ catch accounting.

A vessel with a Federal Fisheries Permit participating in the drift gillnet fishery not retaining groundfish would need to be exempt from the Improved Utilization/Improved Retention regulations at 50 CFR 679.20.

2.5.7. Standardized Bycatch Reporting Methodology

Under Alternative 3, eLandings and Federal logbooks would serve as the SBRM for the commercial salmon fishery in the Cook Inlet EEZ. Harvesters would be required to report any quantities of groundfish discarded at sea or retained at the time of landing. There are already accommodations for reporting of discards in eLandings.

The SBRM would report information about the characteristics of bycatch in the fishery. Self-reporting would be feasible, in accordance with SBRM guidelines. The FMP would also need to identify the data uncertainty resulting from the method and identify how the collected data would be used. In this instance, the information would be used to characterize bycatch in the fishery and potentially develop a methodology to estimate bycatch quantities for the fishery in the future.

For recreational salmon fisheries in the East Area and West Area, the combination of the SWHS, creel surveys, and Saltwater Guide Logbooks that are operated by the State constitute the standardized bycatch reporting methodology for the unguided and guided recreational salmon fishery. These measures would also serve as the SBRM for recreational salmon fishing in the Cook Inlet EEZ under Alternative 3.

2.5.8. Recreational salmon fishery in the Cook Inlet EEZ

Under Alternative 3, Federal management measures would also be required for the recreational salmon fishery in the UCI EEZ. While there is generally limited recreational salmon harvest in the UCI EEZ, (estimated at less than 0.01% of salmon harvest in the EEZ, on average), the options presented here would manage the portion of the recreational fishery that occurs in the EEZ.

It is noted that State bag and possession limits are expected to constrain Cook Inlet EEZ recreational harvests and avoid increasing overall harvests by taking fish in both Federal and State waters.

- *Option 1.* Delegate management of the recreational salmon fishery in the EEZ to the State of Alaska consistent with the management of the recreational salmon fishery in the East Area.
- *Option 2.* Manage the recreational salmon fishery in the Cook Inlet EEZ with Federal regulations.
  Suboption 1. Consistent with existing State of Alaska regulations for the saltwater recreational salmon fishery in Upper Cook Inlet.
    - For Chinook salmon:
        - From April 1 to August 31, 1 per day, 1 in possession of any size.
            - 5 fish annual limit of king salmon 20 inches or longer during this period.
        - From September 1 to March 31, 2 per day, 2 in possession of any size.
            - No annual limit during this period.
    - Other salmon:
        - 6 per day, 6 in possession, only 3 per day, 3 in possession may be coho (silver) salmon.

  Suboption 2. Define other Federal bag limits.
  Suboption 3. Federal managers would also need authority to close and limit the recreational salmon fishery in the Cook Inlet EEZ. This could include a complete closure of the Cook Inlet EEZ to recreational fishing, or a prohibition on retention of specific species. Given the very limited recreational harvest of salmon in Cook Inlet EEZ salt waters (see Section 4.5.2) and State management measures that constrain the number of salmon landed regardless of if they are harvested in State or Federal waters, minimal Federal recreational inseason management needs are anticipated.

Option 2 would likely create considerable enforcement concerns if bag and/or possession limits were managed separately from State of Alaska regulations. Determining where a fish was caught and under which jurisdiction the regulations apply may render a regulation unenforceable. For example, fish caught in the EEZ must be transported across State waters and landed at State ports, further creating enforcement difficulty should differing limits apply.

Under either Option 1 or Option 2, bag limits could not be different for residents of the State of Alaska and non-residents.

For the recreational salmon fishery, the existing recordkeeping and reporting requirements implemented by the State are expected to be sufficient to inform management and satisfy MSA requirements given the small scale and limited removals of the fishery sector. These include creel sampling, the SWHS, harvest records for annual limits, and the Saltwater Guide Logbooks.

2.5.9. Commercial Fishing Periods

Drift gillnet fishing in Cook Inlet is managed by the State of Alaska with scheduled fishing periods to allow for an orderly, predictable commercial drift gillnet fishery and to meet allocation and conservation goals. This benefits participants by allowing them to plan their fishing as well as processors who can plan their operations to maximize efficiency.

Under Alternative 3, choosing to open the EEZ commercial drift gillnet salmon fishery off-cycle with the State commercial drift gillnet salmon fishery would simplify monitoring and catch accounting for both the EEZ drift gillnet fishery and the State waters drift gillnet fishery. This may also reduce the monitoring and recordkeeping requirements needed to manage the commercial fishery in the Cook Inlet EEZ. However, due to the State's additional flexibility in opening and closing the drift gillnet fishery in their waters, precise coordination may not always be feasible. The EEZ drift gillnet salmon fishery could be coordinated with the State's drift gillnet salmon fishery, define independent Federal fishing periods, or allow fishing to occur at any time until the fishery is closed by the Administrator, NMFS Alaska Region (Administrator).

Management of the commercial salmon fishery in the Cook Inlet EEZ has generally been very consistent in the early part of the season with two scheduled 12-hour openings per week until approximately mid-July. Fixing a closure date would help address significant concerns about the lack of Federal management flexibility later in the season when commercial fishery management in Cook Inlet becomes much more dynamic in response to rapidly increasing information about realized run strength (e.g., fishing periods are reduced if escapement goals are not projected to be met, or increased if escapement goals are likely to be exceeded). It would also provide consistent and predictable opportunity to participants in the federal fishery.

Options:

- ***Option 1 (Preferred).*** Establish Federal fishing periods concurrent with existing State of Alaska fishing periods set forth in regulations for the Central District drift gillnet fishery (5 AAC 21.320), such that salmon may be taken in the Cook Inlet EEZ only from 7:00 a.m. Monday until 7:00 p.m. Monday and from 7:00 a.m. Thursday until 7:00 p.m. Thursday. Additional monitoring would have to be identified under this option to ensure accurate catch accounting and enforceability.
- *Option 2.* Establish independent Federal fishing periods and specify that the Cook Inlet EEZ salmon drift gillnet fishery could not be open concurrently with the adjacent State waters salmon drift gillnet fishery.
- ***Suboption A (Preferred).*** May be combined with Option 1 or Option 2. Fix a commercial fishery closure date in Federal regulation of August 15. If the TAC is not reached or the fishery is not otherwise closed prior, the fishery would close automatically on the specified date.

2.5.10. Management Area and Statistical Area Boundaries

The management area would be all EEZ waters in upper Cook Inlet. Existing salmon statistical area boundaries would be used to report harvest with an EEZ identifier added in eLandings.

Due to the mobile nature of drift gillnet gear and the strong tides in Cook Inlet, fishing can occur over multiple areas in a single set. At certain times fishery effort can be concentrated on or around the EEZ boundary. Historically, this has been addressed by the State's management of the fishery without reference to the EEZ as a fishery boundary or explicit reporting area. However, fishery participants have still had to fish within the bounds of specific open areas at any given time. These are typically defined with straight boundaries with coordinates in regulation. The EEZ boundary is irregular in shape which stakeholders have indicated could be problematic for compliance. To remain in compliance with Federal regulations, drift gillnet vessels operating in the Cook Inlet EEZ would need to maintain technology necessary to accurately determine vessel position relative to the boundaries of the EEZ and remain in the area while fishing.

2.5.11. Legal Commercial Fishing Gear

Current Federal regulations at 50 CFR 679.7(h) prohibit commercial fishing for salmon in the EEZ using any gear except troll gear and do not authorize commercial fishing with any gear in the West Area.

> *Salmon fisheries.* (1) Engage in commercial fishing for salmon using any gear except troll gear, defined at §679.2, in the East Area of the Salmon Management Area, defined at §679.2 and Figure 23 to this part.
>
> (2) Engage in commercial fishing for salmon in the West Area of the Salmon Management Area, defined at §679.2 and Figure 23 to this part.

In addition, there are general provisions specified at 50 CFR §600.725 that authorize only hook and line gear for salmon fisheries covered under the FMP. Federal regulations would need to authorize drift gillnet gear in the EEZ portion of Cook Inlet and legal gear configurations would have to be defined. Adopting legal gear configurations that are different from the State could make it challenging for participants to move between the fisheries.

For reference, current legal gear in the Cook Inlet drift gillnet salmon fishery is described in the following State of Alaska regulations:

a. 5 AAC 21.331. Gillnet specifications and operations
b. 5 AAC 21.333. Requirements and specifications for use of 200 fathoms of drift gillnet in the Cook Inlet Area
c. 5 AAC 21.334. Identification of gear
d. 5 AAC 21.335. Minimum distance between units of gear

Authorized drift gillnet gear would be defined in Federal regulations. Draft gear definition:

- Drift gillnet gear must be no longer than 200 fathoms in length, 45 meshes deep, and have a mesh size no greater than 6 inches. Drift gillnet gear must be marked at both ends with buoys marked with the vessel's name and FFP number. It is illegal to stake or otherwise fix a drift gillnet to the seafloor.

The State of Alaska has implemented additional requirements applicable to commercial drift gillnet fishing to prevent gear conflicts by requiring a minimum distance between units of gear. If there is concerned about gear Conflicts, NMFS could recommend adopting the same or similar requirements to be applicable to drift gillnet vessels operating in the Cook Inlet EEZ.

Additional gear restrictions could include the following requirements:

- The float line and floats of gillnets must be floating on the surface of the water while the net is fishing unless natural conditions cause the net to temporarily sink.
- Salmon fishing nets must be measured, either wet or dry, by determining the maximum or minimum distance between the first and last hanging of the net when the net is fully extended with traction applied at one end only.
- A vessel operator would be prohibited from operating gear in greater than the allowable configuration (length or mesh size).

2.5.12. Prohibitions

In order to minimize problems with salmon accounting and reduce the potential for unintended fishery impacts, the following Federal regulatory prohibitions would be required under Alternative 3.

(1) Commercial salmon fishing vessels operating in the Cook Inlet EEZ could not.

- Engage in commercial fishing for salmon in the Cook Inlet EEZ Area with a vessel of the United States that does not have on board a legible copy of a valid SFFP;
- (ii) Engage in commercial fishing for salmon using any gear except drift gillnet gear;
- (iii) Have on board, retrieve, or deploy fishing gear other than a drift gillnet legally configured for the Cook Inlet EEZ Area commercial salmon fishery while commercial fishing for salmon in the Cook Inlet EEZ Area;
- (iv) Deploy and/or operate more than one drift gillnet;
- (v) Set within or allow any portion of drift gillnet gear to enter State waters on the same calendar day drift gillnet gear is also deployed in the Cook Inlet EEZ Area;
- (vi) Deploy commercial drift gillnet gear in excess of the allowable configuration for total length and mesh size;
- (vii) Use a vessel named or required to be named on an SFFP to fish for salmon in the Cook Inlet EEZ Area if that vessel fishes for salmon in State of Alaska waters on the same calendar day;
- (viii) Possess salmon on board a vessel named or required to be named on an SFFP that was harvested in State waters while commercial fishing for salmon in the Cook Inlet EEZ Area;
- (ix) Have salmon on board a vessel prior to beginning a commercial salmon fishing trip in the Cook Inlet EEZ Area;
- (x) Recreationally fish for salmon or have recreational, personal-use, or subsistence-caught salmon on board while commercial fishing for salmon in the Cook Inlet EEZ Area;
- (xi) Use aircraft (manned or unmanned) to locate salmon or direct fishing;
- (xii) Land salmon caught in State waters concurrently with salmon caught in the Cook Inlet EEZ Area;
- (xiii) Land or transfer salmon caught in the Cook Inlet EEZ Area within the EEZ off Alaska;
- (xiv) Operate a vessel named or required to be named on an SFFP to commercially fish for salmon in the Cook Inlet EEZ Area without a functioning VMS; and
- (xv) Discard any salmon caught while commercial fishing for salmon in the Cook Inlet EEZ Area.

(2) Recreational (sport) anglers in the Cook Inlet EEZ could not.

- Engage in recreational fishing for salmon using any gear except for handline, rod and reel, or hook and line gear;
- (ii) Use more than a single line per angler with more than two hooks attached; and
- (iii) Fillet, mutilate, or otherwise disfigure a salmon in any manner that prevents the determination of the species, minimum size, or the number of fish caught, possessed, or landed.

(3) Processors and other entities receiving deliveries of Cook Inlet EEZ salmon could not.

- Receive, purchase or arrange for purchase, discard, or process salmon harvested in the Cook Inlet EEZ Area by a shoreside processor that does not have on site a legible copy of a valid SFPP;
- (ii) For a shoreside processor designated on an SFPP or a registered salmon receiver designated on an RSRP that processes or receives landings of salmon harvested by a vessel in the Cook Inlet EEZ Area to fail to submit a timely and complete landing report;
- (iii) Process salmon harvested in the Cook Inlet EEZ Area in the EEZ; and
- (iv) Receive or transport salmon caught in the Cook inlet EEZ Area without an SFPP or RSRP.

(4) All persons or entities participating in the Cook Inlet EEZ salmon fisheries could not.

- Fail to comply with or fail to ensure compliance with established requirements
- (ii) Alter or forge any permit or document

- (iii) Fail to submit or submit inaccurate information on any required report, application, or statement; and
- (iv) Intentionally submit false information on any required report, application, or statement.

2.5.13. Inseason Management

The FMP would establish the process for NMFS to close the fishery in Federal regulations. For the commercial fishery, a series of open days and times would be defined in regulation. Once the TAC is reached, or there is insufficient TAC to support another fishery opening, NMFS would close the fishery. This approach is consistent with NMFS' management of other commercial fisheries. Having multiple closed days between each fishery opening, which is consistent with current State practice, would allow time for catch data to reach managers and a Federal closure to be published in the *Federal Register* if needed. Closing the fishery would be the primary practicable management tool available to NMFS.

The Administrator may become aware of new information and data relating to stock status during the course of a fishing year which warrant inseason adjustments to a fishery. **However, due to the relatively short duration of the fishery, and the length of noticing requirements for an inseason adjustment (15 to 30 days), inseason adjustments may not always be a practicable tool for inseason management of the Cook Inlet EEZ drift gillnet fishery. This is a significant limitation of Federal management as information about salmon stock abundance develops significantly over the course of the season as escapement data become available.** The other requirements for an inseason adjustment are laid out below.

Inseason adjustments are for changes in stock status that might not have been anticipated or were not sufficiently understood at the time harvest levels were being set. Such changes may become known from events within the fishery as it proceeds, or they may become known from analysis of scientific survey data. Certain changes warrant swift action by the Administrator to protect the resource from biological harm by adjusting the time and area open to drift gillnet fishing.

The need for inseason adjustment may be related to several circumstances. For instance, run size may be much less than originally forecast. When new information indicates a run is well below previous expectations, allowing a fishery to continue under a pre-season harvest level could increase the risk of overfishing. Conservation measures that would reduce harvest in season may be warranted.

Inseason adjustments are recommended to the Administrator by management personnel who are monitoring the fishery and communicating with those in the fishing industry who would be directly affected by such adjustments. Therefore, under Alternative 3, the Administrator could be authorized to make inseason adjustments to conserve fishery resources on the basis of all relevant information. Using all available information, the Administrator may close fishing in the Cook Inlet EEZ. The Administrator could change any previously specified TAC if it is proven to be incorrectly specified on the basis of the best scientific information available or stock status. NMFS may also modify bag limits for the recreational salmon fishery or prohibit retention for one or more salmon species or stocks. Such inseason adjustments must be necessary to prevent one of the following occurrences:

a. the overfishing of any species or stock of fish; and/or
b. the harvest of a TAC for any salmon stock, or the closure of any fishery based on a TAC that, on the basis of currently available information, is found by the Secretary to be incorrectly specified.

The possible types of information that the Administrator could consider in determining whether conditions exist that require an inseason adjustment are described as follows. It could be provided that the Administrator is not precluded from using information not described but determined to be relevant to the issue:

a. the effect of overall fishing effort within an area;
b. catch per unit of effort and rate of harvest;
c. relative distribution and abundance of salmon stocks within an area;
d. the condition of each stock in all or part of an area;
e. economic impacts of fishing businesses being affected;
f. impacts to other harvesters of Cook Inlet salmon stocks; or
g. any other factor relevant to the conservation and management of salmon stocks or any incidentally-caught species.

The procedure that the Secretary must follow requires that the Secretary publish a notice of proposed adjustments in the Federal Register before they are made final, unless the Secretary finds for good cause that such notice is impracticable or contrary to the public interest.

To effectively manage Cook Inlet salmon resources throughout their range, NMFS must coordinate inseason adjustments with the State of Alaska to ensure the impacts of management actions in both State and Federal waters are accounted for.

Any inseason fishing time, area, or limit adjustments made by NMFS will be carried out within the authority of this FMP. Such action is not considered to constitute an emergency that would warrant a plan amendment within the scope of Section 305(e) of the Magnuson-Stevens Act. Any inseason adjustments that are beyond the scope of the above authority will be accomplished by emergency regulations as provided for under Section 305(e) of the Magnuson-Stevens Act.

2.5.14. Use of the Joint Protocol Committee

Under Alternative 3, salmon fisheries that occur in State waters of Cook Inlet would be separately managed by ADF&G. As stated above, the Council and the BOF would need to work closely through the Joint Protocol Committee to minimize conflicts between State and Federal salmon management actions. Preseason coordination would need to occur so Federal TACs would account for expected removals from State waters fisheries. Coordination between State and Federal salmon managers in Cook Inlet would need to be established to minimize management uncertainty to open the EEZ for salmon fishing.

2.5.15. Limited Entry

Under Federal management, commercial salmon fishing permits issued by the CFEC State Limited Entry Program would not be directly applicable to commercial salmon fishing in the EEZ. However, the CFEC limited entry permitting requirements and other State regulations would still be in effect for vessels registered with the State or entering into State waters, including State regulations that prohibit unregistered vessels from entering State waters with salmon harvested in the EEZ.[33] In the long run, the Council may still need to determine whether to limit access to the Cook Inlet EEZ fishery. The Council could decide to develop a License Limitation Program, institute a moratorium, or even a catch share program for vessels fishing in the Cook Inlet EEZ. Absent a Federal program to allocate access based on historical participation, the Cook Inlet EEZ commercial salmon fishery would be managed as an open access fishery. With the management measures contained under Alternative 3, in combination with applicable State regulations, open access management is expected to be a viable solution at this time.

[33] It is conceivable that a vessel operator could decide to cut all ties with the State and only fish in the Cook Inlet EEZ. However, if the vessel involved entered State waters for fuel, supplies, or a mechanical or medical emergency, the vessel would be subject to State enforcement. Therefore, this is not considered a likely scenario.

Options:

- ***Option 1 (preferred):*** *Open Access.* This option would allow anyone to obtain a Salmon Federal Fisheries Permit with the proper endorsements to participate in the Cook Inlet EEZ drift gillnet fishery.
- *Option 2: Open Access and Notification of Intent to Develop a Limited Entry Program.* This option would allow anyone to obtain a Federal Fisheries Permit with the proper gear and species endorsements (to be developed) and participate in the Cook Inlet EEZ drift gillnet fishery; in addition, the public would be notified of the intent to establish a limited entry program for the Cook Inlet EEZ drift gillnet fishery.

2.6. Alternative 4: Federal Management (close the Cook Inlet EEZ to commercial salmon fishing)

Alternative 4 was recommended as the preferred alternative by the Council in December 2020. NMFS implemented this alternative as Amendment 14, with a final rule published in November 2021. On June 21, 2022, the U.S. District Court for the District of Alaska vacated the implementing regulations for Amendment 14. The Court found that, as implemented, the final rule was arbitrary and capricious, and inconsistent with the MSA.

Under Alternative 4, the Salmon FMP would be amended to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management by applying the West Area prohibition on commercial salmon fishing in the EEZ to the Cook Inlet EEZ. As this management approach would apply the existing West Area approach to commercial salmon fishing in the Cook Inlet EEZ, few FMP or regulatory amendments would be needed to implement Alternative 4.

To implement Alternative 4, the Cook Inlet EEZ Area would be incorporated into the Salmon FMP's West Area as a Subarea, thereby bringing the Cook Inlet EEZ Subarea and the commercial salmon fisheries that occur within it under federal management by the North Pacific Fishery Management Council and NMFS. MSY, OY, and ACLs would be separately specified for the Cook Inlet EEZ Subarea, reflecting the fact that Cook Inlet salmon stocks have historically been harvested in both state and federal waters. All other FMP elements applicable to the West Area would be applied to the Cook Inlet EEZ Subarea.

2.6.1. Management Policy and Objectives

Under Alternative 4, no modifications to the Council's existing management policy and management objectives would be required. This is because a prohibition on commercial salmon fishing in the Cook Inlet EEZ would be consistent with existing management policy and objectives as currently applied to all the West Area. Under Alternative 4, the Cook Inlet EEZ would be included within the scope of the Salmon FMP's fishery management unit and subject to the management and policy objectives currently contained within the FMP that support maximized salmon utilization in State managed commercial salmon fisheries.

The following are the Council's management policy and management objectives as stated in Sections 3.1 and 3.2 of the FMP.

2.6.1.1. Management Policy

The Council's salmon management policy is to facilitate State of Alaska salmon management in accordance with the MSA, Pacific Salmon Treaty, and applicable Federal law. This FMP represents the Council's contribution to a comprehensive management regime for the salmon fishery that will be achieved in concert with actions taken by the Pacific Salmon Commission and the State. This policy ensures the application of judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations.

Under this policy, all management measures will be based on the best scientific information available. This management policy recognizes the need to balance many competing uses of marine resources and different social and economic objectives for sustainable fishery management, including protection of the long-term health of the resource and the optimization of yield. This policy uses and improves upon the Council's and State's existing open and transparent process of public involvement in decision-making.

2.6.1.2. Management Objectives

The Council has identified the following six management objectives to guide salmon management under the FMP. The Council, NMFS, and the State of Alaska will consider the management policy and the following management objectives in developing amendments to this FMP and associated management measures. Because adaptive management requires regular and periodic review, the management objectives identified in this section will be reviewed periodically by the Council. The Council, NMFS, and the State of Alaska will also review, modify, eliminate, or consider new management measures, as appropriate, to best carry out the management objectives for the FMP.

Objective 1 – Prevent overfishing and achieve optimum yield

Manage the commercial and sport salmon fisheries in the East Area in concert with the Pacific Salmon Commission, and in accordance with the conservation and harvest sharing goals of the Pacific Salmon Treaty, to prevent overfishing and obtain the number and distribution of spawning fish capable of producing the optimum yield on a sustained basis (wild and hatchery). Prevent overfishing and achieve optimum yield in the West Area by prohibiting the commercial harvest of salmon. Prohibiting commercial harvest enables the State to manage salmon fisheries to achieve escapement goals and maximize economic and social benefits from the fishery.

Objective 2 – Manage salmon as a unit throughout their range

Manage salmon fisheries in the EEZ in a manner that enables the State to manage salmon stocks seamlessly throughout their range. In the East Area, this objective is achieved by delegating management of the sport and commercial troll fishery to the State, to manage consistent with State and Federal laws, including the Pacific Salmon Treaty. In the West Area, this objective is achieved by prohibiting commercial fishing for salmon in the West Area so that the State can manage Alaska salmon stocks as a unit.

Objective 3 – Minimize Bycatch and Bycatch Mortality

To the extent practicable, manage salmon fisheries to minimize bycatch and minimize the mortality of unavoidable bycatch. Decrease, where possible, the incidental mortalities of salmon hooked and released, consistent with allocation decisions and the objective of providing the greatest overall benefit to the people of the United States.

Objective 4 - Maximize economic and social benefits to the Nation over time.

Economic benefits are broadly defined to include, but are not limited to, profits, income, employment, benefits to consumers, and less tangible or less quantifiable benefits such as the economic stability of coastal communities, recreational value, non-consumptive use value, and non-use value. To ensure that economic and social benefits derived from fisheries covered by this FMP are maximized over time, the following will be examined in the selection of management measures:

- Control of fishing effort and salmon catches.
- Fair and equitable allocation of harvestable surpluses of salmon.
- Economic impacts on coastal communities and other identifiable dependent groups (e.g., subsistence users).

This examination will be accomplished by considering, to the extent that data allow, the impact of management measures on the size of the catch during the current and future seasons and their associated prices, harvesting costs, processing costs, employment, the distribution of benefits among members of the harvesting, processing and consumer communities, management costs, and other factors affecting the ability to maximize the economic and social benefits as defined in this section. Other benefits are tied to economic stability and impacts of commercial fishing, as well as unguided and charter recreational fishing associated with coastal communities, subsistence fishing supporting traditional social and cultural 'communities,' and passive-use 'communities.'

Objective 5 – Protect wild stocks and fully utilize hatchery production

Manage salmon fisheries to ensure sustainability of naturally spawning stocks, while providing access to hatchery production.

Objective 6 –Safety

Promote the safety of human life at sea in the development of fisheries management measures. Upon request, and from time to time as appropriate, the Council, NMFS, or the State may provide for temporary adjustments, after consultation with the U.S. Coast Guard and fishery participants, for vessels that are otherwise excluded because of weather or ocean conditions causing safety concerns while ensuring no adverse effect on conservation in other fisheries or discrimination among fishery participants.

2.6.2. Procedures for FMP Implementation

Because Alternative 4 would have the Council and NMFS directly managing all aspects of the Cook Inlet EEZ commercial salmon fishery and would not delegate any management authority to the State, an FMP section describing procedures for FMP implementation in the West Area would not be necessary. The Council and NMFS will follow applicable Federal law in implementing the FMP through Federal regulations.

2.6.3. Management Measures

Under Alternative 4, the primary management measure would be the prohibition on commercial salmon fishing in Cook Inlet EEZ in the FMP and Federal regulations.[34] NMFS would also modify the definition of the Salmon Management Area in 50 CFR 679.2[35] and Figure 23 to add the Cook Inlet EEZ Subarea into the West Area.

[34] 50 CFR 679.7 In addition to the general prohibitions specified in §600.725 of this chapter, it is unlawful for any person to do any of the following: * * * * (h)(2) Engage in commercial fishing for salmon in the West Area of the Salmon Management Area, defined at §679.2 and Figure 23 to this part.

[35] 50 CFR 697.2 Salmon Management Area means those waters of the EEZ off Alaska (see Figure 23 to part 679) under the authority of the Salmon FMP. The Salmon Management Area is divided into a West Area and an East Area with the border between the two at the longitude of Cape Suckling (143°53.6′ W):

(1) The East Area means the area of the EEZ in the Gulf of Alaska east of the longitude of Cape Suckling (143°53.6′ W).

2.6.4. Status Determination Criteria

Under Alternative 4, MSY would be established for the Cook Inlet EEZ Subarea. A description of MSY for Alternative 4 is provided in Section 2.6.6. No other SDC would need to be established because Alternative 4 would establish an ACL of zero for the Cook Inlet EEZ Subarea and the area would be closed to commercial salmon fishing. Alternative 4 would not modify the existing FMP SDC for the remainder of the West Area, which is described in Section 2.3.4.

2.6.5. Annual Catch Limits and Accountability Measures

Under Alternative 4, the ACL for the Cook Inlet EEZ Subarea commercial salmon fishery is zero. This ACL reflects that OY is fully achieved in State waters of Cook Inlet by State salmon fisheries. In order to implement this ACL, NMFS prohibits commercial fishing for salmon in the Cook Inlet EEZ Subarea.

Because the ACL is set equal to zero, commercial salmon fishing is prohibited in the Cook Inlet EEZ Subarea. Furthermore, because there is limited catch from other sources, no additional AMs are required or established.

2.6.6. Optimum Yield and Maximum Sustainable Yield

Under Alternative 4, MSY and OY would be separately specified for the Cook Inlet EEZ Subarea from the rest of the West Area, reflecting that Cook Inlet salmon stocks have historically been harvested in both state and federal waters. For the remainder of the West Area outside of the Cook Inlet EEZ Subarea, no change would be made to the specification of MSY and OY, which are described in Section 2.3.6.

MSY would be established for the Cook Inlet salmon fishery as the maximum amount of harvest possible under the State of Alaska's escapement goals, which is the largest long-term average catch that can be taken by the fishery under prevailing ecological, environmental conditions and fishery technological characteristics (e.g., gear selectivity), and the distribution of catch among fishery sectors. This includes the use of indicator stocks to manage where escapement is not directly known. Escapement goals account for biological productivity and ecological factors. (Section 3.1 and Appendix 12). The Cook Inlet salmon fishery includes the stocks of salmon harvested by all sectors within State and federal waters of Cook Inlet.

The OY range for the Cook Inlet salmon fishery would be the combined catch from all salmon fisheries occurring within Cook Inlet (State and federal water catch), which results in a post-harvest abundance within the escapement goal range for stocks with escapement goals, and below the historically sustainable average catch for stocks without escapement goals, except when management measures required to conserve weak stocks necessarily limit catch of healthy stocks. This OY is derived from MSY, as reduced by relevant economic, social, and ecological factors. These factors include annual variations in the abundance, distribution, migration patterns, and timing of the salmon stocks; allocations by the Alaska Board of Fisheries; traditional times, methods, and areas of salmon fishing; ecosystem needs; and inseason indices of stock strength.

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(2) The West Area means the area of the EEZ off Alaska in the Bering Sea, Chukchi Sea, Beaufort Sea, and the Gulf of Alaska west of the longitude of Cape Suckling (143°53.6′ W) but excludes the Cook Inlet Area, the Prince William Sound Area, and the Alaska Peninsula Area, shown in Figure 23 and described as:

(i) the Cook Inlet Area which means the EEZ waters north of a line at 59°46.15′ N;

(ii) the Prince William Sound Area which means the EEZ waters shoreward of a line that starts at 60°16.8′ N and 146°15.24′ W and extends southeast to 59°42.66′ N and 144°36.20′ W and a line that starts at 59°43.28′ N and 144°31.50′ W and extends northeast to 59°56.4′ N and 143°53.6′ W.

(iii) the Alaska Peninsula Area which means the EEZ waters shoreward of a line at 54°22.5′ N from 164°27.1′ W to 163°1.2′ W and a line at 162°24.05′ W from 54°30.1′ N to 54°27.75′ N.

2.6.7. Annual Process for Determining the Status of the Stocks

Under Alternative 4, no annual process for determining the status of salmon stocks under the NS 1 guidelines would be established for the salmon stocks in Cook Inlet. The FMP currently prohibits commercial fishing in the West Area, which would be applied to include the Cook Inlet EEZ Subarea. With a prohibition on commercial fishing in the Cook Inlet EEZ Subarea, there is no need for an annual process to determine the status of the salmon stocks.

2.6.8. Standardized Bycatch Reporting Methodology

Under Alternative 4, the FMP would be amended to include a statement that because there would be no commercial salmon fishing in the West Area, including the Cook Inlet EEZ Subarea, no standardized bycatch reporting methodology is required or would be established.

2.6.9. Federal Oversight and Review

Under Alternative 4, no substantive changes to Chapter 9 of the FMP would be necessary. Under Alternative 4, no management authority for the Cook Inlet EEZ would be delegated to the State. Federal oversight and review is only needed when an FMP delegates management to a State.

2.6.10. Monitoring, Recordkeeping, and Reporting Requirements

Under Alternative 4, there would be no commercial salmon fishing in the Cook Inlet EEZ Subarea. Therefore, no monitoring, recordkeeping, or reporting measures to monitor commercial fisheries would need to be added to the FMP or Federal regulations.

2.7. Alternatives Considered but not Moved Forward for Analysis

The Cook Inlet Salmon Committee (Committee) developed Alternative 2B: Expanded Scope to fundamentally change how the Federal government manages salmon in Cook Inlet and throughout the West Area. Alternative 2B: Expanded Scope is summarized in Section1.4.1 and provided in full in the May 2020 Committee Report available on the Council's web page.[36]

The Council reviewed the Committee's alternative at their June 2020 Council meeting and decided not to add that alternative to the suite of alternatives to be analyzed in the EA/RIR for Council initial review in October 2020. The Council stated that:

> *"The Council is not moving the Cook Inlet Salmon Committee's (Committee's) recommended alternative forward for analysis, but staff will include it in the section on alternatives considered but not analyzed further. The Council has been clear on its intent to manage the commercial salmon fishery in the EEZ, and not in State waters outside its jurisdiction. The Council requests staff evaluate the recommended management measures that may be applicable to the Council's alternatives, and analyze the implications of incorporating these recommendations in the current suite of alternatives."*

This section summarizes the major provisions of the Committee's Alternative 2B: Expanded Scope recommendation and explains either why the major provision is not carried forward for further analysis, or whether it will be analyzed as an option for Alternative 2. The Committee based Alternative 2B on Alternative 2 and expanded or modified the provisions of Alternative 2 to apply in State waters and to all salmon fisheries.

[36] https://www.npfmc.org/committees/cook-inlet-salmon-committee/

Expand Federal management to State and internal waters of Cook Inlet and the expanded Salmon Management Area

This provision of Alternative 2B: expanded scope would have the FMP include all of the EEZ off Alaska, and west of Cape Suckling including all State waters (0-3 nm from the coastline), and all State internal waters (such as rivers, streams and lakes) and have the FMP manage all fisheries for salmon, such as commercial, sport, personal use, and subsistence. Similar to Alternative 2, the FMP under the Committee's Alternative 2B: Expanded Scope would delegate certain management measures to the State. Because of the scope of the FMP, State and Federal management of all salmon fisheries in all waters west of Cape Suckling, including the Cook Inlet area, would have to be consistent with the FMP, the MSA, and other applicable Federal law.

This provision of the Committee's Alternative 2B: Expanded Scope recommendation has been considered and is not carried forward for further analysis. This provision of the Committee's recommendation is not a reasonable alternative to addressing the purpose and need for action.

First, expanding Federal management to the Prince William Sound EEZ and the South Alaska Peninsula EEZ is not a reasonable alternative because it is outside the scope of the purpose and need for this action. The Council decided to address incorporating the Cook Inlet EEZ into the FMP first, and will develop an FMP amendment to incorporate the Prince William Sound EEZ and the South Alaska Peninsula EEZ subsequent to its work on the Cook Inlet EEZ. Therefore, it is outside the scope of this action to include these other two areas into the FMP at this time.

Second, expanding Federal management to State waters and State internal waters of Cook Inlet is not a reasonable alternative because it is outside the scope of the purpose and need for action. As accurately stated by the Council, the need for action is to bring the Salmon FMP into compliance with the MSA consistent with the Ninth Circuit's decision and the judgment of the district court in *UCIDA v. NMFS*.[37] In *UCIDA v. NMFS*, UCIDA and CIFF challenged the consistency of Amendment 12 to the FMP with the MSA. As explained in Section 1 of this analysis, Amendment 12, among other things, removed the Cook Inlet EEZ and the commercial salmon fisheries occurring within it from the FMP and Federal management. The Ninth Circuit held that Amendment 12's removal of the Cook Inlet EEZ from the FMP, and the commercial salmon fisheries within from Federal management, was contrary to Section 302(h)(1) of the MSA[38], and therefore violated the MSA. The court explained that under Section 302(h)(1), a council must prepare an FMP for a fishery that is under its authority and that requires conservation and management. Because the Cook Inlet EEZ is under the authority of the Council and NMFS, the Council and NMFS determined that the commercial salmon fishery occurring within the Cook Inlet EEZ required conservation and management by some entity, and that "the exempted area of Cook Inlet is a salmon fishery[39], the court held that it was impermissible for Amendment 12 to remove that area and the commercial salmon fishery occurring within that area from Federal management under the FMP.

Immediately prior to Amendment 12, the FMP included all of the EEZ off Alaska and managed salmon fisheries occurring in the EEZ. At no point in its history has the FMP included State waters, or managed salmon fisheries occurring within State waters. Amendment 12 modified the scope of the FMP to exclude three areas of EEZ waters from Federal management under the FMP, including the Cook Inlet EEZ. In doing so, Amendment 12 slightly shrank the EEZ area managed under the FMP. The result of Amendment 12 was that the FMP continued to manage most of the EEZ off Alaska and the salmon

[37] United Cook Inlet Drift Association v. NMFS, 837 F.3d 1055 (9th Cir. 2016). The decision is included in Appendix 9.

[38] Section 302(h)(1) of the MSA (16 U.S.C. § 1852(h)(1)) States, "Each council shall...for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary" an FMP and any necessary amendments to the FMP.

[39] UCIDA v. NMFS, 837 F.3d, at 1061 and 1064.

fisheries within that area but excluded three small pocket areas of the EEZ and the salmon fisheries within those small pockets of EEZ waters from the FMP and Federal management. The controversy with Amendment 12 was its removal of EEZ waters adjacent to Cook Inlet and the termination of Federal management of the commercial salmon fishery within that removed EEZ area. The Ninth Circuit decision creates a need for the Council and NMFS to undo the inconsistencies created by Amendment 12's removal of the Cook Inlet EEZ area. Therefore, the purpose of the action is to add the Cook Inlet EEZ area back into the FMP and manage the commercial salmon fishery within the Cook Inlet EEZ area under the FMP.

During the court challenge to Amendment 12, the parties never argued, and the court's decision never suggests, that the MSA requires the FMP to include State waters and salmon fisheries within State waters. The court's decision correctly characterizes the "fishery" in question as the salmon fishery within the exempted area of Cook Inlet—the salmon fishery within the Cook Inlet EEZ area exempted from the FMP and Federal management by Amendment 12. And it was this area—the exempted Cook Inlet EEZ—to which the court was referring when it said that NMFS could not "wriggle out" of managing relative to the remainder of the EEZ that continued under Federal management. The Council's stated purpose for action—to manage the traditional net fishing area that occurs in Federal waters of Cook Inlet—is consistent with addressing the need identified by the Ninth Circuit's decision and the district court's judgment order and is reasonable in its scope. Finally, the court's decision acknowledges several times that MSA Section 302(h)(1) applies to fisheries "under a Council's authority." As explained further in the following paragraphs, fisheries occurring within State waters are not under a Council's authority and may only be regulated by NMFS after a preemption hearing has occurred in accordance with MSA Section 306(b).[40]

The Ninth Circuit determined that Amendment 12's removal of the Cook Inlet EEZ and the salmon fishery within it from the FMP and Federal management violated Section 302(h)(1) of the MSA. The court's decision does not require the Council to consider an alternative that extends the FMP and Federal management to State waters and salmon fisheries within State waters. Similarly, in vacating Amendment 14, the District of Alaska found that it was impermissible for NMFS to exclude from the FMP the recreational fishery that occurs in the Cook Inlet EEZ, and that closing the EEZ to commercial salmon fishing implicitly deferred management authority to the State of Alaska to achieve the goals of the FMP. There, the court explicitly cabined its opinion to NMFS's obligation to manage salmon fishing in Federal waters.[41] The Council's stated purpose and need for action is consistent with these court decisions and the Council has not impermissibly narrowed the scope of the action relative to either court decision. Because this provision of the Committee's recommendation is outside the scope of the action, it is not a reasonable alternative and is not carried forward for analysis.

Third, expanding Federal management to State waters and State internal waters of Cook Inlet through FMP amendment is not a reasonable alternative because it is not authorized under the MSA. The MSA authorizes NMFS to manage State fisheries in State waters through preemption in accordance with MSA Section 306(b). And as explained above, Federal preemption of State management authority over State salmon fisheries occurring within State waters is not the purpose of, or need for, this action.

MSA Sections 101(a) and (b)(1), 302(a)(1)(G), and 306(a) establish geographic boundaries on the Council's and NMFS's authority to conserve and manage fisheries, including fisheries for anadromous

[40] 16 U.S.C. § 1856(b).

[41] *See UCIDA v. NMFS*, No. 3:21-cv-00255-JMK at *18 n. 87 (D. Alaska June 21, 2022) ("The Court does not address NMFS's authority, if any, to manage state waters because it is not pertinent to its decision. The Court cabins its analysis to the federal waters of the Cook Inlet.").

species like salmon.[42] MSA Section 302(h)(1) requires councils to prepare an FMP for (1) a fishery (2) under its authority that (3) requires conservation and management.

The MSA defines "fishery" at Section 3(13)[43] as "(A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and (B) any fishing for such stocks." This is a broad definition, and it can be used to reference all different kinds of stocks of fish on various characteristics. Some have argued that salmon's unique life history and the MSA definition of "fishery" require the Council and NMFS to manage the salmon fishery in Cook Inlet as a single fishery that includes all waters (EEZ, State marine, and State internal waters) and all types of fishing for salmon (i.e., commercial, recreational, subsistence). These stakeholders have argued that there are not two separate salmon fisheries (a Federal fishery and a State fishery) but only one salmon fishery and that the MSA requires the Council to develop an FMP for that fishery. While the statutory definition of "fishery" is broad, nothing within the definition supports an interpretation that it overrides several other provisions of the MSA that clearly State the Council and NMFS have authority to manage fishery resources within the EEZ and cannot manage fisheries within State waters or State internal waters unless NMFS successfully preempts State management in accordance with MSA Section 306(b). The term "fishery" is descriptive and does not bestow or restrict authority. The Council and NMFS have used it to refer to fisheries occurring within State waters, such as the State Pacific cod Guideline Harvest Level fisheries or the State's parallel groundfish fisheries. The Council and NMFS have also used it too broadly, or precisely, describe Federal fisheries. For example, the "GOA groundfish fishery" refers to commercial fishing for any and all groundfish species in the GOA EEZ that are managed by the GOA Groundfish FMP, whereas the "GOA Pacific cod fishery" refers to all commercial fishing for a specific groundfish species in the EEZ. And to get even more precise, the "GOA Pacific cod hook-and-line fishery" refers to commercial fishing for GOA Pacific cod with hook-and-line gear in the EEZ. While the term "fishery" may be used to refer to any fishing for a stock or stocks of fish on the basis of geographical, scientific, technical, recreational, and economic characteristics, nothing within the definition extends or diminishes the Council's and NMFS's authority as established in other provisions of the MSA. Most, and possibly all, species of fish managed by the Council and NMFS in the EEZ off Alaska can be found in both Federal and State waters and a Federal fishery/State fishery distinction is made routinely. Except for preemption, nothing in the MSA permits the Council and NMFS to erase the 3-nm boundary between State waters and the EEZ just because a species of fish exists in both and there are fisheries for that species of fish in both the EEZ and State waters.

As this analysis demonstrates, the Council and NMFS must consider and analyze the effects of State management of salmon fisheries within State waters in order to develop SDC, ACLs, delegation of management of salmon fishery within the EEZ to the State. This examination and analysis is necessary in order to sustainably manage salmon fishery within the EEZ under the FMP (under either delegated or direct Federal management). The Council and NMFS are not ignoring the impacts and effects of the State's management of salmon fisheries on the stocks of salmon managed by the FMP. While the MSA requires the Council and NMFS to consider the impacts of State fisheries and to account for those impacts when establishing SDC and harvest limits for the EEZ fishery, it does not authorize the Council and NMFS to manage those State fisheries simply because there are State and Federal fisheries for the same stock of fish.

Furthermore, the MSA does not authorize a Council or NMFS to manage fisheries occurring in the waters of a State simply by amending the scope of an FMP to include State waters and the fisheries occurring within them. In Alaska, NMFS can manage fisheries occurring from zero to 3 nautical miles from the

[42] For more explanation, see the legal memorandum dated March 29, 2018, from the NOAA Office of General Counsel, Alaska Section, to the Council in Appendix 10.

[43] 16 U.S.C. § 1802(13).

coastline of Alaska if NMFS successfully preempts State management in accordance with Section 306(b). Section 306(b) does not authorize NMFS to preempt State management of fisheries occurring within the State's internal waters.

Finally, there is no analytical or administrative benefit that would come from examining this provision of Alternative 2B: expanded scope. This analysis examines many aspects of State management of salmon fisheries and the impacts of that management on salmon fisheries, which will help inform the Council in its choice of a preferred alternative. At times, the Council has examined alternatives that were not authorized by the MSA when there was a request by Congress to do so or an indication that changes might be made to the MSA to accommodate the currently unauthorized alternative.[44] There is no indication at this time that the MSA will be amended to allow the Council and NMFS to extend Federal management authority into State waters and to manage State water salmon fisheries absent preemption.

Management Policy and Objectives

The Alternative 2B: Expanded Scope proposes changes to the five FMP objectives in Alternative 2. The overall effect of these changes would be to extend the Federal jurisdiction to manage fisheries that occur in State waters, including other commercial salmon fishing, recreational fishing, subsistence fishing, and personal use fishing. Also, the recommended changes would adversely impact the salmon fishery in the East area by either removing or modifying objectives for the East Area. The proposed changes to Objective 3 - minimize bycatch and bycatch mortality, would greatly constrain the recreational fishing, subsistence fishing, and personal use fishing beyond the current State management of these fisheries.

The Alternative 2B: Expanded Scope would also add Objective 7 - Identify and Protect Salmon Habitat. The objective as recommended by the committee would put requirements on the Council that are outside of the Council's scope of authority under the MSA. Specifically, the Council does not have the authority to assume an aggressive role in the protection and enhancement of EFH. The Council has designated EFH in State waters and streams designated in the Anadromous Waters Catalog. And, under the MSA, the Council is involved in consultations on Federal actions that may adversely impact EFH and can make EFH conservation recommendations. The MSA does not extend the Council or NMFS's authority to require EFH conservation recommendation or stop development projects to ensure no net loss of habitat.

Objective 7 would also require the Council to form a salmon habitat workgroup. There are a number of Federal and State working groups that address fish habitat in Cook Inlet, including the Kenai Peninsula Fish Habitat Partnership (see https://www.kenaifishpartnership.org/) and the Matanuska Susitna Basin Salmon Habitat Partnership (see http://www.matsusalmon.org/). The Committee did not provide additional information on why an additional habitat workgroup was necessary under the FMP or what unique role a Council workgroup would fulfil at this time.

Other Council FMP's have a habitat objective and so NMFS added a new habitat objective to the objectives in Alternative 2 for Council consideration. This habitat objective is similar to the habitat objectives in other Council FMPs and appropriate to the Council's jurisdiction and consistent with the EFH requirements in the MSA.

Procedures for FMP Implementation

The Alternative 2B: Expanded Scope recommendations for these sections include expanding the FMP into State waters and expanding FMP management to all salmon fisheries. However, this Alternative did not provide any recommended management measures for these other fisheries. Since State waters and the

[44] The Crab Rationalization Program is an example of this. At the time the Council was developing alternatives, it also examined an alternative that would provide for processor quota share and arbitration, both of which were not authorized by the MSA but were aspects Congress asked the Council to consider.

salmon fisheries that occur there are outside the jurisdiction of the Council, these recommendations are not carried forward in the analysis.

The Alternative 2B: Expanded Scope would add escapement goals as a Category 1 Federal management measure and have a Salmon Technical Team set escapement goals. This is outside the scope for a number of reasons. The State has established escapement goals for Cook Inlet salmon and has the expertise, experience, and the data to set escapement goals. There is no reason to create a new Federal escapement goal setting body that would lack the expertise, experience, and data to effectively and efficiently set escapement goals. This Federal body would not have access to the best available scientific information for the management of FMP salmon stocks, resulting in increased uncertainty and therefore more constrained catch limits compared to the status quo. Further, Alternative 2B: Expanded Scope states that the Salmon Technical Team would include a large group of people without experience in the science of setting escapement goals, including stakeholders from fishing groups. This is very different from the Pacific Fishery Management Council's salmon technical team which is comprised of Federal, State, and tribal scientists and managers. In reality, the Pacific Fishery Management Council's salmon technical team is similar to the proposed Salmon Plan Team under Alternative 2.

The Alternative 2B: Expanded Scope would make legal gear a Category 1 Federal management measure only, which would mean that any changes to the gear used would be in Federal regulations and require Federal rulemaking to change. This would be contrary to the aim of Alternative 2 which is to delegate appropriate management measures to the State because they have the expertise and experience to make these management decisions. The Committee did not identify why legal gear should only be a Category 1 management measure. Under Alternative 2, legal gear is both a Category 1 and Category 2 management measure because Federal regulations are necessary to authorize the use of drift gillnets in Federal waters, however, the detailed regulations on gear specification would remain in State regulations. Additionally, legal gear is a Federal management measure under Alternative 3.

Annual Process for Determining the Status of the Stocks

The Alternative 2B: Expanded Scope would add that the Salmon Plan Team would make recommendations on State water fisheries. This is outside of the scope of Federal management under the FMP. Additionally, the Committee recommended a Salmon Technical Team to set escapement goals, as discussed above, and review requests for Federal review of State salmon management decisions in Cook Inlet. It is not clear that there is a need for an additional layer of new decision-making body for either escapement goals or to resolve if State management actions are in conflict with the MSA, FMP, or other applicable Federal law. And, since the proposed Salmon Technical Team would be a large body, it would not be an efficient way to make timely decisions.

Federal Oversight and Review Process for State management of all salmon fisheries

Chapter 9 of the FMP currently sets forth a process for Council and NMFS oversight and review of State management measures implemented by the State under its delegated authority and applicable to the EEZ. This process is intended to ensure that the State's exercise of its delegated authority is consistent with the provisions of the FMP, the MSA, and other applicable law.

For the most part, the Alternative 2B: Expanded Scope would continue the process set forth in Chapter 9. However, it would make three major modifications to the current process.[45] The first modification would

[45] According to section 2.4.9 of the Alternative 2B: expanded scope recommendation attached to the May 26, 2020, Committee Report, the Committee's recommendation would also remove existing FMP language that States that the Federal review process does not prevent a person from seeking judicial review of a State management measure and that initiation of State judicial review is not required before petitioning NMFS to conduct a consistency review. It is not

expand the State management measures that would be subject to Federal review and oversight under Chapter 9. This modification would be consistent with the intent of Alternative 2B: expanded scope to have the FMP manage all salmon fisheries in both Federal and State waters of Cook Inlet and delegate most of the day-to-day management of those salmon fisheries to the State of Alaska. Under this modification, all State management measures implemented by the State under its delegated authority and applicable to all commercial and non-commercial salmon fisheries that occur in both Federal and State waters of Cook Inlet would be subject to Federal oversight and review under Chapter 9 of the FMP.

The second modification would allow the submission of petitions that challenge the State's salmon management policy choices. Chapter 9 currently states that petitions for Federal review must claim that the State management measure to be reviewed is inconsistent with some provision of the FMP, the MSA, or other applicable Federal law. Alternative 2B: expanded scope would continue this type of consistency review, but would also permit the submission of petitions that object to the policy choice made by the BOF or the State of Alaska, or that claim an alternative management measure would be more acceptable to the petitioner than the measure adopted by the BOF or the State.[46] Under this modification, the Federal review process could have NMFS deciding between two or more State fishery management policy choices, all of which may be consistent with the FMP, the MSA, and other applicable law.

The third modification would remove the requirement that a person exhaust available administrative procedures with the State of Alaska prior to submitting a petition to NMFS for Federal review. Removal of this requirement would allow petitioners to submit a petition for Federal review directly to NMFS without first attempting to get the State to change the challenged management measure.

The proposed action is to reincorporate into the FMP the geographic portion of the EEZ adjacent to Cook Inlet that was removed from the FMP by Amendment 12 and to federally manage the commercial salmon fishery that occurs within that portion of the EEZ under the FMP. Both Alternative 2 and Alternative 3 would assert Federal management over the Cook Inlet EEZ and the commercial salmon fishery that occurs within it (e.g., the drift gillnet fishery). Because Alternative 2 would delegate to the State of Alaska the authority to manage certain aspects of the drift gillnet commercial salmon fishery occurring in the EEZ, Alternative 2 requires Federal review and oversight of the State's management measures to ensure the State is managing the commercial salmon fisheries occurring in the EEZ consistent with the provisions of the FMP, the MSA and other applicable Federal law. As explained above, the provision of Alternative 2B: expanded scope that would have the FMP managing all salmon fisheries in all waters of Cook Inlet is not a reasonable alternative and is not carried forward for additional analysis. Because the first modification is derived from, and directly tied to, the scope of the Committee's Alternative 2B: expanded scope, it is also unreasonable and is not carried forward for additional analysis.

The second modification that would allow the submission of petitions that challenge the State's salmon management policy choices is not carried forward for additional analysis because it is in tension with, and undermines, the concept of delegation and an alternative that delegates management authority to the State

clear why this language is recommended to be removed, but since the stricken language is acknowledging that a person may seek State judicial review in addition to Federal review and does not need to initiate State judicial review prior to filing a petition, its removal does not change the availability of State judicial review or modify the current process.

[46] This seems to be the best reading of the Alternative 2B: expanded scope recommendation. According to section 2.4.9 of the Alternative 2B: expanded scope recommendation attached to the May 26, 2020, Committee Report, the Committee's recommendation would remove existing FMP language that prohibits petitions that "merely object to a State management measure or argue that an alternative measure would provide for better management of the salmon fishery." However, the Committee recommendation did not modify other existing language that requires a petition to identify and describe the inconsistency of the challenged State management measure with the FMP, the MSA, or other applicable Federal law. It is reasonable to conclude that the Committee recommendation is to continue petitions that challenge the consistency of a State management measure with the FMP, the MSA, or other applicable Federal law and to add the ability to petition NMFS to review State management policy choices.

of Alaska. Alternatives 2 and 3 capture the Council's broad range of management choices—federally manage the commercial salmon fishery occurring within the Cook Inlet EEZ through direct Federal management and no delegation of any management authority to the State of Alaska (Alternative 3) or federally manage the commercial salmon fishery within the Cook Inlet EEZ through a mix of direct Federal management for some management measures and delegation of management authority to the State of Alaska for other management measures (Alternative 2). Inherent within the concept of delegation under the MSA is the ability of the State to make management policy choices under its delegated authority. The MSA requires management decisions by the State to be consistent with the provisions of the FMP, the MSA, and other applicable Federal law, but allows the State to exercise its delegated authority and choose among those policy options that are consistent with the FMP, the MSA, and other applicable Federal law. If the Council wants to retain its ability to choose among various salmon management policy choices, then it could: 1) select Alternative 3 (full Federal management with no delegation); 2) retain Federal control over those management measures for which the Council wants to set management policy and not delegate those to the State; or 3) develop criteria for a delegated management measure that control the State's exercise of its authority for that management measure. If the Council selects Alternative 2 as its preferred alternative, the Council will be authorizing the State to implement its management policy choices for the commercial salmon fishery in the EEZ as long as those choices are consistent with the FMP, the MSA, and other applicable Federal law. Allowing the Council and NMFS to review and possibly overturn the State's federally consistent policy decisions contradicts and undermines the concept of delegation. If the Council becomes concerned with the State's policy choices, even when those choices are consistent with the FMP, the MSA, and other applicable law, the Council has the authority to amend the FMP to narrow the delegated authority or to withdraw the delegation.

Finally, the Council may wish to consider adding an option to remove the requirement that a person exhaust available administrative procedures with the State of Alaska prior to submitting a petition for Federal review. The MSA does not require a person to exhaust their remedies with a State, however, this is a provision in all Council FMPs that delegate management to the State. Staff did not create an option because the exhaustion provision is in the best interest of the fishery participants because it allows for quick resolution and changes to measures that are inconsistent with the FMP, MSA, or applicable Federal law. Submitting a petition to NMFS for review is a lengthy process and any potential resolution through Federal rulemaking may take years.

Habitat and Ecosystem Issues

Aggressively pursuing Northern pike eradication in lakes is outside the Council's scope, however, this analysis provides information on the State and Federal actions being taken to control Northern pike in the Cook Inlet region. Additionally, this analysis also provides consideration of threats to salmon habitat in Cook Inlet. These sections are in the cumulative impacts analysis in Section 3.6.

3. Environmental Assessment

This draft Environmental Assessment (EA) analyzes the impacts of the proposed action to revise the Salmon FMP and the alternative management approaches considered. This EA is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the 2020 CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. This review began on or before September 9, 2020, and the agency has decided to proceed under the 1978 regulations.

The environmental impacts of the *Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska* (FMP) were first analyzed in an Environmental Impact Statement (EIS) (NPFMC 1978). The EIS analyzed the impacts of alternatives to allow an unrestricted fishery, greatly restrict the fishery, or hold the fishery at its present level. The 1978 FMP maintained the fisheries in the EEZ at their then present level (i.e., no change in fishing with the introduction of the Federal FMP). The EIS concluded:

> A primary objective of the action is to prevent overfishing and conserve the resource, the overall impact of the fishery management plan on the environment will generally be beneficial. Monitoring the plan will allow adjustments in applying the management concepts outlines in the plan. These concepts are designed to help minimize fluctuations in fish stock numbers due to catch efforts and to integrate management of ocean salmon with those of other salmon fisheries. This will exert a stabilizing influence in the ecosystem by preventing biological depletion of fish populations.

The environmental impacts of the 1990 version of the FMP were first analyzed in an EA (NPFMC 1990a). The EA concluded:

> The proposed amendment will have no significant impacts on the human environment. The proposed changes are primarily of style and structure of the fishery management plan, rather than with the way the fisheries are actually managed. The parts of the draft amendment that deal with management of the fisheries (e.g., deferring[47] regulatory authority to the State of Alaska, for vessels registered under Alaska law) will, by themselves, have little, if any effect of the human environment.

In 1997, NMFS and ADF&G prepared an EA for the salmon fisheries in the EEZ and State waters off Alaska that evaluated the deferral of regulation and management to the State (NMFS 1997). The EA concluded that the impacts on the target species by the current salmon fishery in southeast Alaska, due to a fishery policy of optimal sustainable yield, are such that produce optimum production of the stocks and healthy escapement levels. Moreover, management over the past several decades (since Statehood) has resulted in healthy salmon stocks for all species.

In 2003, NMFS prepared the Final Programmatic Environmental Impact Statement for the Pacific Salmon Fisheries Management off the Coasts of Southeast Alaska, Washington, Oregon, and California, and in the Columbia River Basin (FPEIS, NMFS 2003). The primary Federal action considered in the FPEIS for the Southeast Alaska salmon fishery was the annual decision regarding continued deferral of management

[47] The 1990 version of the FMP delegated management of the East Area salmon fisheries to the State of Alaska with Federal oversight, but used the term “defer,” rather than “delegate,” when referencing the delegation. Amendment 12 updated the FMP to be more precise in its description so that the current version of the FMP uses the term “delegate” when referencing the delegation of management authority of the East Area salmon fisheries to the State. At the time of Amendment 12, a new meaning for the term “defer” developed. The Council and NMFS currently use the term “defer” when there is no Federal management of a fishery occurring in the EEZ but the State has regulations that manage State-registered vessels that may be fishing in the EEZ. In such a case, the Council and NMFS have deferred management of the fishery to the State.

to the State and the issuance of an incidental take statement through the Endangered Species Act Section 7 consultation process. The FPEIS details the short-term, long-term, and cumulative effects of the Federal action on salmon fisheries and harvests, ESA-listed salmon, non-salmon fish species, ESA-listed and unlisted marine mammals, ESA-listed and unlisted seabirds. The FPEIS also evaluates effects on the human environment, including angler benefits (i.e., net willingness to pay for ocean salmon fishing), net income (profit) to businesses that are directly affected by angler activity, net income to commercial fishers, and social effects on the coastal and riverine communities of commercial and sport fisheries affected by the Federal action.

In 2012, NMFS prepared an EA for the salmon fisheries in the EEZ off Alaska that evaluated alternatives for defining the scope of the FMP and determining where Federal conservation and management is required, and options for the specific management provisions in the FMP that apply to the fisheries managed under the FMP. The proposed action was not found to substantially change salmon management under the FMP in a way that would change the prosecution of the fisheries. Therefore, the analysis concluded that Alternatives 1, 2, and 3 would have an insignificant impact on Alaska salmon stocks, Pacific salmon stocks listed under the Endangered Species Act, marine mammals, seabirds, and essential fish habitat. The analysis concluded that Alternative 4, which would remove the majority of EEZ waters from the FMP, could impact salmon abundance and other resources, such as marine mammals, if unregulated fishing occurred in EEZ waters. However, since it was not possible to estimate the potential for or extent of unregulated fishing, or the nature of the impacts of that fishing, the impacts of Alternative 4 were considered unknown.

The proposed action analyzed in this EA concerns the application of Federal management in addition to, or in place of, the existing State management for the commercial salmon or recreational salmon fisheries that occur in the Cook Inlet EEZ. Alternative 1, the no action alternative, would not include the Cook Inlet EEZ in the Salmon FMP and would therefore maintain all existing conditions in the fisheries. Alternative 2 would include the Cook Inlet EEZ in the FMP and delegate management of the salmon fishery occurring within the Cook Inlet EEZ to the State of Alaska. This is not expected to significantly change the State’s management of salmon fisheries in a way that would result in impacts to the environment that are significantly different from the status quo/no action. Alternative 3 would institute Federal management of Cook Inlet EEZ waters in the FMP, which could result in changes to the spatial and temporal distribution of commercial salmon harvest in Cook Inlet. Alternative 4 would institute Federal management by closing the Cook Inlet EEZ to commercial salmon fishing, which would result in all commercial salmon fishing in Cook Inlet occurring in State waters. Under both Alternatives 3 and 4, it is expected that salmon harvests in the Cook Inlet EEZ may be reduced. However, harvests in the State waters of Cook Inlet by all salmon users would be expected to increase and offset some reductions in overall Cook Inlet salmon harvest as a result of an EEZ closure. The proposed actions are not expected to change salmon management in a way that would result in significant environmental impacts. Including the Cook Inlet EEZ in the FMP would require NMFS to conduct ESA § 7 consultations on salmon fishing activities in the EEZ. These potential impacts are discussed in this chapter.

The best available information on the status of the salmon stocks in Cook Inlet, and interactions between the EEZ and State waters salmon fisheries and ESA-listed Pacific salmon, marine mammals, seabirds, and habitat are provided in the following sections. This EA analyzes the impacts of the alternatives on these resource components.

3.1. Alaska Salmon Stocks

Alaska salmon fisheries are complex and target mixed stocks of five Pacific salmon species (Chinook, pink, sockeye, chum, and coho), with many divergent users. It is difficult to achieve MSY for each salmon stock and species present in these mixed stock, mixed species fisheries because the composition, abundance, and productivity of salmon stocks and species in these fisheries varies substantially on an annual basis. One of the primary tools used by the State to conserve and maximize yield of Alaska salmon stocks is the escapement goal, where escapement is defined as the annual estimated spawning stock. A comprehensive description of the scientific methods and principles underlying State of Alaska salmon management can be found in Appendix 12. The need to conserve weaker stocks by reducing fishing effort sometimes results in foregone yield from more productive stocks. This can result in escapement goals being exceeded, which is sometimes referred to as overescapement. The potential for overescapement to reduce future yields through density dependent processes, referred to as overcompensation, is considered by ADF&G (Clark et al. 2007, McKinley et al. 2020) and has been evaluated for important salmon stocks in Cook Inlet in Appendix 14.

Abundance data

The State establishes salmon stock escapement goals, which provide benchmarks for assessing stock performance (Munro and Volk 2017, Munro 2021, Munro 2022). In 2018, the State had 287 established and monitored escapement goals (Munro 2019). The State of Alaska publishes an annual report of all current escapement goals for salmon stocks in Alaska.[48] Table 3-2 and Table 3-3 provide an overview of salmon stocks in Upper Cook Inlet for which escapement goals exist. This includes a numerical description of the goal, type of goal, year the goal was first implemented, and recent years' escapement data for each stock. In addition, summary statistics documenting performance in achieving goals are presented in Table 3-3. Escapement data are collected by aerial and on-the-ground surveys, and through weir and sonar counts. Depending on the method of observation, the annual escapement estimate may represent an absolute or relative index of spawning abundance. For sockeye and Chinook, run-specific escapement estimates are available for many rivers, providing data for estimating stock-specific reference points. Coho and chum escapement estimates are available for only four and one rivers, respectively, and are not all suitable to be used as indicator stocks.

Stock-specific exploitation data

Stock, or even stock complex-based, exploitation rates require the ability to partition catches to the stock or stock complex to which they belong. Genetic analysis is one of the most prevalent methods for stock identification, and genetic stock identification (GSI) baselines exist for Chinook and sockeye in Cook Inlet. Commercial catches of Chinook and sockeye are sampled throughout the season by ADF&G and GSI data are available for specific locations and gear types, enabling the post-season allocation of harvests and harvest impacts to specific stocks. GSI data are not yet available for coho, chum, or pink salmon stocks in Cook Inlet, preventing run or stock specific harvest allocations of these species.

GSI data are a key source of information for reconstruction of stock-specific annual run sizes, informing the correct apportionment of mixed-stock catches and allocation to stock of origin. While age-only reconstruction methods are available (see Bernard 1983 and Branch and Hilborn 2010), using both age and genetic composition data to inform run reconstruction is preferred (Cunningham et al. 2017). In the absence of accurately reconstructed annual run sizes for stocks or stock complexes, observed fishing mortality rates (F_t) and necessary reference points (F_{MSY}, F_{ABC}, F_{OFL}) cannot be calculated for the UCI system and species level proxies would be necessary.

Sufficiency of Sustainable Escapement Goals as Proxies for S_{MSY}

State management of salmon fisheries within the Cook Inlet region by ADF&G is based on inseason adjustment of fishing effort by emergency order (EO) and time-area closures to achieve fixed escapement goals or abundance levels on the spawning grounds. Both the type of escapement target and method used to estimate abundance vary by species and location. Three types of escapement goals are currently

[48] http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

implemented for UCI stocks, biological escapement goals (BEG), sustainable escapement goals (SEG), and optimal escapement goals (OEG).

A BEG is defined in policy as the escapement level that provides the greatest potential for maximum sustained yield, and usually requires a complete stock-recruitment analysis be conducted to identify the range of escapements that are likely to produce MSY, and therefore requires stock-specific spawning abundance (escapement), catch, and age composition information. ADF&G seeks to maintain evenly distributed salmon escapements within the bounds of a BEG.

An SEG is a level of escapement, as indicated by an absolute level of spawning abundance or alternative index, that has been observed to provide sustained yield over a 5- to 10-year period and is used when data are insufficient to reliably estimate S_{MSY} and a BEG can therefore not be established or managed for effectively. SEGs may be established by the ADF&G as either an “SEG range” or “lower bound SEG” and may be defined based on a Percentile Approach (Clark et al. 2014, 2017), stock-recruitment analysis, habitat capacity, risk analysis or other methods. In the case of the Percentile Approach, the range of observed escapements to a system are ranked, and percentiles of the observed range ascribed to each observation. SEGs are subsequently defined as a function of the distribution of observed escapements, the contrast in past escapement observations, exploitation rate, and the level of relative measurement error.

Both BEGs and SEGs are based on the best available biological information and are scientifically defensible, with escapement ranges intended to account for variation in stock productivity and data uncertainty.

OEGs are management targets established by the BOF that consider other biological or allocative factors and may differ from the SEG or BEG specified for a given stock.

The majority of management targets for UCI salmon stocks are SEGs, evaluated annually based on weir or sonar counts, single aerial surveys or single foot surveys (Table 3-1). Exceptions are BEGs for Kasilof River and Russian River (Early Run) sockeye salmon, and an OEG for Kenai River (Early Run) Chinook salmon and an OEG for Kasilof River sockeye salmon that is implemented under certain circumstances.

Table 3-1 Percentile ranges recommended by Clark et al. (2014, 2017) for defining Sustainable Escapement Goals using the Percentile Approach. Contrast in the escapement data is defined as the maximum observed escapement divided by the minimum observed escapement.

Tier	Contrast	Measurement Error	Exploitation	SEG Range
1	High (>8)	High (aerial and foot surveys)	Low to moderate (<0.40)	20th to 60th Percentile
2	High (>8)	Low (weirs, towers)	Low to moderate (<0.40)	15th to 65th Percentile
3	Low (<=8)		Low to moderate (<0.40)	5th to 65th Percentile

The State does not have the necessary resources to monitor returns of salmon to each drainage in Upper Cook Inlet. Therefore, the State does not have the information necessary to set escapement goals for many of the salmon runs, nor is there a need for an escapement goal for each tributary or drainage for purposes of sustainable salmon management. The State has identified the most important species and stocks in each area and directs resources to monitoring returns to these key drainages. Even though the State does not directly monitor some stocks of sockeye, Chinook, pink, chum, and coho salmon; aerial surveys, test fisheries, and commercial harvest provide indicators of relative abundance. In the absence of specific stock information, the State manages these stocks conservatively following the precautionary principle and based on information collected from adjacent indicator stocks (stocks that can be assessed that are assumed to represent nearby stocks) and the performance of salmon fisheries (Appendix 12).

3.1.1. Impacts of Alternative 1 on Salmon Stocks

Under Alternative 1, the EEZ waters of Cook Inlet would continue to be excluded from the FMP, which would result in a continued deferment of management to the State of Alaska. No changes to the management of salmon or levels of salmon removals would be expected as a result.

The majority of escapement goals in Upper Cook Inlet are SEGs, including lower-bound SEGs. OEGs and BEGs collectively represent a small proportion of escapement goals in Cook Inlet. SEGs and BEGs are set by ADF&G to maximize return per spawner, while OEGs are set by the BOF and may not represent a spawning escapement that maximizes return per spawner. Escapement goals are typically evaluated on a triennial basis.

Between 2013 and 2021, an average of approximately 66% of stocks in Cook Inlet with escapement data achieved at least the lower bound of their escapement goals (See Table 3-3).

Where escapements for a given stock are chronically below established goal ranges or lower bounds, a stock of concern designation may be recommended to the BOF by ADF&G at one of three levels of increasing concern: yield, management, and conservation. Stocks of concern and the conditions which may trigger their adoption by the BOF are narrowly defined in the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222). Three categories of concern exist:

- yield concern – stocks that fail to produce expected yields or harvestable surpluses;
- management concern – stocks that fail to meet established escapement goals; or
- conservation concern – stocks with chronic inability to maintain escapements above a threshold level such that the ability of the stock to sustain itself is jeopardized.

Stocks may be designated as a management concern if the stock fails to meet the escapement goal over a period of 4 to 5 years despite appropriate management taken to address the concern.

When stocks of concern are identified, ADF&G works with the BOF and public to develop action plans describing potential management actions and research programs to achieve stock re-building goals. Action plans for management may involve time and area restrictions for commercial fisheries judged to have significant impacts on the stock of concern, as well as sport fishery restrictions including bag limit changes, prohibiting use of bait or retention of a species, or closures of the fisheries. Subsistence fishing restrictions may also be considered in action plans.

Currently, stocks of concern in Cook Inlet are as follows:

- Chuitna and Theodore rivers – Chinook stocks of management concern, designation adopted 2010/11
- Alexander Creek – Chinook stock of management concern, designation adopted 2010/11
- Eastside Susitna River – Chinook stock of management concern, designation adopted 2019/20.

In addition to measures affecting commercial and sport fishery management, stock of concern action plans also identify key research objectives designed to provide information necessary to make informed decisions. For Westside Cook Inlet Chinook stocks of management concern in the Chuitna and Theodore Rivers, ADF&G will continue to build appropriate genetic baselines in Cook Inlet which will assist in specifically identifying these stocks in mixed fisheries. The current baseline has sufficient discriminatory power to allow genetic mixed stock analysis of at least five Chinook salmon stock groups within Cook Inlet (Barclay et al. 2015) and sampling and analysis of marine Chinook salmon harvests were instituted in 2013. Aerial survey programs will continue monitoring escapements for these stocks, and installation of weirs from 2012–2014 on the Theodore River improved assessment of escapements and provided a platform for collection of reliable age, sex and size information. Continued monitoring of salmon escapements against established goals allows ADF&G, the BOF, and the public to gauge the success of these actions and modify action plans accordingly.

The impacts of Alternative 1 are shown in Table 3-3, which provides an overview of salmon stocks in Upper Cook Inlet for which escapement goals exist, a numerical description of the goal, type of goal, year the current goal was first implemented, and recent years' escapement data for each stock. In Table 3-3, escapements from 2013 through 2021 were compared against escapement goals in place at the time of enumeration to assess outcomes in achieving goals. Escapements for a particular stock were classified as "below" if escapement for a given year was less than the lower bound of the escapement goal range. If escapement fell within the escapement goal range or was greater than a lower-bound goal, escapements were classified as "met." Where escapements exceeded the upper bound of an escapement goal range (if an upper bound was defined), they were classified as "above." Where escapement goals or enumeration methods changed for a stock between 2013 and 2021, outcomes were assessed by comparing escapement estimates with the goal and methods in place at the time of the fishery. In addition, summary statistics documenting performance in achieving goals are presented in Table 3-3. The State would continue to use these escapement goals and update them based on new information available through their escapement goal review process. The stock of concern system would continue to be used to identify potential yield, conservation, or management concerns and take appropriate action in response. These conditions would be maintained under Alternative 1 and do not result in a significant impact on Cook Inlet salmon stocks.

Table 3-2 Upper Cook Inlet Chinook, chum, coho, pink, and sockeye salmon escapement goals and escapements, 2013–2021. SEG is Sustainable Escapement Goal, BEG is Biological Escapement Goal, and OEG is Optimal Escapement Goal.

	2021 Goal Range			Initial	Escapement								
System	**Lower**	**Upper**	**Type**	**Year**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
CHINOOK SALMON													
Alexander Creek	1,900	3,700	SEG	2020	588	911	1,117	754	170	296	1,297	596	288
Campbell Creek	380		LB SEG	2011	NS	274	654	544	475	287	393	154	339[a]
Chuitna River	1,000	1,500	SEG	2020	1,690	1,398	1,965	1,372	235	939	2,115	869	806
Chulitna River	1,200	2,900	SEG	2020	1,262	1,011	3,137	1,151	NC	1,125	2,765	845	1,535
Clear (Chunilna) Creek	eliminated			2020	1,471	1,390	1,205	NS	780	940	1,511		
Crooked Creek	700	1,400	SEG	2020	1,103	1,411	1,459	1,747	911	714	1,444	830	594
Deshka River	eliminated			2020	18,531	16,335	24,316	22,874	11,383	8,548	9,705		
Deshka River	9,000	18,000	BEG	2020								10,638	18,674
Eastside Susitna River	13,000	25,000	SEG	2020								13,815[b]	15,208[b]
Goose Creek	eliminated			2020	62	232	NC	NC	148	90	NC		
Kenai River - Early Run (all fish)	eliminated[c]			2017	2,148	5,311	6,190	9,177					
Kenai River - Early Run (large fish)	3,900	6,600	OEG	2017					6,725	2,909	4,128	2,439	4,036
	2,800	5,600	SEG	2017									
Kenai River - Late Run (all fish)	eliminated			2017	15,395	16,263	22,626	18,790					
Kenai River - Late Run (large fish)	15,000	30,000	OEG	2020								11,909	12,147
	13,500	27,000	SEG	2017					20,615	17,289	11,638		
Lake Creek	eliminated			2020	3,655	3,506	4,686	3,588	1,601	1,767	2,692		
Lewis River	eliminated			2020	61	61	5[d]	0	0[d]	0	0		
Little Susitna River (Aerial)[e]	700	1,500	SEG	2020	1,651	1,759	1,507	1,622	1,192	530	NC	558	889
Little Susitna River (Weir)	2,100	4,300	SEG	2017					2,531	549	3,666	2,445	3,121
Little Willow Creek	eliminated			2020	858	684	788	675	840	280	631		
Montana Creek	eliminated			2020	1,304	953	1,416	692	603	473	789		
Peters Creek	eliminated			2020	1,643	1,443	1,514	1,122	307	1,674	1,209		
Prairie Creek	eliminated			2020	3,304	2,812	3,290	1,853	1,930	1,194	2,371		
Sheep Creek	eliminated			2020	NC	262	NC	NC	NC	334	NC		
Talachulitna River	eliminated			2020	2,285	2,256	2,582	4,295	1,087	1,483	3,225		
Talkeetna River	9,000	17,500	SEG	2020								7,279[b]	9,107[b]
Theodore River	500	1,000	SEG	2020	476	312	426	68	21	18	201	111	38
Willow Creek	eliminated			2020	1,752	1,335	2,046	1,814	1,329	411	897		
Yentna River	16,000	22,000	OEG	2020								14,850[b]	18,890[b]
	13,000	22,000	SEG	2020									
CHUM SALMON													

	2021 Goal Range			Initial	Escapement								
System	**Lower**	**Upper**	**Type**	**Year**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Clearwater Creek	3,500	8,000	SEG	2017	9,010	3,110	10,790	5,056	7,040	1,800	9,600	3,970	9,440
COHO SALMON													
Upper Cook Inlet													
Deshka River	10,200	24,100	SEG	2017					36,869	13,072	10,445	NA	NA
Fish Creek (Knik)	1,200	6,000	SEG	2020	7,593[a]	10,283	7,912	2,484	8,966	5,022	3,025	4,555	6,462
Jim Creek	250	700	SEG	2020	663	122	571	106	607	758	162	735	1,499
Little Susitna River	9,200	17,700	SEG	2020	13,583	24,211[a]	12,756	10,049	17,781	7,583[a]	4,229[a]	10,765	10,923
PINK SALMON													
Upper Cook Inlet													
There are no pink salmon stocks with escapement goals in Upper Cook Inlet.													
SOCKEYE SALMON													
Upper Cook Inlet													
Crescent River	eliminated			2014	NS								
Fish Creek (Knik)	15,000	45,000	SEG	2017	18,912	43,915	102,309	46,202	61,469	71,180	75,411	64,234	99,324
Kasilof River	140,000	370,000	OEG	2020	489,654	440,192	470,677	239,981	358,724	388,009	374,109	540,872	516,956[b]
	140,000	320,000	BEG	2020									
Kenai River	OEG eliminated			2017	980,208	1,218,342	1,400,047	1,119,988	1,071,064				
	750,000	1,300,000	SEG	2020					NA	886,761	1,457,031	1,505,940	2,223,538[b]
Packers Creek	15,000	30,000	SEG	2008	NA	19,242	28,072	NA	17,164	16,247	7,719[a]	15,903[a]	19,975
Russian River - Early Run	22,000	42,000	BEG	2011	35,776	44,920	50,226	38,739	37,123	44,110	125,942	27,103	49,976
Russian River - Late Run	44,000	85,000	SEG	2020	31,364	52,277	46,223	37,837	45,012	71,052	64,585	78,816	123,950
Chelatna Lake	20,000	45,000	SEG	2017	70,555	26,374	69,897	60,792	26,986	20,434	26,303	NS	NS
Judd Lake	15,000	40,000	SEG	2017	14,088	22,229	47,934	NA	35,731	30,844	44,145	31,219	49,440
Larson Lake	15,000	35,000	SEG	2017	21,821	12,430	23,184	14,333	31,866	23,632	9,699	12,074	21,993

Source: Munro & Brenner 2022
Note: NA = data not available; NC = no count; NS = no survey; LB SEG = lower-bound SEG.
a Incomplete survey or weir count.
b Preliminary data.
c Kenai River early-run Chinook salmon (all fish) SEG was eliminated and OEG was revised by BOF.
d Lewis River mouth naturally obstructed.
e Little Susitna River Chinook salmon aerial survey goal is only used to assess escapement if weir count is not available.

Table 3-3 Summary of Upper Cook Inlet salmon escapements compared against escapement goals for the years 2013–2021.

		2013	2014	2015	2016	2017	2018	2019	2020	2021
Stocks with Escapement Data		31	34	31	27	31	35	33	25	25
Below Lower Goal	Number	8	14	2	9	12	20	12	10	6
	Percent	26%	41%	6%	33%	39%	57%	36%	40%	24%
Goal Met	Number	18	16	23	17	14	12	16	11	9
	Percent	58%	47%	74%	63%	45%	34%	48%	44%	36%
Above Upper Goal	Number	5	4	6	1	5	3	5	4	10
	Percent	16%	12%	19%	4%	16%	9%	15%	16%	40%

Source: Munro & Brenner 2022

3.1.2. Impacts of Alternative 2 on Salmon Stocks

Alternative 2 would establish Federal management of the Cook Inlet EEZ salmon fishery and delegate certain management authorities to the State. The additional Federal management measures and processes are not likely to result in significant changes relative to current State management of salmon stocks under the status quo. However, over time the additional review and Federal resources implemented through the FMP may lead to incremental improvement and refinement of the information available to managers.

The SDC process and ACLs are the aspects of Alternative 2 that would most impact salmon stocks in Cook Inlet. For this analysis, we apply the proposed SDC and ACL processes to the salmon stocks in Cook Inlet. The FMP would establish a tier system for annually determining the status of the salmon stocks in Cook Inlet.

- Tier 1: salmon stocks with escapement goals and stock-specific catches
- Tier 2: salmon stocks managed as a complex, with specific salmon stocks as indicator stocks
- Tier 3: salmon stocks with no reliable estimates of escapement

The following analysis provides a retrospective analysis of how the proposed SDC under Alternative 2 would have been applied to each stock in each tier, to determine the status of that stock from 2003 to 2021. This provides an assessment of whether the addition of required Federal management measures would be expected to constrain, or otherwise modify the previously experienced levels of salmon removals in the Cook Inlet EEZ salmon drift gillnet fishery. This analysis does not explicitly include removals from the recreational fishery for calculation of EEZ reference points, but recreational catch is included in the total catch terms. However, that recreational harvest constitutes an average of less than 0.01% of total EEZ harvest (as shown in Section 4.5.2.1.1 and Appendix 16), and the stock composition of that harvest which is thought to contain a majority of Chinook that do not originate from Cook Inlet stocks (Barclay et al. 2016), the addition of these harvests would not substantively change the results presented here. If implemented, these criteria would also include consideration of the recreational fishery in the Cook Inlet EEZ and be applied using the best available scientific information during the SDC process. In addition to a comparison of historical catches and escapement to the proposed SDC and ACLs, the analysis also evaluates how the proposed SDC relate to the State of Alaska's and BOF determination of stock of concern designation for salmon stocks. The stock of concern designation is described in Section 3.1.1.

During each management cycle, the best available information would be used to assign stocks to each tier through the scientific review process. It is recognized that at present, sufficient data are not available to develop SDC and ACLs for all salmon stocks within Cook Inlet. Table 3-4 provides an illustration of the stocks that would fit in each tier given the current level of information for each stock. ADF&G reviews and updates (if necessary) salmon escapement goals regularly on a three-year cycle. ADF&G is continuously developing and improving the genetic tools used for stock identification, particularly for stocks with direct management needs. For some Tier 2 stocks (e.g., sockeye and coho salmon), the ability to do genetic stock identification exists but might not be practical for several other reasons, such as logistics and costs of obtaining catch samples or costs of analysis. For some species, genetic stock identification at the fine scale is more challenging (e.g., pink salmon), but ADF&G is continually developing and improving genetic baselines and applying the latest genetic techniques to be able to support salmon management needs. The scientific review process and ADF&G managers would incorporate this information as it becomes available to improve stock-specific management.

Table 3-4 Tier levels and proposed Upper Cook Inlet salmon stocks in each Tier, based on the current information available for each stock, under Alternative 2.

Tier	Stock	Description
1	Kenai River sockeye salmon	Stock-specific catches and escapements are annually calculated for this stock and the sustainable escapement goal is currently 750,000 to 1,300,000 fish. Average generation time is 5 years.
	Kasilof River sockeye salmon	Stock-specific catches and escapements are annually calculated for this stock and the biological escapement goal is currently 140,000 to 320,000 fish. Average generation time is 5 years.
	Kenai River late run Chinook salmon	Stock-specific catches and escapements are annually calculated for this stock and the sustainable escapement goal is currently 13,500 to 27,000 large fish. Average generation time is 6 years.
2	Upper Cook Inlet coho salmon	There are no stock-specific catches of coho salmon calculated, but there are sustainable escapement goals for the Deshka and Little Susitna rivers, and Jim and Fish creeks. Stocks regularly assessed with weirs, such as the Deshka and Little Susitna rivers, can be used as stock status indicators. Average generation time is 4 years.
	Other sockeye salmon	Some stock-specific catch information is calculated, but complete escapement enumeration is not available. Stocks with sustainable escapement goals based on weir counts, such as Chelatna, Judd, and Larson lakes; and Fish Creek can be used as stock status indicators. Average generation time is 5 years.
3	Upper Cook Inlet chum salmon	There are no stock-specific catches of chum salmon calculated. While there is one sustainable escapement goal for chum salmon, it cannot be used as a stock status indicator. Average generation time is 4 years.
	Upper Cook Inlet pink salmon	There are no stock-specific catches of pink salmon calculated. There are no escapement goals for pink salmon. Generation time is two years to address odd and even brood lines in a single stock.

Note: For quick reference—

- Biological escapement goal is the number of salmon in a particular stock that ADF&G has determined should be allowed to escape the fishery to spawn to achieve the maximum yield. This determination is based on biological information about the fish stock in question. See 5 AAC 39.222(f)(3) for formal definition.
- Sustainable escapement goal is defined as a level of escapement, indicated by an index or a range of escapement estimates, that is known to have provided for sustained yield over a 5- to 10-year period. A sustainable escapement goal is used in situations where a biological escapement goal cannot be estimated due to the absence of a stock-specific catch estimate. See 5 AAC 39.222(f)(36) for formal definition.

Tier 1: salmon stocks with escapement goals and stock-specific catches

Three salmon stocks would be placed in Tier 1 with the current information available: Kenai River sockeye salmon, Kasilof River sockeye salmon, and Kenai River late run Chinook salmon (see Table 3-4).

Total catches in Upper Cook Inlet, catches in the EEZ portion of Upper Cook Inlet, and escapements of salmon for each stock were used to develop examples of SDC and ACLs for 1999 through 2021. EEZ catch of each salmon stock was estimated based on annual approximations of the percentage of the sockeye and Chinook salmon harvest in the Central District drift gillnet fishery (see Section 4.5.1.2.3 for description of methods). It was assumed for these examples that sport fishery catches of sockeye and Chinook salmon in the EEZ waters of UCI are minimal and not included in the estimate of EEZ catches, although they may be included once SDC are implemented.

Stock-specific harvests of Kenai River and Kasilof River sockeye salmon in the Central District drift gillnet fisheries were taken from estimates provided in Barclay (2020b) using GSI (2005–2019) and Tobias and Willette (2013) using age composition estimates (1999–2004). The estimated number of large Kenai River late-run Chinook salmon harvested in the drift gillnet fishery was taken from Appendix B3 in Fleischman and Reimer (2017) for the years 1999–2015, and provided by Robert Begich, ADF&G (pers. comm.) for 2016–2021. The methods assume 60% of the commercial driftnet harvest is of Kenai-origin fish and uses East Side set gillnet (ESSN) harvest fraction of large fish.

For all Tier 1 stocks, the MFMTs and MSSTs are based on the estimated stock-specific exploitation rates in the EEZ and spawning escapements of salmon for the specific stock. The lower bound of the escapement goal, total catches, catches in the EEZ, and run size accumulated over the average generation time were used to calculate the MFMT relevant to the EEZ.

The preseason ACL would be estimated as the expression of the observed potential yields from the previous T-1 years and the preseason estimate of potential yield in the EEZ based on the preseason forecast of run size.

If implemented, these criteria would be applied annually to each stock using the best available scientific information during the SDC process.

Kenai River sockeye salmon

The following provides a retrospective analysis of how the proposed Tier 1 SDC under Alternative 2 would have been applied to Kenai River sockeye salmon, to determine the status of that stock from 2003 to 2021.

Total catches in Upper Cook Inlet, catches in the EEZ portion of Upper Cook Inlet, and escapements of sockeye salmon in the Kenai River were used to develop SDC and ACLs for 1999 through 2021 (Table 3-5). The MSST for Kenai River sockeye salmon is calculated from one-half of the lower bound of the escapement goal (700,000 sockeye salmon; 750,000 starting in 2020) accumulated over T=5 years. Based on the example, overfishing and overfished status were not observed between 2003 and 2021 although the escapement goal was not met in 2000.

The preseason ACL would be estimated as the expression of the observed potential yields from the previous T-1 years and the preseason estimate of potential yield in the EEZ based on the preseason forecast of run size. For example, the 2021 preseason run forecast for Kenai River sockeye salmon was 2.325 million fish. The preseason potential yield in the EEZ ($\hat{Y}_t$) would have been estimated by applying the recent (2016-2020) average harvest rate in State waters ($\bar{F}_{state}$= 0.54) to the preseason forecast to estimate State water harvest; then subtracting that value (1.088 million) and the lower bound of the escapement goal (750,000) from the preseason forecast (i.e. $\hat{Y}_{EEZ,t}$ = 2.325 - 0.750 - 2.325 × 0.42 = 0.487). The 2021 potential yield in the EEZ (487,000 fish) added to the sum of potential EEZ yields for the previous T-1 years (3.352 million fish; sum of EEZ Yield 2017-2020) results in a preseason ACL of 4.248 million fish. Postseason, the EEZ ACL would be recalculated using the realized run and catch in State waters and result in an ACL of 4.420 million fish for 2021 (Table 3-5).

This retrospective analysis indicated that ACLs would not have been exceeded, overfishing would not have occurred, and no stocks would have been overfished. Escapement goals have consistently been met for the sockeye stocks, so they have not met the State criteria for stock of concern designation.

Table 3-5 Tier 1, Kenai River sockeye salmon catch, estimated catch in the EEZ, escapements, run size, lower bound of escapement goal from 1999-2021 (in thousands) and retrospective estimates of the Status Determination Criteria and Annual Catch Limits from 2003 to 2021 (in thousands).

Year	Total Kenai R. Catch (C_{Total})	Kenai R. EEZ Catch (C_{EEZ})	Escapement (S)	Run (R)	Lower Bound of Goal (G)	Potential Yield (Y_{EEZ})	F_{EEZ}	MFMT	MSST	Cumulative Escapement ($\sum S_t$)	ACL ($\sum Y_{EEZ,t}$)	Cumulative Catch ($\sum C_{EEZ}$)	Overfishing	Overfished	ACL Exceeded
1999	2,035	341	949	2,985	700	590									
2000	1,118	181	**697**	1,815	700	178									
2001	1,451	221	738	2,190	700	259									
2002	2,340	360	1127	3,467	700	786									
2003	3,037	431	1402	4,440	700	1,134	0.103	0.198	1,750	4,913	2,947	1,534	No	No	No
2004	4,015	716	1691	5,705	700	1,707	0.108	0.231	1,750	5,655	4,064	1,909	No	No	No
2005	4,455	857	1654	6,109	700	1,811	0.118	0.260	1,750	6,612	5,697	2,585	No	No	No
2006	957	107	1892	2,849	700	1,299	0.109	0.298	1,750	7,766	6,737	2,471	No	No	No
2007	2,638	774	964	3,602	700	1,038	0.127	0.308	1,750	7,603	6,989	2,886	No	No	No
2008	1,374	220	709	2,082	700	228	0.131	0.299	1,750	6,910	6,084	2,674	No	No	No
2009	1,582	328	848	2,430	700	476	0.134	0.284	1,750	6,067	4,852	2,285	No	No	No
2010	2,558	672	1038	3,596	700	1,011	0.144	0.278	1,750	5,452	4,052	2,100	No	No	No
2011	4,982	1,140	1281	6,263	700	1,721	0.174	0.249	1,750	4,840	4,474	3,134	No	No	No
2012	3,557	1,214	1213	4,770	700	1,727	0.187	0.270	1,750	5,089	5,162	3,573	No	No	No
2013	2,648	683	980	3,628	700	963	0.195	0.285	1,750	5,360	5,897	4,036	No	No	No
2014	2,186	504	1218	3,404	700	1,022	0.194	0.297	1,750	5,731	6,443	4,212	No	No	No
2015	2,419	238	1400	3,819	700	938	0.173	0.291	1,750	6,092	6,371	3,778	No	No	No
2016	2,592	400	1120	3,712	700	820	0.157	0.283	1,750	5,932	5,469	3,038	No	No	No
2017	1,525	202	1071	2,596	700	573	0.118	0.251	1,750	5,790	4,315	2,025	No	No	No
2018	679	97	887	1,566	700	284	0.095	0.241	1,750	5,696	3,637	1,440	No	No	No
2019	2,085	252	1457	3,542	700	1,009	0.078	0.238	1,750	5,935	3,624	1,189	No	No	No
2020	888	50	1506	2,394	750	806	0.073	0.253	1,775	6,041	3,492	1,001	No	No	No
2021	1,751	256	2242	3,992	750	1,747	0.061	0.314	1,800	7,163	4,420	857	No	No	No

Escapements in bold did not meet the lower bound of the escapement goal.
NOTE: Prior to 2011, escapement and escapement goal were based on Bendix sonar assessment; 2011 to present they are based on DIDSON. Escapements and escapement goals in this table are all in DIDSON or DIDSON equivalents.
NOTE: Kenai River sockeye salmon sustainable escapement goal range was revised from 700,000–1,200,000 fish to 750,000–1,300,000 fish starting with the 2020 fishing season.
NOTE: Average generation time (T) is assumed to be 5 years.
Source: Developed by ADF&G fisheries scientists using harvest and escapement data from ADF&G.

Kasilof River sockeye salmon

The following provides a retrospective analysis of how the proposed Tier 1 SDC under Alternative 2 would have been applied to Kasilof River sockeye salmon, to determine the status of that stock from 2003 to 2021.

Total catches in Upper Cook Inlet, catches in the EEZ portion of Upper Cook Inlet, and escapements of sockeye salmon in the Kasilof River were used to develop SDC and ACLs for 1999 through 2021 (Table 3-6). The MSST is calculated from one-half of the lower bound of the escapement goal (160,000 sockeye salmon; updated to 140,000 fish in 2020) accumulated over T=5 years. Based on the example, overfishing and overfished status were not observed between 2003 and 2021 and the escapement goal was met every year.

This retrospective analysis indicated that ACLs would not have been exceeded, overfishing would not have occurred, and no stocks would have been overfished. Escapement goals have consistently been met for the sockeye stocks, so they have not met the State criteria for stock of concern designation.

Table 3-6 Tier 1, Kasilof River sockeye salmon catch, estimated catch in the EEZ, escapements, run size, and lower bound of escapement goal from 1999-2021 (in thousands) and retrospective estimates of the Status Determination Criteria and Annual Catch Limits from 2003 to 2021 (in thousands).

Year	Total Kasilof R. Catch (C_{Total})	Kasilof R. EEZ Catch (C_{EEZ})	Escapement (S)	Run (R)	Lower Bound of Goal (G)	Potential Yield (Y_{EEZ})	F_{EEZ}	MFMT	MSST	Cumulative Escapement ($\sum S_t$)	ACL ($\sum Y_{EEZ,t}$)	Cumulative Catch ($\sum C_{EEZ}$)	Overfishing	Overfished	ACL Exceeded
1999	514	110	312	826	160	263									
2000	267	60	264	531	160	163									
2001	432	81	319	751	160	239									
2002	432	76	236	667	160	152									
2003	509	78	354	862	160	271	0.111	0.299	400	1,484	1,088	404	No	No	No
2004	897	160	524	1,421	160	524	0.107	0.319	400	1,695	1,349	454	No	No	No
2005	867	71	360	1,227	160	271	0.094	0.296	400	1,792	1,457	466	No	No	No
2006	1,490	61	390	1,880	160	291	0.074	0.249	400	1,863	1,509	446	No	No	No
2007	792	193	365	1,157	160	398	0.086	0.268	400	1,992	1,755	563	No	No	No
2008	1,248	160	327	1,575	160	327	0.089	0.249	400	1,966	1,811	646	No	No	No
2009	779	87	326	1,105	160	253	0.082	0.222	400	1,768	1,541	572	No	No	No
2010	523	73	295	819	160	208	0.088	0.226	400	1,703	1,477	574	No	No	No
2011	564	75	246	810	160	161	0.108	0.247	400	1,559	1,347	588	No	No	No
2012	258	65	375	632	160	280	0.093	0.249	400	1,569	1,229	460	No	No	No
2013	513	51	490	1,003	160	381	0.080	0.293	400	1,731	1,282	351	No	No	No
2014	663	74	440	1,103	160	354	0.077	0.317	400	1,845	1,383	338	No	No	No
2015	704	18	471	1,175	160	328	0.060	0.318	400	2,021	1,504	283	No	No	No
2016	241	1	240	481	160	81	0.047	0.324	400	2,015	1,424	209	No	No	No
2017	443	39	359	802	160	238	0.040	0.303	400	1,999	1,382	183	No	No	No
2018	329	30	388	717	160	258	0.038	0.294	400	1,898	1,260	162	No	No	No
2019	240	10	373	613	160	223	0.026	0.298	400	1,831	1,128	98	No	No	No
2020	303	6	542	845	140	408	0.025	0.349	390	1,902	1,208	86	No	No	No
2021	409	21	517	925	140	398	0.027	0.391	380	2,179	1,525	107	No	No	No

Escapements in bold did not meet the lower bound of the escapement goal.
NOTE: Prior to 2011, escapement and escapement goal were based on Bendix sonar assessment; 2011 to present they are based on DIDSON. Escapements and escapement goals in this table are all in DIDSON or DIDSON equivalents.
NOTE: Kasilof River sockeye salmon sustainable escapement goal range was revised from 160,000–340,000 fish to 120,000–320,000 fish starting with the 2020 fishing season.
NOTE: Average generation time (T) is assumed to be 5 years.
Source: Developed by ADF&G fisheries scientists using harvest and escapement data from ADF&G.

Kenai River late-run Chinook salmon

The following provides a retrospective analysis of how the proposed Tier 1 SDC under Alternative 2 would have been applied to Kenai River late-run Chinook salmon, to determine the status of that stock from 2004 to 2021.

Total catches in Upper Cook Inlet, catches in the EEZ portion of Upper Cook Inlet, and escapements of Kenai River late-run Chinook salmon were used to develop SDC and ACLs for 1999 through 2021 (Table 3-7). The MSST is calculated from one-half of the lower bound of the escapement goal (13,500 Chinook salmon) accumulated over T=6 years. Based on the example, overfishing and overfished status were not observed between 2004 and 2021 although the escapement goal was not met in 2010, 2013, 2014, and 2019 through 2021.

This retrospective analysis indicated that ACLs would not have been exceeded, overfishing would not have occurred, and no stocks would have been overfished. Kenai River late run Chinook salmon has not had a chronic inability to meet the escapement goal despite the recent downturn in productivity of this stock and other Chinook salmon stocks throughout the state. This is in part because of State management actions implementing fishery restrictions that have reduced harvest in order to achieve escapement goals.

Table 3-7 Tier 1, Kenai River late-run Chinook salmon catch, estimated catch in the EEZ, escapements, run size, and lower bound of escapement goal from 1999-2021 and retrospective estimates of the Status Determination Criteria and Annual Catch Limits from 2004-2021.

Year	Total Kenai late-run Catch (C_{Total})	Kenai late-run EEZ Catch (C_{EEZ})	Escapement (S)	Run (R)	Lower Bound of Goal (G)	Potential Yield (Y_{EEZ})	F_{EEZ}	MFMT	MSST	Cumulative Escapement ($\sum S_t$)	ACL ($\sum Y_{EEZ,t}$)	Cumulative Catch ($\sum C_{EEZ}$)	Overfishing	Overfished	ACL Exceeded?
1999	16,557	62	29,100	45,657	13,500	15,662									
2000	16,217	49	25,502	41,719	13,500	12,051									
2001	16,223	58	29,531	45,754	13,500	16,089									
2002	15,396	39	40,514	55,910	13,500	27,053									
2003	19,523	109	48,461	67,984	13,500	35,070									
2004	26,200	121	65,112	91,312	13,500	51,733	0.001	0.453	40,500	238,220	157,658	438	No	No	No
2005	28,501	194	55,688	84,189	13,500	42,382	0.001	0.477	40,500	264,808	184,378	570	No	No	No
2006	17,817	109	39,305	57,122	13,500	25,914	0.002	0.493	40,500	278,611	198,241	630	No	No	No
2007	14,757	114	29,664	44,421	13,500	16,278	0.002	0.495	40,500	278,744	198,430	686	No	No	No
2008	14,586	49	28,094	42,680	13,500	14,643	0.002	0.480	40,500	266,324	186,020	696	No	No	No
2009	9,793	105	18,251	28,044	13,500	4,856	0.002	0.448	40,500	236,114	155,806	692	No	No	No
2010	9,143	65	**13,037**	22,180	13,500	0	0.002	0.374	40,500	184,039	104,073	636	No	No	No
2011	10,650	72	15,731	26,381	13,500	2,303	0.002	0.290	40,500	144,082	63,994	514	No	No	No
2012	753	38	22,453	23,206	13,500	8,991	0.002	0.252	40,500	127,230	47,071	443	No	No	No
2013	2,077	32	**12,305**	14,382	13,500	0	0.002	0.196	40,500	109,871	30,793	361	No	No	No
2014	1,423	32	**11,980**	13,403	13,500	0	0.003	0.127	40,500	93,757	16,150	344	No	No	No
2015	5,971	40	16,825	22,796	13,500	3,365	0.002	0.120	40,500	92,331	14,659	279	No	No	No
2016	10,453	102	14,676	25,129	13,500	1,278	0.003	0.127	40,500	93,970	15,937	316	No	No	No
2017	10,647	41	20,615	31,262	13,500	7,156	0.002	0.160	40,500	98,854	20,790	285	No	No	No
2018	1,222	103	17,289	18,511	13,500	3,892	0.003	0.125	40,500	93,690	15,691	350	No	No	No
2019	1,633	29	**11,638**	13,271	13,500	0	0.003	0.126	40,500	93,023	15,691	347	No	No	No
2020	310	29	**11,909**	12,219	13,500	0	0.003	0.127	40,500	92,952	15,691	344	No	No	No
2021	518	25	**12,147**	12,665	13,500	0	0.003	0.109	40,500	88,274	12,326	329	No	No	No

Escapements in bold did not meet the lower bound of the escapement goal.
NOTE: The escapement goal was in terms of all fish prior to 2017. In 2017 the escapement goal was revised to a large fish goal (>=75 cm). All fish numbers in this table are in terms of large Chinook salmon.
NOTE: Average generation time (T) is assumed to be 6 years in this example.
Source: Developed by ADF&G fisheries scientists using harvest and escapement data from ADF&G

Tier 2: salmon stocks managed as a complex, with specific salmon stocks as indicator stocks

Two salmon stocks complexes would be placed in Tier 2 with the current information available: Upper Cook Inlet coho salmon and other sockeye salmon (see Table 3-4). If Alternative 2 is implemented, these criteria would be applied annually using the best available scientific information during the SDC process.

The EEZ catch of each indicator salmon stock was estimated based on annual approximations of the percentages of the coho and sockeye salmon harvest in the Central District drift gillnet fishery (see Section 4.5.1.2.3 for description of methods).

All other sockeye harvest in the Central District drift gillnet fishery is attributed to Other UCI sockeye. In calculating harvest of Other UCI sockeye for Tier 2, all sources of sockeye salmon harvest were included—not just harvest of the indicator stocks. The sources of harvest include for commercial harvest UCI set gill net fisheries (EESN, Kalgin-Westside, Northern District) as well as commercial test fishery harvests. For sport fish, all freshwater and marine resident and non-resident harvest estimates for UCI are included. In addition, estimated harvest from personal use, subsistence and educational fisheries are included. The proxy run estimate for Other UCI sockeye is then the sum of the escapements to the indicator stocks and all sockeye harvest in UCI (minus Kenai River and Kasilof River harvests accounted for in the Tier 1 examples). Tier 2 coho salmon was handled like Tier 2 Other UCI sockeye. The proxy run is the sum of the escapements of the indicator stocks (stock-specific) and UCI coho harvest (not stock-specific).

For all Tier 2 stocks, the MFMTs and MSSTs are proxies for the true but unknown exploitation rates in the EEZ and spawning escapements of coho salmon or other sockeye salmon in Upper Cook Inlet. The lower bound of the aggregated escapement goals, total catches, catches in the EEZ, and indexed run size accumulated over the average generation time (T=4 years for coho, T=5 years for sockeye) were used to calculate the MFMT relevant to the EEZ. There are three examples where overfishing in the EEZ would have occurred and the ACL would have been exceeded: Tier 2 UCI coho (2013 and 2021) and Tier 2 UCI other sockeye (2008).

Upper Cook Inlet coho salmon

The following provides a retrospective analysis of how the Tier 2 SDC would have been applied to the Upper Cook Inlet coho salmon stock complex, using Deshka River and Little Susitna River coho stocks as indicator stocks from 2002 to 2021. If Alternative 2 is implemented, these criteria would be applied annually using the best available scientific information during the stock SDC process.

Catches of coho salmon in all of Upper Cook Inlet and in the EEZ portion of Upper Cook Inlet, and escapements of coho salmon based on weir counts in the Deshka and Little Susitna rivers were used to develop examples of SDC and ACLs during 1999-2021 (Table 3-8).

The MSST is calculated from one-half of the lower bound of the aggregated escapement goals (10,200 fish in Deshka River and 10,100 fish in Little Susitna River) accumulated over T=4 years. In retrospect, overfishing would have been observed only in 2013 (F = 0.1877. MFMT = 0.1876) and 2021 (F=0.109, MFMT = 0.096), but overfished status would not have been observed between 2002 and 2021 although individual river escapement goals were not met in some years. The cumulative ACL was exceeded in 2013 by 113 fish.

For Tier 2 coho salmon, the four-year cumulative catch of coho salmon in the EEZ exceeded the ACL and OFL in 2013 by 113 fish. The indicator stocks in the retrospective analysis are Deshka and Little Susitna rivers. Leading up to 2013, the lower bound of the escapement goal (10,200 fish) for Deshka River coho salmon was not met in only two years (2011 and 2012). For Little Susitna River, the lower bound of the escapement goal (10,100 fish) was not met between 2009 and 2012. Stock of concern status is reviewed (along with the escapement goals) every three years on the BOF cycle for the given region or area. The BOF meetings for UCI occurred in early 2011 and 2014. Given this, neither of these stocks met the criteria for stock of concern designation.

Table 3-8 Tier 2 example using Upper Cook Inlet coho salmon total catch, estimated catch in the EEZ, indexed escapements, proxy run size, and sum of lower bounds of escapement goals from 1999-2021 and retrospective estimates of the Status Determination Criteria and Annual Catch Limits, 2002-2021.

Year	Total Catch (C_{Total})	EEZ Catch (C_{EEZ})	Deshka R. Escapement	Little Susitna R. Escapement	Total (S) Escapement	Run (R)	LB Goal Index (G)	Potential Yield (Y_{EEZ})	F_{EEZ}	MFMT (EEZ)	MSST	Cumulative Escapement ($\sum S_t$)	ACL ($\sum Y_{EEZ,t}$)	Cumulative Catch ($\sum C_{EEZ}$)	Overfishing	Overfished	ACL Exceeded?
1999	257,704	29,177	**4,566**	**3,017**	7,583	265,287	20,300	16,460									
2000	443,988	68,810	26,387	15,436	41,823	485,811	20,300	90,333									
2001	320,985	19,384	29,927	30,587	60,514	381,499	20,300	59,598									
2002	465,327	66,185	24,612	47,938	72,550	537,877	20,300	118,435	0.110	0.171	40,600	182,470	284,826	183,556	No	No	No
2003	261,952	26,096	17,305	10,877	28,182	290,134	20,300	33,978	0.106	0.178	40,600	203,069	302,344	180,475	No	No	No
2004	509,533	92,888	62,940	40,199	103,139	612,672	20,300	175,727	0.112	0.213	40,600	264,385	387,738	204,553	No	No	No
2005	391,817	64,728	47,887	16,839	64,726	456,543	20,300	109,154	0.132	0.230	40,600	268,597	437,294	249,897	No	No	No
2006	359,893	44,646	59,419	**8,786**	68,205	428,098	20,300	92,551	0.128	0.230	40,600	264,252	411,410	228,358	No	No	No
2007	316,900	65,791	10,575	17,573	28,148	345,048	20,300	73,639	0.145	0.245	40,600	264,218	451,071	268,053	No	No	No
2008	357,443	38,407	12,724	18,485	31,209	388,652	20,300	49,316	0.132	0.201	40,600	192,288	324,660	213,572	No	No	No
2009	315,690	37,456	27,348	**9,523**	36,871	352,561	20,300	54,027	0.123	0.178	40,600	164,433	269,533	186,300	No	No	No
2010	353,653	59,497	10,393	**9,214**	19,607	373,260	20,300	58,804	0.138	0.162	40,600	115,835	235,786	201,151	No	No	No
2011	203,893	18,580	**7,326**	**4,826**	12,152	216,045	20,300	10,432	0.116	0.130	40,600	99,839	172,579	153,940	No	No	No
2012	197,966	36,416	**6,825**	**6,779**	13,604	211,570	20,300	29,720	0.132	0.133	40,600	82,234	152,983	151,949	No	No	No
2013	382,699	109,846	22,141	13,583	35,724	418,423	20,300	125,270	0.184	0.184	40,600	81,087	224,226	224,339	**Yes**	No	**Yes**
2014	280,218	33,163	11,578	24,211	35,789	316,007	20,300	48,652	0.170	0.184	40,600	97,269	214,074	198,005	No	No	No
2015	377,887	54,489	10,775	12,756	23,531	401,418	20,300	57,720	0.174	0.194	40,600	108,648	261,362	233,914	No	No	No
2016	231,482	34,640	**6,820**	**10,049**	16,869	248,351	20,300	31,209	0.168	0.190	40,600	111,913	262,851	232,138	No	No	No
2017	416,258	76,492	36,869	17,781	54,650	470,908	20,300	110,842	0.138	0.173	40,600	130,839	248,423	198,784	No	No	No
2018	362,708	60,426	13,072	**7,583**	20,655	383,363	20,300	60,781	0.150	0.173	40,600	115,705	260,552	226,047	No	No	No
2019	273,194	39,361	10,445	**4,229**	14,674	287,868	20,300	33,735	0.152	0.170	40,600	106,848	236,567	210,919	No	No	No
2020	226,730	1,621	16,802*	10,765	27,567	254,297	20,300	8,888	0.127	0.153	40,600	117,546	214,246	177,900	No	No	No
2021	277,020	33,047	19,297*	10,923	30,220	307,240	20,300	42,967	0.109	0.119	40,600	93,115	146,370	134,455	No	No	No

Escapements in bold did not meet the lower bound of the escapement goal.
NOTE: Average generation time (T) is assumed to be 4 years in this example.
*Escapement was not enumerated. An estimate is substituted using the average escapement over a generation time.
Source: Developed by ADF&G fisheries scientists using harvest and escapement data from ADF&G.

<u>*Other sockeye salmon*</u>

The following provides a retrospective analysis of how the Tier 2 SDC would have been applied to the other sockeye salmon stock complex in the Upper Cook Inlet.

Catches of other sockeye salmon in all of Upper Cook Inlet and in the EEZ portion of Upper Cook Inlet, and escapements of sockeye salmon based on escapement to the Yentna Rivers, Chelanta Lake, Judd Lake, Larson Lake, and Fish Creek were used to develop examples of SDC and ACLs during 1999-2021 (Table 3-9).

The MSST is calculated from one-half of the lower bound of the aggregated escapement goals accumulated over T=4 years. In this example, MSST changes over time as assessment projects change and escapement goals are updated. In retrospect, overfishing would have been observed only in 2008 (F = 0.195, MFMT = 0.175), and overfished status would not have been observed between 2003 and 2021 although individual river escapement goals were not met in some years. The cumulative ACL was exceeded in 2008 by 63,479 fish.

For UCI other sockeye, the BOF designated Susitna River sockeye as a stock of concern (yield) in 2008, the same year the ACL and OFL would have been exceeded. The reason for the designation was because the Yentna River (Susitna drainage) escapement goal had not been met in 5 out of 8 years (2000–2007) and there were declines in harvest in the Northern District set gillnet fishery. This stock was delisted as a stock of concern by the BOF during the 2019/2020 board cycle. It should be noted that while harvest exceeded the ACL and OFL for only one year, the stock of concern designation was in place for 12 years and the regulatory changes to management are still in place. The other indicator stock for UCI other sockeye, Fish Creek, has regularly achieved the escapement goal since implementation of the SSFP and the stock of concern process; however, it was declared a stock of concern (yield) in 2002. Leading up to the stock of concern designation, personal use dipnet and Northern District commercial set gillnet fisheries were closed in 5 out 6 years in order to meet the escapement goal and there was little or no surplus yield available for harvest. Fish Creek sockeye salmon was delisted as a stock of concern by the BOF in 2005.

Table 3-9 Tier 2 example using Upper Cook Inlet other sockeye salmon total catch, estimated catch in the EEZ, indexed escapements, proxy run size, and sum of lower bounds of escapement goals from 1999-2021 and retrospective estimates of the Status Determination Criteria and Annual Catch Limits, 1999-2021.

Year	Total Catch (C_{Total})	EEZ Catch (C_{EEZ})	Yentna R.	Chelatna Lk.	Judd Lk.	Larson Lk.	Fish Ck.	Total (S)	Run (R)	LB Goal Index (G)	Potential Yield (Y_{EEZ})	F_{EEZ}	MFMT	MSST	Cumulative Escape. ($\sum S_t$)	ACL ($\sum Y_{EEZ,t}$)	Cumul. Catch ($\sum C_{EEZ}$)	Overfishing	Overfished	ACL Exceeded
1999	648,575	156,824	**99,029**				**26,746**	125,775	774,350	150,000	132,599									
2000	434,858	119,113	133,094				**19,533**	152,627	587,485	150,000	121,740									
2001	456,081	109,011	**83,532**				**43,469**	127,001	583,082	150,000	86,012									
2002	634,198	143,699	**78,591**				90,483	169,074	803,272	110,000	202,773									
2003	620,332	233,954	180,813				92,298	273,111	893,443	110,000	397,065	0.209	0.258	335,000	847,588	940,189	762,601	No	No	No
2004	759,438	217,801	**71,281**				22,157	93,438	852,876	110,000	201,239	0.221	0.271	315,000	815,251	1,008,829	823,578	No	No	No
2005	676,378	61,373	**36,921**				**14,215**	51,136	727,514	110,000	2,509	0.198	0.230	295,000	713,760	889,598	765,838	No	No	No
2006	255,955	38,546	92,051				32,562	124,613	380,568	110,000	53,159	0.190	0.234	275,000	711,372	856,745	695,373	No	No	No
2007	650,879	229,734	**79,901**				27,948	107,849	758,728	110,000	227,583	0.216	0.244	275,000	650,147	881,555	781,408	No	No	No
2008	424,069	85,106	90,146				**19,339**	109,485	533,554	110,000	84,591	0.194	0.175	275,000	486,521	569,081	632,560	**Yes**	No	**Yes**
2009	539,840	135,999		**17,721**	44,616	40,930	83,480	186,747	726,587	80,000	242,746	0.176	0.195	260,000	579,830	610,588	550,758	No	No	No
2010	636,906	201,708		37,734	**18,466**	20,324	126,836	203,360	840,266	80,000	325,068	0.213	0.288	245,000	732,054	933,147	691,093	No	No	No
2011	834,648	254,210		70,353	39,909	**12,225**	66,678	189,165	1,023,813	80,000	363,375	0.234	0.320	230,000	796,606	1,243,363	906,757	No	No	No
2012	472,767	166,148		36,736	**18,715**	16,557	**18,813**	90,821	563,588	80,000	176,969	0.229	0.323	215,000	779,578	1,192,749	843,171	No	No	No
2013	506,729	143,884		70,555	**14,088**	21,821	**18,912**	125,376	632,105	80,000	189,260	0.238	0.343	200,000	795,469	1,297,418	901,949	No	No	No
2014	469,175	136,438		26,374	**22,229**	**12,430**	43,915	104,948	574,123	80,000	161,386	0.248	0.335	200,000	713,670	1,216,058	902,388	No	No	No
2015	504,962	70,489		69,897	47,934	23,184	102,309	243,324	748,286	80,000	233,813	0.218	0.318	200,000	753,634	1,124,803	771,169	No	No	No
2016	308,201	48,990		60,792	28,575	**14,333**	46,202	149,902	458,103	80,000	118,892	0.190	0.296	200,000	714,371	880,320	565,949	No	No	No
2017	656,080	131,865		26,986	35,731	31,866	61,469	156,052	812,132	65,000	222,917	0.165	0.287	192,500	779,602	926,268	531,666	No	No	No
2018	361,858	79,263		20,434	30,844	23,632	71,180	146,090	507,948	65,000	160,353	0.151	0.289	185,000	800,316	897,361	467,045	No	No	No
2019	448,705	73,049		26,303	44,145	**9,699**	75,411	155,558	604,263	65,000	163,607	0.129	0.287	177,500	850,926	899,582	403,656	No	No	No
2020	230,842	13,142		40,882*	31,219	**12,074**	64,234	148,409	379,251	65,000	96,551	0.125	0.276	170,000	756,011	762,320	346,309	No	No	No
2021	367,315	54,303		35,079*	49,440	21,993	99,324	205,836	573,151	65,000	195,139	0.122	0.291	162,500	811,946	838,568	351,622	No	No	No

Escapements in bold did not meet the lower bound of the escapement goal.
NOTE: Average generation time (T) is assumed to be 5 years in this example.
Note: Yentna River sockeye salmon escapement goal was replaced by escapement goals for Chelatna, Judd, and Larson lakes in 2009.
Note: Fish Creek escapement goal from 1982-2001 was a point goal and not a lower-bound goal, but in this retrospective example it is treated as a lower bound.
*Escapement was not enumerated. An estimate is substituted using the average escapement over a generation time.
Source: Developed by ADF&G fisheries scientists using harvest and escapement data from ADF&G.

Tier 3: salmon stocks with no reliable estimates of escapement

Two salmon stocks would be placed in Tier 3 with the current information available: Upper Cook Inlet chum salmon and Upper Cook Inlet pink salmon (see Table 3-4).

EEZ catch of chum salmon and pink salmon were estimated based on annual approximations of the percentages of the chum salmon harvest in the Central District drift gillnet fishery (see Section 4.5.1.2.3 for description of methods). It was assumed for this example that there was minimal sport fishery catch of chum salmon or pink salmon in the EEZ waters of UCI, although estimates of harvest may be included once SDC are implemented.

Upper Cook Inlet chum salmon

The following provides a retrospective analysis of how the Tier 3 SDC would have been applied to Upper Cook Inlet chum salmon from 2002 to 2021. If implemented, these criteria would be applied annually using the best available scientific information during the SDC process.

Total catches of chum salmon in Upper Cook Inlet and catches in the EEZ portion of Upper Cook Inlet for 1999 through 2021 were used to develop the example OFLs and ABCs (Table 3-10).

The maximum return year catch in the EEZ between 1999 and 2021 was used to develop the OFL and ABC. Under Tier 3, other time periods (prior to 1999 or shorter period within 1999-2021) and methods of summarizing the catch data could be used (e.g., average or percentile) based on best available scientific information and analysis during the stock SDC.

The 1999 through 2021 period was chosen due to the advent of the current abundance-based approach to management of sockeye salmon in Upper Cook Inlet that likely limits chum catches independent of stock status. The maximum return year catch of chum salmon was chosen as a reference point because chum catches are incidental in Upper Cook Inlet (i.e., no fishing time directed at chum is provided beyond regular fishing periods). Based on the example, the proposed ABC was not exceeded between 2002 and 2021.

Table 3-10 Tier 3 example using Upper Cook Inlet chum salmon total catch, estimated catch in the EEZ, and retrospective estimates of the OFL and ABC, 1999-2021.

Year	Total Catch (C_{Total})	EEZ Catch (C_{EEZ})	EEZ OFL	EEZ Max ABC	EEZ Cumulative Catch ($\sum C_{EEZ}$)	EEZ Max ABC Exceeded?
1999	179,720	80,551				
2000	133,335	62,061				
2001	90,953	36,633				
2002	245,784	116,282	560,932	504,839	295,527	No
2003	126,146	53,224	560,932	504,839	268,200	No
2004	151,246	64,510	560,932	504,839	270,649	No
2005	73,992	33,787	560,932	504,839	267,803	No
2006	67,753	33,259	560,932	504,839	184,780	No
2007	79,871	46,255	560,932	504,839	177,811	No
2008	53,862	23,460	560,932	504,839	136,761	No
2009	86,817	41,179	560,932	504,839	144,153	No
2010	233,038	122,502	560,932	504,839	233,396	No
2011	134,114	48,972	560,932	504,839	236,113	No
2012	274,157	140,233	560,932	504,839	352,886	No
2013	145,038	76,391	560,932	504,839	388,098	No
2014	122,739	57,216	560,932	504,839	322,812	No
2015	281,694	116,190	560,932	504,839	390,030	No
2016	127,623	39,656	560,932	504,839	289,453	No
2017	249,251	103,807	560,932	504,839	316,869	No
2018	118,603	64,550	560,932	504,839	324,203	No
2019	132,645	53,994	560,932	504,839	262,007	No
2020	33,287	7,681	560,932	504,839	230,032	No
2021	73,235	29,239	560,932	504,839	155,464	No

Note: OFL in this example is the product of the maximum return year catch during this time period and the average generation time of the species (i.e., 4 years for chum salmon). ABC is calculated by applying a default buffer of 10% to the OFL.
Source: Developed by ADF&G fisheries scientists using harvest data from ADF&G.

Upper Cook Inlet pink salmon

The following provides a retrospective analysis of how the Tier 3 SDC would have been applied to Upper Cook Inlet pink salmon from 1999 to 2021. If implemented, these criteria would be applied annually using the best available scientific information during the stock SDC process.

Total catches of pink salmon in Upper Cook Inlet and catches in the EEZ portion of Upper Cook Inlet for 1999 through 2021 for even and odd years, were used to develop the OFLs and ABCs (Table 3-11 and Table 3-12).

The maximum return year catch in the EEZ between 1999 and 2021 for each brood-line was used to develop the OFL and ABC. Under Tier 3, other time periods (prior to 1999 or shorter period within 1999-2021) and methods of summarizing the catch data could be used (e.g., average or percentile) based on best available scientific information and analysis during the stock SDC process.

The 1999-2021 time period was chosen due to the advent of the current abundance-based approach to management of sockeye salmon in Upper Cook Inlet that likely limits pink catches independent of stock status. The proposed ABC would have been exceeded in 2009 and 2014 (i.e., the maximum harvest years that OFL is based on).

Table 3-11 Tier 3, Upper Cook Inlet odd-year pink salmon total catch, estimated catch in the EEZ, and retrospective estimates of the OFL and ABC, 1999-2021.

Year	Total Catch (C_{Total})	EEZ Catch (C_{EEZ})	EEZ OFL	EEZ Max ABC	EEZ Max ABC Exceeded?
1999	26,144	1,257	74,764	67,288	No
2001	84,759	14,518	74,764	67,288	No
2003	60,415	13,424	74,764	67,288	No
2005	62,780	16,016	74,764	67,288	No
2007	163,094	41,584	74,764	67,288	No
2009	244,571	74,764	74,764	67,288	Yes
2011	47,718	6,313	74,764	67,288	No
2013	63,904	12,718	74,764	67,288	No
2015	70,815	9,509	74,764	67,288	No
2017	196,211	23,323	74,764	67,288	No
2019	99,581	15,691	74,764	67,288	No
2021	111,708	25,560	74,764	67,288	No

Note: OFL is maximum return year catch during this time period. ABC is calculated by applying a default buffer of 10% to the OFL.
Source: Developed by ADF&G fisheries scientists using harvest data from ADF&G.

Table 3-12 Tier 3, Upper Cook Inlet even-year pink salmon total catch, estimated catch in the EEZ, and retrospective estimates of the OFL and ABC, 2000-2020.

Year	Total Catch (C_{Total})	EEZ Catch (C_{EEZ})	EEZ OFL	EEZ Max ABC	EEZ Max ABC Exceeded?
2000	189,728	42,595	150,023	135,021	No
2002	490,034	114,737	150,023	135,021	No
2004	393,589	103,094	150,023	135,021	No
2006	442,423	90,616	150,023	135,021	No
2008	208,092	49,503	150,023	135,021	No
2010	320,840	89,935	150,023	135,021	No
2012	498,572	132,790	150,023	135,021	No
2014	703,285	150,023	150,023	135,021	Yes
2016	425,497	109,481	150,023	135,021	No
2018	172,974	38,981	150,023	135,021	No
2020	395,430	11,828	150,023	135,021	No

Note: OFL is maximum return year catch during this time period. ABC is calculated by applying a default buffer of 10% to the OFL.
Source: Developed by ADF&G fisheries scientists using harvest data from ADF&G.

Conclusions

Retrospective analyses of proposed SDC indicate that there are limited instances where state management would have resulted in an ACL being exceeded, or a determination that overfishing was occurring on a stock or that a stock was overfished. There are only two examples of where harvest exceeded the OFL and ACL: Tier 2 UCI other sockeye (2008) and Tier 2 UCI coho (2013). Additionally, ABC was exceeded once for odd-year pink salmon and once for even-year pink salmon. No stocks of salmon in Cook Inlet would have been overfished during this period.

This indicates that there is reasonable consistency between the SDC process and the State stock of concern designation. It is likely that the SDC process may recognize a conservation concern more immediately given the annual evaluation of overfished/overfishing compared to the State's triannual stock of concern designation. It is also important to note that the State has also taken a proactive management approach to conserve stocks and avoid triggering a stock of concern designation that may have also prevented overfishing from occurring or a stock from being overfished. Such restrictions required to conserve specific stocks can and do result in forgone harvest of co-occurring healthy stocks. It is expected that recommendations by the SSC would also become more conservative as a stock neared overfishing or overfished status.

Further, this analysis suggests that existing levels of removals are appropriate for the conservation of Cook Inlet salmon stocks. As the State would continue to manage inseason using escapement goals based on realized salmon run strength that are largely consistent with existing conditions, no significant changes in salmon removals are expected under Alternative 2. Management measures implemented by the State under its delegated authority would have to be consistent with the MSA and other applicable Federal law, but these are not expected to be significantly different from the status quo because most existing State management measures and strategies for both the commercial and recreational fishery sectors would remain in place. As a result, the level of salmon removals, including their spatial and temporal distribution, are not expected to change significantly. Therefore, the impacts of Alternative 2 on salmon stocks are not expected to be significant.

In the event that management measures delegated to the State were not implemented, the Cook Inlet EEZ would be closed to commercial salmon fishing. Additional discussion of the potential impacts of an EEZ closure are provided in Section 3.1.3. It should be noted that as described in Sections 4.7.1.3 and 4.7.1.4, some management responses to a potential periodic closure of the EEZ may differ compared to a permanent closure (Alternative 4).

3.1.3. Impacts of Alternative 3 on Salmon Stocks

Alternative 3 would establish Federal management of the Cook Inlet EEZ salmon fishery with no delegation of management authority to the State. Under Alternative 3, SDC for salmon stocks in Cook Inlet would be specified according to the tier system outlined in Section 2.5.2. Each year, the salmon stocks would be assigned tiers based on the information available. Retrospectively, the resulting SDC and post-season ACLs specified for the fishery would have been equivalent to Table 3-5 through Table 3-12. Preseason, OFL and ABC (ABC=ACL) would be recommended by NMFS, reviewed and approved by the SSC, and adopted by the Council. However, unlike Alternative 2, the Council would set a TAC, likely at the species level, as the inseason management catch limit for the fishery to facilitate management by NMFS. Each TAC amount could not exceed the combined ABC values established for all component stocks and may include additional reductions in harvest to account for management uncertainty, as well as any additional ecological, social, and economic considerations.

Calculating SDC for stocks and stock complexes in Tier 1 and Tier 2 would be initially dependent on receiving the relevant salmon forecast, harvest, and escapement data from ADF&G in time to prepare for the February and April Council meetings each year, or preparing suitable alternate forecasts. If these data are not available, then SDC would be set using Tier 3, which sets harvest levels based on the catch of each stock in the Cook Inlet EEZ in previous years, with appropriate buffers to account for uncertainty. Because Tier 3 results in increased scientific uncertainty, OFL, ABC, and TAC would likely be more conservative than the expected limits established under either Tier 1 or Tier 2. Generally, it is expected that ABC and OFL recommendations would also become more conservative if one or more stocks was nearing overfishing or overfished status. However, even with conservative management, because harvests in the EEZ (and State waters) occur before spawning escapements are fully assessed, it is still possible that these harvests could result in the spawning escapement goals not being achieved for some stocks during some years, which would be a primary driver of conservative management. Accountability measures would be expected to prevent ACL overages from occurring multiple years in a row. If salmon harvest in other fisheries did increase, the EEZ TAC would be reduced in future years if required to prevent overfishing.

Under Alternative 3, commercial and recreational salmon fishing in the Cook Inlet EEZ would occur every year that the conservation and management considerations outlined in Section 2.5.2.4 were satisfied. A season-long closure of commercial and recreational salmon fishing has only occurred once under State management (in response to the Exxon Valdez oil spill) and is not expected to occur under Alternative 3. A closure would only occur if opening the EEZ fishery would result in exceed one or more TAC amounts and no level of de minimis harvest was acceptable (if applicable), or if opening would be likely to result in overfishing or a stock becoming overfished. If there was a closure, it is likely that no commercial salmon fishing in the Cook Inlet EEZ would be allowed in that year due to the mixture of stocks in the EEZ and inability of the drift gillnet fleet to target individual stocks. However, a species-selective recreational fishery could still potentially occur by prohibiting retention of the species or stocks in question. As described in Sections 4.7.1.3 and 4.7.1.4, some management responses to a potential periodic closure of the EEZ (Alternative 3) may be different than those resulting from a permanent closure (Alternative 4).

Available information indicates that recreational harvest of salmon in the Cook Inlet EEZ is minimal, with an estimated total average annual harvest of approximately 66 salmon per year from 2015 to 2021, or less than 0.01% of the total estimated Cook Inlet EEZ harvest (See Table 4-35 and Appendix 16 for additional information). Because removals from the recreational fishery in the Cook Inlet EEZ are small, and proposed management measures for the EEZ recreational fishery under Alternative 3 are not expected to significantly change these harvests, no significant impacts to salmon stocks are expected from the recreational fishery. Therefore, the remainder of this discussion focuses on potential impacts from Federal management of the drift gillnet fleet in the EEZ, which is a major driver of overall salmon harvests in Cook Inlet.

Alternative 3 would establish a drift gillnet fishing season from approximately June 19 until August 15, with two, 12-hour fishing periods in the Cook Inlet EEZ per week. NMFS would close the fishery prior to August 15 if one or more TAC amounts would be exceeded, or if other scientific information indicated that inseason salmon abundance was significantly lower than the forecasted amounts used to establish TACs. Figure 4-12 in Section 4.5.1.2.3 shows the average cumulative landings in the EEZ (2013 to 2021) by season day as a percentage of total EEZ landings. Table 4-46 in Section 4.7.1.3 shows the average percent of total Cook Inlet EEZ catch realized by each date. This table provides some assessment of what portion of the historical EEZ drift gillnet catch may have already occurred if the fishery were to be closed at a given point in the season. However, there is significant uncertainty associated with this estimate due to the inherent variability of salmon abundance and run timing (Table 4-1), uncertainty about what TACs would be set in future years, and whether there would be a TAC-based closure prior to the season end date. For reference, under the most recent management plan, the State has generally provided less EEZ fishing opportunity to the drift gillnet fleet after July 15 (Table 4-2) than that proposed under Federal management. As is expected to continue under this action, under State management there has been consistent fishing opportunity provided to the drift gillnet fleet in the EEZ prior to ~July 15 across a broad range of salmon abundances, including low abundance years. Additionally, under this proposed action there could be one additional EEZ opening per week from July 16 until July 31 compared to existing State management in years of low-moderate abundance. Because drift gillnet catches often peak during this period, the proportion harvested by date, relative to the data presented in Table 4-46, would likely increase as a result of these additional fishery openings. In years prior to 2015, there was generally more consistent EEZ fishing opportunity later into the season due to relatively higher salmon abundance and State management decisions. Generally, it is expected that catch of coho salmon, which return later in the season, would be most reduced if there was an earlier closure.

As discussed above, drift gillnet gear cannot target individual salmon stocks in EEZ waters where many stocks are mixed (Willette & Dupuis 2017; Barclay & Chenoweth, 2021). The mixed stock nature of the drift gillnet fishery also limits options to increase fishery openings in the EEZ under Alternative 3. For example, the high abundance of all sockeye and coho salmon stocks in Cook Inlet EEZ waters make it difficult to direct harvest on Kenai and Kasilof sockeye salmon stocks, which have exceeded escapement targets in recent years, without potential overharvest of other stocks or limiting the harvest by other salmon user groups operating in Cook Inlet State waters. A connection between decreased harvest in the drift gillnet fisheries and increased harvest by some other salmon fisheries in Northern Cook Inlet has been noted by fishery managers in recent years (Marston and Frothingham, 2019, 2022). A discussion of the potential impacts of exceeding escapement goal targets for primary Cook Inlet EEZ fishery salmon stocks is provided in Section 3.1.4, and is not expected to have significant impacts.

Other regulatory elements and participant responses may also impact Cook Inlet EEZ salmon harvest under Alternative 3. This action would prohibit commercial salmon fishing in both EEZ and State waters during the same day by individual participants. As a result, additional vessels may choose to forgo fishing in State waters early in the season to maximize EEZ catch. However, the additional requirements associated with participating in the EEZ fishery could result in some fishery participants not fishing in EEZ waters. While some reduction in catch could occur as a result of these factors, there is likely be significant harvest opportunity in the EEZ under Alternative 3 that would remain attractive to existing participants.

As a result of Federal management under Alternative 3, relative to the status quo, it is expected that Cook Inlet EEZ salmon harvests would be near, or marginally below, existing levels. Potential reductions in harvest totals may occur in some years to account for decreased data availability, increased scientific uncertainty, increased management uncertainty, and reduced Federal inseason management flexibility. This is most likely in the initial fishing seasons under this action before Federal management expertise is developed. However, the Cook Inlet drift gillnet fleet would still be expected to maintain a significant portion of its historical catch in the EEZ. Exact catch amounts cannot be predicted due to natural variations in salmon abundance, interaction between run size and State vs. EEZ waters harvest proportions, potential State management action, and Federal TAC setting considerations.

Under Alternative 3, it is expected that salmon abundance in excess of escapement needs (i.e., potential yield) will be harvested in the EEZ and in State waters, when possible. If there are years when EEZ harvests are reduced under Alternative 3, this may result in an increase in the amount and proportion of Cook Inlet salmon harvested in State waters. When this occurs, there may be practical, logistical, or management constraints that could limit the amount of salmon harvested in the compressed time and space that salmon are available to the fishery in State waters, which could result in larger salmon escapements for some stocks in years when the EEZ is closed to commercial fishing for all, or a significant portion, of the potential season. However, given that drift gillnet fishing in the EEZ is only one source of salmon removals in Cook Inlet, a significant portion of existing drift gillnet and recreational fishing opportunity in the EEZ would be expected to occur in most years, significant reductions in harvest are not expected over the long term. In addition, compensatory fishery effort would be expected in State waters during years when EEZ harvests were reduced, such that any reductions in the harvest of Cook Inlet salmon stocks and subsequent changes in escapement are not expected to be significant. Therefore, the impacts of Alternative 3 on salmon stocks are not likely to be significant.

3.1.4. Impacts of Alternative 4 on Salmon Stocks

Alternative 4 would establish Federal management of the Cook Inlet EEZ and apply the West Area prohibition on commercial salmon fishing to the Cook Inlet EEZ. As a result, all commercial salmon fishing in Cook Inlet would occur within State waters. Within State waters, it is expected that ADF&G would continue to apply the management approach described in Section 3.1.1, although ADF&G may modify State management plans as a result of the Cook Inlet EEZ closure. Staff from ADF&G provided information about the expected impacts of an EEZ closure on State salmon fisheries in Appendix 13, which has been synthesized with other information to inform the following analysis.

State management plans for salmon in Cook Inlet are currently predicated on commercial fishing by the salmon drift gillnet fleet occurring in the Cook Inlet EEZ. Under Alternative 4, salmon fishing by the drift gillnet fleet in the EEZ could no longer occur. If no modifications to the existing State management plans are made, it is likely that increased abundances of Northern Cook Inlet salmon stocks (including stocks originating from the Susitna River, Knik Arm, and Matanuska River) would pass into Northern Cook Inlet due to decreased interception by the drift gillnet fleet operating in the EEZ. Further, Area 2, north of the EEZ boundary, is generally not open to the drift gillnet fleet later in the season when fishing in this Area may become more productive (see Section 4.5.1.2.1 for a summary of current management). This would increase availability of these stocks to salmon fisheries in Northern Cook Inlet and could also lead to higher escapements. In the event there is insufficient harvest capacity across all Northern Cook Inlet salmon fisheries, or mixed stock conservation concerns for Chinook or coho stocks prevent increased effort, these stocks could exceed their escapement goal ranges more frequently.

While pink and chum salmon stocks may be most susceptible to increases in escapement because they are generally not a primary target species for non-commercial fisheries (Figure 4-6), they currently have highly variable harvests under existing conditions (Table 3-10, Table 3-11, and Table 3-12). This is because of both natural abundance cycles (for pink salmon) and management measures to conserve Chinook, sockeye, or coho stocks that limit harvest (Marston and Frothingham, 2019). Generally, routinely exceeded escapement goals could result in additional interannual variation in run size and uncertainty in yields in future years due to density dependence effects in river. While this could potentially reduce yield for some stocks in some years, it is not expected to result in conservation concerns or otherwise significantly impact Cook Inlet salmon stocks as it already occurs regularly (Table 3-2 and Table 3-3). This is of particular concern for sockeye salmon stocks due to their high value and their relatively long freshwater rearing period, which increases their potential exposure to density-dependent impacts in freshwater. An analysis of the potential for density-dependent impacts in Kenai and Kasilof river sockeye salmon, presented in Appendix 14, found limited evidence for overcompensation (the tendency for recruitment to decrease at high levels of spawning abundance) for either stock. Additionally, harvest of Kenai and Kasilof river stocks by the drift gillnet fleet are expected to be less affected than Northern Cook Inlet stocks. This is because the drift gillnet fleet may be better able to intercept Kenai and Kasilof stocks as they move into State waters as the Kenai and Kasilof sections are more frequently open to the drift gillnet fleet under the existing management plans.

Any increases in forgone harvest due to reductions in fishing area under Alternative 4 are expected to be most pronounced in years with large salmon run sizes. In any given year, the amount of forgone harvest would also depend on the proportional abundances of salmon stocks, run timing, and any management measures required to conserve weak stocks. For example, low productivity king salmon stocks may limit additional effort by the Cook Inlet set gillnet fishery to offset the elimination of EEZ fishery exploitation. However, more selective in-river fisheries may have substantially more scope for increased effort and harvest. Because of these interacting factors, it is not possible to precisely predict changes in overall removals of Cook Inlet salmon stocks under Alternative 4. At a minimum, the Cook Inlet drift gillnet fleet would be expected to maintain their existing levels of salmon removals in State waters, which currently constitutes over 50% of their average annual catch. Effort by the drift gillnet fleet and other salmon fisheries would be expected to increase in State waters with the EEZ closed to commercial salmon fishing. Without any commercial fishery interception of salmon in the EEZ, it is also possible that State waters catch rates may improve over what has been historically observed. Conversely, if there is a reduction in drift gillnet fishery participation due to an EEZ closure, this could limit increases in State water harvests by the fishery. These factors suggest that at least a portion of the salmon harvested in the EEZ under existing conditions would be harvested in State waters under Alternative 4.

To illustrate the scope for potential impacts on salmon harvests under Alternative 4, analysts offer the following example. On average, approximately 55% of the salmon (all species) harvested in upper Cook Inlet are harvested by the drift gillnet fleet (Figure 4-6). Further, the drift gillnet fleet is estimated to harvest approximately 47% of their catch in the EEZ, on average (Figure 4-11). Therefore, approximately 26% of the total upper Cook Inlet salmon harvest occurs by the drift gillnet fleet in the EEZ, on average. Thus, under Alternative 4, 26% of the Cook Inlet salmon harvest could be foregone unless this harvest is compensated for by increased effort or catch rates by fisheries in State waters, on average. While this provides a crude approximation of the scope of this action, individual stocks and individual years may have markedly different outcomes. Given that existing escapement goals would be maintained, no increases in the harvest of salmon stocks would be expected under Alternative 4.

Over time, it is expected that the BOF and ADF&G would modify management of Cook Inlet salmon fisheries to optimize utilization under a closed EEZ scenario, consistent with existing conservation goals. The ability to do this would likely be enhanced by a consistent closure as the State would not have to develop multiple management contingencies depending on variable fishery conditions in the EEZ.

No significant additional catch of Chinook salmon stocks by the drift gillnet fleet is expected under Alternative 4 given the fishery's limited catch of Chinook salmon (Figure 4-6). The drift gillnet fleet would continue to operate in State water areas where their gear is generally not selective for relatively low abundance Chinook salmon (Appendix 13).

Generally, it is likely that harvests of Cook Inlet salmon stocks by the drift gillnet fishery would be reduced both in the EEZ and overall under Alternative 4. Commercial salmon harvest patterns would be expected to change, but whether fish unharvested in the EEZ go unharvested elsewhere is hard to quantitatively predict. However, salmon surplus to escapement needs are expected to be harvested in State waters salmon fisheries, including the State waters drift gillnet fishery whenever possible. Given that drift gillnet fishing in the EEZ is only one source of salmon removals in Cook Inlet, and that compensatory fishery effort would be expected in State waters, any reductions in the harvest of Cook Inlet salmon stocks are not expected to result in significant impacts. Therefore, the impacts of Alternative 4 on salmon stocks are not likely to be significant.

3.2. ESA-listed Pacific Salmon

No species of Pacific salmon originating from freshwater habitats in Alaska are listed under the ESA. West Coast salmon species currently listed under the ESA originate in freshwater habitat in Washington, Oregon, Idaho, and California. Table 3-13 lists the ESA-listed salmon and steelhead stocks that are known to range into marine waters off Alaska during the ocean migration and growth to maturity phases of their anadromous life history. None of these ESA listed stocks have critical habitat in Alaska. During ocean migration to the Pacific marine waters, a small (undetermined) portion of the stock go into the GOA as far west as the Aleutian Islands (Weitkamp 2010). In that habitat they are mixed with hundreds to thousands of other stocks originating from the Columbia River, British Columbia, Alaska, and Asia. The listed fish are not visually distinguishable from unlisted stocks. Incidental take of ESA-listed salmon occurs in the Alaska groundfish fishery, primarily by pelagic trawl gear, and the salmon fisheries. While the commercial salmon fisheries occur primarily in nearshore waters, they may also have the potential to incidentally take ESA-listed salmon. No ESA-listed salmon have been detected in the catch of the region-wide Cook Inlet drift gillnet fishery. As the Cook Inlet salmon drift gillnet fishery targets maturing salmon that are returning to their natal streams, it is unlikely that the fishery would encounter a stock from the West Coast during its ocean life history. Furthermore, 80% of the Cook Inlet drift gillnet fishery’s catch is sockeye salmon on average, of which, over 99% of the catch is typically attributed to Cook Inlet stocks (Barclay 2020a).

Table 3-13 ESA listed salmon stocks potentially encountered in Alaskan waters[49]

ESA listed stock	Status
Hood Canal Summer-run Chum Salmon	Threatened
Columbia River Chum Salmon	Threatened
Lower Columbia River Coho Salmon	Threatened
Oregon Coast Coho Salmon	Threatened
Lower Columbia River Steelhead	Threatened
Middle Columbia River Steelhead	Threatened
Snake River Basin Steelhead	Threatened
Upper Columbia River Steelhead	Threatened
Upper Willamette River Steelhead	Threatened
Puget Sound Steelhead	Threatened
Snake River Sockeye Salmon	Endangered
Lake Ozette Sockeye Salmon	Threatened
Lower Columbia River Chinook Salmon	Threatened
Puget Sound Chinook Salmon	Threatened
Snake River Fall Chinook Salmon	Threatened
Snake River Spring/Summer-run Chinook Salmon	Threatened
Upper Columbia River Spring Chinook Salmon	Endangered
Upper Willamette River Chinook Salmon	Threatened

In 2020, coded-wire tag (CWT) information was queried for ESA-listed Chinook, coho, sockeye, and steelhead recovered in the region-wide Cook Inlet drift gillnet fishery. No CWTs have been recovered from ESA-listed salmon or steelhead in the sampling for the Cook Inlet drift gillnet fishery. Of the non-Alaska origin salmon species that may be encountered by the Cook Inlet Drift gillnet fishery, Chinook would be the most likely to be encountered due to their relatively nearshore distribution during ocean residency. There has been limited sampling of Chinook salmon from the drift gillnet fishery in Districts 244, 245, and 249. ADF&G sampled this fishery in Areas 244 and 245 from 1997–2004 (excluding 2000–2003). During this time period, a total of 43 Chinook salmon were sampled, and only one CWT was recovered from an Alaska hatchery fish. It should be noted that this limited sampling is due to the fact that the Cook Inlet drift gillnet fishery has a very limited catch of Chinook salmon, typically less than 500 fish per year for the entire fishery. For context, the total annual average commercial harvest of Chinook salmon in upper Cook Inlet commercial fisheries is 8,430 fish (Marston and Frothingham 2019). ADF&G is establishing a genetic baseline for possible future studies of stock composition of salmon in Cook Inlet commercial and subsistence fisheries.

The recreational fishery in the Cook Inlet EEZ harvests Chinook, coho, sockeye, chum, and pink salmon. Chinook salmon harvested by the fishery originate from stocks both inside and outside of Cook Inlet. Chinook salmon harvested in the marine sport fishery in UCI are sampled for CWTs to determine harvest composition by stock of origin. From 2014 through 2020, there were 62 CWT recoveries. Due to existing

[49] https://www.fisheries.noaa.gov/alaska/endangered-species-conservation/endangered-threatened-and-candidate-species-alaska

reporting areas, it is not possible to determine if these catches occurred in the EEZ or state waters. It is estimated that the total annual average catch of Chinook salmon of all stocks by the saltwater recreational fisheries in the UCI EEZ is approximately 60 fish, less than 5% of total saltwater recreational salmon harvests in UCI.

3.2.1. Impacts of the Alternatives

For Cook Inlet, the best available information on the interactions between the region-wide Cook Inlet salmon drift gillnet fishery and ESA-listed salmon is presented in Section 3.2. This information indicates that the Cook Inlet salmon drift gillnet fishery has no impact on ESA-listed salmon.

Neither Alternative 1 nor Alternative 2 is likely to significantly impact the gear used, or the spatial and temporal distribution of the Cook Inlet drift gillnet or recreational fishery. Given that there is no known harvest of ESA listed salmon by commercial or recreational salmon fishing in the Cook Inlet EEZ and abundance of ESA listed salmon in the GOA is low, it is extremely unlikely that these fish are encountered and captured by salmon fishing in the Cook Inlet EEZ.

Alternative 3 would result in Federal management of the Cook Inlet EEZ salmon fishery without delegation to the State. However, the commercial drift gillnet fishery would remain constrained to the Cook Inlet EEZ north of the Anchor Point line using gillnet gear. It is also expected that the recreational fishery would maintain its existing footprint and harvest levels. Given that there is no known harvest of ESA listed salmon by commercial or recreational salmon fishing in the Cook Inlet EEZ and abundance of ESA listed salmon in the GOA is low, it is extremely unlikely that these fish are encountered and captured by salmon fishing in the Cook Inlet EEZ.

Alternative 4 would result in Federal management of the Cook Inlet EEZ and a prohibition on commercial salmon fishing in the area. This would move all drift gillnet fishing for salmon in Cook Inlet into State waters. Available data indicates that the Cook Inlet drift gillnet fishery has not encountered ESA-listed salmon in either State or EEZ waters. As a result, Alternative 4 would not be expected to result in any impacts to ESA listed Pacific salmon stocks.

3.3. Marine Mammals

The GOA supports one of the richest assemblages of marine mammals in the world. Twenty-two species are present from the orders Pinnipedia (seals and sea lions), Carnivora (sea otters), and Cetacea (whales, dolphins, and porpoises). Some marine mammal species are resident throughout the year, while others migrate into or out of Alaska fisheries management areas. Marine mammals occur in diverse habitats, including deep oceanic waters, the continental slope, and the continental shelf (Lowry et al. 1982). Table 3-15 provides a summary of the status of the marine mammals potentially affected by the region-wide Cook Inlet drift gillnet salmon fishery. The 2022 marine mammal stock assessment report[50] provides background information, population estimates, population trends, estimates of human caused mortality and serious injury (including fishery interactions), and estimates of the potential biological removal levels for each stock.

Interactions between marine mammal species and salmon drift gillnet and troll fisheries occur when fishing vessels disturb or displace marine mammals, marine mammals prey on captured salmon, or marine mammals become snagged or entangled in fishing gear. We use the term “incidental take” in this section as it is used in fisheries management to refer to the catch or entanglement of animals that were not the intended target of the fishing activity. Our use of “incidental take” in this document is more narrowly defined than “take” under the ESA or MMPA. Reports of marine mammal injuries or mortalities

[50]The draft 2022 Marine Mammal Stock Assessment Report (Young et al. 2022) is available at https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports

incidental to commercial fishing operations have been obtained from fisheries reporting programs (self-reporting or logbooks), observer programs, and reports in the literature. The known interactions between marine mammals and the Cook Inlet drift gillnet fishery are detailed in Table 3-16.

Salmon fisheries may also compete with marine mammals that prey on salmon. Salmon is primarily a summer prey species in Cook Inlet for Steller sea lions, resident killer whales, harbor seals, beluga whales, and northern fur seals (NPFMC 2011). Table 3-14 lists the marine mammal species that may prey on salmon in Cook Inlet. Salmon harvested in salmon fisheries may otherwise be available as prey for these marine mammals.

Table 3-14 Marine Mammals that prey on salmon

Species	Prey
Humpback whale	Zooplankton, schooling fish (pollock, herring, capelin, saffron cod, sand lance, Arctic cod, and juvenile **salmon** species)
Minke whale	opportunistically feed on crustaceans, plankton, and small schooling fish (e.g., anchovies, dogfish, capelin, coal fish, cod, eels, herring, mackerel, **salmon**, sand lance, saury, and wolfish)
Beluga whale (Cook Inlet DPS)	**Salmon**, eulachon, and other fish as well as a wide variety of invertebrates
Killer whale (resident)	Fish including herring, halibut, **salmon,** and cod)
Harbor seal	Primarily pelagic and nearshore fish (pollock and **salmon**), occasionally cephalopods and crustaceans
Steller sea lion	pollock, Atka mackerel, Pacific herring, capelin, Pacific sand lance, Pacific cod, and **salmon**

Source: NPFMC 2011

This section provides an analysis of the commercial salmon drift gillnet fishery in the Cook Inlet EEZ and the potential for interactions with identified marine mammal species.

The MMPA requires NMFS to publish an annual list of commercial fisheries and classify each fishery based on whether it has frequent (Category I), occasional (Category II), or remote likelihood (Category III) of incidental mortality and serious injury of marine mammals. The Cook Inlet drift gillnet fishery is classified as a Category II fishery under the MMPA as it has occasional incidental mortality or serious injury of marine mammals. Fishermen participating in a Category II fishery are required to accommodate an Alaska Marine Mammal Observer Program observer onboard the vessel(s) upon request by NMFS (50 CFR 229.7). Under the Alaska Marine Mammal Observer Program (AMMOP), NMFS has placed observers on vessels on the Cook Inlet drift gillnet fishery; however, observer coverage was at a very low rate (~7.5) and for a very short duration (1999-2000), so data are limited. These limited observer data are used to understand the impacts of these fisheries on marine mammals and seabirds detailed in the following sections. NMFS may develop and implement Take Reduction Plans for any Category II fishery that interacts with a strategic stock. Participants in a Category II fishery are required to comply with any applicable Take Reduction Plans.[51] NMFS has not developed a Take Reduction Plan for the Cook Inlet salmon drift gillnet fishery. Additionally, each vessel fishing in a Category II fishery must register with NMFS under the Marine Mammal Authorization Program to receive a certificate that must be carried onboard the vessel. Vessel operators in possession of the MMAP certificate are exempted from the prohibition on incidental takes of marine mammals during commercial fishing operations under the MMPA, as long as they self-report those takes to NMFS.

It is important to note that the classification of fisheries and the requirements NMFS places on the Category II fisheries under the MMPA applies to both State and Federal fisheries. For example, NMFS has deployed marine mammal observers on vessels participating in several State-managed salmon drift gillnet fisheries occurring in State waters.

[51] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams

Recreational fishing for salmon in Cook Inlet is done with hook and line gear, while either trolling or drift fishing. From 2015-2021, an average of 9 trips per year with salmon fishing effort were estimated to take place within the Cook Inlet EEZ, with an additional average of 125 trips per year that may have entered the Cook Inlet EEZ. For comparison, there was an average of 345 saltwater salmon fishing trips that occurred entirely in State waters. An average of seven coho, 58 Chinook, and one or fewer sockeye salmon were landed annually from the Cook Inlet EEZ. Recreational fishing vessels salmon fishing in the Cook Inlet EEZ departed and returned from Anchor Point, Anchor River, Deep Creek, Happy Valley, Homer, and Ninilchik. These trips occur from mid-May to August. While the recreational salmon fishery is not categorized under the MMPA, the commercial salmon troll fishery off Alaska may be the most comparable fishery that is categorized, although the commercial troll fishery is orders of magnitude larger than the recreational salmon fishery in the Cook Inlet EEZ. Generally, the commercial Alaska salmon troll fishery is classified as a Category III fishery under the MMPA with little or no suspected serious injury or mortality effect. A fishery with no known interactions, or that interacts only with non-strategic stocks, or whose level of take has an insignificant impact on the stocks is placed in Category III.

Table 3-15 Status of marine mammal stocks potentially affected by the salmon fisheries in Cook Inlet

Marine mammal species and stock	Status under the ESA	Status under the MMPA	Population Trends	Distribution in action area
Steller sea lion - Western and Eastern distinct population segment (DPS)	Endangered (WDPS)	Depleted & a strategic stock (WDPS)	Using survey counts from 1987-2018, western Steller sea lion pup and non-pup counts in Alaska in 2018 were modeled to be 53,624. Modeled count data collected from 1978 through 2018 indicates that pup and non-pup counts of western stock Steller sea lions in Alaska were at their lowest levels in 2002 and have increased at 1.52% y-1 and 2.05% y-1, respectively, between 2002 and 2018. However, there are strong regional differences across the range in Alaska, with positive trends in the GOA and the eastern Aleutian Islands region and generally negative trends to the west of Samalga Pass. Survey effort was focused in the Aleutian Islands in 2018. Non-pup and pup counts in the western Aleutians have been in a steep decline overall. However, modeled realized counts show that there was a period of stability in this region from 2014 to 2016 (and potentially an increase in pup counts), followed by a decline between 2016 and 2018. Pup counts in the eastern (-33%) and central (-18%) GOA declined sharply between 2015 and 2017, counter to the continuous increases observed in both regions since 2002. The EDPS is increasing, driven by growth in pup counts in the majority of regions.	WDPS inhabits Alaska waters from Prince William Sound westward to the end of the Aleutian Island chain and into Russian waters. EDPS inhabit waters east of Prince William Sound to Dixon Entrance. Occur throughout Alaska waters, terrestrial haulouts and rookeries on Pribilof Is., Aleutian Is., St. Lawrence Is. and off mainland. Use marine areas for foraging. Critical habitat designated around major rookeries and haulouts and foraging areas.

Marine mammal species and stock	Status under the ESA	Status under the MMPA	Population Trends	Distribution in action area
Humpback Whale – Western North Pacific DPS and Mexico DPS	Endangered (Western North Pacific DPS) Threatened (Mexico DPS)	Depleted & strategic	For humpback whale stocks feeding in the North Pacific, it is generally believed that stocks are increasing between 5.5 and 7% per year. While there is agreement that these stocks have a positive population trend, there is some uncertainty in the exact rate of increase.	The summer feeding range of humpback whales in the North Pacific encompasses coastal and inland waters around the Pacific Rim from Point Conception, California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk and north of the Bering Strait.
Harbor seal – Gulf of Alaska	None	None	The current (2011–2018) estimate of the Cook Inlet/Shelikof Strait population trend is -111 seals per year, with a probability that the stock is decreasing of 0.609.	GOA stock found primarily in the coastal waters and may cross over into the Bering Sea coastal waters between islands.
Harbor porpoise – Gulf of Alaska	None	Strategic	Reliable data on population trends are unavailable.	Primarily in coastal waters in the GOA, including upper and lower Cook Inlet, usually less than 100 meters (m).
Dall's porpoise – Alaska	None	None	Reliable data on population trends are unavailable.	Found in the offshore waters from coastal western Alaska to Bering Sea.
Beluga Whale – Cook Inlet DPS	Cook Inlet stock is endangered	Depleted & a strategic stock	In 2018, there were an estimated 267 individuals in Cook Inlet. From 2008-2018 there has been an estimated decline in abundance of 2.3% There is a 93% probability that the decline is greater than 1% per year.	Cook Inlet belugas remain in Cook Inlet year-round.
Fin Whale	Endangered	Depleted & a strategic stock	There are no reliable estimates of current and historical abundances and population trends for the entire Northeast Pacific fin whale stock.	Found seasonally in the offshore waters from the Gulf of Alaska to the Chukchi Sea. They have been documented in Lower Cook Inlet, but not in Upper Cook Inlet.
Killer whale - Eastern North Pacific Alaska resident stock	None	None	The minimum population estimate (Nmin) for the Alaska Resident stock of killer whales based on photo-identification studies conducted between 2005-2009 is 2,084 animals. Data from Matkin et al. (2003) indicate that the component of the Alaska Resident stock that summers in the Prince William Sound and Kenai Fjords area is increasing. With the exception of AB pod, which declined drastically after the Exxon Valdez oil spill and has not yet recovered, the component of the Alaska Resident stock in the Prince William Sound and Kenai Fjords area increased 3.2% (95% CI = 1.94 to 4.36%) per year from 1990 to 2005 (Matkin et al. 2008).	Alaska resident whales are found from southeastern Alaska to the Aleutian Islands and Bering Sea. Intermixing of Alaska residents have been documented among the three areas, at least as far west as the eastern Aleutian Islands.
Minke Whale	None	None	The abundance estimate for this stock is unknown and, thus, PBR is unknown. However, because minke whales are considered common in the waters off Alaska and human-caused mortality and serious injury is thought to be minimal, this stock is presumed to be a non-strategic stock.	Minke whales are relatively common in the Bering and Chukchi seas and in the inshore waters of the Gulf of Alaska but are not considered abundant in any other part of the eastern Pacific. Visual and acoustic data found minke whales in the Chukchi Sea north of Bering Strait in July and August and minke whale "boing" sounds have been detected in the northeast Chukchi Sea in August, October, and November.

Marine mammal species and stock	Status under the ESA	Status under the MMPA	Population Trends	Distribution in action area
Gray Whale	None	None	In 1994, the ENP stock of gray whales was removed from the ESA. In 2009, the ENP population was estimated at 85% of carrying capacity (K) and at 129% of the maximum net productivity level (MNPL), with a probability of 0.884 that the population was above MNPL and therefore within the range of its optimum sustainable population (OSP). Overall, the population nearly doubled in size over the first 20 years of monitoring, and has fluctuated for the last 30 years, with a recent increase to over 26,000 whales. Carrying capacity for this stock was estimated at 25,808 whales in 2009, however the authors noted that carrying capacity was likely to vary with environmental conditions.	Gray whales are commonly found in the North Pacific. Genetic studies indicate there are distinct “Eastern North Pacific” (ENP) and “Western North Pacific” (WNP) population stocks, During summer and fall, most whales in the ENP population feed in the Chukchi, Beaufort and northwestern Bering Seas. An exception to this is the relatively small number of whales that summer and feed along the Pacific coast between Kodiak Island, Alaska and northern California. Three primary wintering lagoons in Baja California, Mexico are utilized, and some females are known to make repeated returns to specific lagoons.

Source: Muto et al. 2019, 2021 and List of Fisheries for 2022 (87 FR 23122, April 19, 2022).

Table 3-15 lists all marine mammals that could potentially overlap with salmon fisheries in Cook Inlet, and Table 3-16 lists these marine mammal species with some evidence for an interaction with the fishery, whether it be documented interactions or by proxy based on other fisheries with similar gear types with documented interactions. Those species include Cook Inlet beluga whale *(Delphinapterus leucas),* Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), and Steller sea lion (*Eumetopias jubatus*). Additionally, NOAA’s Office of Protected Resources recommended analyzing the potential impacts on fin whales (*Balaenoptera physalus*), gray whales (*Eschrichtius robustus*), minke whale (*Balaenoptera acutorostrata*), and humpback whales (*Megaptera novaeangliae*) due to the potential range overlap of these species and the fishery. The reported interactions between this fishery and marine mammals are shown in Table 3-16. This fishery was categorized as a Category II based on takes of harbor porpoise observed by the AMMOP.

AMMOP was implemented in 1999 and 2000 to observe the Cook Inlet salmon drift gillnet fishery in response to the concern that there may be significant numbers of marine mammal injuries and mortalities that occur incidental to this fishery (Manly 2006). Observer coverage in the Cook Inlet drift gillnet fishery was 1.75% and 3.73% in 1999 and 2000, respectively. This fishery has not been observed since 2000; therefore, no additional observer data are available. Self-reporting information is available from 1990 to present (see Appendix 7 to Muto et al. 2019).

Table 3-16 Reported interactions between the Cook Inlet drift gillnet fishery and marine mammals.

Marine Mammal	Year	Observed mortality in that year	Extrapolated mortality in that year	Estimated Mean annual mortality	Self-reporting of entanglements
Harbor Seal	No takes reported by observers.				6 incidents were self-reported in 1990. 1 incident of a dead seal was self-reported in 1992, 2011, and 2013.
Harbor Porpoise*	1999	0	0	15.6	3 incidents were self-reported in 1990. 1 incident of a dead harbor porpoise was self-reported in 2013.
	2000	1	31.2		
Cook Inlet Beluga whale	No takes reported by observers.			0- based on a lack of reported mortalities	None
Dall's Porpoise	No takes reported by observers.				1 incident was self-reported in 1990 and in 1992.
Steller sea lions	No takes reported by observers and no additional information on interactions is available.				
Humpback Whales	No takes reported by observers and no additional information on interactions is available.				
Fin Whales	No takes reported by observers and no additional information on interactions is available.				
Minke Whales	No takes reported by observers and no additional information on interactions is available.				
Gray Whales	No takes reported by observers and no additional information on interactions is available.				
Unidentified small cetacean	An unidentified small cetacean was caught and killed in drift gillnet gear in 2011.				

*Two harbor porpoise were caught and killed in an AK Cook Inlet salmon drift gillnet. These mortalities are not counted against the AK Cook Inlet salmon drift gillnet fishery because bycatch estimates from 1999-2000 AMMOP observer data are used in the Stock Assessment Report.
Source: 2022 List of Fisheries, Muto et al. 2022, and Freed et al. 2022

There have been no recent takes of marine mammals by the drift gillnet fishery in Cook Inlet (Table 3-16). However, as there are ESA listed species that could occur in the action area, further analysis is considered for the Cook Inlet beluga whale, Steller sea lion, humpback whale and fin whale.

3.3.1. Cook Inlet Beluga Whale

In 2008, the Cook Inlet DPS of beluga whales was listed as an endangered species under the ESA following a significant population decline (73 FR 62919, October 22, 2008) and the most recent 5 year review required by the ESA (2022 Beluga Whale – Cook Inlet FPS 5-Year Review: Summary and Evaluation[52]) found that the DPS has not met the minimum demographic criteria specified in the recovery plan for reclassification from Endangered to Threatened. Prior to 1980, the population was estimated to be at a high of 1,300 whales (NMFS 2008). Cook Inlet belugas primarily occur in the central and northern portion of Cook Inlet. The best estimate of abundance for the Cook Inlet beluga whale population from the aerial survey data for 2022 is 331 whales (Goetz et al. 2023). Over the most recent 10-year time period (2012-2022), the estimated trend in the abundance estimates shows a slight increase of 0.2% per year (Goetz et al 2023). In summer 2023, researchers observers anecdotally reported a greater than average number of neonate belugas observed during August fieldwork; however, quantitative data on 2023 young-of-the-year calves is not yet available. The potential biological removal rate (PBR) for a marine mammal stock is defined under the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population and is determined by the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: PBR = $N_{MIN} \times 0.5R_{MAX} \times F_R$. The recovery factor ($F_R$) for this stock is 0.1, the value for cetacean stocks that are listed as endangered. Using the N_{MIN} of 267 beluga whales, the calculated PBR for this stock is 0.53 beluga whales (267 × 0.02 × 0.1) (Young et al. 2023).

[52] https://media.fisheries.noaa.gov/2022-09/cibw-5-year-review-2022.pdf

NMFS will consult on the potential effects of this action on ESA-listed species under Section 7 of the ESA.

Based on the best scientific information available of the ecology and natural history of Cook Inlet beluga whales and their conservation needs, NMFS determined the following physical or biological features (PBFs)[53] are essential to the conservation of this species (76 FR 20179[54]):

1. Intertidal and subtidal waters of Cook Inlet with depths less than 30 feet (MLLW)(9.1 m) and within 5 miles (8 km) of high and medium flow anadromous fish streams.
2. Primary prey species consisting of four species of Pacific salmon (Chinook, sockeye, chum, and coho), Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole.
3. Waters free of toxins or other agents of a type and amount harmful to Cook Inlet beluga whales.
4. Unrestricted passage within or between the critical habitat areas.
5. Waters with in-water noise below levels resulting in the abandonment of critical habitat areas by Cook Inlet beluga whales.

NMFS has designated more than one third of Cook Inlet as Cook Inlet beluga whale DPS critical habitat (Figure 3-2, 76 FR 20180, April 11, 2011). Pacific salmon are one of the PBFs of the Cook Inlet beluga whale's critical habitat. As a PBF, NMFS concluded that availability of and access to salmon are essential to the conservation of the Cook Inlet beluga whale and a reduction in prey sufficient to meet metabolic needs is one of 10 threats outlined in the 2016 Recovery Plan for Cook Inlet Belugas (NMFS 2016b).

This analysis focuses on direct take (as a result of gear or vessel interaction) of belugas in the Cook Inlet drift gillnet fishery and indirect take through the reduction of prey availability through salmon fishery removals. These were the potential impacts on belugas from salmon fisheries identified in the Recovery Plan for the Cook Inlet beluga whale (NMFS 2016b) that are applicable to this action. The largest fisheries in Cook Inlet, in terms of participant numbers and landed biomass, are the State-managed salmon drift and set gillnet fisheries concentrated in the Central and Northern districts of Cook Inlet. Only the drift gillnet fishery occurs in the Cook Inlet EEZ. Fishery operation times change depending upon fishery and salmon management requirements, but in general, the drift gillnet fishery operates from late June through August. Belugas in Cook Inlet have been documented feeding on salmon (Chinook, chum, coho, and sockeye) from June to September, when the salmon fisheries occur, as well as later into the November.

Incidental Take: Beluga distribution overlaps with the entire action area, although there is little overlap temporally with the fishing activities under this proposed action. Belugas remain year-round in Cook Inlet but demonstrate seasonal movements within the Inlet. During the summer and fall, beluga whales generally occur in shallow coastal waters and are concentrated in the northern district of Upper Cook Inlet near the Susitna River mouth, Knik Arm, Turnagain Arm, and Chickaloon Bay. Belugas do spend some time in the central district just south of Kalgin Island around the Kenai and Tuxedni Rivers in the summer months, but they are more likely to be present there from mid-August through May. Historical reports indicate Cook Inlet belugas used the Kenai and Kasilof Rivers year-round (Ovitz 2019), but recent observations indicate that they now only forage in these rivers from late August to early May (Ovitz 2019, AKBMP 2023, NMFS unpublished data).

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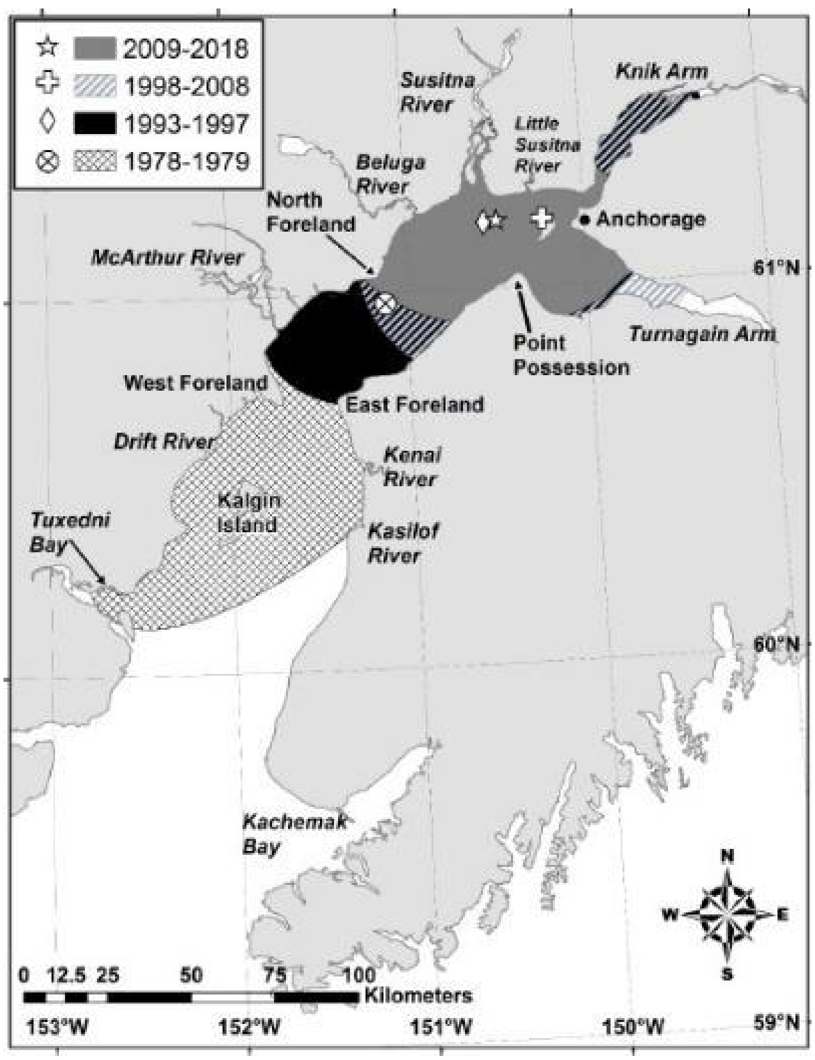
[53] The designation(s) of critical habitat for Cook Inlet beluga whales use(s) the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (81 FR 7414; February 11, 2016) replaced this term with physical or biological features (PBFs). In this analysis, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

[54] https://www.federalregister.gov/documents/2011/04/11/2011-8361/endangered-and-threatened-species-designation-of-critical-habitat-for-cook-inlet-beluga-whale

During winter, Cook Inlet belugas are more often in deeper waters in the mid and lower Cook Inlet. There have been several recent observations in the Kachemak Bay area, a part of their historical range with sightings in July and acoustic signatures in November (V. Gill pers comm). Information on Cook Inlet beluga distribution, including aerial surveys and acoustic monitoring, indicates that the species' range in Cook Inlet has contracted markedly since the 1990s. This distributional shift and range contraction coincided with the decline in abundance. Beginning in 1993, aerial surveys have been conducted annually or biennially in June and August by NMFS AFSC Marine Mammal Laboratory. Historic aerial surveys for beluga whales were also completed in the late 1970s and early 1980s. Results indicate that prior to the 1990s belugas used areas throughout the upper, mid, and lower Inlet during the spring, summer, and fall. While the surveys in the 1970s showed whales dispersing into the lower inlet by mid-summer, the majority of the population is now found in northern Cook Inlet from late spring into the fall (Shelden and Wade 2019). The reason for this range contraction is unknown. Potential explanations include changing habitat, prey concentration, predator avoidance, or displacement from preferred feeding grounds due to human activities.

Figure 3-1 Summer range contraction of Cook Inlet belugas over time as indicated by ADF&G and NMFS aerial surveys.



Note: Adapted from Shelden and Wade (2019). The distribution of belugas around each central location (shaded regions next to symbols) for each period was calculated at 2 standard deviations (SD; capturing ca. 95% of the whales). The 95% core summer distribution contracted from 7,226 sq. km in 1978–79 to 2,110 sq. km in 2009–18 (29% of the 1978–79 range).

Incidental Take in Commercial Salmon Fisheries: NMFS implemented the AMMOP, a rotational observer program to identify potential interaction ‘hot spots’ among State-managed commercial salmon fisheries in Alaska. With the heightened concern in Cook Inlet for belugas, the program observed two Cook Inlet fisheries in 1999 and 2000, the Cook Inlet salmon drift gillnet fishery and the upper and lower Cook Inlet set gillnet fishery. Manly (2006) reported that the Cook Inlet drift gillnet fishery had a total of 5,709 permit days (one permit fished for one day) of fishing in 1999 and 3,889 permit days of fishing in 2000, with all or part of 241 permit days of fishing observed for both years. No interactions with belugas were reported in the Cook Inlet salmon fisheries in 1999 and 2000 (Manly 2006). Additionally, no other direct takes of Cook Inlet beluga whales in the Cook Inlet salmon drift gillnet fishery have been reported. The proposed action is focused on the Cook Inlet EEZ, where vessel distribution is more dispersed than in the nearshore fishery. The EEZ fishery occurs farther away from beluga preferred summer feeding locations in rivers and nearshore habitats in the northern district. The Recovery Plan for the Cook Inlet Beluga Whale (NMFS 2016b) concluded that the current rate of direct mortality from incidental take (entanglement) due to commercial fisheries in Cook Inlet appears to be insignificant and should not delay recovery of these whales (NMFS 2016b).

Vessel Noise: The Recovery Plan for the Cook Inlet Beluga Whale (NMFS 2016b) identified anthropogenic noise as a high concern among potential threats. An assessment of noise sources in Cook Inlet (Castellote et al. 2019) indicates that anthropogenic noise occurring in some of the most important habitat has the potential to mask beluga whale communication and hearing, and the potential reduction of communication and echolocation range is considerable. Vessels and vessel noise associated with the proposed action would have a transitory and short-term presence within the action area, because the Cook Inlet drift gillnet fishery is generally open only two 12-hour periods per week, although some extensions may be granted. Beluga whales are typically not present in the fishing area during the fishing season, except for rare instances at the very end of the fishing season (after mid-August) when very few boats (most often fewer than 10) are still fishing and under Federal management the EEZ would be closed by this time. Fishing that is occurring under status quo during this time is on the far west side of Cook Inlet in Area 4. It is not anticipated that Cook Inlet belugas will be exposed to a noticeable increase in vessel noise during fishing operations due to the expectation that noise will not differ noticeably from status quo and the low likelihood of spatial and temporal overlap between the fishery and belugas. Therefore, any effects on belugas from a change in vessel noise is likely to be too small to detect and therefore insignificant.

Reduction of Prey: Aside from incidental take and disturbance associated with fishing activities, fisheries may compete with beluga whales in Cook Inlet for salmon and other prey species. The following information is summarized from the Recovery Plan for the Cook Inlet beluga whale (NMFS 2016b). In the summer, as eulachon runs begin to diminish, belugas rely heavily on several species of salmon as a primary prey resource. There is strong indication beluga whales are dependent on access to relatively dense concentrations of high value prey throughout the summer months. Diminishment in the ability of beluga whales to reach or utilize spring/summer feeding habitat, or reductions in the amount of prey available, may impact the energetics of these animals and delay recovery. Feeding habitat occurs near the mouths of anadromous fish streams, coinciding with the spawning runs of returning adult salmon. These habitats may change quickly as each species of salmon, and often each particular river, is characterized as having its individual run timing.

Belugas feed on salmon largely in rivers or at river mouths in the northern district. The Susitna, Little Susitna, Beluga, Eagle, Ship Creek, 20-Mile, Placer, Portage, Chickaloon, McArthur, and Tuxedni rivers have been identified as particularly important for beluga feeding in Cook Inlet. The Kenai and Kasilof rivers are not currently used by foraging belugas early May until late August, but were utilized all year prior to the mid 1990’s (Ovitz 2017). While the commercial salmon drift gillnet fishery in the EEZ is geographically removed from those feeding areas, it intercepts salmon on their way to these areas. As noted in Section 4.5.1.2.3 of the RIR, an average of 47% of the total salmon removals by the drift gillnet fishery may occur in the EEZ. The drift gillnet fishery in State waters likewise does not occur in the northern district, but also may intercept salmon on their way to those more northern rivers where belugas feed in the summer. The current State Salmon Management Plan, which oversees Cook Inlet fisheries in the lower, middle, and northern districts includes provisions for setting escapement goals as part of the management tools to support the sustained harvest and productivity of salmon in Cook Inlet. The salmon that escape being caught in the fishery and are able to move into rivers to reach spawning grounds are assumed to have also been available to belugas prior to escapement, as long as access to the prey is not impeded[55]. The State actively manages the salmon fisheries inseason to meet escapement goals or indices for each stock, opening and closing the fishery throughout the season, presenting many opportunities for adequate numbers of salmon to reach their spawning streams in high density. The State also uses “in-river” goals in some systems to ensure periods of high-density escapement to provide for freshwater fisheries. This provides additional opportunity for belugas to potentially access salmon in excess of the escapement goal prior to harvest in freshwater fisheries. However, in situations where escapement of a stock is not directly monitored but assumed to be represented by a closely related index stock, there is increased uncertainty about the abundance of the stock and subsequent adequacy for beluga energetic needs. There also are salmon hatcheries operating in Cook Inlet, which have measurably added to the numbers of adult fish returning to upper Cook Inlet.

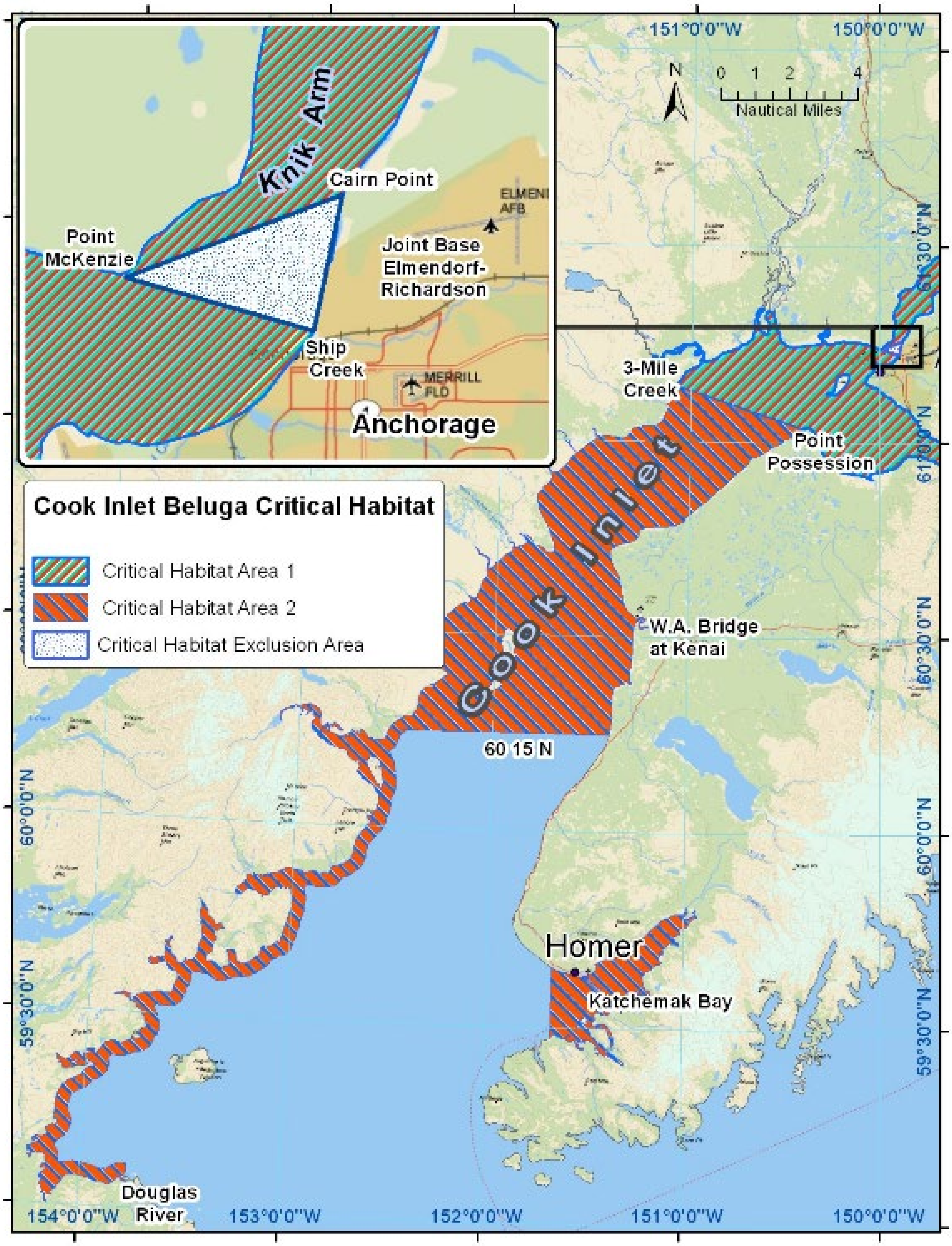
While known salmon escapement numbers and commercial harvests have fluctuated widely throughout the last 40 years, samples of harvested and stranded beluga whales have shown consistent summer blubber thicknesses, suggesting adequate availability of prey (NMFS 2008). However, there is no contemporary data on that and recent studies have shown that malnutrition has been a cause of death in about 8% of carcasses where death could be determined (McGuire et al 2021, Burek-Huntington et al 2015). The exact quantity and density of salmon needed to allow belugas to forage efficiently and sufficiently enough to thrive is not well known. Feeding efficiency would necessarily vary according to individual whale sex, age, size, time of year, state and stage of pregnancy, and a number of other factors. Recent studies have begun to address gaps in understanding of beluga metabolic needs. A recent study using stable isotopes on historical and recent beluga bone samples suggests that the diets of Cook Inlet belugas have shifted over time (i.e., since the 1980s) to a diet influenced more by freshwater prey (Nelson et al. 2018). The cause of this dietary shift is unknown, but appears to have begun before the documented population decline. Another recent study found that sea surface temperature and prey availability were weakly correlated with modeled fecundity and survival rates (Warlick et al. 2022, PhD Dissertation) and similarly, McHuron et al. 2023 found fitness trade-offs at various energy input thresholds, where individuals who obtained 75% of their baseline summer energetic requirements were generally able to compensate with increased fall foraging, whereas at 50% obtainment of summer energetic values, individuals were not as likely to be able to compensate with increased fall foraging. McHuron et al. 2023, also repeatedly pointed out the importance of the spring eulachon run for CIBWs, as it provides a buffer against later season fluctuations in prey availability. It is also their first abundant fish run to feed upon following winter. John et al. (2023) took a more granular approach and investigated the calculated daily energetic requirements of CIBWs and found that an individual beluga whale on average would need to consume approximately four Chinook “king” salmon (Noren, 2010) per day. By comparison, the individual whale would require 16 Chum salmon (Noren, 2010), nine Sockeye salmon (Davis et al., 1998), seven Coho salmon (Davis et al., 1998), or 19 Pink salmon (Davis et al., 1998) per day due to the difference in caloric value of the fish. Continued research into beluga stomach and fatty acid analyses and Cook Inlet beluga whale population demographics may shed more light on overall feeding and prey requirements for these whales. Further, if funds are available, NMFS would seek to support augmentation

[55] Commercial, subsistence and personal use fisheries can imped beluga access to rivers during runs of salmon and eulachon both in the Susitna Delta and in the Kenai and Kasilof rivers (pers comm. AKRO PRD 2023)

of salmon escapement monitoring in unmonitored rivers, including those used for foraging by belugas, under a Cooperative Agreement with the State.

NMFS has recognized and acknowledged that the current management structure of the salmon fisheries has generally provided for the sustained harvest and productivity of salmon in Cook Inlet (76 FR 20180, April 11, 2011). The Recovery Plan for the Cook Inlet Beluga Whale concludes that it is unknown whether competition with commercial fishing operations for prey resources is having a measurable effect on Cook Inlet beluga whales (NMFS 2016b), however recent modeling efforts have suggested that fecundity and survival rates of Cook Inlet belugas are likely affected by prey abundance and oceanographic conditions (A. Warwick Dissertation, 2022). While the reason or reasons for the lack of recovery of Cook Inlet beluga whales are unknown, there is currently no information available to definitively conclude that the lack of recovery is linked to insufficient prey, specifically salmon, availability however there are suggestions it has the potential to (see McHuron et al. 2023, Norman et al. 2020). A consultation under Section 7 of the ESA will be conducted to assess the potential effects of this action on Cook Inlet belugas and their designated critical habitat.

Figure 3-2 Cook Inlet Beluga Critical Habitat. NMFS Alaska Region



3.3.1.1. Impacts of the Alternatives on Cook Inlet Beluga

The impacts of Alternative 1, status quo, on Cook Inlet beluga whales are summarized in Section 3.3. No changes to the management or the overall annual progression of the fishery are expected under

Alternative 1. There is no known direct incidental take (i.e., entanglement) of Cook Inlet belugas in the Cook Inlet drift gillnet or saltwater recreational fisheries under existing conditions, and this would not be expected to change without modifications to fishery management. Additionally, removals of salmon by the fishery would be expected to remain within the recently observed ranges (Section 3.1.1). The current level of fishery removal is not currently known to be a threat to Cook Inlet belugas. Additionally, for some key rivers where beluga currently feed, escapement is estimated through the use of indices rather than direct monitoring. The use of indices rather than direct monitoring of escapement may not provide a clear assessment of the prey densities available to belugas in those rivers.

Alternative 2 would delegate management of the Cook Inlet EEZ salmon fishery to the State of Alaska. This is not expected to result in significant changes relative to State management of salmon stocks under the status quo. Fishing seasons, closed areas, management area, district, subdistrict, section, statistical area boundaries, and inseason management are all measures that would be delegated to the State and are not expected to change significantly. Distribution of the fishing effort in the Cook Inlet EEZ and State waters is described in Section 4.5.1.2.3 of the RIR. Alternative 2 is not expected to impact the temporal or spatial distribution of fishing effort. As the spatial and temporal distribution of the fishery and gear utilized would not change, Alternative 2 would maintain the existing risk profile for direct and indirect incidental take of Cook Inlet belugas, which is considered to be zero or near zero. Therefore, Alternative 2 is not expected to result in a change to the direct incidental take level of Cook Inlet belugas. Monitoring options presented in Section 4.7.2.2, or the AMMOP, could be used to obtain updated information about direct incidental take for the fishery.

As noted in Section 3.3.1, availability of salmon as prey for Cook Inlet belugas is identified in the Cook Inlet Beluga Whale Recovery Plan as a primary biological need to recover and sustain the Cook Inlet beluga population and reduction in prey is one of 10 threats of concern listed in the plan. Removals of salmon under Alternative 2 are summarized in Section 3.1.2. The application of proposed SDC and ACLs to removals that have occurred under State management of the fishery suggest that State management has been appropriate for the conservation of FMP salmon stocks. Given this, it is likely that salmon removals will remain within or below the previously observed ranges. As Alternative 2 would maintain or marginally reduce levels of salmon harvest in the EEZ compared to the status quo, it is not expected to have a significant impact on prey availability to Cook Inlet belugas. There may be some beneficial effect to belugas if salmon harvest is reduced under Alternative 2, resulting in more salmon available to belugas feeding in the northern district in summer months. It is important to note that information about the harvest and escapement of Cook Inlet salmon stocks is expected to improve over time under Alternative 2 due to additional Federal review and resources. This could provide additional information to better evaluate the adequacy of salmon availability for Cook Inlet belugas. Of particular note, for some key rivers where beluga currently feed, escapement is estimated through the use of indices rather than direct monitoring. Improved understanding of actual escapement through direct monitoring rather than the use of indices for those rivers may provide a more reliable assessment of whether beluga energetics are being met.

Alternative 3 would result in Federal management of the Cook Inlet EEZ salmon fishery without any delegation of management authority to the State. Two potential management outcomes could occur under Alternative 3. First, if MSA-compliant management measures are not in place, or the management uncertainty is too great to allow for the fishery to be opened, then the Cook Inlet EEZ would be closed to commercial salmon fishing. Depending on the reason for the closure, recreational fishing may still be allowed in the EEZ because retention of stocks of concern could be prohibited (i.e., catch and release) while still allowing for focused harvest on stocks with a harvestable surplus. This would result in all commercial salmon harvest occurring in State waters. This would move additional fishery effort into nearshore waters, including those that have been documented as particularly important for Cook Inlet belugas. However, the data that are currently available on fishery incidental takes of Cook Inlet belugas has not documented any take by the drift gillnet or saltwater recreational fisheries in either State or EEZ waters. Under this outcome, Alternative 3 is not expected to result in a change to the direct incidental take level of Cook Inlet belugas, particularly as some additional effort in State waters would be expected to occur near the EEZ boundary (i.e., similar to status quo). Regarding prey availability under Alternative 3, it is expected that overall fishery removals would be similar or marginally less than status quo removals. There may be practical or logistical constraints that limit the amount of salmon harvested in the compressed time and space that salmon are available to the fishery in State waters that may result in larger salmon escapements when the EEZ is closed to commercial salmon fishing for all or a significant portion of the season. This would maintain salmon abundance at or above existing levels that have not yet been shown to be insufficient for Cook Inlet beluga whales. If the change in beluga summer distribution away from historical feeding areas, such as the mouth of the Kenai River, is associated with human activities including commercial fishing, additional fishing effort inside State waters in such areas as a result of this alternative may further preclude access, should belugas attempt to return to those foraging grounds. Such a shift in beluga distribution is not anticipated under any of the alternatives, especially as recent studies have shown a contraction in range for belugas (Shelden and Wade, 2019). If there are decreased harvests of salmon stocks headed through the EEZ toward the northern Cook Inlet rivers, where belugas currently concentrate during summer salmon runs, this could benefit Cook Inlet belugas with increased salmon availability in the Northern Cook Inlet beluga foraging areas. There is not currently information available to assess the impact of this potential spatial shift of fishery effort to nearshore waters that may occur in some years and not others on the adequacy of salmon density for efficient beluga foraging in these habitats. Possible impacts on belugas from permanently closing the EEZ to the drift gillnet fishery in the EEZ are provided in the discussion of the impacts under Alternative 4 below. It is noted here that the difference in impacts on belugas between a permanent closure under Alternative 4 and occasional closures from year to year under Alternative 3 cannot at this time be precisely predicted beyond the results from presumed changes to State management and the fleet behavior and the resulting impacts to harvest levels as described in Sections 4.7.1.3 and 4.7.1.4.

The second outcome under Alternative 3 would be a federally managed salmon fishery that occurs in the Cook Inlet EEZ. This fishery would occur using the same gear type and within the same absolute boundaries as the Cook Inlet EEZ drift gillnet fishery has historically occurred in. Given the scientific and management uncertainty associated with using a pre-season forecast to manage the fishery required under a Federal system without delegation to the State, commercial fishing effort and salmon removals in the Cook Inlet EEZ, where catch rates of Northern District salmon stocks by the drift gillnet fleet are highest may be reduced in some years, and it is likely that total removals in the EEZ will be close to status quo harvests or slightly below status quo harvests on average. Little or no change to fishing location and harvest by the recreational fishery (estimated total annual average EEZ harvest of approximately 66 salmon) are expected. There may be some beneficial effect to belugas if EEZ salmon harvest is reduced under Alternative 3, resulting in more salmon available to belugas feeding in the northern district in summer months. In years when the drift gillnet fishery in the EEZ does not close until August 15, the drift gillnet fleet in the Cook Inlet EEZ may harvest an increased proportion of Northern District salmon stocks relative to the status quo. However, while the concurrent State drift gillnet fishery, as well as other salmon fisheries, in Cook Inlet could still harvest salmon that are surplus to the escapement goal, the commercial fishery season length in the EEZ could have impacts to prey availability for Cook Inlet belugas. A longer EEZ commercial fishing season, while likely maintaining similar levels of total removals, could harvest a greater proportion of salmon that would otherwise be available to Cook Inlet belugas. Under status quo management, fishery harvest is generally intended to ensure Northern District salmon stocks pass through the EEZ, which also results in them passing through Cook Inlet beluga foraging areas.

No direct or indirect takes are documented in available data on commercial salmon drift gillnet fishery interactions with Cook Inlet belugas, including State waters. Therefore, as alternative 3 is expected to maintain or slightly reduced status quo harvest and effort in the EEZ drift gillnet fishery alternative 3 is not expected to result in a change in direct or indirect takes of Cook Inlet belugas.

Alternative 4 would result in Federal management of the Cook Inlet EEZ and prohibit commercial salmon fishing in the area. This action would result in all Cook Inlet salmon commercial fishery effort occurring in waters from 0–3 NM from shore. The data that are currently available on fishery incidental takes of Cook Inlet belugas have not documented any take by the drift gillnet fishery in State waters. Therefore, Alternative 4 is not expected to result in a change to the direct incidental take level of Cook Inlet belugas.

Regarding prey availability under Alternative 4, it is expected that fishery removals would be lower than under existing conditions. There are practical, logistical, or management constraints that limit the amount of salmon harvested in the compressed time and space that salmon are available to the fishery in State waters that may result in larger salmon escapements (see Section 3.1.3). Reductions of harvests on salmon stocks migrating through the EEZ toward the northern Cook Inlet rivers, where belugas currently concentrate during summer salmon runs, could have benefits to Cook Inlet beluga prey availability. However, significant changes in the abundance of salmon stocks are not expected. This would maintain salmon abundance at or above existing levels that have not been found to be insufficient for Cook Inlet beluga whales. If the change in beluga summer distribution away from historical feeding areas, such as the mouth of the Kenai River, is associated with human activities including commercial fishing, additional fishing effort inside State waters in such areas as a result of this alternative may further preclude access, should belugas attempt to return to those foraging grounds. Such a shift in beluga distribution is not anticipated under any of the alternatives.

As noted in Section 4.7.1.4, salmon drift gillnet vessels displaced by a permanent EEZ closure would have the options of ceasing to fish or relocating their fishing activities to State waters in Upper Cook Inlet. However, a number of factors may potentially make it difficult for vessels to fully offset the loss of access to the EEZ by increasing effort inside State waters. If salmon drift gillnet vessels displaced by an EEZ closure shift their fishing effort to State waters in Upper Cook Inlet, areas with both displaced vessels and vessels that only fish in State waters may result in increased congestion. The combination of adverse effects on the profitability of fishing operations resulting from a permanent closure of the EEZ may cause the drift gillnet fleet size to shrink, as some fishermen may choose not to participate in the fishery and either retire or transfer to other areas. The effect of this potential outcome on endangered belugas would likely be decreased possibility of incidental take and an increase in prey availability.

Under Alternative 4, it is possible that the BOF would amend the Central District Drift Gillnet Fishery Management Plan to compensate the drift gillnet fleet for closure of the Cook Inlet EEZ. For example, the BOF could direct ADF&G to provide drift gillnet fishing opportunity in Drift Gillnet Area 2. This would likely result in increased harvest of Susitna River, Knik Arm, and Matanuska River stocks relative to circumstances under which that area stayed closed when the EEZ is closed to drift gillnet fishing. However, if fishing in Area 2 occurred concurrent to closure of the EEZ to drift gillnet fishing, the total level of harvest of Susitna River, Knik Arm, and Matanuska River stocks would not be expected to be higher compared to status quo with the EEZ open to drift gillnet fishing change, since escapement goals for those rivers would not change. Therefore, the impact on belugas by reducing prey availability in those rivers where belugas do forage in the summer would likely be no change from status quo.

As Alternative 4 is expected to result in lower harvests by the drift gillnet fleet, the harvests of other user groups, including set gillnet, sport and personal use could increase and/or overall levels of escapement could increase. However, it is not possible to estimate the magnitude of the harvest shift to these other user groups because of the complexities of Upper Cook Inlet mixed-stock fisheries and intertwined State management/allocation plans. For example, the Upper Subdistrict and Northern District set gillnet fisheries may see increased harvests of sockeye salmon if the EEZ were closed to fishing with drift gillnet gear, but they may not be able to fully utilize this benefit in years when set gillnet fisheries are restricted to conserve Chinook or coho salmon (Appendix 13). However, the re-allocation to other user groups may occur, the escapement goals for those rivers would remain and no additional impacts to Cook Inlet belugas compared to status quo would be expected.

3.3.2. Steller Sea Lions

The Steller sea lion range extends from California and associated waters to Alaska, including the GOA and Aleutian Islands, and into the Bering Sea and North Pacific and into Russian waters and territory. In 1997, based on biological information collected since the species was listed as threatened in 1990 (60 FR 51968), NMFS reclassified Steller sea lions as two distinct population segments under the ESA (62 FR 24345). The Eastern Distinct Population Segment (EDPS) of Steller sea lion (east of 144° W. longitude, a line near Cape Suckling, Alaska) was delisted in 2013 (78 FR 66140, November 4, 2013). The Western Distinct Population Segment (WDPS) Steller sea lion (west of 144° W. longitude) is currently listed as endangered. All Steller sea lions present in Cook Inlet are assumed to be from the endangered WDPS.

NMFS designated critical habitat in 1993 (58 FR 45278) for the WDPS of Steller sea lion based on the Recovery Team's determination of habitat sites essential to reproduction, rest, refuge, and feeding. Listed critical habitats in Alaska include all rookeries, major haul-outs, and specific aquatic foraging habitats of the BSAI and GOA. Neither the upper Cook Inlet drift gillnet fishery nor the saltwater recreational fishery in upper Cook Inlet overlap designated critical habitat for Steller sea lions; therefore, we do not expect any effects to critical habitat from any of the alternatives.

The Cook Inlet drift gillnet fishery occurs in the northeastern portion of the GOA, in the range of the WDPS of Steller sea lions. The following information on Steller sea lion interactions with the drift gillnet fishery is summarized from the most recent Alaska Marine Mammal Stock Assessment (Muto et al 2022), the 2010 biological opinion on the effects of fisheries managed under the GOA and BSAI FMPs (NMFS 2010) and the 2014 biological opinion on the effects of fisheries in the Aleutian islands on Steller sea lions (NMFS 2014). The 2010 BiOp provided a review of the State managed salmon fisheries, including:

- A description of the fishery management strategy including any special measures pertaining to Steller sea lions;
- Recent changes in the spatial and temporal distribution of the fisheries; and
- A description of direct and indirect Steller sea lion interactions.

It is expected that the Cook Inlet drift gillnet and recreational salmon fishery could have the potential for the following impacts on Steller sea lions:

Incidental Take: No incidental takes of Steller sea lions have been observed in the Cook Inlet drift gillnet fishery. The Cook Inlet drift gillnet fishery is thought to have the potential to interact with Steller sea lions, however, no takes have been reported by observers and no additional information on interactions is available (Table 3-16, Kruse et al. 2000, Ferrero et al. 2000). Steller sea lions are also known to depredate on salmon hooked on recreational hook and line gear. If the Steller sea lion becomes internally hooked while depredating, this results in take. There were no report of incidental takes of Steller sea lions in the Cook Inlet recreational fishery from 2016-2020 (Freed et al. 2022).

Reduction of Prey: Potential indirect effects of State managed fisheries include the competition for prey resources and the modification of Steller sea lion critical habitat. Prey items which occurred in greater than 10% of the Steller sea lion scats by area, season, and DPS-wide were determined to be important prey species. Salmon, pollock, and Pacific cod were identified as important prey species. Salmon was ranked fairly high— often higher than Pacific cod or pollock depending upon area and season. Salmon are high-energy forage species that may be seasonally important components of the diet of Steller sea lions. Salmon fisheries remove important Steller sea lion prey species, and many fisheries are concentrated in space (usually bays or river outlets) and in time (usually spawning aggregations and salmon congregating near rivers for their return to spawning grounds in spring and summer).

To date, there have been few studies specifically designed to address the effects of the salmon fisheries on Steller sea lions. Soboleff (2005) analyzed State fisheries (salmon, herring, shellfish, groundfish) fish ticket data for 1976–2002 and Steller sea lions counts by rookery (32) groupings (7). He indicated that within 50 nm of rookeries, Steller sea lion counts were both negatively and positively correlated with certain State fisheries, but few were significant and some probably spurious. This study also found negative correlation between State salmon fisheries and the Steller sea lion decline across all regions or all years, which disappeared at a regional scale. Soboleff (2005) felt this could be plausible as some salmon fisheries occur near Steller sea lion haulouts and rookeries and salmon are important Steller sea lion prey. The study concluded that few data, low power, and concentration of State fisheries outside areas where Steller sea lions declines have been most severe all may be factors that indicate a low likelihood of State-managed fisheries adversely affecting Steller sea lions. No additional studies have specifically evaluated the relationship between the Cook Inlet drift gillnet fishery or Alaskan salmon fisheries and Steller sea lions. However, a more recent study did not find a strong relationship between groundfish fisheries and condition of Steller sea lions (Hui et al. 2015). Data availability and challenges with variable selection do make inferences from these prey availability studies potentially difficult to determine with certainty (Conn et al. 2014).

The early summer salmon fisheries could affect Steller sea lions during an important weaning period for juveniles and leading up to the birth of pups. Due to intensive salmon fishing activity in such areas during the same times when Steller sea lions target concentrations of salmon, individual Steller sea lions may feed less efficiently or may avoid these feeding opportunities entirely. The commercial salmon fisheries in upper Cook Inlet occur from late June to early September, while the saltwater recreational salmon fisheries in Upper Cook Inlet run from May to September. Geographically, the upper Cook Inlet salmon fisheries take place after the salmon stocks have passed by major Steller sea lion rookeries and haulouts. The salmon escapement goals limit the commercial harvest to the surplus above the amount needed for spawning (Kruse et al. 2000), but these harvest controls probably do not eliminate competition for available salmon between Steller sea lions and the fishery.

The State employs various management measures that indirectly provide some measure of protection to Steller sea lions. All waters within 3 nm of shore within Steller sea lion rookery critical habitat are closed to vessel entry, including vessels fishing under the State programs. State managed salmon fisheries are open for relatively short periods, and only rarely remain open for 24 hours per day, 7 days per week (Kruse et al. 2000). In Cook Inlet, the drift gillnet fishery is generally open for two 12-hour periods each week, with the ability to add one additional 12-hour opening in years of high salmon abundance during mid-July (Table 4-2). This allows for pulses of high-density salmon passage and escapement during closed periods. Nevertheless, a portion of the fishery takes place at stream or river outlets where salmon congregate before moving upstream to spawn (Kruse et al. 2000). These same areas may provide important Steller sea lion foraging opportunities on high-density prey, enabling the Steller sea lions to feed efficiently and survive other periods of low prey availability.

The 2010 BiOp concluded based on available information that State managed salmon fisheries are likely to continue to compete for fish with foraging Steller sea lions. Given the importance of near shore habitats to Steller sea lions, this competition for fish may have consequential effects for animals that forage in locations where State fisheries may be prosecuted. More data on the foraging habits of Steller sea lions from research in key geographic areas could aid understanding of where and when these effects might be most important. The 2010 BiOp identified as a research priority the re-initiation of Marine Mammal Observer Program studies in the GOA to assess the significance of mortality incidental to Category II commercial fisheries with special emphasis placed on evaluating mortalities associated with the Prince William Sound salmon drift gillnet fishery.

In the 2014 BiOp, NMFS concluded based on available information that State managed fisheries for salmon may compete with foraging Steller sea lions for fish (NMFS 2014). Given the importance of near shore habitats to Steller sea lions and the nearshore execution of State fisheries, this potential competition may have consequential effects for sea lions. Specifically, these potential interactions may contribute to nutritional stress for Steller sea lions and may reduce the value of the marine portions of designated Steller sea lion critical habitat. State managed fisheries will likely continue to reduce the availability of prey within some marine foraging areas and may alter the distribution of certain prey resources in ways that reduce the foraging effectiveness of Steller sea lions. However, it is important to note that the upper Cook Inlet salmon drift gillnet fishery under consideration does not overlap with Steller sea lion critical habitat. More data on the foraging habits of Steller sea lions from research in this area could aid our understanding of potential impacts.

It is also important to note that salmon is one of many prey species eaten by Steller sea lions in the GOA. The long term trend (2006 to 2021) of Steller sea lion populations in the GOA is positive but the percentage rate of increase has flattened in the GOA (Sweeney et al. 2022). Declines in pups were observed between 2015 and 2017 and in 2019 there was a decline in non-pup counts in GOA (Sweeney et al. 2019, Muto 2022). It is possible that warming temperatures in the North Pacific Ocean are impacting pup production, juvenile survival, adult survival, and movement patterns, although the mechanisms are unknown (Sweeney et al. 2022).

3.3.2.1. Impacts of the Alternatives on Steller Sea Lions

The impacts of Alternative 1, status quo, on Steller sea lions are summarized in Section 3.3.2. No changes to the management or the overall annual progression of the fishery are expected under Alternative 1. As there is insignificant incidental take of Steller sea lions in the Cook Inlet drift gillnet and saltwater recreational fisheries under existing conditions, no modification would be expected under Alternative 1. Additionally, removals of salmon by the fishery would be expected to remain within the recently observed ranges (Section 3.1.1) that are not thought to be a definitive threat to Steller sea lions. Therefore, no significant impacts from Alternative 1 on Steller sea lions are expected.

Alternative 2 would establish Federal management of the Cook Inlet EEZ and delegate management of the Cook Inlet EEZ salmon fishery to the State of Alaska. This is not expected to result in significant changes relative to State management of salmon stocks under the status quo. Fishing seasons, closed areas, management area, district, subdistrict, section, statistical area boundaries, and inseason management are all measures that would be delegated to the State and are not expected to change significantly. As the spatial and temporal distribution of the fishery and gear utilized would not change, Alternative 2 would maintain the existing risk profile for incidental take of Steller sea lions. No takes of Steller sea lions by the Cook Inlet drift gillnet or the saltwater recreational fisheries have been reported or observed. Regarding the availability of salmon as prey for Steller sea lions, removals of salmon under Alternative 2 are summarized in Section 3.1.2. The application of proposed SDC and ACLs to removals that have occurred under State management of the fishery suggest that State management has been appropriate for the conservation of FMP stocks. Given this, it is likely that salmon removals will remain within the previously observed range that have not been found to have significant direct impacts on Steller sea lions. Furthermore, neither the Cook Inlet drift gillnet nor recreational salmon fishery occurs within 30 miles of major Steller sea lion rookeries or haul-outs, with the majority of the fishery occurring further away. Therefore, Alternative 2 would not have a significant impact on Steller sea lions.

Alternative 3 would result in Federal management of the Cook Inlet EEZ salmon fishery without any delegation of management authority to the State. Two potential management outcomes could occur under Alternative 3. First, if MSA compliant management measures are not in place, or the management uncertainty is too great to allow for the fishery to be opened, then the Cook Inlet EEZ would be closed to commercial salmon fishing, and potentially recreational salmon fishing. This outcome is not expected, but would result in all upper Cook Inlet commercial drift gillnet salmon harvest occurring in State waters. The data that are currently available on fishery takes of Steller sea lions have not documented any takes by the Cook Inlet drift gillnet fishery in State or Federal waters. Under this outcome for Alternative 3, it is expected that fishery removals would be less than existing conditions. As this alternative would maintain salmon removals at or slightly below existing levels, this option is not likely to have a significant impact on prey availability for Steller sea lions.

The second outcome under Alternative 3 would be a federally managed fishery that occurs in the Cook Inlet EEZ. This fishery would occur using the same gear type and within the same absolute spatial boundaries as existing conditions. Given the scientific and management uncertainty associated with using a pre-season forecast to manage the fishery required under a Federal system without delegation to the State, it is likely that there would be reduced fishing effort and salmon removals in the Cook Inlet EEZ, on average. However, the State waters drift gillnet fishery in Cook Inlet would still be able to harvest salmon that are surplus to the escapement goals. Therefore, this outcome would result in total amounts of fishing effort and salmon removals in Cook Inlet that are not significantly different from existing conditions. Neither outcome under Alternative 3 would move the fishery within 30 miles, or otherwise closer to major Steller sea lion rookeries or haul outs. This may increase the proportion of effort that occurs in State waters, but given that available data on fishery interactions with Steller sea lions, which included the State waters drift gillnet fishery found that there were no interactions, Alternative 3 is not expected to result in a significant increase in takes of Steller sea lions nor is it expected to reduce the abundance of salmon. Therefore, Alternative 3 is not expected to have a significant impact on Steller sea lions.

Alternative 4 would result in Federal management of the Cook Inlet EEZ and prohibit commercial salmon fishing in the area. The Cook Inlet EEZ would be closed to commercial salmon fishing, which would result in all upper Cook Inlet commercial drift gillnet salmon harvest occurring in State waters. The data that are currently available on fishery takes of Steller sea lions have not documented any takes by the Cook Inlet drift gillnet fishery in State or Federal waters. Alternative 4 would also not move the fishery within 30 miles, or otherwise closer to major Steller sea lion rookeries or haulouts. Regarding prey availability under Alternative 4, it is expected that fishery removals would be lower than existing conditions. As this option could result in salmon abundance at or above existing levels, this alternative is not likely to have a significant impact on prey availability for Steller sea lions.

3.3.3. Humpback Whales

Humpback whales were initially listed in 1969 with the Endangered Species Conservation Act, and maintained in the status of endangered when the ESA passed into law in 1973. On September 8, 2016, NMFS published a final rule that revised the listing of humpback whales under the ESA by removing the original, taxonomic-level species listing, and in its place creating 14 DPSs and listing four as endangered and one DPS as threatened (81 FR 62260). Critical habitat for humpback whale DPSs under U.S. jurisdiction was designated on April 21, 2021 (86 FR 21082). A Recovery Plan for Humpback whales has been adopted (NMFS 1991). The historic summering range in the North Pacific encompasses coastal and inland waters around the Pacific Rim from Point Conception, California, north to the GOA and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk. The humpback whale population in much of this range was considerably reduced as a result of intensive commercial exploitation during this century.

Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, it was concluded that whales feeding in Alaskan waters belong primarily to the Hawaii DPS (not listed), with small numbers from the Western North Pacific DPS (endangered) and Mexico DPS (threatened) individuals (Wade et al. 2016). In Cook Inlet, Hawaii DPS individuals are estimated to comprise 89 percent of the humpback whales present, Mexico DPS individuals to comprise 10.5 percent, and Western North Pacific DPS individuals to comprise 0.5 percent (Wade et al. 2016).

There is no designated critical habitat for humpback whales in Cook Inlet therefore we do not expect any effects to humpback whale critical habitat as a result of any of the alternatives.

NMFS has determined that for humpback whales, the mortality and serious injury incidental to commercial fishing operations will have a negligible impact (60 FR 45399; August 31, 1995). A 'negligible impact' is defined as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through an effect on annual rates of recruitment or survival. Section 7 consultation was completed on this determination, including issuance of an incidental take statement (ITS) for humpback whales for commercial fishing operations.

The current population trends for the three DPSs are as follows:

- Hawaii DPS has a calculated abundance of 11,278 and the maximum possible rate of increase is thought to be 7% per year.
- Mexico DPS has a calculated abundance of 2,241 and the maximum possible rate of increase is thought to be 6.6% per year.
- WNP DPS has a calculated abundance of 1,084 and the maximum possible rate of increase is thought to be 6.7% per year.

It should be noted that a North Pacific wide survey has not be conducted since 2006 and abundance estimates for these populations are considered out of date. Humpback whale populations were generally assumed to be increasing at the rates outlined above until 2015 when a decline in encounter rates, a decline of calfs in Prince William Sound, a large whale Unusual Mortality Event in the western Gulf of Alaska in 2015-2016, and a decline in abundance and calf production in Glacier Bay and Icy Straits occurred, potentially indicating that GOA wide decline may have occurred (SARS 2022).

Individuals from any of these three DPS of humpback whales may enter Cook Inlet to feed. This may occur at any time of the year but is most prevalent during the summer. Summer surveys of Cook Inlet in 2016 only encountered three humpback whales over the entire season in lower Cook Inlet (Renner et al. 2017), which is outside of the area where the upper Cook Inlet drift gillnet fishery occurs.

3.3.3.1. Impacts of the Alternatives on Humpback Whales

While there have been no reported interactions with the Cook Inlet drift gillnet or recreational salmon fishery and humpback whales, the 2019 Marine Mammal Stock Assessment (Muto et al. 2020) reports interactions between humpback whales and the Cook Inlet salmon set gillnet and purse seine fisheries, and the Southeast salmon drift gillnet fisheries. None of these fisheries are proposed to be managed by the FMP. None of the alternatives under consideration are expected to significantly change the drift gillnet gear used by the Cook Inlet drift gillnet fleet. Alternatives 1 and 2 are expected to maintain the spatial and temporal distribution of the fishery consistent with existing conditions. Alternative 3 will also maintain the outermost boundary of the fishery consistent with existing conditions but is likely to result in additional drift gillnet fishing effort in State waters due to more conservative EEZ catch limits under Federal management. Alternative 4 would result in all Cook Inlet drift gillnet fishing occurring in State waters. As there are no data indicating that humpbacks whales interact with the Cook Inlet drift gillnet or recreational fishery in either State or Federal waters, and their infrequent occurrence in upper Cook Inlet where the drift gillnet fishery occurs, none of the alternatives under consideration are expected to have a significant impact on humpback whales.

There is the possibility of prey reduction because humpback whales are known to consume juvenile salmon in some circumstances. However, there is limited potential for this interaction because humpback whales target juvenile salmon while the Cook Inlet drift gillnet fishery targets mature adult salmon and has no bycatch of juvenile salmon due to the large size of gillnet mesh used in the fishery. As none of the alternatives under consideration are expected to increase overall removals of Cook Inlet salmon, the number of spawning salmon and subsequent juvenile salmon abundance are not expected to decrease beyond the range previously observed. Furthermore, this potential competition for salmon prey is not likely to have a significant effect on humpback whales because salmon is one of many prey species eaten by humpback whales in the GOA.

3.3.4. Fin Whales

Fin whales are listed as endangered under the Endangered Species Act of 1973, and therefore designated as depleted under the MMPA. The Northeast Pacific stock is classified as a strategic stock under the MMPA. While reliable estimates of the minimum population size and population trends are available for a portion of this stock, much of the North Pacific range has not been surveyed. Therefore, the status of the stock relative to its Optimum Sustainable Population is not available. The minimum estimated mean annual level of human-caused mortality and serious injury for Northeast Pacific fin whales between 2014 and 2018 (0.6 whales) does not exceed the calculated PBR of 5.1 whales (Muto et al. 2021). The minimum estimated mean annual rate of U.S. commercial fishery-related mortality and serious injury (0 whales) is less than 10% of the calculated PBR (10% of PBR = 0.5) and, therefore, can be considered insignificant and approaching a zero mortality and serious injury rate (Muto et al. 2021).

The fin whale recovery plan (NMFS 2010b) identifies high density habitat as the northern GOA, southeastern Bering Sea, and along the Aleutian Islands in offshore waters depending on the season. Summer surveys of lower Cook Inlet in 2016 only encountered a single fin whale over the entire season (Renner et al. 2017). While takes of fin whales off the east coast of Canada and the US have been occasionally documented, it is noted that takes of fin whales by inshore fishing gear in the North Pacific only occur very rarely (NMFS 2010b).

One incidental mortality of a fin whale due to entanglement in the ground tackle of a commercial mechanical jig fishing vessel was reported to the NMFS Alaska Region in 2012 (Table 1; Helker et al. 2019). Because observer data are not available for this fishery, this mortality results in a mean annual mortality and serious injury rate of 0.6 fin whales in U.S. commercial fisheries in 2014-2018 (Table 1). They have been no documented interactions with the Cook Inlet salmon drift gillnet or recreational salmon fisheries.

3.3.4.1. Impacts of the Alternatives on Fin Whales

There have been no reported interactions between fin whales and the Cook Inlet drift gillnet or recreational salmon fishery, and it is uncommon for fin whales to move into upper Cook Inlet or other inshore waters. None of the alternatives under consideration will expand the outermost boundaries of where the Cook Inlet EEZ commercial salmon fishery can occur or increase total levels of fishery effort. Because of this, interaction between the Cook Inlet drift gillnet fishery in the EEZ and fin whales are unlikely.

Fin whales have not been documented consuming salmon. Therefore, the Cook Inlet salmon fisheries would not have any impact on prey availability for fin whales.

In summary, none of the alternatives under consideration will have a significant impact on fin whales.

3.4. Seabirds

Effects of fishing activity on seabirds occur through direct mortality from collisions with vessels and entanglement with fishing gear. Indirect impacts include competition with the commercial fishery for prey, alteration of the food web dynamics due to commercial fishery removals, disruption of avian feeding habits resulting from developed dependence on fishery waste, fish-waste related increases in gull populations that prey on other bird species, and marine pollution and changes in water quality. Competition between seabirds and fisheries for forage fish is difficult to evaluate. Climatic fluctuations undoubtedly contribute to fluctuations in seabird food resources, but so may fisheries.

Fish processing provides food directly to scavenging species such as Northern Fulmars and large gulls which may benefit their population. However, gulls often predate on other species' eggs and increases in their population size could be detrimental to other species. Predation by birds has effects on fish populations, which have variously been estimated as minor to significant.

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

Species Nesting in Alaska

Tubenoses-Albatrosses and relatives: Northern Fulmar, Fork-tailed Storm-petrel, Leach’s Storm-petrel
Kittiwakes and terns: Black-legged Kittiwake, Red-legged Kittiwake, Arctic Tern, Aleutian Tern, Caspian Tern
Pelicans and cormorants: Double-crested Cormorant, Brandt’s Cormorant, Pelagic Cormorant, Red-faced Cormorant
Jaegers and gulls: Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Bonaparte’s Gull, Mew Gull, Herring Gull, Glaucous-winged Gull, Glaucous Gull, Sabine’s Gull, Slaty-backed Gull
Auks: Common Murre, Thick-billed Murre, Black Guillemot, Pigeon Guillemot, Marbled Murrelet, Kittlitz’s Murrelet, Ancient Murrelet, Cassin’s Auklet, Parakeet Auklet, Least Auklet, Whiskered Auklet, Crested Auklet, Rhinoceros Auklet, Tufted Puffin, Horned Puffin, Dovekie
Eiders: Common Eider, King Eider, Spectacled Eider, Steller’s Eider

Species that visit Alaska waters

Tubenoses: Short-tailed Albatross, Black-footed Albatross, Laysan Albatross, Sooty Shearwater, Short-tailed Shearwater
Gulls: Ross’s Gull, Ivory Gull

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

Cook Inlet provides an important foraging and nesting habitat for millions of seabirds. Some of the more abundant species include: dark shearwaters (*Ardenna* spp., including *A.grisea* and *A. tenuirostris*), black-legged kittiwake (*Rissa tridactyla*), common murre (*Uria aalge*), pigeon guillemot (*Cepphus columba*), Kittlitz’s murrelet (*Brachyramphus brevirostris*), marbled murrelet (*B. marmoratus*), horned puffin (*Fratercula corniculata*), and tufted puffin (*F.cirrhata*) which combined make up 77% of seabirds counted during surveys in the region (Arimitsu et al. 2023). In addition to those species, two species of conservation concern occur in the GOA (Table 3-17). Short-tailed Albatross is listed as endangered and Steller’s Eider is listed as threatened. The short-tailed albatross is a larger rare species with a wide range over the North Pacific. There are three distinct populations of Steller's eider worldwide: two distinct Russian populations and the Alaska-breeding population. However, members of all three populations may occur at the same place and time depending on the season. The Alaska-breeding population is the only population of Steller's eider listed as threatened under the ESA, though it is not physically discernable from the two distinct Russian populations. The ESA protects the Alaska-breeding population of Steller's eider in Alaska waters and throughout its range. There have been no reported or observed interactions between these species and the Cook Inlet salmon drift gillnet fishery.

Table 3-17 ESA-listed seabird species that occur in the GOA

Common Name	Scientific Name	ESA Status
Short-tailed Albatross	Phoebaseotria albatrus	Endangered
Steller's Eider	Polysticta stelleri	Threatened

Previously, Kittlitz's Murrelet were listed as an ESA candidate species. However, USFWS lowered the listing priority for the species from a 2 (highest possible priority for the species) to an 8 (out of 12) (76 FR 66370, October 26, 2011), and then eventually removed Kittlitz's Murrelets from the ESA candidate list in 2013 (78 FR 61763, October 3, 2013). This change was based on growing doubts about severity of population declines and lack of a clear link between melting glaciers and population change. USFWS has shifted focus from the loss of glaciers to poor reproductive success. Poor nest success (as opposed to adult mortality) could be the underlying reason for the population decline, and if it is occurring range-wide, the population would be expected to continue to decline. USFWS maintains that loss of the adult Kittlitz's Murrelets is particularly important and has identified several sources of adult mortality such as hydrocarbon contamination, entanglement in gillnets, and predation. Although none of these sources of mortality alone rises to the level of a threat, in total, the chronic, low level loss of adults, in combination with evidence that a small proportion of the population is breeding, and the low reproductive success led the USFWS to conclude that it will be difficult for this species to maintain a stable population level or rebound from a stochastic event that causes population loss. The USFWS concludes that the magnitude of threat from these sources is low to moderate, depending on events that occur in a given year (number and location of oil spills/shipwrecks, number and location of gillnets) (76 FR 66370, October 26, 2011). There are no data or reports indicating that the Cook Inlet drift gillnet fishery is a cause of direct mortality for Kittlitz's Murrelets.

Prey for these species includes schooling fishes (capelin, Pacific sandlance, Pacific herring, and juvenile walleye pollock), zooplankton, and other invertebrates. The large gillnet meshes used in the Cook Inlet salmon drift gillnet fishery (5-7 inches) are not selective for these forage species. Therefore, the potential impacts of the Cook Inlet salmon drift gillnet fishery are limited to incidental take.

Potential marine bird interactions are of concern in the drift gillnet fishery, because of the high numbers of marine birds in Cook Inlet in the summer, perhaps as high as two to three million birds. Densities of up to 300 birds/km^2 have been reported. In particular, there is very high primary productivity around Kachemak Bay on the eastern side of Lower Cook Inlet, leading to high concentrations of birds.

3.4.1. Impacts of the Alternatives on Seabirds

The following analysis provides the best available information on seabird interactions with the Cook Inlet drift gillnet fishery. Under Section 118 of the MMPA, NMFS is required to monitor the rate of incidental take of marine mammals in commercial fisheries. To accomplish this, NMFS managed the Alaska Marine Mammal Program to observe State fisheries, including salmon gillnet fisheries, to estimate take of marine mammals. Observers for this program have also collected information related to seabird bycatch, but the study methodologies were designed for estimating marine mammal take, not seabird take. However, the seabird bycatch information collected by this program is the best available information we have to assess the potential impact of the Cook Inlet drift gillnet fishery on seabirds.

The Alaska Marine Mammal Observer Program for the Cook Inlet salmon drift gillnet fishery was implemented in 1999 and 2000 (Manly 2006). Observer coverage in the Cook Inlet drift gillnet fishery was low; 1.75% in 1999 and 3.73% in 2000. In 1999, the observed incidental take of seabirds consisted of Common Murres (three released dead) and gulls (two released alive without serious injuries). This extrapolated to an estimated take of 182.6 Common Murres and 121.7 gulls (Manly 2006). In 2000, the observed incidental take of seabirds was one Common Murre (released alive without serious injuries). This extrapolated to an estimated take of 31.2 Common Murres (Manly 2006). Although Kittlitz's Murrelets occur in Cook Inlet (Kuletz et al. 2011), none were noted by observers in 1999 or 2000. No Short-tailed Albatrosses or Steller's Eiders were encountered, which means they were not observed within 10m of active drift gillnets in this fishery. Although observer coverage rates were very low in this region for both years of the Alaska Marine Mammal Observer Program, these are the only quantifiable data we have for seabird bycatch in this area. This fishery has not been observed since 2000; therefore, no additional observer data are available.

While observer data indicate that the Cook Inlet drift gillnet fishery does result in some direct impact to seabirds, the estimated annual take (up to 182.6 Common Murres and 121.7 gulls) resulting from the fishery are not significant in the context of regional seabird populations numbering in the tens to hundreds of thousands. This indicates that impacts of the Cook Inlet salmon drift gillnet fishery on seabirds are not significant under existing conditions. Alternative 1 would maintain all existing conditions in the fishery, and therefore would not result in significant impacts to seabirds.

Alternative 2 would establish Federal management of the Cook Inlet EEZ with delegation of management authority to the State. It is expected that delegating management to the State would maintain existing levels of salmon removals, gear type, and fishing effort by time and area. This would maintain the existing risk profile for take of seabirds in the fishery which available information has determined to be minimal. Therefore, Alternative 2 would not have significant impacts on seabirds.

Alternative 3 would establish Federal management of the Cook Inlet EEZ with no delegation of management authority to the State. In some years, additional fishing effort may occur in State waters due to increased Federal management uncertainty and associated reductions in EEZ catch limits. Available information does not provide an understanding of whether previously documented interactions with seabirds in the fishery occurred in the EEZ or in State waters. If additional nearshore fishing effort occurs under Alternative 3 due to more conservative catch limits in the EEZ, it could result in additional fishery interactions with seabirds in State waters with a corresponding decrease of interactions in the EEZ. Given that Alternative 3 would maintain the outermost boundary, gear-type, and total drift gillnet effort level consistent with existing conditions, it is still not expected to have a significant impact on Cook Inlet seabirds.

Alternative 4 would establish Federal management of the Cook Inlet EEZ and prohibit commercial salmon fishing in the area. All commercial salmon fishing in Cook Inlet would occur in State waters. Available information does not provide an understanding of whether previously documented interactions with seabirds in the fishery occurred in the EEZ or in State waters. This could result in additional fishery interactions with seabirds in State waters and a corresponding decrease of interactions in the EEZ. As a result, Alternative 4 is not expected to have a significant impact on Cook Inlet seabirds.

In addition, Alternatives 2 and 3 would reestablish Federal discretion over salmon fishing activities in the EEZ within Cook Inlet that may affect listed species or critical habitat, and thus would establish the Federal nexus that triggers ESA Section 7 consultations. NMFS would conduct a Section 7 consultation with the USFWS on the proposed action as part of the approval process for the revised FMP.

3.5. Essential Fish Habitat

Section 303(a)(7) of the MSA requires all FMPs to describe and identify EFH, which it defines as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." In addition, FMPs must minimize effects on EFH caused by fishing and identify other actions to conserve and enhance EFH. These EFH requirements are detailed in Amendment 13 to the Salmon FMP, the EFH EIS (NMFS 2005), and subsequent 5-year review documents.

EFH designations are done through a prescribed process and EFH can be designated in both Federal and State waters depending on the habitat (water) needs for each life history stage of each FMP species. Because of habitat characteristics, salmon EFH is (1) Federal and State waters (0–200nm) covering juvenile and adult maturing life history stages and ranges from Dixon Entrance to Demarcation Bay (Arctic) and (2) all freshwaters listed as anadromous for mature, juvenile, and egg stages of the five salmon species. Amendment 12 to the FMP did not change salmon EFH. For example, removing the Cook Inlet traditional net fishing area from the FMP did not affect the salmon EFH designation in that region because salmon EFH is based on the life history needs of salmon.

As part of the 5-year review process, the NMFS Alaska Region and AFSC staff have developed a new methodology using oceanic variables to refine EFH descriptions for all marine life stages of salmon. This methodology has undergone peer review and was published (Echave et al. 2012). The Council recommended Amendment 13 to amend the FMP to include these new marine salmon EFH descriptions as part of its 2015 5-year review. NMFS approved Amendment 13 on May 31, 2018 (83 FR 31340, July 5, 2018).

No evidence suggests salmon drift gillnet or recreational hook and line gear directly impacts habitat. The activity targets only adult salmon in the water column, largely avoiding any significant disturbance of the benthos, substrate, or intertidal habitat. The EEZ salmon fishery does not occur in any areas designated as Habitat Areas of Particular Concern.

Loss of salmon drift gillnet gear could adversely impact habitat. Derelict gillnets can become entangled on rough seafloors, boulders, and other benthic structures (Carr 1988, Williamson 1998, Barnette 2001). Entanglement on benthic structures can break, displace, or cover benthic structures that fish use as EFH components (Macfadyen et al. 2009). Derelict gillnets can also alter the seafloor by shifting or scouring the sediment, or by concentrating fine sediments once settled and blocking vegetation growth (Gilardi et al. 2010). In flat, sandy or muddy benthic habitats, derelict gillnets are more likely to form balls instead of getting entangled, with the balled-up gear concentrating sediments and potentially disturbing established submerged aquatic vegetation (Matsuoka et al. 2005, Good et al. 2009). It is unknown, however, if there are long term effects to EFH if derelict gillnets are fully covered by concentrated sedimentation. There are no data available on rates of drift gillnet gear loss in Cook Inlet. Fishery participants and ADF&G personnel familiar with the fishery indicated that loss of a drift gillnet would be highly unusual in Cook Inlet.

Salmon drift gillnet fishing in Cook Inlet is not known to be a vector for the introduction or spread of invasive species.

A number of ongoing and future actions impact salmon spawning habitat, including in-river fisheries, development, and pollution. A complete discussion of non-fishing impacts to salmon habitat is contained in the report *Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska* (Limpinsel et al. 2017). That report is incorporated by reference. A review of non-fishing impacts specific to Cook Inlet salmon EFH follows in Section 3.6.2.

Coordination and consultation on EFH is required by MSA § 305(b). However, this consultation does not supersede the regulations, rights, interests, or jurisdictions of other Federal or State agencies. Limpinsel et al. (2017) contains non-binding recommendations for reasonable steps that could be taken to avoid or minimize adverse effects of non-fishing activities on EFH.

Non-fishing activities discussed in Limpinsel et al. (2017) are subject to a variety of regulations and restrictions designed to limit environmental impacts under Federal, State, and local laws. Any future activity that potentially impacts salmon spawning habitat would be subject to these regulations and the MSA's EFH consultation requirements.

Regarding the effects of recreational fishing on EFH, recreational fishing in State waters falls under non-MSA fishing activities that may adversely affect EFH (50 CFR 600.815(a)(3)). The regulations require FMPs to identify any fishing activities that are not managed under the MSA that may adversely affect EFH, including fishing managed by State agencies or other authorities. NMFS identified and addressed those activities in Section 2.3 of the Summary Report (Simpson et al. 2017). Section 2.3 of the Summary Report notes that the effects of non-MSA fishing activities are covered within the discussion of fishing effects on habitat in the 2005 EFH EIS and remain valid.

NMFS works closely with the Council, which includes State and Federal agency representatives as well as industry representatives in a collaborative decision-making process for managing Federal fisheries. Coordination and consultation on EFH is required by Section 305(b) of the MSA. However, this consultation does not supersede the regulations, rights, interests, or jurisdictions of other Federal or State agencies. The MSA requires NMFS to make conservation recommendations to Federal and State agencies regarding actions that may adversely affect EFH. These EFH conservation recommendations are advisory, not mandatory, and may include measures to avoid, minimize, mitigate, or otherwise offset the potential adverse effects to EFH. Within 30 days of receiving NMFS' conservation recommendations, Federal action agencies must provide a detailed response in writing. The response must include measures proposed for avoiding, mitigating, or offsetting the impact of a proposed activity on EFH. State agencies are not required to respond to EFH conservation recommendations. If a Federal action agency chooses not to adopt NMFS' conservation recommendations, it must provide an explanation. Examples of Federal action agencies that permit or undertake activities that may trigger EFH consultation include, but are not limited to, the U.S. Army Corps of Engineers, the Environmental Protection Agency, Bureau of Ocean Energy Management, the Federal Energy Regulatory Commission, and the Department of the Navy. Limpinsel et al. (2017) contains non-binding recommendations for reasonable steps that could be taken to avoid or minimize adverse effects of non-fishing activities on EFH.

3.6. Cumulative Effects

Analysis of the potential cumulative effects of a proposed Federal action and its alternatives is a requirement of NEPA regulations under which this EA is written, which pre-date the revised 2020 NEPA requirements. Cumulative effects are those combined effects on the quality of the human environment that result from the incremental impact of the proposed actions when added to other past, present, and reasonably foreseeable future actions, regardless of which Federal or non-Federal agency or person undertakes such other actions (40 CFR 1508.7, 1508.25(a) and 1508.25(c)). Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The concept behind cumulative effects analysis is to capture the total effects of many actions over time that would be missed if evaluating each action individually. Concurrently, the Council on Environmental Quality (CEQ) guidelines recognize that it is most practical to focus cumulative effects analysis on only those effects that are truly meaningful. Based on the preceding analysis, the effects that are meaningful are potential effects on salmon. The cumulative effects on the other resources have been analyzed in numerous documents and the impacts of this proposed action on those resources is minimal, therefore there is no need to conduct an additional cumulative impacts analysis.

This EA analyzes the cumulative effects of each alternative and the effects of past, present, and reasonably foreseeable future actions (RFFA). Past and present actions that are related to the other resources analyzed are contained in the appropriate subsection of Section 5. The past and present salmon-related actions are described in Section 3, the fishery impact statement, and several other documents which are incorporated by reference. These documents include the 1997 EA for the salmon fisheries in the EEZ and State waters off Alaska (NMFS 1997), the FPEIS (NMFS 2003), the 2008 BiOp (NMFS 2008a), the 2010 BiOp (NMFS 2010), and the 2014 BiOp (NMFS 2014).

This section provides a review of the RFFA that may result in cumulative effects on salmon. Actions are understood to be human actions (e.g., a proposed rule to designate northern right whale critical habitat in the Pacific Ocean), as distinguished from natural events (e.g., an ecological regime shift). CEQ regulations require consideration of actions, whether taken by a government or by private persons that are reasonably foreseeable. This requirement is interpreted to indicate actions that are more than merely possible or speculative. In addition to these actions, this cumulative effects analysis includes climate change. Actions are considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or NMFS's publication of a proposed rule. Actions only "under consideration" have not generally been included because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen. Identification of actions likely to impact a resource component within this action's area and time frame will allow the public and Council to make a reasoned choice among alternatives. The following RFFAs are identified as likely to have an impact on a resource component within the action area and timeframe:

- Invasive species
- Non-fishing impacts to habitat
- Climate change

3.6.1. Invasive Species

According to Executive Order 13112, an "invasive species" is defined as a species:

1. that is nonnative to the ecosystem under consideration, and
2. whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Nonnative invasive species are introduced to new marine environments through shipping and boat traffic, aquaculture operations, marine laboratories, aquariums, and intentional introductions. Increases in shipping traffic have led to increases in nonnative and invasive species spreading between ports and waterways. The new species can be delivered to Cook Inlet through ballast water discharges or from attaching to the hulls of ships. Ballast water, the water taken in or discharged to compensate for weight changes in the vessel, is a major source of invasive species by taking in new organisms in port or underway and releasing them elsewhere (Bailey 2015).

Nonnative species become invasive in a new environment when the natural predators, diseases, or other biological mechanisms that kept the species in check within its former habitat are missing in its new environment. Lacking this biological balance, the invading species effectively changes the biodiversity of a locale. The invasive species can compete with native species for resources, prey upon native species, foul infrastructure and alter habitat, and spread disease. This has severe impacts to EFH and can cause millions of dollars in damage to local economies (Lovell et al. 2006).

In Alaska, ADF&G is responsible for management of fisheries, wildlife and habitats. ADF&G strives to protect native fish and wildlife and the habitats that support them from impacts imposed by invasive species. The Alaska Department of Natural Resources (DNR) has management responsibility for terrestrial and freshwater plants. As appropriate, the two agencies collaborate to safeguard Alaska ecosystems from aquatic invasive species.

3.6.1.1. Northern Pike Control and Eradication

Although native to much of the State, northern pike (*Esox lucius*) were illegally introduced south and east of their native range, resulting in impacts to fisheries in the Cook Inlet watershed. In 2007, when ADF&G wrote the Alaska Northern Pike Management Plan, widespread damage to resident rainbow trout, grayling and salmon populations in the Susitna River drainage had been observed, resulting in northern pike being identified as the "highest invasive species threat in Southcentral [Alaska]." Since 2007, ADF&G has spent more than $800,000 and has formed partnerships with the USFWS, the United States Geological Survey (USGS), NOAA, and private organizations to control and eradicate Northern pike from Southcentral Alaska. In 2009, ADF&G received National Invasive Species Act funds from NOAA for pike control and eradication projects.

The State has continued to lead efforts to eliminate northern pike populations from closed-system lakes in Southcentral Alaska, and has initiated large-scale control efforts in Alexander Creek, a tributary of the Susitna River, where reduction of salmonid abundance has been observed. However, northern pike continue to affect important resident and anadromous fisheries from Anchorage and the Matanuska-Susitna Valley to the Kenai Peninsula.

ADF&G plans to continue to investigate options to control and eradicate northern pike in systems that support valuable commercial, subsistence and sport fisheries in the Cook Inlet watershed, and to implement options as feasible. ADF&G's projects and partnerships to control and eradicate northern pike are reasonably foreseeable future action that will mitigate the negative impacts of pike predation on salmonid abundance in freshwater lakes and rivers and will reduce the potential for pike to move into estuarine waters of Cook Inlet.

Known water bodies with northern pike within Cook Inlet watershed

- Susitna River tributaries, including lakes and sloughs
- Knik Arm drainages, including the Little Susitna River
- West Cook Inlet rivers and lakes
- Matanuska-Susitna Valley lakes
- Anchorage lakes (Lower Fire)
- Kenai Peninsula lakes (Vogel and North Vogel Lakes)

ADF&G's Northern pike management, control, or eradication projects

In 2007, ADF&G—

- Developed the Invasive Pike Management Plan as part of Aquatic Nuisance Species Management Plan,
- Removed >400 pike from 5 lakes on Kenai Peninsula, and
- Gathered data on three pike populations within Cook Inlet drainage.

In 2008, ADF&G—

- Removed >600 pike from three lakes in Mat-Su Valley,
- Eradicated two populations of pike from closed system lakes - Anchorage and Soldotna,
- Evaluated Alexander Lake pike size structure to assess if slot limit is an effective method for controlling pike, and
- Initiated telemetry study of pike movement in Stormy Lake on Kenai Peninsula.

In 2009, ADF&G—

- Removed >200 pike from three lakes in Matanuska-Susitna valley, including Deshka River sloughs,
- Eradicated three populations of pike from closed system lakes: Kenai Peninsula, Anchorage, Yakutat,
- Evaluated the 2008 eradication projects,
- Completed Stormy Lake pike movement study,
- Investigated alternatives for Stormy Lake pike population, including using rotenone for pike eradication, and
- Studied the use of gillnets as control measure for northern pike populations in 20 sloughs off Alexander Creek and found gillnetting to be a feasible option to control populations from Alexander Lake to Sucker Creek.

In 2010, ADF&G—

- Removed >1500 pike during continued gillnetting in 20 sloughs of Alexander Creek from Alexander Lake to Sucker Creek,
- Evaluated 2008 and 2009 eradication projects, and
- Conducted strategic planning for invasive northern pike priorities and projects.

In 2011, ADF&G—

- Began the first year of Alexander Creek northern pike suppression. ~4,000 pike were removed.
- Began a three-year radio telemetry project to investigate pike movements between Alexander Lake and Alexander Creek.
- Conducted under ice-gillnetting to prevent illegally introduced pike from spawning and re-establishing in the lake (the effort was successful).
- Acquired funding for Stormy Lake pike eradication

In 2012, ADF&G—

- Removed ~3,000 pike from Alexander Creek during the annual pike suppression program.
- Continued the Alexander Lake pike telemetry study.
- Eradicated pike from Stormy Lake in Nikiski.
- Conducted a large-scale native fish rescue effort in Stormy Lake.

In 2013, ADF&G—

- Removed ~3,800 pike from Alexander Creek during the annual pike suppression program
- Worked in collaboration with USGS and the USFWS to develop eDNA markers for northern pike and began applying eDNA to pike monitoring.
- Acquired an AKSSF grant to eradicate pike from the entire Soldotna Creek drainage.

In 2014, ADF&G—

- Removed ~2,700 pike from Alexander Creek during the annual pike suppression program.
- Eradicated pike from West Mackey Lake in Soldotna.
- Eradicated pike from East Mackey Lake in Soldotna.
- Eradicated pike from Union Lake in Soldotna.
- Eradicated pike from Derks Lake in Soldotna.

In 2015, ADF&G—

- Removed ~2,000 pike from Alexander Creek during the annual pike suppression program.
- Conducted study to test eDNA for evaluating pike eradication projects.

- Conducted large-scale native fish rescue from Soldotna Creek
- Eradicated pike from Otter Lake on Joint Base Elmendorf-Richardson.

In 2016, ADF&G—

- Removed ~2,200 pike from Alexander Creek during the annual pike suppression program.
- Eradicated pike from Sevena Lake near Soldotna.
- Eradicated pike from Soldotna Creek and surrounding wetlands.

In 2017, ADF&G—

- Removed ~1,100 pike from Alexander Creek during the annual pike suppression program.
- Eradicated pike from Loon Lake in Soldotna.
- Continued large-scale native fish restoration in the Soldotna Creek drainage.
- Acquired AKSSF grant for Tote Lakes pike eradication.

In 2018, ADF&G—

- Removed ~1,200 pike from Alexander Creek during the annual pike suppression program.
- In partnership with the Tyonek Tribal Conservation District (TTCD), Mark-Recapture assessment to determine pike population size in Threemile Lake in Beluga.
- In Partnership with TTCD, removed ~1,000 pike from the Threemile Lake complex in Beluga during the first year of annual suppression.
- Eradicated pike from Crystal Lake in Soldotna.
- Eradicated pike from Ranchero Lake in Soldotna.
- Eradicated pike from Fred's Lake in Soldotna.
- Eradicated pike from CC Lake in Soldotna.
- Eradicated pike from Leisure Lake in Soldotna.
- Eradicated pike from Leisure Pond in Soldotna.
- Eradicated pike from Hope Lake in Soldotna.
- Continued large-scale native fish restoration in the Soldotna Creek drainage.

In 2019, ADF&G—

- Removed ~900 pike from Alexander Creek during the annual pike suppression program.
- In Partnership with TTCD, removed ~1,000 pike from Threemile Lake during annual suppression.
- In Partnership with TTCD, mark-Recapture assessment to determine pike population size in Chuitbuna Lake in Beluga.
- In Partnership with TTCD, removed ~150 pike from Chuitbuna during the first year of annual suppression.
- Acquired AKSSF grant for pike eradication in Anderson and Kings Lakes in Wasilla.

Future Efforts (scheduled for 2020)—

- Continue annual pike suppression in Alexander Creek.
- Continue annual pike suppression in Threemile and Chuitbuna Lakes in partnership with TTCD.
- Eradicate pike from Anderson and Kings Lakes in Wasilla.

3.6.1.2. Elodea Detection and Response Action in the Cook Inlet Drainage, 2011–2018

An infestation of the submerged aquatic macrophyte Elodea spp. was detected in Chena Slough (Tanana River drainage) and brought to the attention of natural resource managers in Alaska in September of 2010. Aside from early northern pike eradication projects in Southcentral, Alaska had little experience managing aquatic invasive species. At the time, there was uncertainty about which State agency had statutory authority for management of the nonindigenous aquatic plant as well as ambiguity about the threat or injury it posed to ecological systems. Meanwhile, subsequent infestations of the invasive species were detected in numerous locations Statewide.

In 2011, Elodea was found in DeLong, Little Campbell and Sand lakes in the Anchorage Bowl. This prompted additional surveys that detected Elodea in Lake Hood, and Little Survival Creek. The following year, ADF&G detected Elodea was on the Kenai Peninsula in Stormy Lake during a pike eradication project and then later that year in Daniels Lake. Partnerships emerged among Federal, State and local entities to tackle the problem. The U.S. Fish and Wildlife Service, Kenai National Wildlife Refuge, DNR, ADF&G, Kenai Peninsula Cooperative Weed Management Area, and Kenai Peninsula Borough collaborated with other partners Statewide to begin eradication efforts in the Cook Inlet Drainage.

Elodea remains an invasive species of high priority for Alaska. DNR quarantined the import, export, and transport of Elodea in Alaska, as well as four other aquatic invasive plants. Outreach to targeted audiences, including boaters, floatplane pilots, and pet store owners, provide instructions on how to prevent spreading or introducing Elodea and other aquatic invasive species. Surveys are regularly conducted to detect the spread of elodea and evaluate control efforts. Management actions outlined here have been accomplished by a consortium of agencies and organizations.

2015

- June Elodea detected in Lake Hood
- July Emergency Exemption granted by Alaska Department of Environmental Conservation (ADEC); Lake Hood treated with Diquat
- Aug. Fluridone applied to DeLong, Little Campbell and Sand lakes
- Sept. Fluridone applied to Lake Hood

2016

- Sept. Fluridone applied to Lake Hood
- Oct. Elodea detected in Little Survival Creek

2017

- May Fluridone application in Little Survival Creek
- Aug. Fluridone concentrations at or below lethal range, additional Fluridone application in Little Survival Creek
- Surveys in DeLong, Little Campbell and Sand lakes detect no Elodea

2018

- Feb. Fluridone concentrations in DeLong, Little Campbell and Sand lakes ideal range for Elodea mortality
- May Survey of Lake Hood, no Elodea detected
- June Diquat application in Little Survival Creek, small Elodea infestation still present
- July Survey of Lake Hood, no Elodea detected, Fluridone concentrations remain in ideal range for mortality of Elodea
- Aug. Diquat treatment in Lake Hood
- Fall Survey Anchorage lakes, Fluridone treatment planned for Little Survival Creek

2019

- Survey Lake Hood, Fluridone application in Little Survival Creek, surveys to follow

Kenai Peninsula: Beck, Daniels, Stormy lakes

2012

- Sept. Elodea detected in Stormy Lake during a northern pike control project (ADF&G)
- Oct. Elodea detected in Daniels Lake prior to ice up (ADF&G)

2013

- Feb. Survey of spatial extent of Elodea in Daniels Lake by KP-CWMA, Elodea public meeting on Kenai Peninsula (Nikiski)
- May Survey of Daniels Lake
  Presentation and petition to the Kenai Peninsula Borough Assembly
- June Surveys for Elodea in other Kenai Peninsula lakes
  Kenai Peninsula Borough Assembly allocated $40K for Elodea response
- July Elodea detected in Beck Lake
- Aug. Environmental Assessment approved by DNR and USFWS for herbicide applications to control Elodea Beck, Daniels and Stormy lakes
- Sept. A total of 65 lakes on the Kenai Peninsula surveyed for Elodea during summer months
- Dec. Integrated Pest Management plan completed for herbicide control in Kenai Peninsula lakes

2014

- Jan. National Fish and Wildlife Foundation grant ($40K) received by USFWS
- April Second public/landowner meeting on Elodea held in Nikiski
  - Two grants received from USFWS for $155K
  - Special session on Elodea at the Kenai Peninsula Cooperative Weed Management Assoc. Annual Conference,
- May Pre-herbicide treatment surveys to evaluate product efficacy in Beck, Daniels and Stormy lakes (50 sites per lake)
  - Pre-treatment surveys of water quality and non-target impacts
  - Kenai Peninsula Fish Habitat Partnership contributes $120K for Elodea response
  - Kenai Peninsula Borough contributes additional $400K for Elodea response
  - Cook Inlet Aquaculture Association installed nets at the outlet of Daniels and Beck Lakes
- June First herbicide application in Beck and Daniels lakes under ADEC Pesticide Use Permit
- July First herbicide application in Stormy Lake,
- Sept. Second herbicide application in Beck, Daniels and Stormy lakes.

2015

- July Third herbicide application in Daniels Lake
- Oct. Supplemental Fluridone application in Daniels Lake
  - Beck, Daniels and Stormy lakes have been surveyed in May and September from treatment date through 2018.
  - Fluridone concentration was monitored in all three lakes in May and September in 2017.

In September 2016, 2017, and 2018 sediment samples will have been assayed from all three lakes for residual Fluridone.

Grid-based aquatic plant surveys have been done in June 2015, 2016, and 2018 to assess native plant recovery.

Sport Lake and North-South Lake

2017

- Feb. Elodea detected in Sport Lake,
- March Through-the-ice survey for Elodea,
- April Public meeting regarding Elodea in Sport Lake held at Cook Inlet Aquaculture Assoc.,
- May Public boat launch at the lake was partially closed, when open watercraft were inspected prior to launch and prior to departure,
  - Pre-treatment 50-point rake survey,
  - ADEC issues Emergency Exemption from the PUP, other permits approved,
  - First application of Diquat and Fluridone,

- June Re-surveyed Sport Lake at 50-sites and water samples assayed for Fluridone concentration,
- July Second application of Fluridone in Sport Lake,
    - Sport Lake boat launch opened,
    - Elodea detected in North-South lakes in Nikiski,
- Aug. Cook Inlet Aquaculture installed nets to contain Elodea at North-South Lake,
    - ADEC grants Emergency Exemption to the PUP for North-South Lake,
- Sept. All other permits granted for North-South Lake Fluridone applications,
    - Pre-application 50-point rake survey completed,
    - First application of liquid and pellet Fluridone applied to North-South Lake,
- Oct. Assayed water samples for Fluridone concentrations in North-South Lake,
- Nov. Supplemental Fluridone applied in North-South Lake.

2018

- May Assayed water samples from North-South and Sport lakes for Fluridone concentration
- June 50-point rake survey conducted in all five treated lakes on the Kenai Peninsula
- July Third application of Fluridone in Sport Lake
- Aug. Assayed water samples from North-South Lake for Fluridone concentration

Matanuska- Susitna Valley: Alexander Lake and Sucker Lakes

2014

- Aug. Ten-acre infestation of Elodea detected in Alexander Lake.

2016

- Aug. Elodea infestation in Alexander Lake expanded to 500 acres, Fluridone application.

2017

- May Fluridone application in Alexander Lake,
- Spring Elodea confirmed in Sucker Lakes,
- Sept. Alexander Lake application unsuccessful,
- Oct. Sucker Lakes surveyed; all three lakes infested.

Future: Hydrology studies are needed for all Mat-Su waterbodies.

3.6.2. Habitat in Cook Inlet

Salmon EFH extends from the marine ecosystem to freshwater spawning streams of Cook Inlet. The waters and substrates that comprise salmon EFH are susceptible to a wide array of human activities unrelated to fishing. These activities include, but are not limited to, mining, dredging, fill, impoundment, discharge, water diversions, thermal additions, actions that contribute to nonpoint source pollution and sedimentation, introduction of potentially hazardous materials, introduction of exotic species, and the conversion of aquatic habitat that may eliminate, diminish, or disrupt the functions of EFH. For Cook Inlet specifically, salmon EFH is susceptible to human activities both in Cook Inlet waters and terrestrial influences from coastal communities. These include oil and gas development, shipping traffic, and coastal development. For each of the broad activity categories, known and potential adverse impacts to EFH are described in Limpinsel et al. (2017).

Cook Inlet hosts some of the State's oil and gas development leases. There are 203 active leases in Cook Inlet that cover 412,252.76 onshore and offshore acres. From these leases, Cook Inlet produces approximately 5 million barrels of oil each year, which is roughly 2.5% of the total State production (ADNR 2020). Oil and gas operations inherently lead to leaks and spills into the surrounding environment, with accidental discharges occurring at every stage of exploration, development, and production. Crude oil spills in Alaska have adverse impacts on salmon EFH and can cause mortality events or developmental changes in embryo, larval, and juvenile salmon (Thomas and Rice 1987, Rice et al. 1996).

Natural gas development also provides adverse impacts to salmon EFH. The infrastructure required to extract natural gas changes the benthic habitat and natural gas production lead to leaks similar to oil production. The natural gas leak from a Hilcorp 8-inch pipeline in Cook Inlet lasted nearly four months before being contained affected salmon EFH. The Alaska DEC also noted that several other fish species were in the vicinity of the natural gas leak including salmon prey species Pacific herring, eulachon, and walleye pollock (ADEC 2017). Leaks from both oil and gas production can change the chemical makeup of the benthic environment, kill prey species, and lead to disturbances of the shoreline during necessary cleanup measures.

Cook Inlet experiences a high volume of dredging activity. Dredging sediments from the Port of Anchorage can impact EFH by altering the physical habitat, increasing turbidity and sedimentation in the water column, releasing contaminants that had previously settled in the sediment, and burying habitat features like submerged aquatic vegetation. The changes to water clarity and introduction of disbursed contaminants can impact water quality for salmon, their prey, and benthic habitat (NMFS 1998). Cook Inlet waters are turbid and experience seasonally varying levels of sedimentation naturally, so some of these impacts may not apply (USACE 2017).

The Port of Anchorage draws cargo ships, tankers, tugboats, and fishing vessels. Vessel traffic offers another source for adverse effects through fuel spills, waste discharges, and ballast water introducing invasive species. Diesel is the most commonly used fuel and is also one of the most toxic to marine organisms (Michel et al. 2013). Salmon, their prey, or submerged aquatic vegetation exposed to spilled diesel may be killed. Small spills in open water may have less of an adverse impact through dilution (Michel et al. 2013). Waste discharges can change water quality for salmon and their prey, and the impacts include changes in behavior, changes to benthic habitats, and the introduction of toxic contaminants (Limpinsel et al. 2017).

Regarding freshwater, Cook Inlet and Knik Arm connect to thousands of salmon spawning rivers, streams, and creeks (Giefer and Blossom 2020). Activities in or adjacent to watersheds that drain into Cook Inlet include, but are not limited to, mining, road construction and runoff, development, river/stream access, and freshwater boat traffic.

Mining, whether active and small or proposed and large, in the watersheds adjacent to Cook Inlet can have adverse impacts on salmon EFH. There are thousands of State and Federal mining claims in these watersheds (ADNR 2020b). There are existing regulations in place to mitigate many potential environmental impacts of mining, there are unavoidable changes to the landscape, natural resources, and the watershed that come from mining (NRC 1999). Small recreational mining impacts streams through panning, dredging, and stream access. Commercial mining is on a larger scale and has a greater environmental footprint (Williamson et al. 1995). The disturbance of salmon spawning streams can lead to destroyed salmon spawning habitat or redds, increased turbidity and shifting sedimentation, changes to riparian ecology, and the introduction of chemical pollutants. The exposure of metal contamination can also change fish behavior and development (see Limpinsel et al. 2017 for a review).

Coastal development has major impacts to salmon EFH (NMFS 1998). The development of roads, building construction, and installation of freshwater docks are some of the ways coastal development can lead to changes in marine and freshwater habitat features, affect stream flow and access, and introduce chemical pollutants. Similar to mining activities, impacts to salmon EFH include changes to riparian ecology, disturbance of spawning streams, and altering benthic structures. Stormwater runoff from roads, parking lots, buildings, and drainage ditches is a vector for transferring pollutants into watersheds

(EPA 2017). As development increases in Cook Inlet watersheds, these impacts to salmon EFH will increase as well.

The watersheds surrounding Cook Inlet are also accessed for outdoor recreation. Irresponsible access to these and the methods of access can cause adverse impacts to salmon EFH. Hiking into an area can cause trampling of riparian vegetation and disturbance of stream beds. Small boat traffic in spawning streams can displace sediment, increase turbidity, result in fuel spills, and disturb spawning and juvenile fish habitat (Asplund 2000). Finally, the use of off-road vehicles to access streams has adverse impacts to habitat. These include, but are not limited to, vegetation loss, destabilization of stream banks, disturbance of stream beds, and fuel spills (Davenport and Davenport 2006).

3.6.3. Climate Change

Evidence from studies in the Bering Sea, Arctic, and GOA have shown that the region is experiencing significant warming trends in ocean temperatures and major declines in seasonal sea ice. This has both direct and indirect impacts on Cook Inlet salmon stocks in adjacent freshwater and marine habitats in the North Pacific. While climate warming trends are being studied and increasingly understood on a global scale, the ability for fishery managers to forecast specific biological responses to changing climate continues to be difficult. The North Pacific Ocean is subject to periodic climatic and ecological “regime shifts.” These shifts change the values of key parameters of ecosystem relationships and can lead to changes in the relative success of different species and stocks.

In marine waters, many efforts are underway to assess the relationship between climate-driven oceanographic conditions, ocean mortality of salmon, and the timing of their migrations. Changes in ocean temperature can alter food availability, metabolism, growth, and maturation timing for salmon. Regime shifts and consequent changes in climate patterns in the North Pacific Ocean have been shown to correspond with changes in salmon production (Mantua et al. 1997, Litzow et al 2018). A correlation between sea surface temperature and juvenile salmon survival rates in their early marine life has also been proposed (Mueter et al. 2002). Additionally, ocean habitats for salmon species are being shifted northward as southerly waters continue to warm (Poesch et al. 2016). While the historical relationship between climate features and ocean salmon productivity have become more apparent over time, it is also clear that the drivers of these relationships are subject to change and the response of salmon populations to future climate changes may not mirror what has been previously observed (Malick 2020).

The impact of climate change on freshwater salmon habitat is another essential area of study. In the Pacific Northwest, reductions in juvenile salmon survival have been documented when in-stream temperatures increase (Marine and Cech 2004, Crozier and Zabel 2006). The response of salmon stocks to climate changes is highly variable at small spatial scales, and among individual populations (Schindler et al. 2008). This diversity among salmon populations means that the uncertainty in predicting biological responses of salmon to climate change remains large, and the specific impacts of changing climate on salmon are not consistent. Some stocks will benefit, while others will decline because of differential thermal and hydrological changes resulting from climate shifts. For example, Kenai River Chinook salmon have generally declined in both abundance and size, while Kenai River sockeye have been marginally above long-term abundance averages in recent years (Schoen et al. 2017). Around Cook Inlet, it has generally been found that summers are drier while the fall season has experienced increased precipitation. The impact of these conditions on freshwater systems, in addition to density dependent conditions, have reduced the productivity of Chinook salmon stocks across southcentral Alaska (Jones et al. 2020). The impacts to specific watersheds depend on their predominant water source, glaciers or rainfall. Increases the temperature of glacial systems will be temporarily buffered by additional glacier meltwater (Milner et al 2009). Long term, it is expected that a consistent trend of increasing temperatures resulting from current climate change trajectories will present challenges for Cook Inlet salmon stocks as physiological temperature thresholds are exceeded more regularly in freshwater habitats (Mauger et al. 2016). However, some salmon stocks have already responded to increased temperatures with increased growth rates and decreased freshwater residency (Cline et al. 2019). In addition to direct impacts of climate change, it will be essential to evaluate the compounding impacts on salmon productivity of climate change and human habitat modifications in and around the freshwaters of Cook Inlet.

The Council, NMFS, and the State have taken actions that demonstrate adaptation of fishery management to be proactive in the face of changing climate conditions. The Council currently receives an annual update on the status and trends of indicators of climate change in the GOA through the presentation of the Ecosystem Status Report (Zador et al. 2019). This information is used by existing Council's plan teams to inform their assessment of stocks and would also be used by the Salmon Plan Team. As the impacts of climate change become apparent, fishery management will also adapt in response. Because of the large uncertainties regarding possible impacts, however, and our current inability to predict such change, it is not possible to estimate what form these adaptations may take.

3.6.4. Cumulative Effects Conclusions

Considering the direct and indirect impacts of the alternatives, when added to the impacts of past and present actions analyzed in this EA, and the 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 and its alternative are determined to be not significant.

Beyond the cumulative impacts discussed above and documented in the referenced analyses, no additional past, present, or reasonably foreseeable cumulative negative impacts on the biological and physical environment (including salmon stocks, essential fish habitat, ESA-listed species, marine mammals, or seabirds) have been identified that would accrue from the proposed action or its alternatives.

4. Regulatory Impact Review

This Regulatory Impact Review (RIR) examines the benefits and costs of a proposed regulatory action that would amend the *Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska* (Salmon FMP) to manage the salmon fisheries that occur in Federal waters of Cook Inlet. The proposed action (or alternatives) may affect private individuals or firms participating in Upper Cook Inlet commercial and sport salmon fisheries, the communities engaged in these fisheries, the Council, and NMFS.

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 nevertheless 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, the environment, public health or safety, or State, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in E.O. 12866.

4.1. Statutory Authority

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 EEZ. The management of these marine resources is vested in the Secretary and in the regional fishery management councils. In the Alaska Region, the Council has the responsibility for preparing FMPs and FMP amendments for the marine fisheries that require conservation and management, and for submitting its recommendations to the Secretary. If Council fails to develop and submit to the Secretary, after a reasonable period of time, any necessary amendment to an FMP, the Secretary is given authority to prepare such amendment under 304(c). 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 salmon fishery in the vast majority of the EEZ off Alaska is managed under the Salmon FMP. The proposed action under consideration would amend this FMP and Federal regulations at 50 CFR Section 600 and 50 CFR Section 679 to include the Cook Inlet EEZ and the commercial salmon fishery that occurs within it. Actions taken to amend FMPs or implement regulations governing these fisheries must meet the requirements of applicable Federal laws, regulations, and Executive Orders.

4.2. Purpose and Need for Action

NMFS intends to amend the Salmon FMP to manage the traditional net fishing area that occurs in Federal waters of Cook Inlet, referred to in this analysis as the Cook Inlet EEZ. Federal management in an FMP must meet the MSA required provisions for an FMP in Section 303(a) and related MSA provisions. This proposed action is necessary to bring the Salmon FMP into compliance with the MSA consistent with the recent Ninth Circuit ruling (*UCIDA et al. v. NMFS*).

4.3. Alternatives

The alternatives proposed under this action are described in a general sense below. More detailed descriptions of the Alternatives are found in Section 2.

Alternative 1: No Action. No amendment to the Salmon FMP. This alternative would maintain the existing management regime, which excludes the Cook Inlet EEZ and the commercial salmon fishery within it from Federal management under the FMP. Alternative 1 is not a viable alternative given the Ninth Circuit decision, however, NEPA requires that Federal agencies analyze a no action alternative.

Alternative 2: Federal management of the fishery in the EEZ with specific management measures delegated to the State. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit and establish a Federal management regime for the salmon fishery that delegates specific management measures to the State of Alaska, to use existing State salmon management infrastructure, in compliance with the MSA and Ninth Circuit ruling. Alternative 2 would identify the management measures that would be managed by the Council and NMFS, the management measures that would be delegated to the State to manage with Federal oversight, and the process for delegation and oversight of management.

Alternative 3 (Preferred): Federal management of the fishery in the EEZ. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit and apply Federal management to the salmon fishery that occurs in the EEZ.

Alternative 4: Federal management of the commercial fishery in the EEZ with the EEZ closed to commercial fishing. Amend the Salmon FMP to include the Cook Inlet EEZ in the FMP's fishery management unit in the West Area and apply Federal management by applying the existing West Area prohibition on commercial salmon fishing in the EEZ to the Cook Inlet EEZ.

4.4. Methods Used for the Impact Analysis

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 the alternatives with respect to these attributes are described in the sections that follow. Each action alternative is compared with Alternative 1: No Action, with "no action" not necessarily meaning a continuation of the present situation, but instead being the most likely scenario for the future, in the absence of other alternative actions. The analysis then provides a qualitative assessment of the net benefit to the nation of each alternative, with Alternative 1: No Action as a baseline.

This analysis was prepared using a combination of qualitative and quantitative sources. Quantitative data on harvest, harvesting vessels, and value were obtained from ADF&G fish tickets provided both by ADG&G (2022) and by AKFIN using the Comprehensive Fish Ticket (Comprehensive FT) database (AKFIN 2020, 2022). Additional data were obtained from various NMFS and CFEC publications, in particular Alaska Commercial Fisheries Entry Commission (2019) with updates through 2021.

4.5. Description of Salmon Fisheries that Utilize the EEZ in the Upper Cook Inlet

This section describes the two salmon fisheries utilize the EEZ in the Upper Cook Inlet:

- Section 4.5.1 describes the UCI salmon drift gillnet fishery
- Section 4.5.2 describes the UCI saltwater salmon sport fishery

4.5.1. Description of the Upper Cook Inlet Salmon Drift Gillnet Fishery

In Cook Inlet the use of drift gillnet gear to commercially harvest salmon is restricted to the Central District in the Upper Cook Inlet Management Area, which Alaska Department of Fish and Game (2020a) defines as that portion of Cook Inlet north of the latitude of the Anchor Point Light. The Central District includes all waters between a line extending from Boulder Point at 60º46’23” N. lat., to Shell Platform C, to a point on the west shore at 60º46’23” N. lat., and the latitude of Anchor Point. The District is approximately 75 miles long and averages 32 miles in width, with a total area of approximately 2,267 square miles. To maintain consistency with the parlance of fishery participants, this RIR refers to the commercial salmon drift gillnet fishery occurring in the Central District as the Upper Cook Inlet (UCI) salmon drift gillnet fishery.

The UCI salmon drift gillnet fishery occurs in both State of Alaska and Federal waters. Currently, the FMP does not include the Cook Inlet EEZ, or contain management measures to monitor the UCI salmon drift gillnet fishery in the EEZ or to measure total salmon catch or bycatch from EEZ waters. The State-Federal boundary has not been relevant to active salmon management in the UCI salmon drift gillnet fishery because the fishery is managed by districts, subdistricts, and sections, which are comprised of salmon statistical areas that overlap both State and Federal waters. Further, the 2012 revisions to the Salmon FMP removed the commercial salmon fishery that occurs in the EEZ waters of Cook Inlet from Federal management. While the description of potentially affected fisheries in this RIR includes approximations of the percentages of the salmon harvest in the UCI salmon drift gillnet fishery (Section 4.5.1.2.3) and UCI saltwater salmon sport fishery (Section 4.5.2.2) occurring in EEZ waters versus State waters, a comprehensive description of the Federal waters portion of the Cook Inlet commercial and sport salmon fisheries is not possible at this time. As described in Sections 2.4.8 and 2.5.6, revision of the FMP to include management measures to monitor catch and effort in salmon fisheries occurring in the Cook Inlet EEZ is considered under Alternative 2 and Alternative 3.

4.5.1.1. Management

4.5.1.1.1. Role of the North Pacific Fishery Management Council and U.S. Department of Commerce, NOAA, and NMFS

With Amendment 12, the Council modified the Salmon FMP’s management area to exclude the three traditional net fishing areas and the sport fishery from the West Area. The Council maintained the prohibition on commercial fishing in the West Area.

The Council accepts the harvest levels set by the Pacific Salmon Commission and the State of Alaska, as long as those levels are consistent with the Council's policy and the objectives of the Salmon FMP. Further, it accepts the allocations of harvests among the various user groups set by the BOF, as long as those allocations are consistent with the Council's policy and objectives and the national standards of the Magnuson-Stevens Act.

The Magnuson-Stevens Act assigns to the Secretary of Commerce (Secretary) the authority to approve fishery management plans and implement them with Federal regulations and to provide the regional fishery management councils with a number of services. The Secretary has delegated fishery management authority and responsibility to NOAA, an agency within the Department of Commerce, and NOAA, in turn has delegated some of its authority and responsibility to NMFS, an agency within NOAA. In its regular activities, the Council works with the Secretary, the Department of Commerce, and NOAA through the NMFS Alaska Region.

4.5.1.1.2. Role of the State of Alaska

Four State of Alaska agencies/entities are involved in managing the salmon fisheries under its jurisdiction. The BOF sets policy and promulgates the regulations for allocation of salmon resources, ADF&G manages the fisheries according to the policies and regulations of the BOF and State law, the CFEC limits the number of permit holders eligible to participate in the fisheries, and the Alaska Department of Public Safety enforces the regulations.

With the exclusion of the Cook Inlet EEZ from the West Area by the Council under Amendment 12, the FMP "deferred" management[56] of the salmon fisheries occurring within the Cook Inlet EEZ to the State of Alaska. The State currently manages the salmon fisheries occurring in the Cook Inlet EEZ and can regulate participating vessels that are registered under the laws of the State of Alaska (16 U.S.C 1856(a)(3)).

4.5.1.1.2.1. Alaska Board of Fisheries

The BOF has the authority to adopt regulations described in AS 16.05.251, including establishing open and closed seasons and areas for taking fish; setting quotas, bag limits, harvest levels and limitations for taking fish; and establishing the methods and means for the taking of fish. The BOF establishes fishing regulations through a public forum that provides for public and agency input. This public review and comment process satisfies most, if not all, of the Council's needs for public review, thereby making maximum use of limited State and Federal resources and preventing duplication of effort. On a three-year cycle, the BOF solicits proposed changes to the regulations governing each of Alaska's fishery management areas.[57] Usually, chief among those submitting proposals is ADF&G. The BOF distributes these proposals to the public for review and comment and then conducts open public meetings to evaluate and take action on the proposals. The fishing community has come to rely on this regularly scheduled participatory process as the basis for changing Alaska's fishing regulations. Among those things considered by the BOF are fishing periods and areas for the salmon fisheries, and the allocation of harvests among the various groups of fishermen. The BOF system provides for extensive public input, is

[56] See Footnote 47.

[57] From time to time, the BOF receives a proposed change to the regulations that, according to the proposal, needs to be addressed on an emergency basis under AS 44.62.250. An "emergency" is defined as "an unforeseen, unexpected event that either threatens a fish or game resource, or an unforeseen, unexpected resource situation where a biologically allowable resource harvest would be precluded by delayed regulatory action and such delay would be significantly burdensome to the petitioners because the resource would be unavailable in the future" (5 AAC 96.625(f)).

flexible enough to accommodate changes in salmon abundance and fishing patterns, and is familiar to salmon fishermen, fish processors, and other members of the public.

The regulations formulated by the BOF specific to the UCI salmon drift gillnet fishery are set forth in the Central District Drift Gillnet Fishery Management Plan, which was established in 2005. As stated in 5 AAC 21.353, "The purpose of the management plan is to ensure adequate escapement and a harvestable surplus of salmon into the Northern District drainages and to provide management guidelines to the department. [ADF&G] shall manage the commercial drift gillnet fishery to minimize the harvest of Northern District salmon and Kenai River coho salmon in order to provide all users with a reasonable opportunity to harvest these salmon stocks over the entire run, as measured by the frequency of inriver restrictions." The management plan does not allocate fishery resources among user groups (e.g., commercial, personal use, and sport fisheries); rather, it achieves its purpose by means of fishing time and area restrictions for the UCI salmon drift gillnet fishery.

4.5.1.1.2.2. Alaska Department of Fish and Game

ADF&G manages the fisheries during the fishing season (i.e., inseason) and issues emergency regulations to achieve conservation objectives and to implement allocation policies established by the BOF. ADF&G also monitors the fisheries and collects data on the stocks and the performance of the fisheries. ADF&G has managed salmon fisheries in Federal waters since Statehood in 1959 and has made substantial investments over the years in facilities, communications, information systems, vessels, equipment, and experienced personnel capable of carrying out extensive management, research, and enforcement programs. Since the implementation of the FMP in 1979, the State of Alaska has played the major role in managing the salmon fisheries in the EEZ, and the Council, for the most part, has coordinated its management with the State.

ADF&G manages the UCI drift gillnet fishery primarily under the guidance of the Central District Drift Gillnet Fishery Management Plan. As described in Section 4.5.1.1.2.1, the purpose of this management plan is to ensure adequate escapement of salmon into Northern Cook Inlet drainages and to provide the ADF&G with management guidelines.

4.5.1.1.2.3. Alaska Commercial Fisheries Entry Commission

The CFEC is an independent, quasi-judicial State agency responsible for helping promote the conservation and sustained yield management of Alaska's fishery resources and the economic health and stability of commercial fishing by regulating entry into the fisheries. Its primary duties are limiting the number of persons eligible to hold permits; issuing permits and vessel licenses to qualified individuals in both limited and unlimited fisheries; providing due process hearings and appeals; performing critical research; and providing data to governmental agencies, private organizations, and the general public.

4.5.1.1.2.4. Alaska Department of Public Safety

The Fish and Wildlife Protection Division of the Alaska Department of Public Safety enforces State regulations. The NOAA Office of Law Enforcement and the U.S. Coast Guard cooperate with the Alaska Department of Public Safety. Many Alaska Department of Public Safety agents are cross-deputized so that they can enforce both State and Federal regulations.

4.5.1.1.3. Role of the Joint Protocol Committee

Because many of the marine and anadromous fish populations in Alaska spend some of the year in both Federal and State waters, the Council and BOF established the Joint Protocol Committee to keep each other informed on cross-jurisdictional issues and to help coordinate compatible and sustainable management of fisheries within each organization's jurisdiction. The committee includes three members from each organization, and it meets at least once a year to identify and discuss issues of mutual interest.

4.5.1.1.4. Role of the North Pacific Anadromous Fish Commission and the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean

The North Pacific Anadromous Fish Commission was established in 1993 under the *Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean* (Convention). The Convention dissolved the prior International North Pacific Fisheries Commission, established through the 1952 *International Convention for the High Seas Fisheries of the North Pacific Ocean* between Canada, Japan, and the United States.

The member Parties include the United States, Canada, Japan, the Republic of Korea, and the Russian Federation (collectively "the Parties"), which are the major countries of origin and migration for Pacific anadromous fish stocks. The area to which the Convention applies is the "waters of the North Pacific Ocean and its adjacent seas, north of 33 degrees North Latitude beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured" (Article I). The Convention's principle objective is to "promote the conservation" of anadromous fish species in the Convention Area, including chum, coho, pink, sockeye, and Chinook salmon (Article VIII).

To promote conservation, the Convention prohibits direct fishing for anadromous fish in the Convention Area. The Convention also prohibits retention of anadromous fish taken as incidental catch during fishing for non-anadromous fish and requires minimization, to the maximum extent practicable, of any incidental taking of anadromous fish (Article III). The Parties are also encouraged to take appropriate measures to prevent trafficking in anadromous fish. The North Pacific Anadromous Fish Commission Science Plan, however, allows fishing of anadromous fish for scientific research purposes. The Science Plan is a long-term, cooperative scientific research plan that endeavors to predict the annual variations in Pacific salmon production, in order to forecast returning salmon abundances for accurate salmon population conservation and management (Article VII).

Finally, pursuant to the Convention, each member Party has the authority to board, inspect, and detain fishing vessels of other Parties found operating in violation of the Convention, though only the authorities of the Party to which the violating person or vessel belongs may try the offense and impose penalties (Article V). The Parties are to cooperate in exchange of information on any violation of the provisions of the Convention and on any enforcement action undertaken (Article VI).

4.5.1.2. Harvest

4.5.1.2.1. Overview of UCI Salmon Drift Gillnet Fishery

Drift gillnet gear works by entangling the fish as they attempt to swim through the net. In the UCI salmon drift gillnet fishery, the net may not be more than 150 fathoms long and 45 meshes in depth[58] with a maximum mesh size of six inches.[59] Floats are positioned along a line on top of the net, and lead weights line the bottom. Mesh openings are designed to be large enough to allow fish to get their heads stuck or "gilled" in the mesh. Net deployment and retrieval are accomplished using a hydraulic-powered rotating drum on which the net is rolled. The drum is mounted near the bow ("bow picker") or stern ("stern picker") (Petterson and Glazier 2004). Primarily stern picking is used by the UCI salmon drift gillnet fleet. The net stays attached or in close proximity to the vessel and is suspended by the floats as it soaks. The duration of sets can vary from 20 minutes to four or more hours, depending on fishing conditions and other variables, with between four and 20 sets per day (National Marine Fisheries Service 2012). Fish are removed from the net by hand "picking" them from the mesh as the net is reeled aboard (Petterson and Glazier 2004)

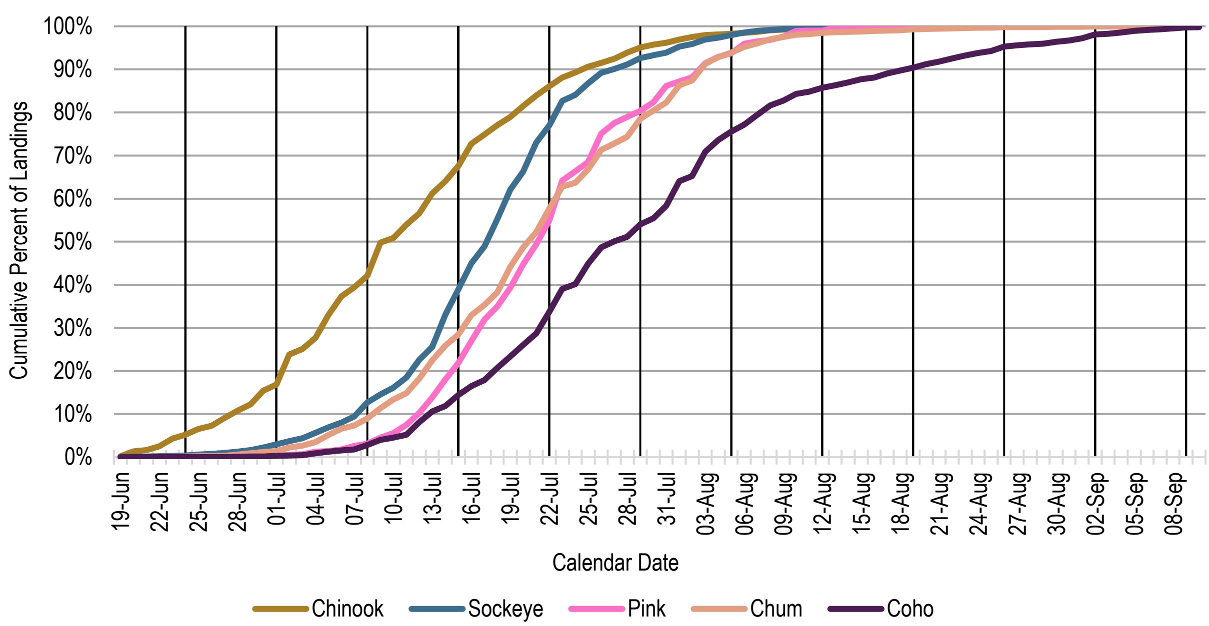
[58] Regulations allow two permit holders to fish concurrently from the same vessel and jointly operate up to 200 fathoms of gillnet (5 AAC 21.333).

[59] 5 ACC 21.331 (b).

Current regulations open the UCI salmon drift gillnet fishery on the third Monday in June or June 19, whichever is later.[60] The season remains open until closed by EO but no later than August 15 (Farrington et al. 2014).[61] Salmon may only be harvested in the UCI salmon drift gillnet fishery during time periods known as "openers," which are established by ADF&G inseason. ADF&G posts weekly notices of fishing openers and announces the openers on regular radio channels. Openers generally occur on Mondays and Thursdays for 12 hours beginning at 7:00 a.m., although additional fishing time has been allowed via EO depending on catches, escapements, and the projected run size of sockeye salmon (Willette and Dupuis 2017).

Figure 4-1 shows the temporal distribution of catch in the UCI salmon drift gillnet fishery in terms of the average timing of harvest percentages for each of the five salmon species taken in the fishery from 2009–2021. The temporal differences in harvest among species are largely a function of differences in run timing. Chinook salmon are the first species to enter Cook Inlet, followed by sockeye salmon, which is the most consistently abundant species and the mainstay of the UCI salmon drift gillnet fishery. Chum, pink, and coho salmon appear later in the season, although there is considerable overlap across all five species with respect to both run timing and migration routes. Note that the vertical lines represent weekly intervals, and are placed to correspond to July 1, July 8, July 15, etc.

Figure 4-1 Average harvest percentages in the UCI salmon drift gillnet fishery by date and species, 2009–2021.



Note: The harvest percentages for each species were calculated by summing the catch by each calendar day from 2009–2021 and dividing by the total catch in all years. The vertical lines represent weekly intervals and are placed intentionally on July 1, July 8, and July 15.
Source: Developed by Northern Economics based data from AKFIN (2022) and ADF&G (2022).

[60] However, fishing with drift gillnets may not occur within (A) two miles of the mean high tide mark on the eastern side of the Upper Subdistrict until those locations have been opened for fishing with set gillnets; (B) one and one-half miles of the mean high tide mark of the Kenai Peninsula shoreline in (i) that area of the Kenai and Kasilof Sections of the Upper Subdistrict south of the Kenai River and (ii) the Anchor Point Section, if fishing with drift gillnets is open in the Anchor Point Section under 5 AAC 21.353; (C) one mile of the mean high tide mark of the Kenai Peninsula shoreline in that area of the Kenai and East Forelands Sections of the Upper Subdistrict north of the Kenai River (5 AAC 21.310 (b) (3)).

[61] From August 16 until closed by emergency order, Drift Gillnet Areas 3 and 4 are open for fishing during regular fishing periods (5 AAC 21.353).

Table 4-1 summarizes the interannual variability in the timing of harvests of each species in the UCI salmon drift gillnet fishery from 2009–2021. The table separates percentage of total catch attained into four groups: 25%; 50%; 75%; and 100%. The variability is shown by the earliest, average, and latest dates that each percentage group was attained. For example, half of the sockeye salmon harvest in the fishery occurred by July 17 during an average year, but in one year the 50% mark was attained as early as July 12, and in another year as late as July 25.

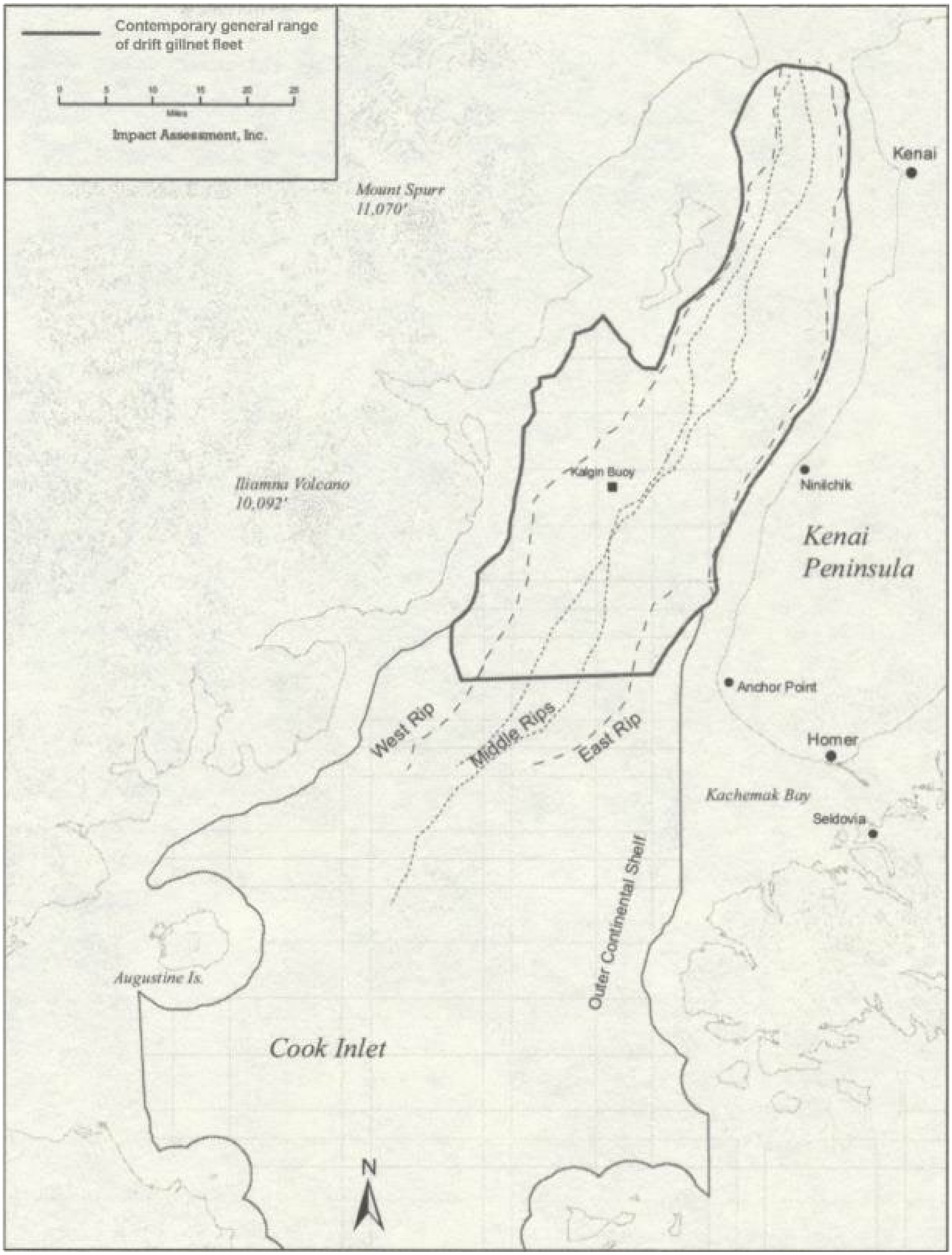
Table 4-1 Earliest, latest and average dates of harvest in the UCI salmon drift gillnet fishery by species and selected harvest percentages, 2009–2021.

Species	Day	25% of Harvest	50% of Harvest	75% of Harvest	100% of Harvest
Chinook	Earliest	June 25, 2019	July 5, 2018	July 9, 2018	August 6, 2012
Chinook	Average	July 3	July 11	July 17	August 23
Chinook	Latest	July 9, 2020	July 16, 2012	July 25, 2019	September 9, 2017
Sockeye	Earliest	July 5, 2018	July 12, 2018	July 16, 2018	August 31, 2012
Sockeye	Average	July 12	July 17	July 22	September 10
Sockeye	Latest	July 20, 2015	July 26, 2021	August 2, 2021	September 20, 2017
Chum	Earliest	July 5, 2018	July 10, 2018	July 13, 2018	September 1, 2011
Chum	Average	July 14	July 20	July 26	September 11
Chum	Latest	July 22, 2011	July 29, 2019	August 3, 2017	September 20, 2017
Pink	Earliest	July 9, 2019	July 14, 2015	July 18, 2016	August 26, 2013
Pink	Average	July 16	July 19	July 25	September 5
Pink	Latest	July 21, 2011 & 2012 & 2020	July 27, 2020	August 3, 2020	September 16, 2016
Coho	Earliest	July 12, 2018	July 22, 2010 & 2014	July 24, 2018	September 1, 2011
Coho	Average	July 20	July 28	August 4	September 11
Coho	Latest	August 1, 2017	August 17, 2020	August 22, 2020	September 20, 2017

Note: The harvest percentages for each species were calculated by summing the catch by each calendar day from 2009–2021 and dividing by the total catch in all years.
Source: Developed by Northern Economics based on data from AKFIN (2022) and ADF&G (2022).

With respect to where in Cook Inlet the UCI salmon drift gillnet fleet fishes, Figure 4-2 depicts the general range of the fleet based on input from fishery participants (Petterson and Glazier 2004; Glazier et al. 2006). As noted in the legend, the heavy black line indicates the parameters of fleet activity. A combination of bottom conditions, salmon migration patterns, and other factors render the first six or so miles of Upper Cook Inlet due west of the Anchor Point shoreline and northeastward to a point about three miles offshore of Ninilchik largely unused by the fleet. The western limit of the fleet is effectively delimited by shallows along western Upper Cook Inlet. Water depth in the area where most fishing occurs is typically in the range of 25 to 50 fathoms. Of particular note on the map is the location of the east, middle, and west rip zones in the center of Cook Inlet. While the location of these zones shifts somewhat with water volume and to a lesser degree with changes in bathymetry, the map shows their approximate locations over time. These turbulent rip tide zones where salmon congregate are highly favored for salmon drift gillnet fishing (Glazier et al. 2006). Where along the rip zones vessel operators decide to fish depends on the point in time in the fishing season. Typically, vessels will congregate near the Anchor Point line at the beginning of the season. As the season progresses the fleet follows the concentrations of salmon as they shift northward up the Inlet.

Figure 4-2 Map of fishing areas in the UCI salmon drift gillnet fishery.

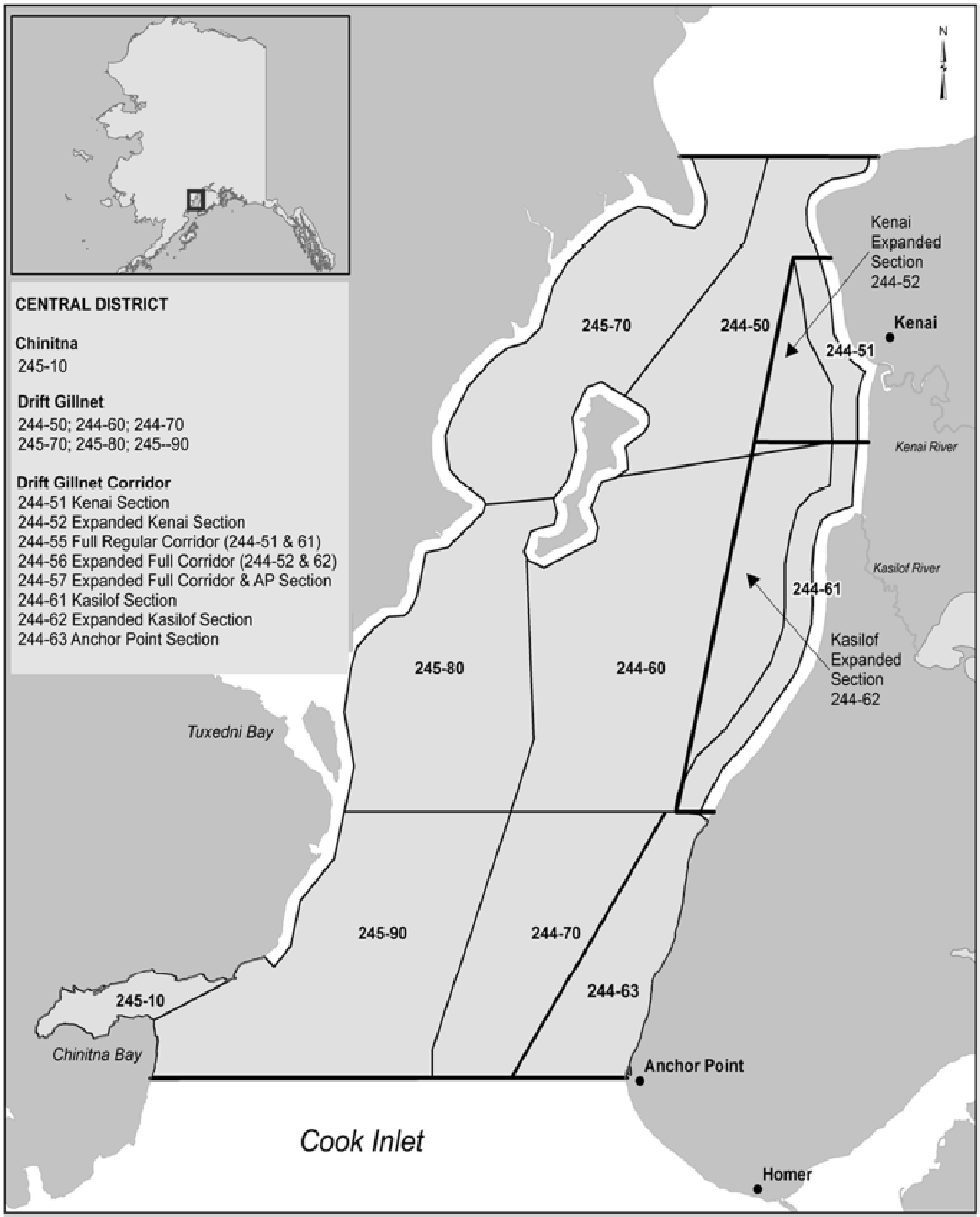


Source: Adapted from Glazier et al. (2006).

Fishing areas in the UCI salmon drift gillnet fishery are also determined by the BOF's Central District Drift Gillnet Fishery Management Plan, which imposes area restrictions to regular fishing periods. These area restrictions can vary throughout fishing seasons and across years, as they are based on preseason forecasts and inseason evaluations of the total Kenai River late-run sockeye salmon return during the fishing season. ADF&G uses its EO authority to make inseason adjustments to both fishing area and time.

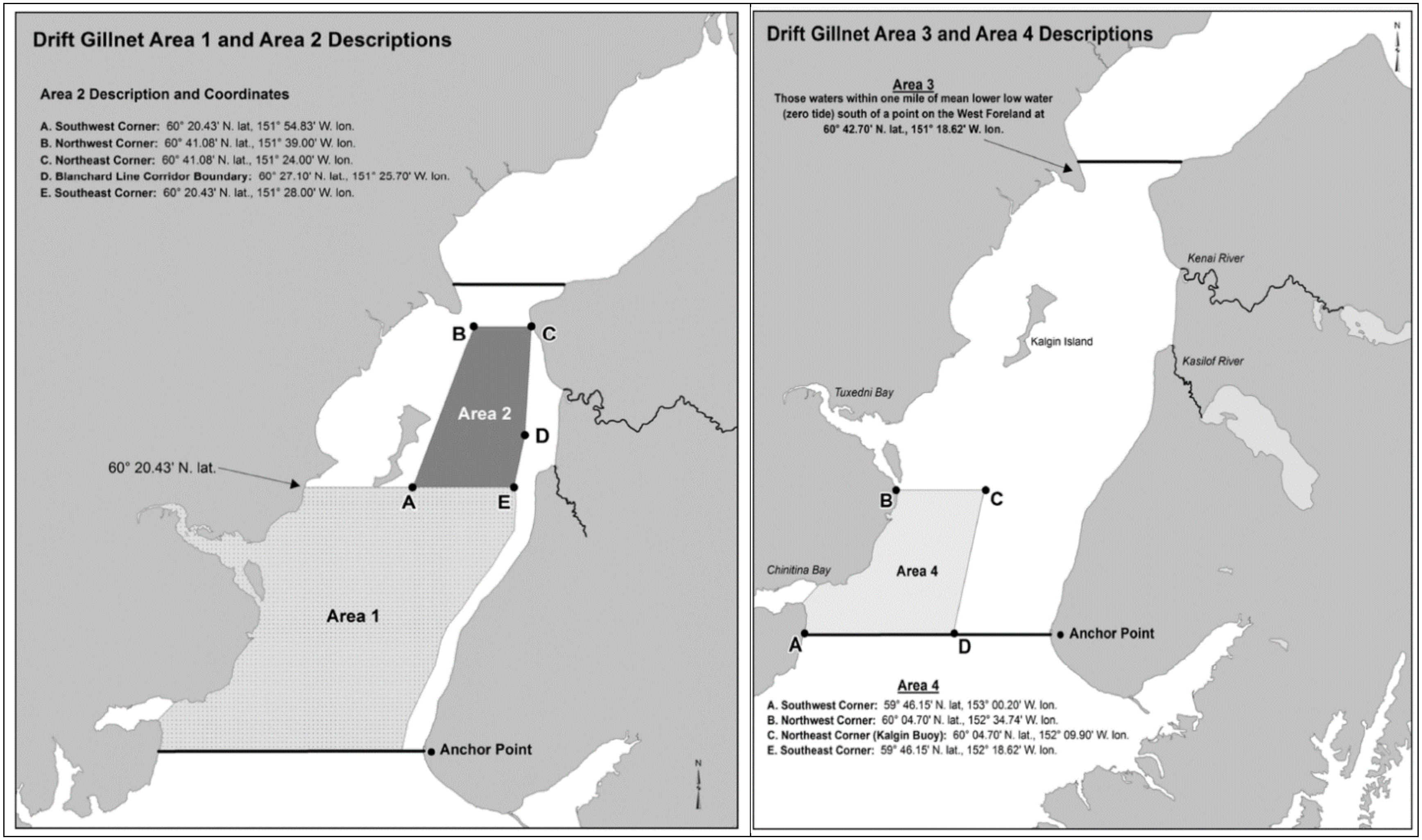
Figure 4-3 and Figure 4-4 show the boundaries of area provisions of the Central District Drift Gillnet Fishery Management Plan. In 2011, the BOF created the Expanded Kenai and Kasilof Sections shown in Figure 4-3 to focus the UCI drift gillnet fleet's harvest during some fishing periods on Kenai River and Kasilof River sockeye salmon while minimizing harvests of Susitna River sockeye salmon and Northern District coho salmon (Willette and Dupuis 2017). The areas push fishing effort toward the east side of Cook Inlet, leaving a corridor free of drift gillnets in the middle in an effort to let fish continue swimming north. The Anchor Point Section was created by the BOF in 2014 to increase fishing opportunities for Homer-based drift gillnetters during some time periods when the corridor is in place (Matanuska-Susitna Borough Fish and Wildlife Commission 2017). The Drift Gillnet Areas shown in Figure 4-4 are also regulatory areas that ADF&G opens and closes as part of inseason management in the Central District.

Figure 4-3 Map of the UCI salmon drift gillnet fishery statistical areas, including Expanded Kenai and Kasilof Sections and Anchor Point Section.



Source: Marston and Frothingham (2019).

Figure 4-4 Map of the Drift Gillnet Areas.



Source: Marston and Frothingham (2019).

The key area and time provisions of the Central District Drift Gillnet Fishery Management Plan are summarized in Table 4-2.

Table 4-2 Summary of key time and area provisions of the Central District Drift Gillnet Fishery Management Plan.

<table>
<tr><th>Dates</th><th>Kenai Sockeye Run Strength Triggers</th><th>District Wide</th><th>Drift Gillnet Area 1</th><th>Expanded Kenai and Kasilof Sections</th><th>Anchor Point Section</th><th>Drift Gillnet Area 3 and 4</th></tr>
<tr><td>Jun 19–Jul 8*</td><td></td><td>Two 12-hr periods/week</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">July 9–15</td><td></td><td></td><td colspan="2">Both 12-hr periods</td><td></td><td></td></tr>
<tr><td>> 2.3 million</td><td></td><td colspan="2">One additional 12-hr period may be allowed by emergency order</td><td></td><td></td></tr>
<tr><td rowspan="4">July 16–31</td><td>< 2.3 million</td><td></td><td></td><td>Two 12-hr periods/week</td><td></td><td></td></tr>
<tr><td rowspan="2">2.3-4.6 million</td><td rowspan="2"></td><td colspan="3">One 12-hr period/week</td><td></td></tr>
<tr><td></td><td colspan="2">One 12-hr period/week</td><td></td></tr>
<tr><td>> 4.6 million</td><td>One 12-hr period/week</td><td></td><td colspan="2">One 12-hr period/week</td><td></td></tr>
<tr><td>August 1–15</td><td></td><td></td><td>Two 12-hour periods/week**</td><td></td><td></td><td>Two 12-hour periods if there is a 1% closure</td></tr>
<tr><td>After Aug 16</td><td></td><td></td><td></td><td></td><td></td><td>Two 12-hour periods/week until closed by emergency order</td></tr>
</table>

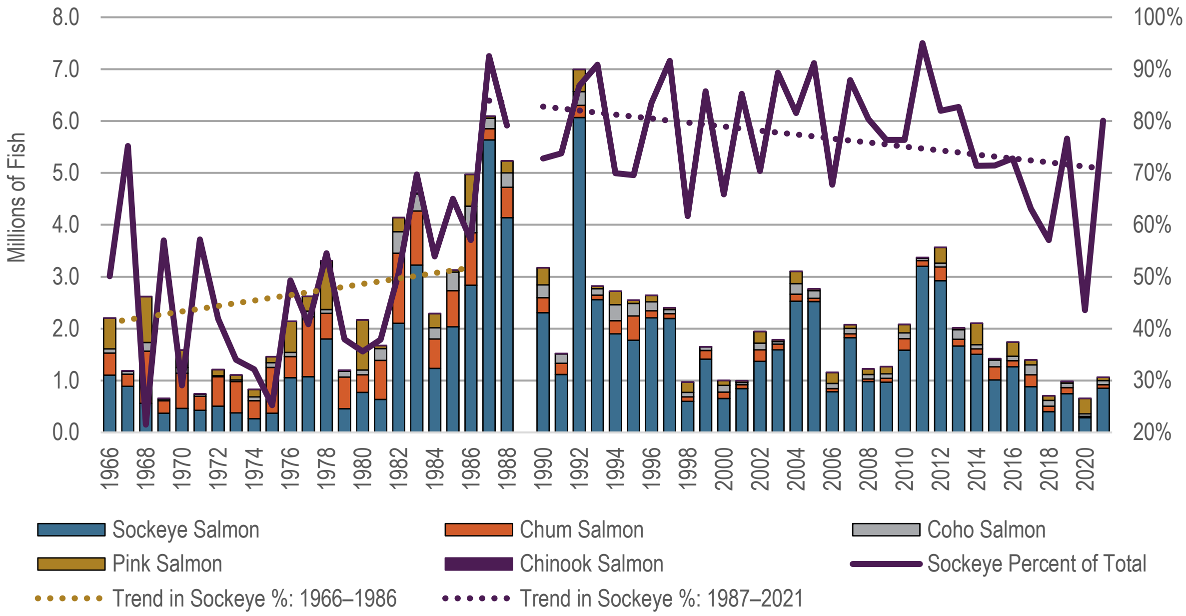
* Season opens 3rd Monday in June or June 19, whichever is later.
** Prior to 2020, fishing periods were allowed district wide. Closure triggered by two consecutive fishing periods of less than 1% of the seasons' total sockeye catch taken per period.
Notes: Other than the two standard 12-hour periods/week, additional fishing time may be allowed by emergency orders in any of the time periods—such openings will be limited to Expanded Kenai and Kasilof Sections or the Anchor Point Section
Source: Developed by Northern Economics based on data provided by Alaska Department of Fish and Game (2020e).

4.5.1.2.2. Salmon Harvest in the UCI Salmon Drift Gillnet Fishery

Due to the inherent annual variability in the scale of wild salmon runs, harvest levels in the UCI salmon drift gillnet fishery fluctuated dramatically from 1966–2021 (Figure 4-5). The exact causes of changes in salmon abundance are unknown, but they may involve a variety of factors outside the control of fishery managers, including ocean conditions, freshwater environmental factors, and disease.

The UCI salmon drift gillnet fishery landed an average of 2.27 million salmon annually from 1966–2021 (Figure 4-5). Although all five species of Pacific salmon are caught in the fishery, since the late 1980s the fishery has been temporally and spatially managed by the State to target sockeye salmon and ensure escapements of Chinook, coho, and chum salmon are met. Sockeye salmon accounted for 80% of the salmon caught in the fishery during 1990–2021. Since 2011, the sockeye percentage of the harvest has shown a downward trend due to decreases in the size of sockeye runs. In 2018, the sockeye run in Upper Cook Inlet deviated particularly sharply from most previous runs, both in terms of size and timing. The total sockeye run was about 32% below what was forecast (Marston and Frothingham 2019), and sockeye landings were 22% of the 1990–2017 annual average. For only the second time in ADF&G's records, more than half the Kenai River sockeye run arrived after August 1 (Earl 2018a). Similar low levels of harvest occurred again in 2020, but much of the harvest was relatively lower value pink salmon.

Figure 4-5 Harvest (in numbers of fish) in the UCI salmon drift gillnet fishery by species, 1990–2021.

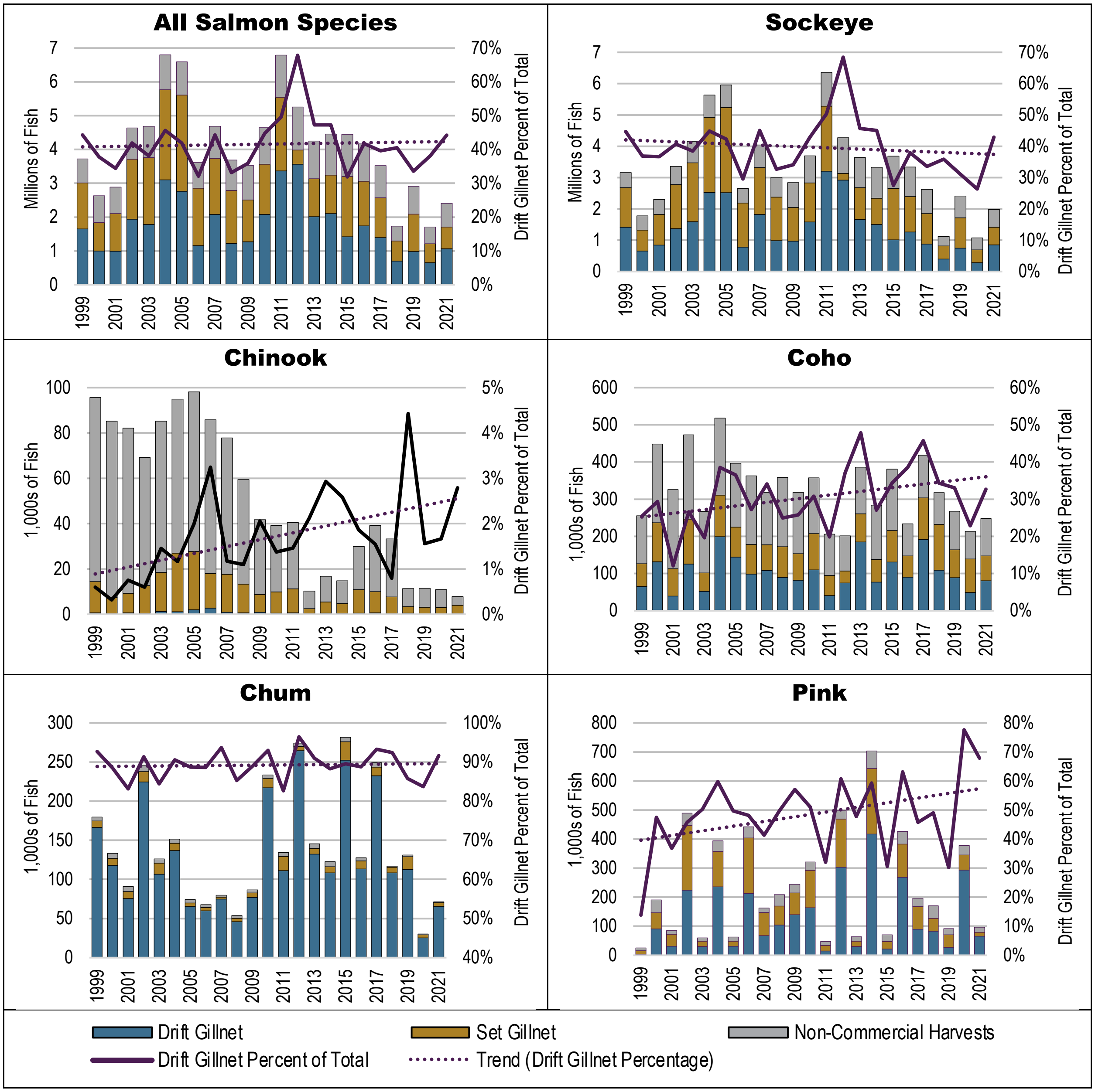


Notes: Data for 1989 omitted because the fishery was largely closed due to the *Exxon Valdez* oil spill in Prince William Sound.
Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2022) and from ADF&G (2022).

Figure 4-6 compares the salmon harvest in the UCI salmon drift gillnet fishery to salmon harvests in other Upper Cook Inlet fisheries, both commercial and non-commercial. The other commercial salmon fishery occurring in Upper Cook Inlet besides the drift gillnet fishery is the set gillnet fishery. The non-commercial salmon fisheries include the sport, personal use, and subsistence/educational fisheries. The set gillnet fishery and non-commercial fisheries are described in more detail in Section 4.5.2.2.

From 1999–2021, the UCI salmon drift gillnet fishery accounted for 42% of the total sockeye salmon harvest in all Upper Cook Inlet salmon fisheries; 1% of the total Chinook salmon harvest; 31% of the total coho salmon harvest; 54% of the total pink salmon harvest; and 90% of the total chum salmon harvest. Over all species combined, the UCI salmon drift gillnet fishery accounted for 55% of the total harvest. As shown in Figure 4-6, from 1999–2021, the UCI salmon drift gillnet fleet harvested an overall increasing percentage of the total salmon catch and catch of each species, with the exception of sockeye salmon—the fleet accounted for a relatively flat proportion of the Upper Cook Inlet sockeye harvest.

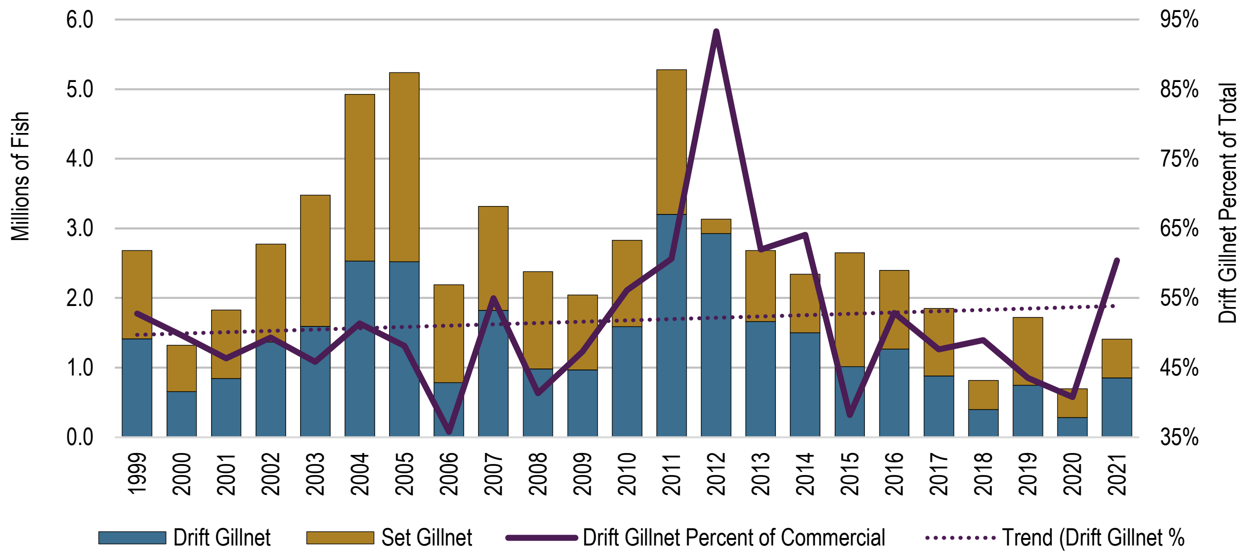
Figure 4-6 Salmon harvest (in numbers of fish) in Upper Cook Inlet by fishery and species, 1999-2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN in the Comprehensive FT database and from ADF&G (2022); ADF&G (2020c); Baumer and Blain-Roth (2020); Booz et al. (2019); Lipka et al. (2020); Marston and Frothingham (2019); and Oslund et al. (2020).

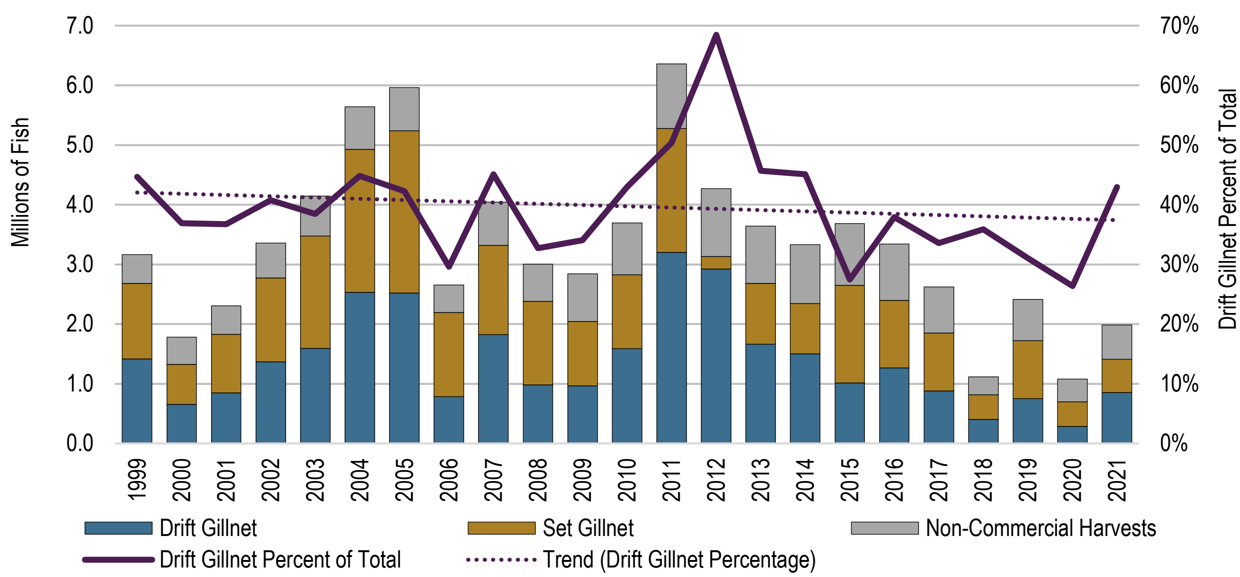
As noted above, sockeye salmon has been the primary target species in the UCI salmon drift gillnet fishery for the past three decades. To show more recent trends in the sockeye salmon harvest levels in the fishery relative to levels in other Upper Cook Inlet fisheries, the following two figures present comparative data from 1999–2021. Figure 4-7 shows that the UCI salmon drift gillnet fishery proportion of the total commercial harvest of sockeye trended slightly upward during that time period, while Figure 4-8 shows that the UCI salmon drift gillnet fishery proportion of the total sockeye harvest (commercial and non-commercial combined) showed little change.

Figure 4-7 Sockeye salmon harvest (in numbers of fish) in Upper Cook Inlet by commercial fishery, 1999–2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020) and from ADF&G (2022).

Figure 4-8 Sockeye salmon harvest (in numbers of fish) in Upper Cook Inlet by fishery, 1999–2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020) and from ADF&G (2022).

4.5.1.2.3. Salmon Harvest in the UCI Salmon Drift Gillnet Fishery Inside the EEZ

A comparison of Figure 4-2 and Figure 1-2 shows that much of the southwestern range of the fleet approximates the boundaries of the Cook Inlet EEZ. However, the boundaries of EEZ waters do not align with the areas used by ADF&G fish tickets to record the location of salmon harvests. Therefore, the percent of the salmon harvest of the UCI salmon drift gillnet fleet occurring in EEZ waters versus State waters was estimated. Required harvest location information on fish tickets consists of 1) statistical area (Figure 4-3), including the percent in numbers of fish per statistical area, and 2) "area caught," which corresponds to the Drift Gillnet Areas in the Central District (Figure 4-4).

To estimate the amount of salmon harvested by the UCI salmon drift gillnet fleet in the EEZ as a percent of its total harvest, ADF&G sorted salmon harvests reported by the UCI salmon drift gillnet fleet on fish tickets from 1999–2021 into combinations of statistical area and locale code, where the locale code was based on Drift Gillnet Areas (Table 4-3) (Shields 2020). ADF&G then assigned percentage splits for each combination of locale code and statistical area based on their knowledge of the fishery and the management priorities at the time of an opening. Finally, these percentage splits, which are listed in Table 4-4, were applied to the reported landings from fish tickets for each opening on a species-by-species basis from 1999–2021.

Table 4-3 Locale codes.

Locale Code	Drift Gillnet Area	Statistical Area
1	1	244-60
2	2	244-60
3	3	244-60
4	3 & 4	244-60
5	1 & 2	244-60

Source: Shields (2020).

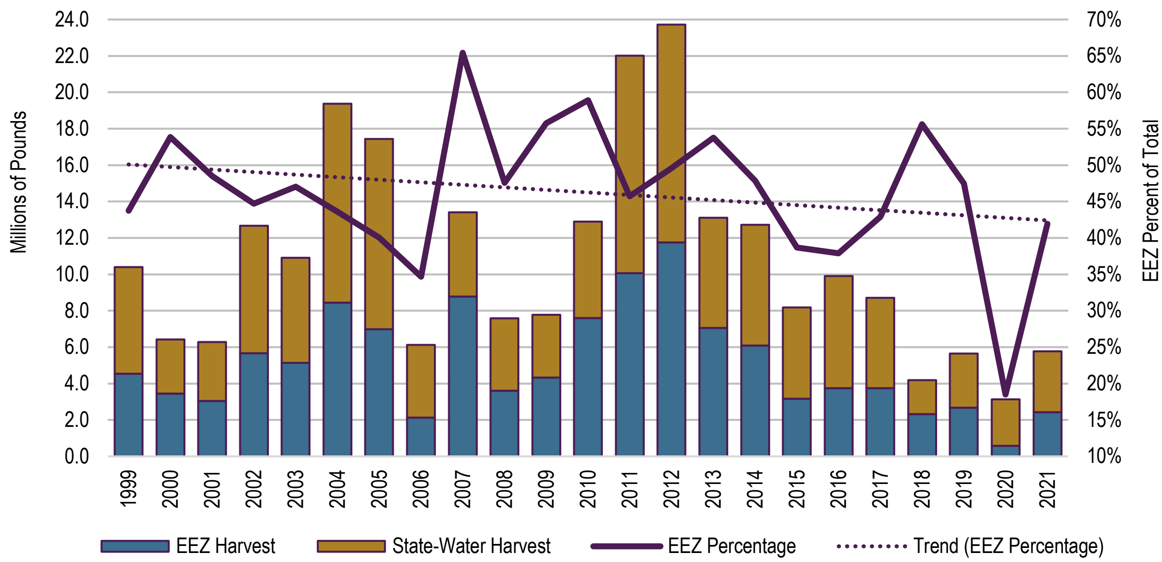
Table 4-4 Assumed percent of the UCI salmon drift gillnet fishery salmon harvest in State waters versus the EEZ by statistical area.

Statistical Area	Name/Description	Locale Code	State Water Percent	EEZ Percent
24426	Kasilof Special Harvest Area	All	100%	0%
24451	Kenai Section	All	100%	0%
24455	Full Corridor	All	100%	0%
24456	Expanded Full Corridor	All	100%	0%
24457	Expanded Kenai/Kasilof & Anchor Point Section	0	94%	6%
		1	25%	75%
24460 (District Wide)	All areas available	0	50%	50%
	Fishing Limited to Drift Area 1	1	25%	75%
	Fishing Limited to Drift Area 3	3	100%	0%
	Fishing Limited to the Drift Areas 3 & 4	4	75%	25%
	Fishing Limited to Drift Areas 1 & 2	5	50%	50%
24461	Kasilof Section	All	100%	0%
24510	Chinitna Bay	All	100%	0%

Source: Shields (2020).

As shown in Figure 4-9, the estimated amount of salmon harvested by the UCI salmon drift gillnet fleet in the EEZ as a percent of its total harvest varied from 1999–2021, but showed an overall slight decreasing trend. The average was 47%, with a low of 35% in 2006 and a high of 65% in 2007. During a given year, the percentage of salmon harvested by the fleet in the EEZ in the district wide openings declines as the fishing season progresses. At the beginning of the fishing season the EEZ percentage is higher than the "season-long" percentage reported for each year in Figure 4-9. The EEZ percentage then gradually declines as the salmon migrate up Cook Inlet and the fleet becomes more dispersed. Toward the latter part of the season, most of the UCI salmon drift gillnet fleet's catch in the district wide openings is generally north of the EEZ (i.e., in State waters). However, some vessel operators may eventually resume fishing in the EEZ in order to target coho salmon. As shown in Figure 4-1, the majority of the coho harvests generally occur after the primary sockeye run.

Figure 4-9 Approximate percent of total salmon harvests (in pounds) in the UCI salmon drift gillnet fishery inside the EEZ, 1999–2021.



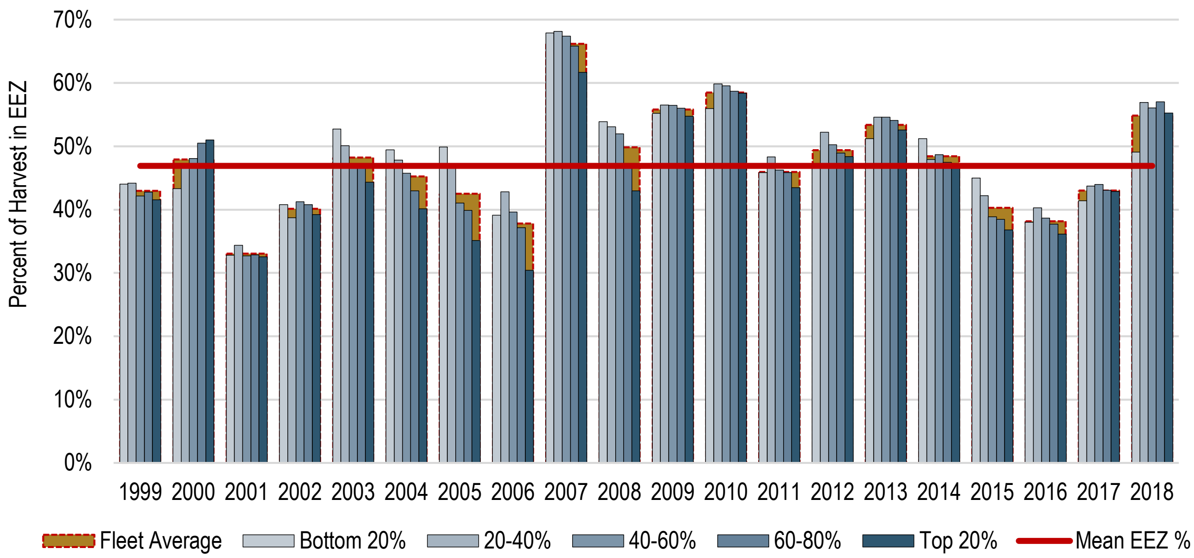
Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020) and from ADF&G (2022).

Given the location of sought-after fishing grounds within the boundaries of the Cook Inlet EEZ (Figure 4-2 and Figure 1-2, practically the entire active UCI salmon drift gillnet fleet must fish in the EEZ at some time during each fishing season. As noted above, the EEZ is likely most heavily fished during the beginning of the season.

However, the level of economic dependency on fishing grounds in the EEZ may differ across vessels when viewed over an entire fishing season. To examine differences in EEZ use within the UCI salmon drift gillnet fleet, the analysis examined the relationship between annual percent of salmon harvest inside the EEZ and 1) vessel length, and 2) vessel average annual catch. The analysis showed no significant correlation between EEZ percentage and vessel size on a vessel-by-vessel basis. However, the annual salmon catch of vessels was significantly (P <0.01% based on Students t-test) and negatively correlated with EEZ percentage. This negative relationship is depicted in Figure 4-10, which separates individual active vessels into five percentile groups based on their catch compared to total fleet catch: bottom 20%; 20-40%; 40-60%; 60-80%; and top 20%. The figure shows the average annual catch of each group from 1999–2018.[62] While there is considerable annual variability within each percentile group, in general the EEZ accounted for a higher proportion of the catches of vessels that caught less fish. It is possible that the operators of these vessels are choosing to forego some opportunities to fish in the Expanded Kenai/Kasilof and Anchor Point Sections (which are in State waters). Although the vessels could increase their annual harvests by fishing in these areas, they may be unwilling to endure the often congested and competitive fishing conditions in the areas. Although statistically significant, the difference between the percentile groups is relatively small: on average, from 1999–2018, the EEZ accounted for 50% of the annual catch of vessels in the group catching the fewest fish, and 44% of the annual catch of vessels in the group catching the most fish.

[62] These data could not be updated with the data provided in 2022.

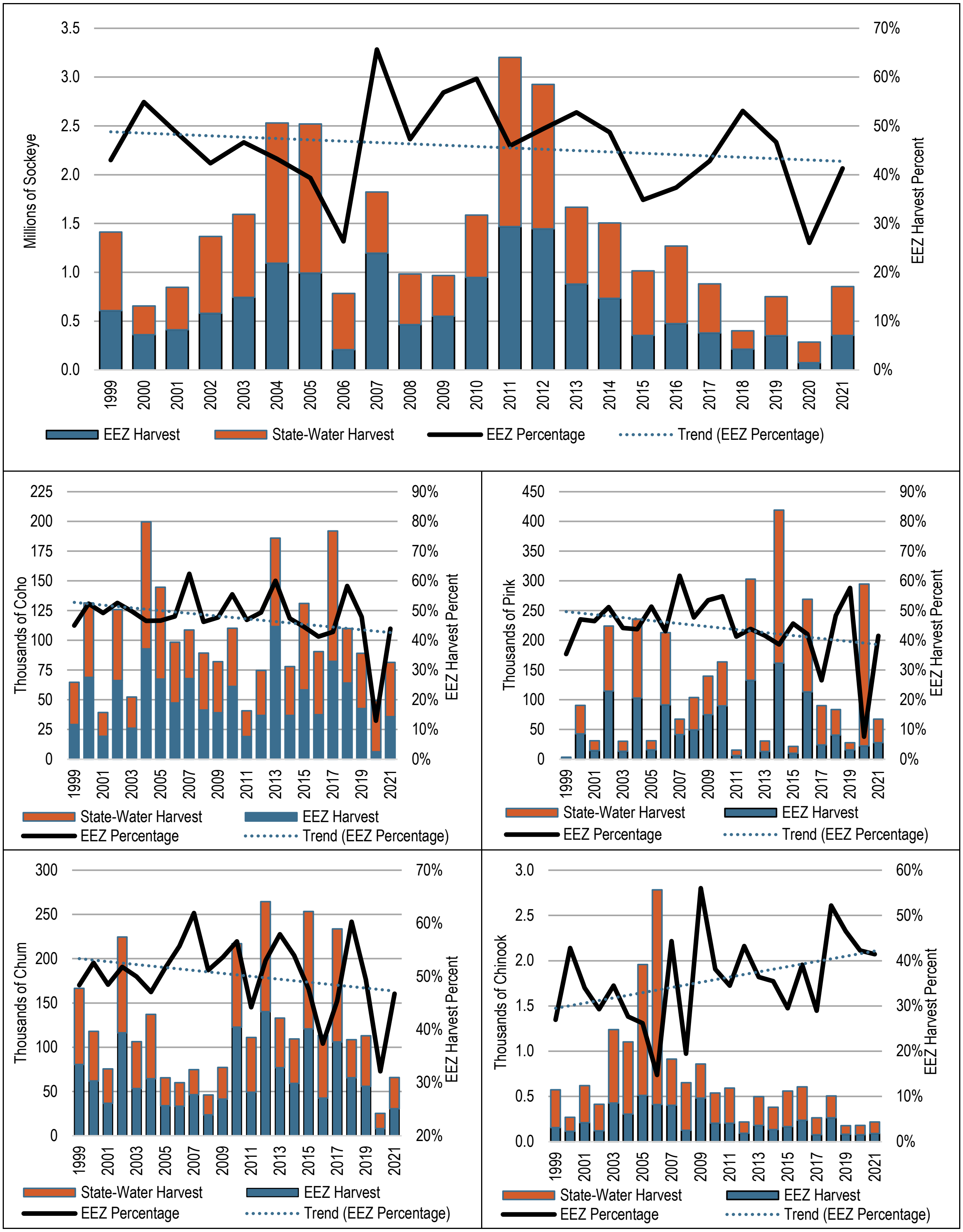
Figure 4-10 Average annual percent of salmon harvest (in pounds) in the UCI salmon drift gillnet fishery inside the EEZ by catch percentile group, 1999–2018.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020)and ADF&G (2022).

Figure 4-11 shows the estimated percentage of the UCI salmon drift gillnet fishery harvest that occurred inside the EEZ by species from 1999–2021. The top portion of the figure focuses on sockeye salmon, while other species are shown in the four quadrants of the bottom portion (on the next page). The EEZ accounted for an average of 47% of the harvest of sockeye salmon, the primary target species in the fishery, with a low of 26% in 2006 and a high of 66% in 2007; for coho salmon, the average was 49%, with a low of 13% in 2020 and a high of 62% in 2007; for chum salmon, the average was 50%, with a low of 37% in 2016 and a high of 62% in 2007; and for Chinook salmon, the average was 32%, with a low of 15% in 2005 and a high of 56% in 2010.

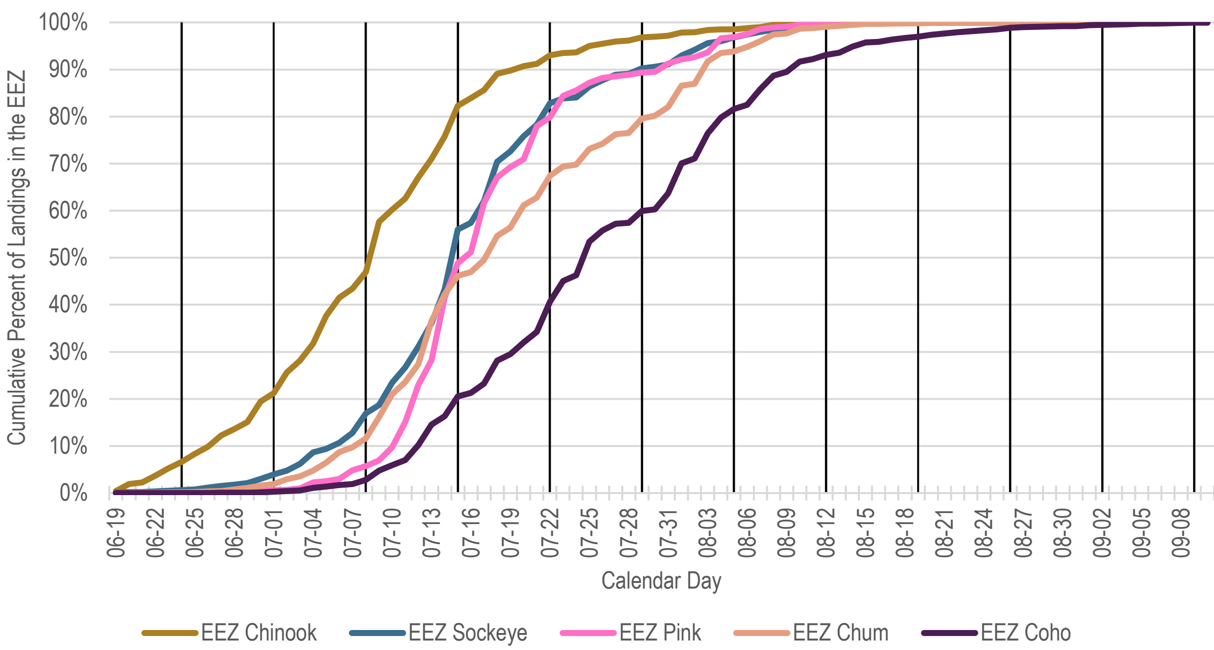
Figure 4-11 Approximate percent of salmon harvests (in numbers of fish) in the UCI salmon drift gillnet fishery inside the EEZ by species, 1999–2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020) and from ADF&G (2022).

Figure 4-12 shows the average cumulative percent of total landings that occur in the EEZ by species and calendar day. The vertical lines represent weekly intervals starting with June 24, and moving through July 1, July 8, and on through the end of August. By July 8, 47% of the Chinook that will be harvested in an average year will have been harvested. Similarly, by July 15, 56% of the Sockeye that will be taken from the EEZ in an average year will have been harvested. This figure is very similar to Figure 4-1, except that the former shows cumulative landings in State and Federal waters combined. The steepness of the lines in Figure 4-12 relative to those in Figure 4-1 indicate that harvest in the EEZ occur earlier than harvests in State waters.

Figure 4-12 Average cumulative landings in the EEZ (2013 to 2021) by season day as a percentage of total EEZ landings.



Developed by Northern Economics based on data from ADF&G (2022).

4.5.1.2.4. Non-target Harvest in the UCI Salmon Drift Gillnet Fishery

Catches in the UCI salmon drift gillnet fishery of species other than salmon consist primarily of groundfish. Alaska groundfish regulations accommodate incidental groundfish bycatch from directed salmon gillnet fisheries. In the Cook Inlet Area (Registration Area H), an EO is issued annually by ADF&G to set groundfish bycatch limits.[63] Since 2014, this EO allowed participants in the UCI salmon drift gillnet fishery to retain 20% pollock round weight as a percent of the target species harvested, which is the maximum bycatch level allowed under 5 AAC 28.070 (Rumble et al. 2019).

However, groundfish species are present in low abundance in most areas where salmon fishing with drift gillnets occurs in Cook Inlet. As a result, the reported catch of groundfish and other non-target species in the UCI salmon drift gillnet fishery has been minimal. According to AKFIN data, between 2002 and 2015, only seven drift gillnet vessels made a landing of groundfish. These landings ranged from three pounds to 962 pounds. The amount of non-target species discarded at sea by the UCI salmon drift gillnet fleet is not reported.

[63] The Cook Inlet Area has as its eastern boundary the longitude of Cape Fairfield (148º50’25” W. long.) and as its southern boundary the latitude of Cape Douglas (58º51’10” N. lat.) (5 AAC 27.400).

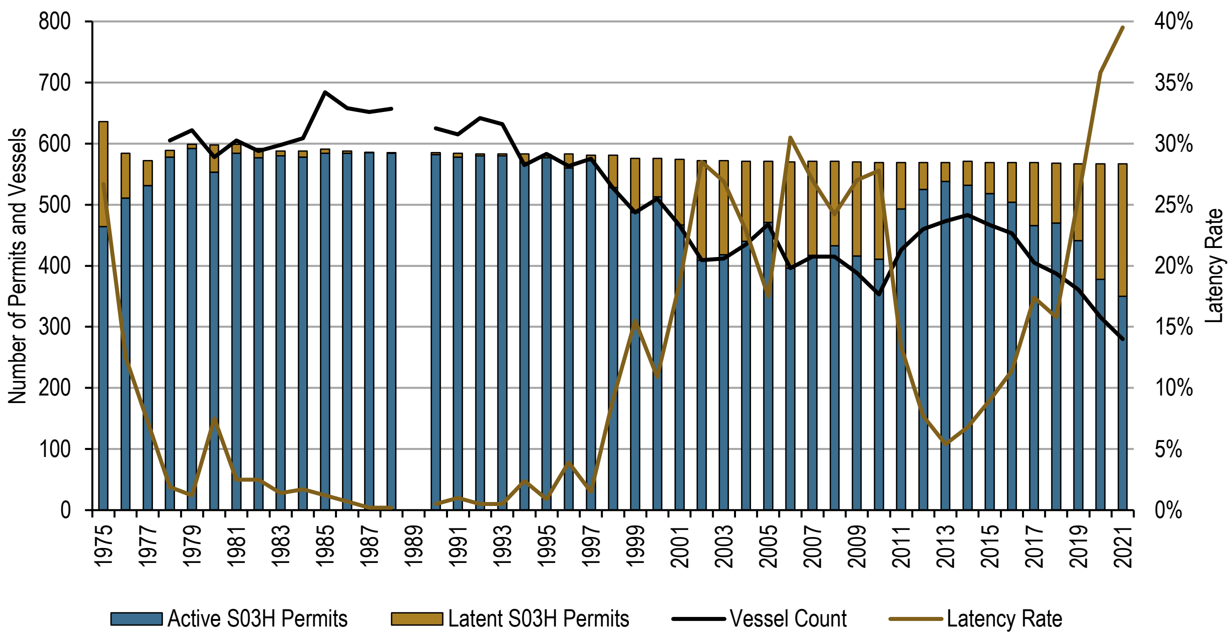
4.5.1.3. Harvesting Vessels

4.5.1.3.1. Harvester Participation

4.5.1.3.1.1. Number of Permits and Vessels

CFEC permits for the Cook Inlet salmon drift gillnet fishery were issued starting in 1975. The permits for the fishery are designated as S03H permits.[64] Figure 4-13 shows that the annual number active of holders of S03H permits from 1975–2021 averaged around 580, with only a slight downward trend. Permit counts represent the total number of issued permits and include both interim-entry permits and permanent permits.[65] From 1995–2010 the number of active permits trended downward. Numbers of active permits rebounded back up to 538 by 2013, but since then, numbers of active permits have been trending downward. In 2020 and 2021 latency rates exceeded 35% for the first time since limited entry permits were issued.[66]

Figure 4-13 Number of S03H permits by active/latent status, 1975–2021.



Notes: Data for 1989 omitted because the fishery was due to the *Exxon Valdez* oil spill in Prince William Sound. From 2008 to 2021, there were an average of 28 permits which were registered as a part of a dual permit operation, but which did not have landings attributed to them. Their activity in dual permits operations implies a smaller level of latency than is shown in the figure.
Source: Developed by Northern Economics based on data from Alaska Commercial Fisheries Entry Commission (2019, 2023).

CFEC regulations require individuals to renew their permits annually, regardless of whether they actually fish. Permits that are not used (do not record landings) in a given year are referred to as “latent” permits for that year. Figure 4-13 indicates the number of S03H permits used and rate of permit latency each year. Latency rates peaked in the 2000s due to low ex-vessel prices caused by saturation of the domestic seafood market with farm-raised salmon. Many vessel operators chose not to fish their permits, opting to wait until prices improved (Glazier et al. 2006). In 2011, the rate of latent permits began to decline.

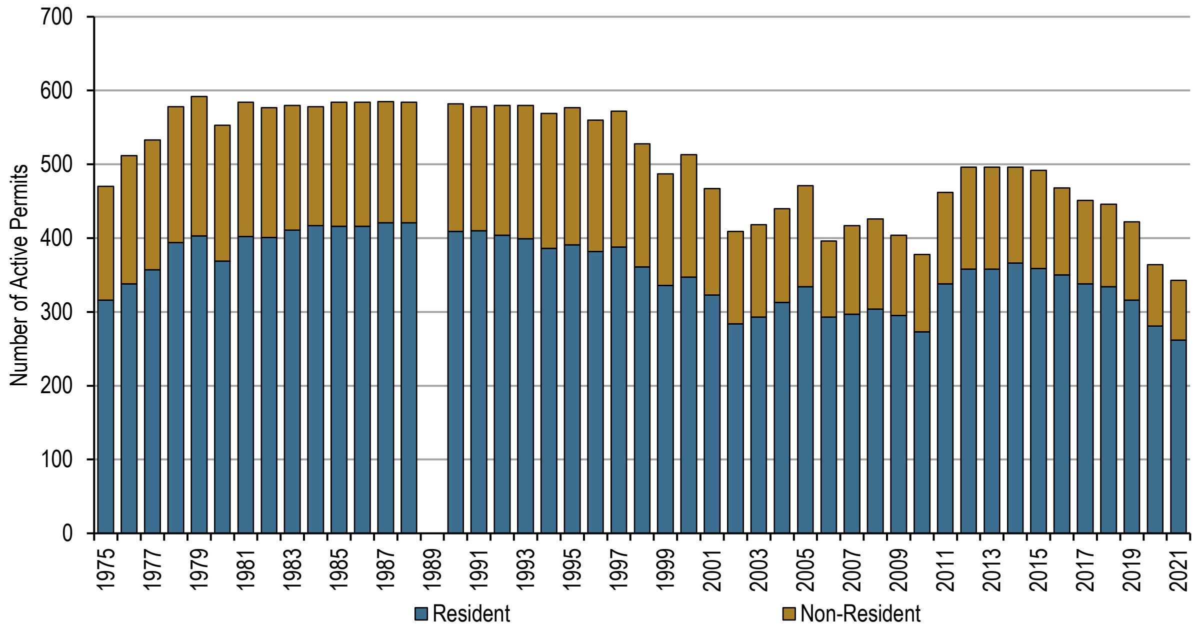
[64] The CFEC’s four-digit code to designate permits refers to the species group, gear, and permit area. In the case of a S03H permit, S = salmon; 03 = drift gillnet; and H = Cook Inlet.
[65] Interim-entry permits are issued to individuals during the period when their applications for permanent permits are in adjudication. The last year an interim-entry permit was held was in 2005 (Alaska Commercial Fisheries Entry Commission 2019).
[66] At least some of the increased numbers of latent permit can be attributed to regulations that allow the use of dual permits and permit stacking (see Sections 4.5.1.3.1.4 and 4.5.1.3.1.5).

Farrington et al. (2014) suggest that the increase in participation and related reduction in latent permits may have been due to an improvement in salmon prices (Section 4.5.1.3.4.2), together with new regulations that allowed the formation of dual-permit operations and permit stacking (Sections 4.5.1.3.1.4 and 4.5.1.3.1.5).

4.5.1.3.1.2. Residency of Permit Holders

In the UCI salmon drift gillnet fishery, an average of 71% of active permits were fished by Alaska residents from 1975–2021 (Figure 4-14). The relatively high percent of resident participation in the fishery is likely a result of the fishery's proximity to Alaska's major population base (McDowell Group 2015).

Figure 4-14 Number of active S03H permits by resident type, 1975–2021.



Notes: Data for 1989 omitted because the fishery was largely closed due to the *Exxon Valdez* oil spill in Prince William Sound.
Source: Developed by Northern Economics based on data from Alaska Commercial Fisheries Entry Commission (2022).

Table 4-5 indicates the initial distribution and historical net changes in permit holdings for the UCI salmon drift gillnet fishery by resident type from 1975–2021. The number of permits can change for three reasons: permits can be transferred to other resident types (transfer); permit holders can move from one location to another (migration); or permits can be cancelled (such as when a permit holder does not pay the renewal fee for two consecutive years). Table 4-5 indicates the extent to which these factors have contributed to net changes in permit holdings in this fishery. Transfers have had the largest impact on the changes, particularly between locals and nonresidents; however, some of the change has been offset by migrations.

Table 4-5 Initial issuance and year-end 2021 totals of S03H permits, with net changes due to permit transfers, migrations, and cancellations by resident type, 1975–2021.

Resident Type	Initial Issue Total	Initial Issue %	Transfers	Transfer % Change from Initial	Migrations	Migrations % Change from Initial	Cancelled	Cancelled % Change from Initial	2021 Year-End Total	2021 Year-End %
Local Resident	367	64.0%	+71	+19.3%	-44	-12.0%	-1	-0.3%	393	69.3%
Nonlocal Resident	21	3.7%	-7	-33.3%	+12	+57.1%	0	0.0%	26	4.6%
Non-resident	185	32.3%	-64	-34.6%	+32	+17.3%	-5	-2.7%	148	26.1%
Total	**573**	**100.0%**	**0**	**0.0%**	**0**	**0.0%**	**-6**	**-1.0%**	**567**	**100.0%**

Notes: “Local” means residing in the ADF&G Cook Inlet Management Area, including Anchorage.
Source: Alaska Commercial Fisheries Entry Commission (2019, 2023).

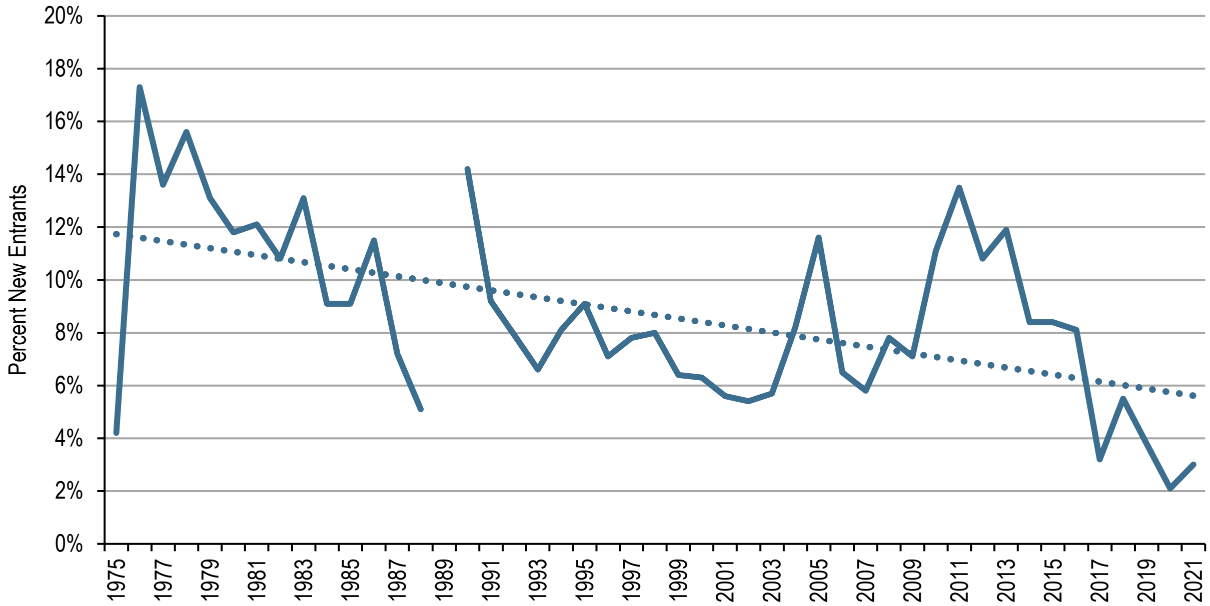
Based on a special report on permit Transfers in Cook Inlet salmon fisheries (Alaska Commercial Fisheries Entry Commission 2019), 58.8% of all S03H permit transfers were sales, 36.0% were gifts, 1.5% were trades, and 3.6% were other transfer types. The annual acquisition methods for the permits did not change substantially throughout the time period. During the same period, 40.8% of all permit transfers were between immediate family members and other relatives, 15.0% were between business partners/friends, and 44.2% were between other types of entities (Alaska Commercial Fisheries Entry Commission 2019).

4.5.1.3.1.3. New Entrants

Figure 4-15 shows the level of new entry into the UCI salmon drift gillnet fishery from 1975–2021 as a percent of total participants in the fishery. New entrants are individuals who, for the first time, record a landing on a permanent S03H permit (Alaska Commercial Fisheries Entry Commission 2019). The figure describes individuals rather than permits. An individual may hold up to two permits for the same fishery but can only fish one of them. An individual may hold one S03H permit one year, and then in subsequent years hold a different permit in the fishery. Likewise, individuals may enter and exit the fishery multiple times over the years. Individuals are only counted once as a new entrant and only in the year in which they made their first documented landing. Initial permit holders are not considered new entrants because they needed a proven fishing history prior to 1975 in order to become an initial holder of a CFEC permit. Individuals who only make landings on an emergency transfer or interim-entry permit for any given year are also not considered in the figure (Alaska Commercial Fisheries Entry Commission 2019).

The average annual rate of new entry in the UCI salmon drift gillnet fishery from 1975–2018 was 9.0%, with a high of 17.3% in 1976 and a low of 3.2% in 2017. In comparison, the average annual rate of new entry over the same time period was 11.7% in the Cook Inlet salmon purse seine fishery, and 8.5% in the Cook Inlet salmon set gillnet fishery (Alaska Commercial Fisheries Entry Commission 2019). In 2020, new entrants into the fishery hit a new low at 2.1%, while new entrants in 2021 were the second lowest on record at 3.0%. If the last three years are factored in, the annual average number of new entrants falls to 8.6%.

Figure 4-15 New entrants as a percent of total participants in the UCI salmon drift gillnet fishery, 1975–2021.



Source: Alaska Commercial Fisheries Entry Commission (2019, 2023).
Note: There was no fishery in 1989, and therefore new entrants could not be determined.

4.5.1.3.1.4. Dual-Permit Operations

Historically, two holders of S03H permits could fish in tandem from one vessel; however, the maximum amount of net that could be fished from a vessel was the same as that of a single permit holder. This changed in 2008 when the BOF implemented a new regulation that allows two permit holders in the UCI salmon drift gillnet fishery to fish concurrently from the same vessel and jointly operate up to 200 fathoms (1,200 feet) of gillnet (5 AAC 21.333), which is one-third more than the net length a permit holder operating alone is allowed.[67] Areas open to these "dual-permit operations" were the so-called "inlet wide" ADF&G statistical areas in the Central District. In 2011, the BOF included the Expanded Kenai and Kasilof Sections in the area available to dual-permit operations (Farrington et al. 2014). The dual-permit regulation was intended to make it possible for young fishermen to enter the UCI salmon drift gillnet fishery without the need to purchase a vessel as well as a permit. In addition, the regulation could help local permit holders get back into the UCI salmon drift gillnet fishery if they did not own a boat (Kotlarov 2019).

The effect of the dual-permit regulation on new entry in the UCI salmon drift gillnet fishery appears to be limited. As shown in Figure 4-15, the annual rate of new entry was relatively high from 2010–2013, but it started declining in 2014. However, data suggest that the regulation may be achieving the goal of helping inactive S03H permit holders resume their participation in the UCI salmon drift gillnet fishery. Farrington et al. (2014) suggest that the basis for forming at least some of the dual-permit operations in the UCI salmon drift gillnet fishery has been the sizable pool of latent S03H permits (Section 4.5.1.3.1.1). By affording fishermen an opportunity to team up, collectively fish extra gear, and hopefully become more profitable, the dual-permit option brought permits out of latency.[68]

[67] The BOF implemented a similar regulation in the Bristol Bay salmon drift gillnet fishery in 2003.

[68] Interviews conducted by Farrington et al. (2014) with S03H permit holders indicate that the decision to enter into a dual-permit operation depends on a range of individual circumstances, included the availability of a good partner, processor support of dual-permit operations, dynamics within an exclusive fishing-group, weather and tide conditions,

Further, it appears that many of the S03H permit owners who were formerly inactive but have resumed participation in the UCI salmon drift gillnet fishery under the dual-permit option are local residents. Table 4-6 reports on the resident type combinations of the individuals in dual-permit operations with landings from 2008–2021. Resident type is counted as the residency status of the permit holder at the end of the year. Note that permit holders can regroup, thereby increasing the total count of dual-permit operations (Alaska Commercial Fisheries Entry Commission 2019). As shown in the table, local Alaska residents constituted the largest number of dual-permit operations in all years.

Table 4-6 Number of individuals in dual-permit operations in the UCI salmon drift gillnet fishery by resident type, 2008–2021.

Year	Both Local Resident	Both Nonlocal Resident	Both Nonresident	Local Resident and Nonlocal Resident	Local Resident and Nonresident	Nonlocal and Nonresident	Total
2008	5	0	2	0	2	2	9
2009	18	**	**	0	0	0	21
2010	45	**	4	**	7	7	59
2011	54	**	6	0	6	6	69
2012	40	**	10	**	9	9	62
2013	38	**	12	**	13	13	68
2014	41	3	8	2	9	9	64
2015	35	**	6	**	15	15	61
2016	34	2	6	3	14	14	61
2017	23	**	7	**	3	3	36
2018	26	**	4	3	3	3	39
2019	21	2	9	2	4	4	38
2020	19	**	4	2	**	**	27
2021	16	**	3	**	**	**	22

Notes: “Local” means residing in the ADF&G Cook Inlet Management Area, including Anchorage. ** indicates that data cannot be provided in order to protect confidentiality.
Source: Alaska Commercial Fisheries Entry Commission (2019, 2023).

4.5.1.3.1.5. Permit Stacking

Since 2017, the BOF has allowed for stacked permit operations in the UCI salmon drift gillnet fishery. A stacked permit operation is where an individual who holds two S03H permits can fish up to two full complements of gear (5 AAC 21.333(a)).

Table 4-7 provides data on participation in stacked permit operations in terms of individuals rather than permits.[69] Allowing the purchase and use of two permits by individuals within a fishery can directly benefit those individuals by providing increased fishing opportunities that can make their fishing operations more efficient (Gho 2012). As shown in the table, individuals with stacked permits accounted for a disproportionately high percentage of total gross revenue across all resident types in all years since permit stacking was legalized. During those years, the count of individuals with stacked permit operations increased from 34 to 71.

vessel and gear capacities, family fishing, and inseason fishing dynamics. The variability of these circumstances likely contributes to the intermittency of dual-permit operations, with permit holders switching from fishing as a dual-permit operation during part of the season to a single-permit operation at other times.

[69] Alaska Commercial Fisheries Entry Commission (2019) notes that reporting on counts of stacked permit operations is not a simple task. Permits can change hands multiple times throughout the year. An individual may fish in a single permit operation at the beginning of season then fish as a stacked operation after acquiring a second permit midseason. An individual in a stacked permit operation might use an emergency transfer permit for part of the season, and then have a permanently held second permit for the rest of the season.

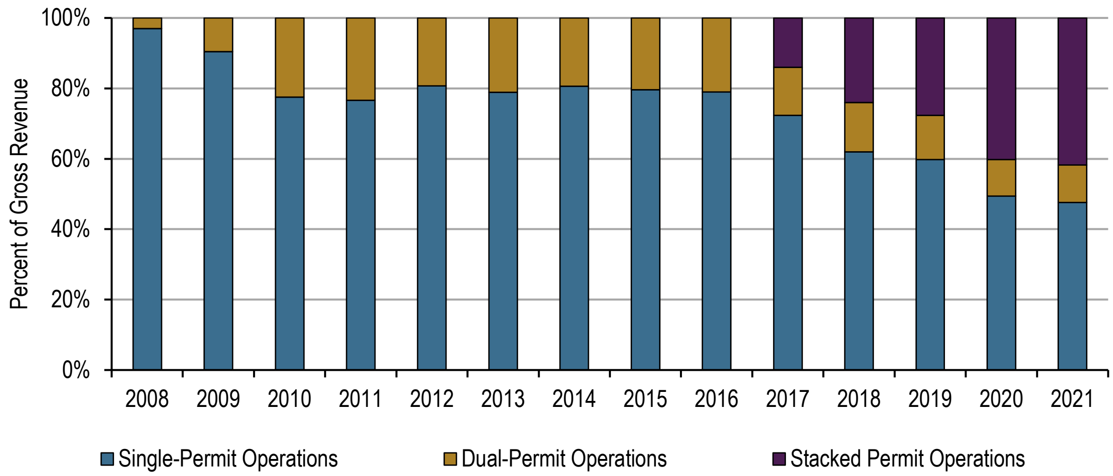
Table 4-7 Number and percent of gross revenue in the UCI salmon drift gillnet fishery by operation type and resident type, 2017–2021.

Year	Resident Type	Individuals With Landings in Stacked Permit Operations	Percent with Landings in Stacked Permit Operations	Percent of Gross Revenue in Stacked Permit Operations
2017	Local	26	6%	11%
	Nonlocal Resident	0	0%	0%
	Nonresident	8	2%	3%
	Total	**34**	**8%**	**14%**
2018	Local	47	12%	19%
	Nonlocal Resident	*	*	*
	Nonresident	*	*	*
	Total	**61**	**15%**	**24%**
2019	Local	53	14%	24%
	Nonlocal Resident	0	0%	0%
	Nonresident	10	3%	4%
	Total	**63**	**17%**	**28%**
2020	Local	56	18%	35%
	Nonlocal Resident	0	0%	0%
	Nonresident	15	5%	6%
	Total	**71**	**22%**	**40%**
2021	Local	53	18%	35%
	Nonlocal Resident	5	2%	2%
	Nonresident	13	5%	5%
	Total	**71**	**25%**	**42%**

Notes: “Local” means residing in the ADF&G Cook Inlet Management Area, including Anchorage.
* = Data are masked for confidentiality.
Source: Developed by Northern Economics based on data from Alaska Commercial Fisheries Entry Commission (2019, 2023).

Figure 4-16 shows the percent of annual revenue in the UCI salmon drift gillnet fishery for single-permit, dual-permit, and stacked-permit operations. In 2008, dual-permit operations accounted for only about 3% of total gross revenue in the UCI salmon drift gillnet fishery. From 2010–2016, the percent of gross revenue attributable to dual-permit operations averaged around 21%. The amount of revenues in dual permit operations has been declining since 2017 when permit stacking was approved. Gross revenues in stacked permit operations have increased quickly since 2017, and in 2021 accounted for more than 40% of gross revenues in the fishery.

Figure 4-16 Percent of gross revenue in the UCI salmon drift gillnet fishery by operation type, 2008–2021.



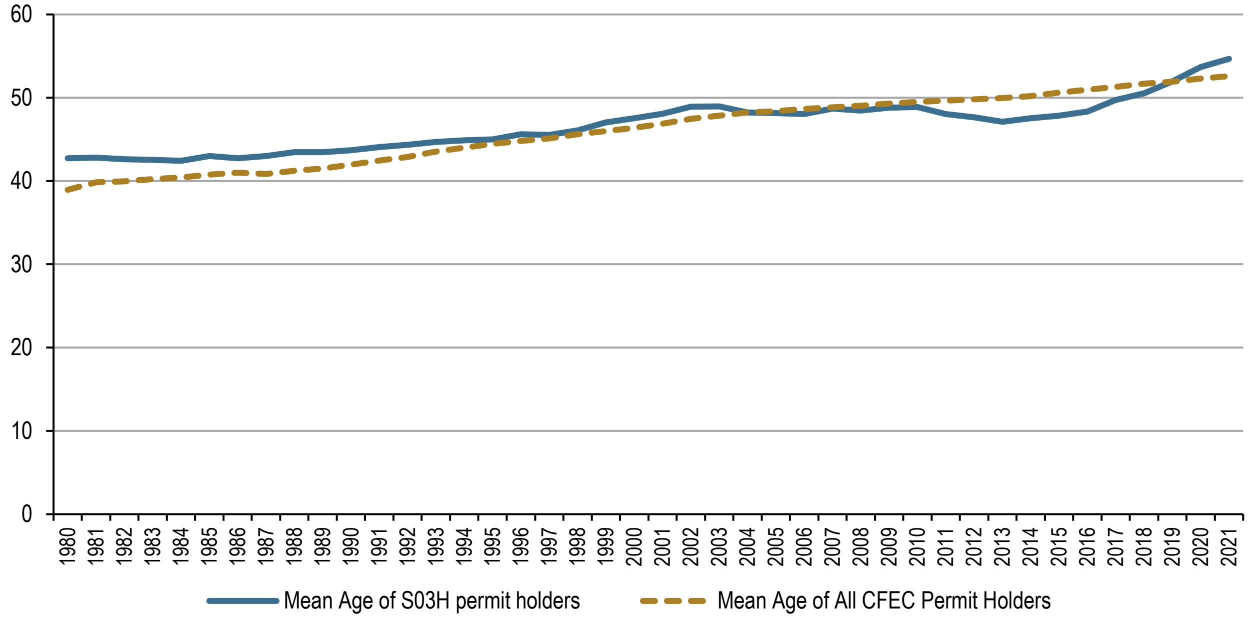
Source: Developed by Northern Economics based on data provided by Alaska Commercial Fisheries Entry Commission (2019, 2023).

4.5.1.3.2. Age of Harvesters

Recent studies (e.g., Cullenberg et al. 2017) have suggested that financial and other socioeconomic challenges have created barriers to entry for the next generation of harvesters in some Alaska fisheries. The resulting "graying of the fleet" especially threatens the healthy succession of fishing as an economic and cultural mainstay in small rural fishing communities. With specific regard to the UCI salmon drift gillnet fishery, fishermen have recently expressed concern that fewer young people are entering and staying in the fishery because of increasing operating costs, relatively low earnings, and unpredictable openings (Earl 2018b).

Figure 4-17 shows the mean age of S03H permit holders from 1975–2021 and compares it to the mean age of all CFEC permit holders. Although new permit holders have entered the UCI salmon drift gillnet fishery over the years (Section 4.5.1.3.1.3), the median age of S03H permit holders increased from 42 to 55 years in the period shown, which represents a 28% increase. The higher mean age indicates that older harvesters may be continuing to fish beyond their expected retirement age or younger harvesters have been slow to replace them (or both). However, the mean age increase of S03H permit holders was lower than the 35% increase for CFEC permit holders as a whole over the same time period.

Figure 4-17 Mean age of S03H permit holders, 1975–2021.



Source: Alaska Commercial Fisheries Entry Commission (2019).

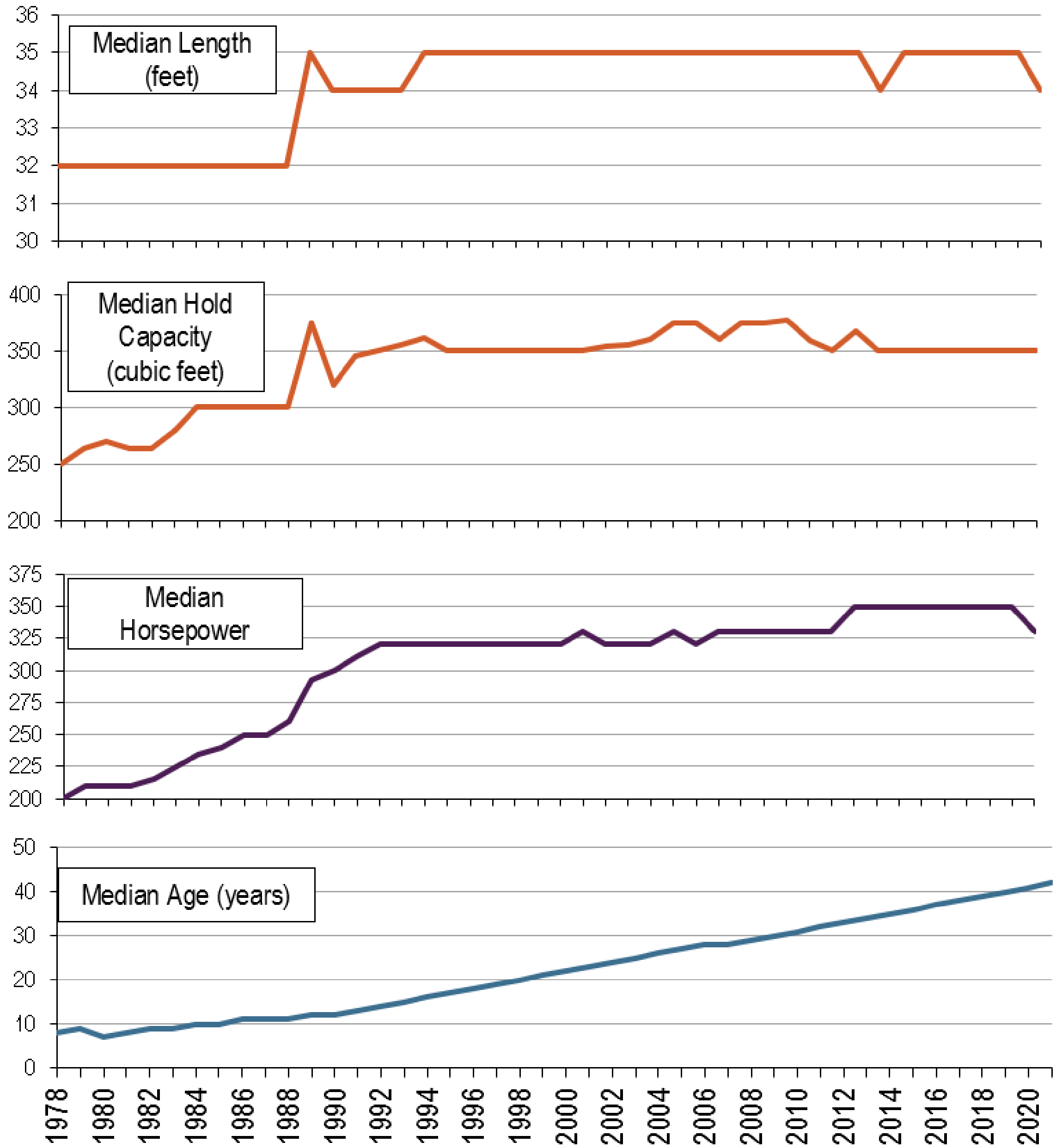
4.5.1.3.3. Vessel Characteristics

Figure 4-18 reports on various vessel characteristics of the UCI salmon drift gillnet fleet. As captains sought to fish larger portions of Upper Cook Inlet during a fishery opening, median vessel length, net tonnage, horsepower, and hold capacity substantially increased during the 1980s.[70, 71] Hull types also changed during the time period, with a trend away from the original wooden boats to fiberglass and aluminum boats (Iverson and Sears 2008; Alaska Commercial Fisheries Entry Commission 2019). Since then, however, vessel characteristics have been fairly stable, with the exception of vessel age. From 1980–2021, the median vessel age in the fleet steadily increased from 8 years to 42 years, suggesting that vessel replacement in the fleet has been minimal.

[70] The increase in median vessel length in the 1990s might reflect not only a change in actual vessel sizes, but also in the way the data were collected. In 1989, the U.S. Coast Guard changed its method for measuring registered length. In addition, in the mid-1990s the CFEC vessel license application began to ask for overall length instead of registered length (Iverson and Malecha 2000; Iverson and Sears 2008).

[71] Stronger pickup trucks for towing, more reliable boat trailers, and improved road conditions also were important in increasing the range of the fleet (Petterson and Glazier 2004).

Figure 4-18 Vessel characteristics in the UCI salmon drift gillnet fishery, 1997–2021.



* The increase in median vessel length in the 1990s might reflect not only a change in actual vessel sizes, but also in the way the data were collected. See Footnote 70.

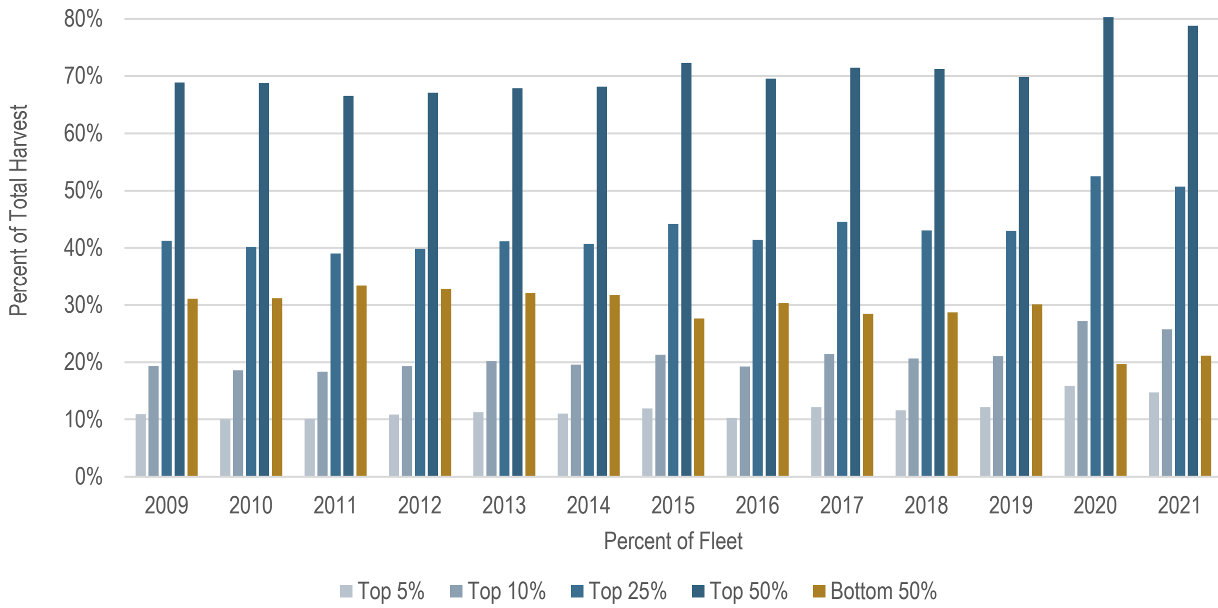
Source: Alaska Commercial Fisheries Entry Commission (2019)..

4.5.1.3.4. Vessel Dependency

4.5.1.3.4.1. Distribution of Salmon Harvest

Figure 4-19 shows the distribution of the salmon harvest across the UCI salmon drift gillnet fleet from 2008–2021. In general, the top 5% of vessels caught approximately 12% of the total catch; the top 10% caught 21% of the total; the top 25% caught 43% of the total; and the top 50% caught 71% of the total. The blue columns are cumulative, while the orange column shows the catch of the bottom 50% of the fleet (29% on average).

Figure 4-19 Distribution of salmon harvests in the UCI salmon drift gillnet fishery by catch percentile group, 2009–2021.

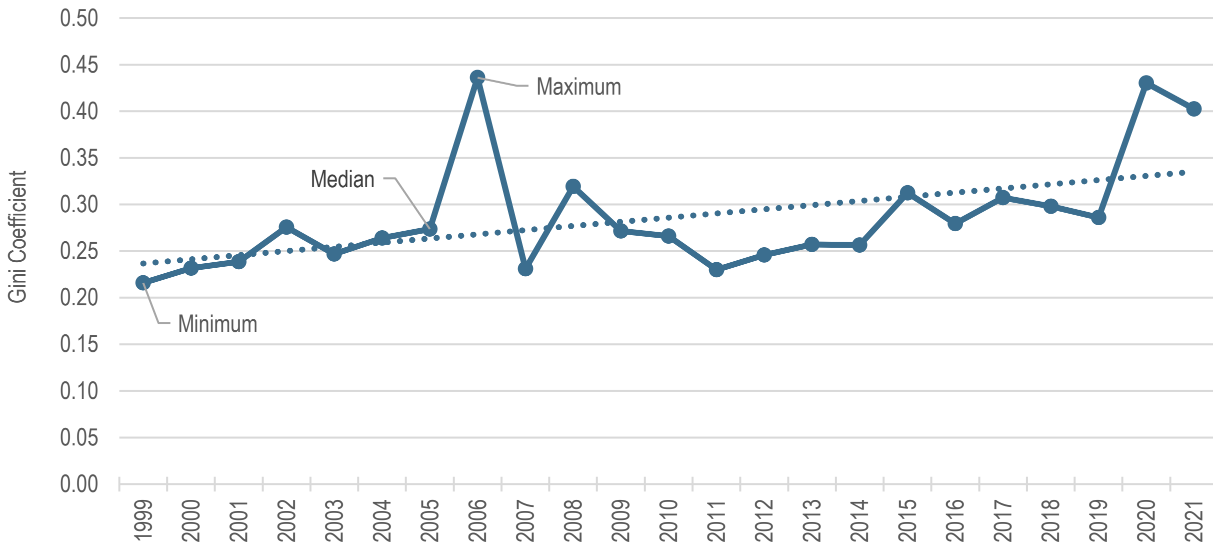


Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2022) in the Comprehensive FT database.

The analysis also computed the Gini coefficient for the sockeye salmon harvest in the UCI salmon drift gillnet fishery from 1999–2021 (Figure 4-20). This coefficient measures the equality of catch distribution among active vessels. A Gini coefficient equal to zero represents a perfectly equal distribution of catch amongst vessels, whereas a value of 1.0 represents a perfectly unequal distribution, with a single vessel accounting for the entire harvest. The median Gini coefficient for the sockeye salmon harvest in the fishery from 1999–2021 was 0.273, while the mean was 0.286. Figure 4-20 shows that the Gini coefficient trended upward from 1999–2021, which indicates that catch became less equally distributed across the fleet. However, the degree of concentration of harvests among vessels is still relatively low, which is likely due to the fact that participants in the fishery operate similarly sized vessels and exhibit similar effort levels. By comparison, the average Gini coefficient for gross revenue in the halibut IFQ fishery and sablefish IFQ fishery from 2005–2014 was 0.67 and 0.58, respectively (North Pacific Fishery Management Council and National Marine Fisheries Service 2016).[72]

[72] The Gini coefficient was calculated across catcher vessels in the sablefish IFQ fishery.

Figure 4-20 Gini coefficient for sockeye salmon harvest in the UCI salmon drift gillnet fishery, 1999–2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020, 2022)

4.5.1.3.4.2. Gross Revenue from Salmon Harvests

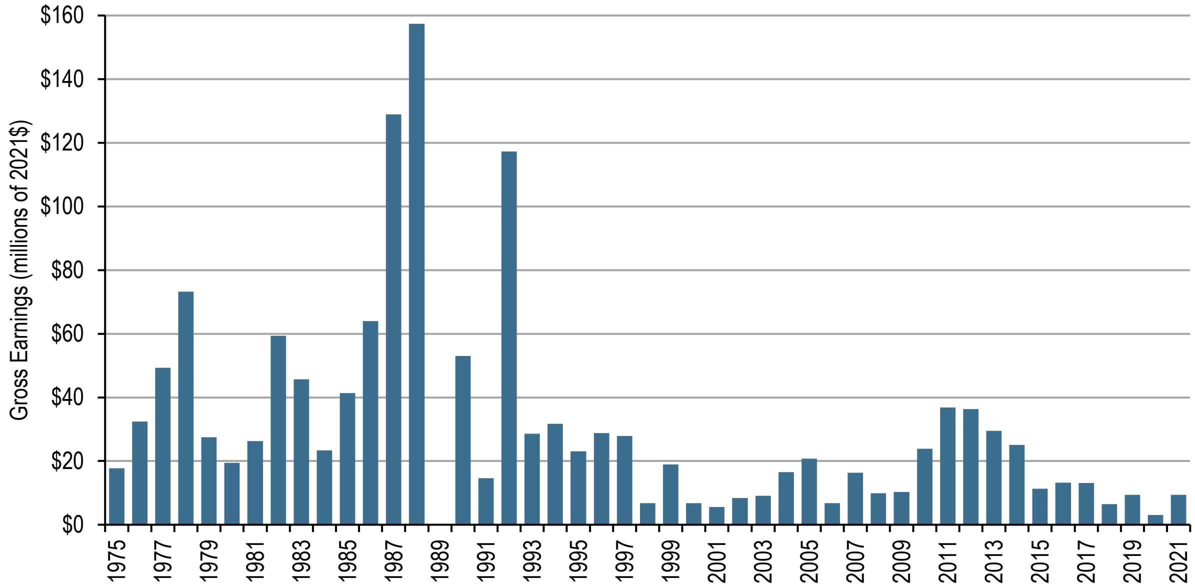
The gross revenue from salmon harvests in the UCI salmon drift gillnet fishery is a function of the harvest and ex-vessel prices.[73] Harvest levels in the fishery fluctuate with salmon run strength, while ex-vessel prices for salmon products vary due to shifting market demand and changes in international currency exchange rates.

As shown in Figure 4-21, gross revenue in the fishery experienced a sharp rise in the late 1980s prior to the *Exxon Valdez* oil spill During this period, salmon ex-vessel prices (Figure 4-22) as well as landings (Figure 4-5) were high.[74] Beginning in the 1990s the price of Alaska salmon dropped across the State, in part because of the large output of farmed Atlantic salmon and a shift in global salmon markets. Landings and gross revenue declined in concert. Since 2018 inflation adjusted gross revenues in the fishery have been quite low with an average of $7 million, on par with revenues from 1998–2003. Revenues in 2020 were the lowest since limited entry began. Since 2015, inflation adjusted prices bounced up and down around a mean of $1.84 per pound.

[73] All revenues and prices in this section are adjusted for inflation to 2021 dollars using the seasonally adjusted U.S. Gross Domestic Product Chain-Type Price Index developed the Federal Reserve Bank of St. Louis (2022).

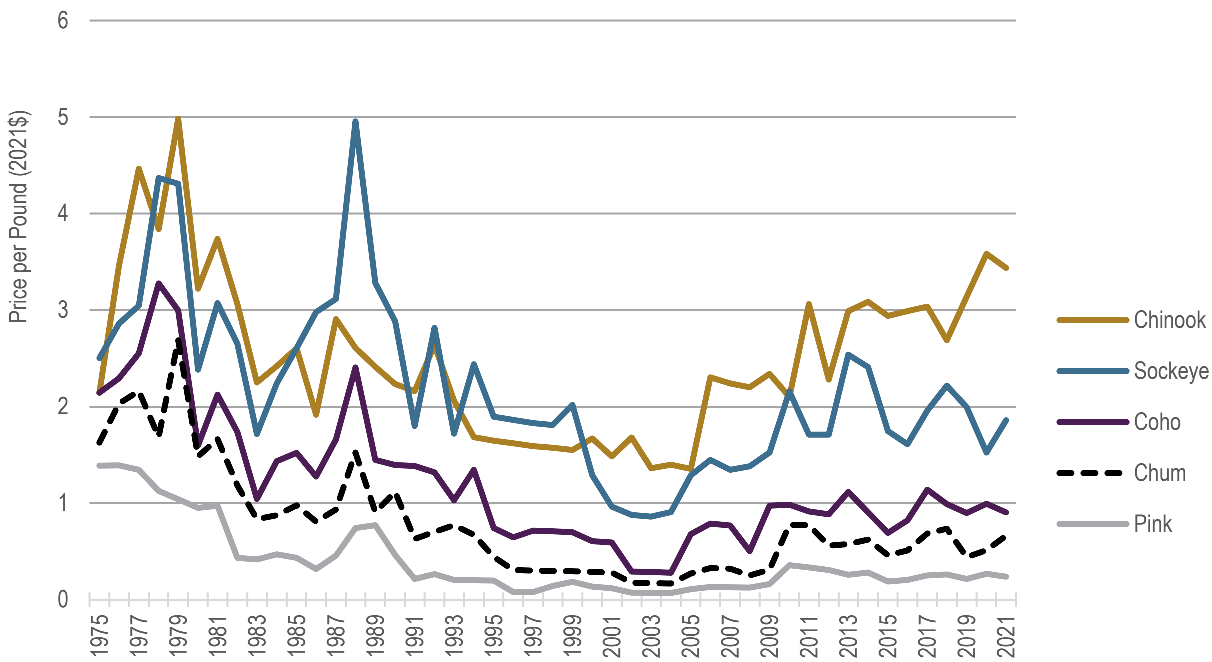
[74] Estimating average annual price paid per pound of salmon caught in Upper Cook Inlet salmon fisheries is challenging because an increasing number of fishermen are self-marketing their catches rather than selling their harvest to regional shorebased processors. By selling some or all of their harvest to niche markets, they often receive higher prices. In addition, early-season price of Chinook and sockeye salmon is often much higher than what is paid later in the season because local markets have kept demand high for early-season fresh fish (Shields 2010; Marston and Frothingham 2019).

Figure 4-21 Gross revenue (inflation adjusted) from salmon harvests in the UCI salmon drift gillnet fishery, 1975–2021.



Notes: The 1989 fishery was cut short by the Exxon Valdez Oil Spill. Values are adjusted for inflation to 2021 dollars
Source: Developed by Northern Economics using data from Alaska Commercial Fishing Entry Commission (2022).

Figure 4-22 Average annual ex-vessel price (inflation adjusted) of salmon harvested in Upper Cook Inlet salmon fisheries by species, 1975–2021.

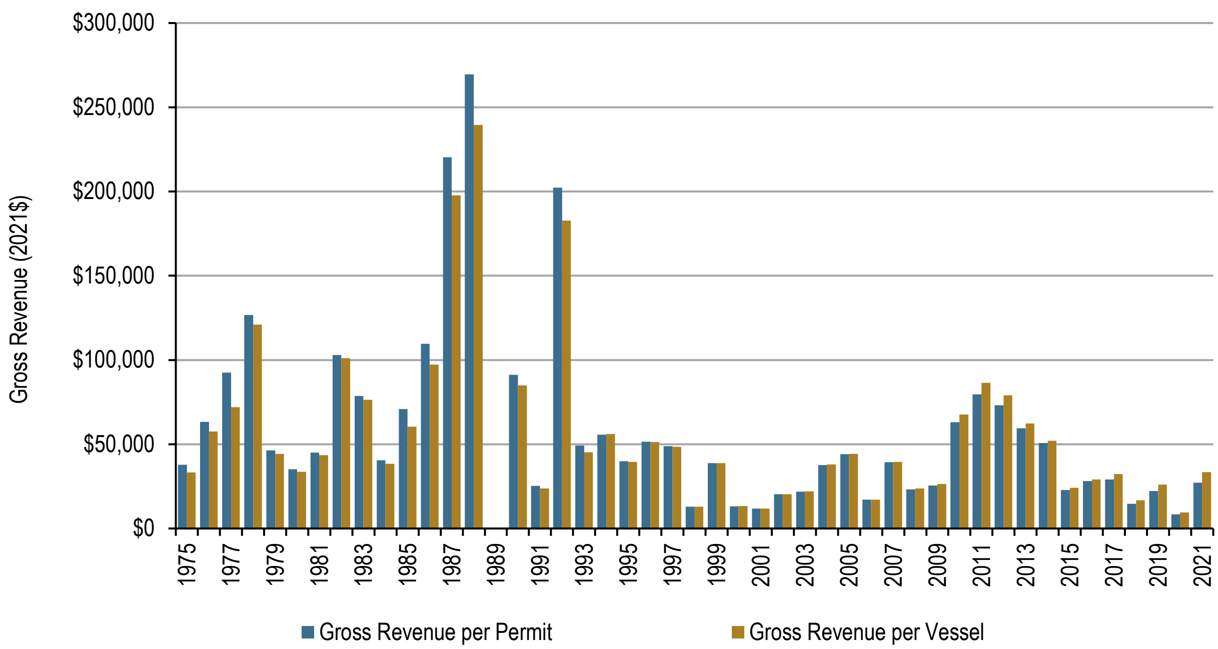


Notes:
Prices are based on random fish ticket averages in both the set and drift gillnet fisheries in the UCI, and do not include bonuses or postseason adjustments. Values are adjusted for inflation to 2021dollars.
Source: Developed by Northern Economics using Marston and Frothingham (2022).

4.5.1.3.4.3. Gross Revenue Per Permit and Vessel

Figure 4-23 shows the estimated gross revenue per permit and per vessel in the UCI salmon drift gillnet fishery from 1975–2021. Revenue was estimated from weighted average ex-vessel prices. The revenue values by permit or vessel span the entire year, regardless of who held the permit or however many times the permit was transferred. Permit counts include interim-entry permits and permanent permits. Some individuals made landings on both an interim-entry permit and subsequently on their adjudicated permanent permit in the same year; for these instances, only the permanent permit was counted (Alaska Commercial Fisheries Entry Commission 2019). The average gross revenue per permit from 1975–2021 was about $58,425 for the UCI salmon drift gillnet fleet. However, over that period the average fluctuated considerably, with a high of more than $269,000 in 1988 and a low of around $8,300 in 2020 (not counting the year of the *Exxon Valdez* oil spill).

Figure 4-23 Gross revenue (inflation adjusted) per active permit and vessel in the UCI salmon drift gillnet fishery, 1975–2021.

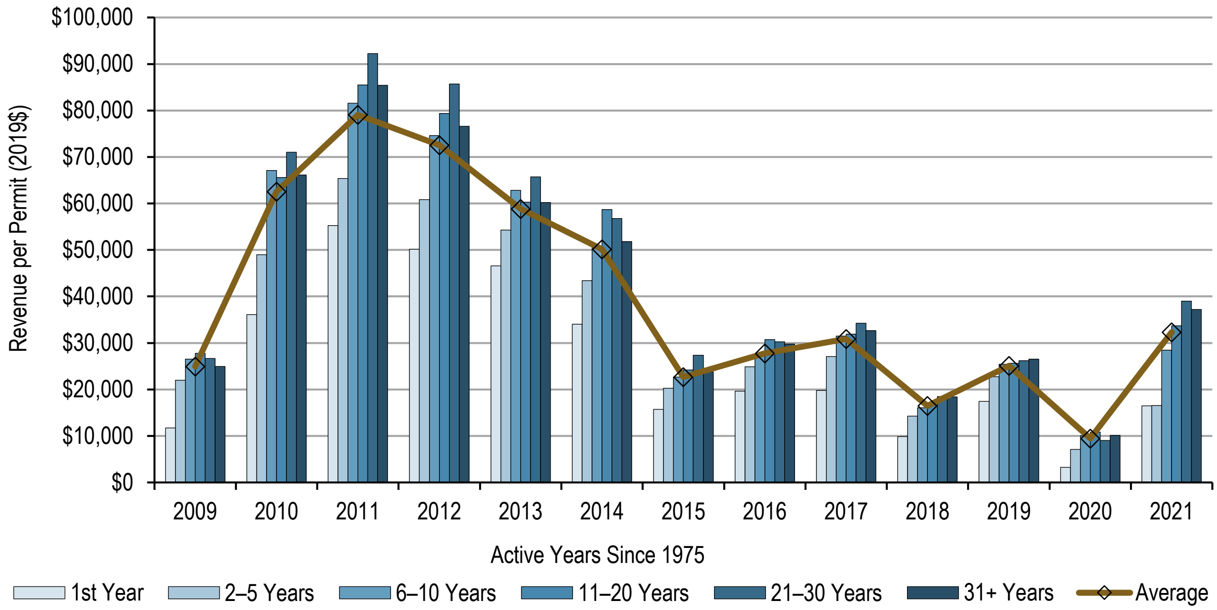


Notes:
Adjusted for inflation to 2021 dollars.
The 1989 fishing season was excluded due to the *Exxon Valdez* oil spill that occurred in Prince William Sound that year.
Source: Developed by Northern Economics based on data from Alaska Commercial Fisheries Entry Commission (2022).

4.5.1.3.4.4. Gross Revenue Per Permit by Longevity in the Fishery

Figure 4-24 summarizes average gross revenue per active S03H permit from 2009–2021 by the number of years of participation in the UCI drift gillnet fishery since 1975. Permit holders with less than six years of experience in the fishery generated less revenue than the average permit holder. First-year participants in the fishery generated 69% of the average gross revenue per permit across all permit holders, while permits holders with two to five years of experience generated 88% of the average gross revenue per permit. Permits holders with 21 to 30 years of experience in the fishery had the highest earnings, averaging 117% of the average gross revenue per permit.

Figure 4-24 Average gross revenue (inflation adjusted) per active S03H permit by years of participation UCI drift gillnet fishery, 2009–2021.



Notes: Adjusted for inflation to 2021 dollars..
Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020, 2022).

4.5.1.3.4.5. Diversification of S03H Permit Holders

As discussed in Section 4.5.1.2.1, fishing opportunities in the UCI salmon drift gillnet fishery consist of only about two months during the summer salmon runs. As a result, most participants supplement their income from the fishery during the remainder of the year. This section examines the diversification of S03H permit holders in terms of participation in other fisheries and participation in wage-and-salary employment.

Table 4-8 summarizes participation by active S03H permit holders in other Alaska fisheries from 2009–2021, and the relative importance of these fisheries to permit holders in terms of gross revenue. The first section of the table shows that an average of 111 active S03H permit holders (27%) were also active in other Alaska fisheries, the most important being the halibut fishery.[75] The second section shows that active S03H permit holders averaged $20.6 million in gross revenue in the UCI salmon drift gillnet fishery, and they averaged $14.4 million in gross revenue in other fisheries. The third section shows that the gross revenue generated in these other fisheries accounted for 41% of the total fishery gross revenue of active S03H permit holders. The fourth section shows the percentage of active S03H permit holders in four categories of dependence on the UCI drift gillnet fishery: permit holders in the first category generated all of their fishery gross revenue in the UCI drift gillnet fishery; permit holders in the second category generated 50–99% of their fishery gross revenue in the fishery; permit holders in the third category generated 25–49%; and permit holders in the fourth category generated less than a quarter. An average of 73% of the active permit holders generated their entire fishery gross revenue in the UCI salmon drift gillnet fishery, while another 11% generated half or more of their gross revenue in the

[75] Anderson et al. (2017) evaluated trends in revenue and diversification over time for individuals fishing commercially in Alaska from 1985 to 2014. The authors found that active S03H permit holders who also fished for halibut were among those fishermen with the lowest estimated revenue variability.

fishery. On average, 15% of active S03H permit holders generated more fishery revenue outside of the UCI salmon drift gillnet fishery than in the fishery.

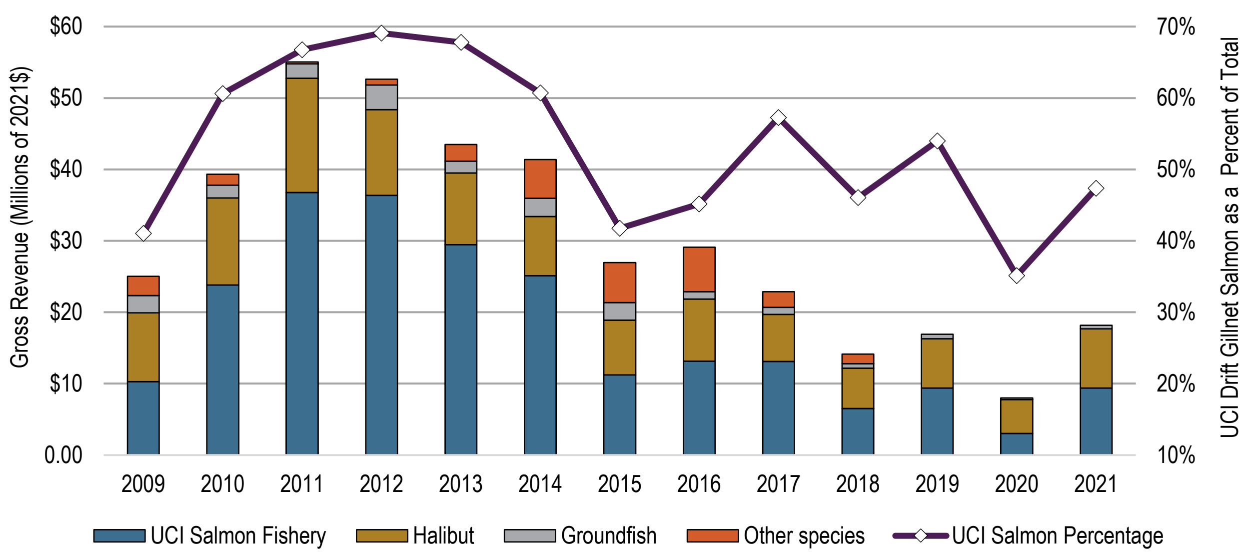
Table 4-8. Gross revenue (inflation adjusted) diversification of active S03H permit holders, 2009–2021.

Fishery	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2009–2018 Average
Number of S03H permit holders by fishery														
UCI Drift Gillnet Fishery	411	381	465	501	501	501	496	473	424	396	375	320	290	**426**
All Other Alaska Fisheries	129	115	133	139	132	123	123	121	102	98	89	67	66	**111**
Halibut Fishery	111	100	111	116	109	100	97	96	84	80	75	56	53	**91**
Groundfish Fishery	66	50	66	63	63	68	54	61	46	42	28	23	21	**50**
Other Alaska Fisheries	29	24	25	31	35	32	36	40	34	26	25	19	23	**29**
Gross revenue of S03H permit holders by fishery (millions of 2021 dollars)														
UCI Drift Gillnet Fishery	$10.3	$23.8	$36.8	$36.4	$29.5	$25.1	$11.2	$13.1	$13.1	$6.5	$9.4	$3.0	$9.4	**$20.6**
All Other Alaska Fisheries	$14.7	$15.5	$18.3	$16.3	$14.0	$16.3	$15.7	$16.0	$9.8	$7.6	$8.0	$5.6	$10.4	**$14.4**
Halibut Fishery	$9.7	$12.2	$16.0	$12.0	$10.0	$8.3	$7.7	$8.7	$6.6	$5.7	$6.9	$4.8	$8.3	**$9.7**
Groundfish Fishery	$2.4	$1.8	$2.0	$3.4	$1.7	$2.5	$2.4	$1.0	$1.0	$0.6	$0.7	$0.2	$0.5	**$1.9**
Other Alaska Fisheries	$2.7	$1.5	$0.3	$0.8	$2.3	$5.4	$5.6	$6.2	$2.2	$1.3	$0.5	$0.6	$1.6	**$2.8**
Gross revenue by fishery as a percent of total gross fishery of revenue of S03H permit holders														
UCI Drift Gillnet Fishery	41%	61%	67%	69%	68%	61%	42%	45%	57%	46%	54%	35%	47%	**59%**
All Other Alaska Fisheries	59%	39%	33%	31%	32%	39%	58%	55%	43%	54%	46%	65%	53%	**41%**
Halibut Fishery	39%	31%	29%	23%	23%	20%	28%	30%	29%	40%	39%	55%	42%	**28%**
Groundfish Fishery	10%	5%	4%	7%	4%	6%	9%	4%	4%	5%	4%	3%	2%	**5%**
Other Alaska Fisheries	11%	4%	1%	1%	5%	13%	21%	21%	10%	9%	3%	7%	8%	**8%**
Percent of S03H permit holders in categories of UCI salmon drift gillnet fishery dependence														
100% of Gross Revenue	69%	70%	71%	72%	74%	75%	75%	74%	76%	75%	76%	79%	77%	**73%**
50–99% of Gross Revenue	9%	15%	17%	17%	16%	12%	6%	8%	10%	6%	10%	4%	10%	**12%**
25–49% of Gross Revenue	10%	10%	8%	8%	7%	8%	10%	11%	8%	8%	7%	7%	5%	**9%**
< 25% of Gross Revenue	12%	5%	4%	3%	3%	5%	8%	7%	6%	11%	7%	10%	8%	**6%**

Notes: Nominal gross revenues are adjusted for inflation to 2021 dollars.
Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2022).

Figure 4-25 summarizes the fishery gross revenue diversification of active S03H permit holders from 2009–2021.

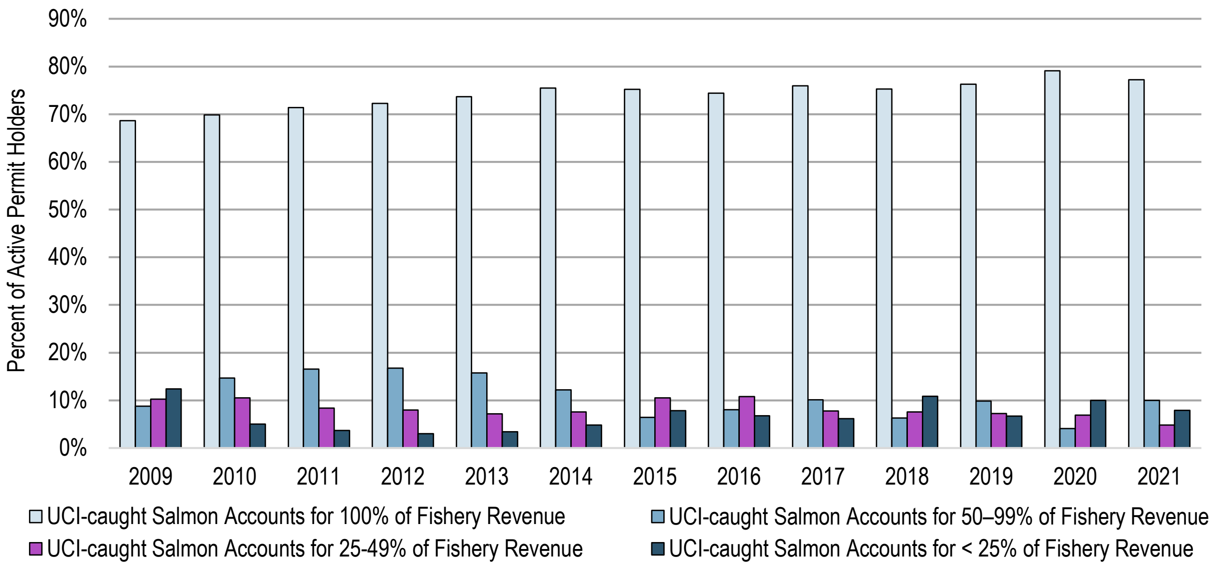
Figure 4-25 Gross revenue (inflation adjusted) diversification of active S03H permit holders by fishery, 2009–2021.



Notes: Nominal gross revenue adjusted for inflation to 2021 dollars.
Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2022).

Figure 4-26 shows the dependence of active S03H permit holders on the UCI salmon drift gillnet fishery in terms of their total gross revenue from all fisheries from 1999–2021. Permit holders are separated into four percentile groups based on their level of dependence: UCI-caught salmon accounts for 100% of fishery revenue; UCI-caught salmon accounts for 50–99% of fishery revenue; UCI-caught salmon accounts for 25-49% of fishery revenue; UCI-caught salmon accounts for < 25% of fishery revenue. The figure shows that the majority (74%) of active S03H permit holders were dependent on the UCI salmon drift gillnet fishery for all of their fishery revenue from 1999–2021.

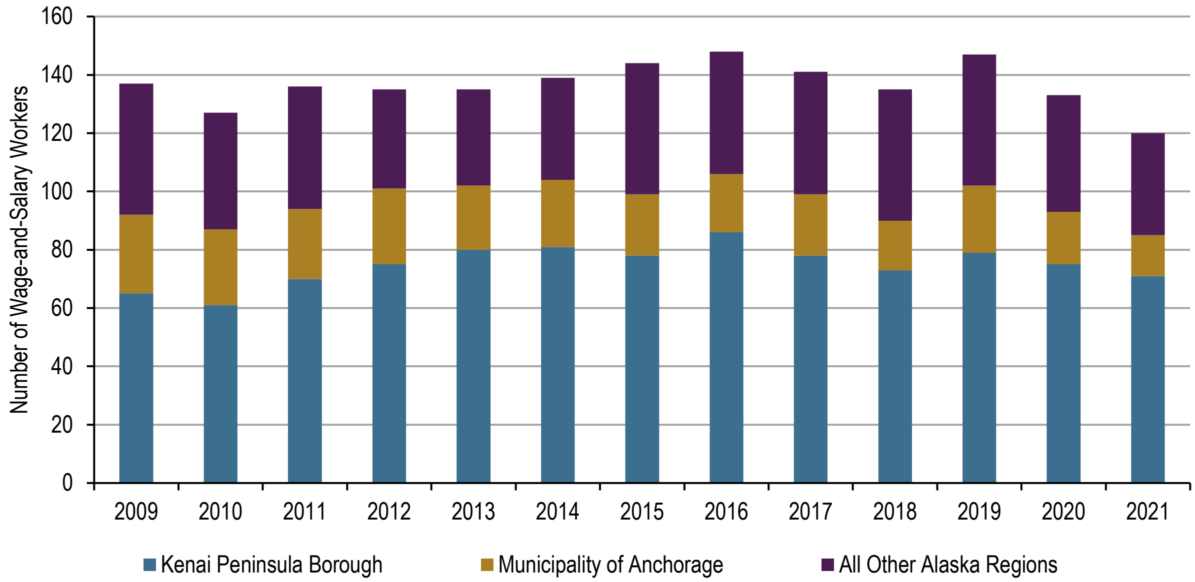
Figure 4-26 Gross revenue dependence of active S03H permit holders on the UCI salmon drift gillnet fishery by dependence percentile group, 2009–2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2022).

Diminishing economic incentives to participate in the UCI salmon drift gillnet fishery and commercial fishing in general have led some participants to seek secondary forms of work (Glazier et al. 2006). The number of active S03H permit holders engaged in wage-and-salary employment from 2009–2021 is shown in Figure 4-27 by place of work. On average, a total of 137 S03H permit holders had wage-and-salary jobs each year, which represents about one-third of all active permit holders. Most (54%) of these individuals worked in the Kenai Peninsula Borough.

Figure 4-27 Number of active S03H permit holders with wage-and-salary employment by place of work, 2009–2021.



Source: Developed by Northern Economics based on data provided by Alaska Department of Labor and Workforce Development (2023).

Table 4-9 lists the occupations of the active S03H permit holders with wage-and-salary employment from 2009–2021. On average, 70% of the employed permit holders held jobs in the top five occupations (education, construction, transportation, management, and production).

Table 4-9 Number of active S03H permit holders with wage-and-salary employment by occupation, 2009–2021.

Occupation	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Management	7	9	9	7	10	13	8	8	8	4	6	6	5
Business and Financial Operations	3	2	1	1	2	1	1	2	1	1	1	1	0
Computer and Mathematical	0	0	0	0	0	0	0	0	0	0	0	0	0
Architecture and Engineering	1	0	2	1	2	1	1	3	2	2	5	5	5
Life, Physical, and Social Science	4	4	3	1	1	1	0	0	0	0	3	2	1
Community and Social Service	0	1	0	0	0	0	1	1	3	2	0	0	0
Legal	1	1	1	1	1	1	1	1	1	1	1	1	0
Educational Instruction and Library	14	13	14	16	17	20	22	26	25	22	23	18	15
Arts, Design, Entertainment, Sports, and Media	0	1	4	3	4	3	0	0	1	0	1	1	0
Healthcare Practitioners and Technical	1	1	1	1	3	2	5	3	3	2	2	2	2
Healthcare Support	2	4	6	4	5	3	0	2	3	7	8	5	5
Protective Service	4	3	3	5	5	7	5	5	4	5	6	5	7
Food Preparation and Serving Related	2	1	4	3	2	3	2	3	3	5	3	1	1
Building and Grounds Cleaning and Maintenance	2	5	3	5	1	3	3	3	3	2	1	3	3
Personal Care and Service	0	0	0	2	0	0	2	3	2	0	1	1	0
Sales and Related	2	2	2	2	3	0	1	2	0	2	1	1	4
Office and Administrative Support	3	5	7	7	3	7	9	7	5	5	5	4	7
Farming, Fishing, and Forestry	0	1	2	1	2	0	1	1	3	4	3	1	3
Construction and Extraction	47	25	26	24	20	23	32	35	32	32	35	30	25
Installation, Maintenance, and Repair	9	6	8	10	9	11	9	5	5	5	6	6	5
Production	13	17	18	17	19	16	17	17	13	11	11	10	8
Transportation and Material Moving	22	26	22	24	26	24	24	21	23	22	25	27	22
All Occupations	**137**	**127**	**136**	**135**	**135**	**139**	**144**	**148**	**140**	**134**	147	130	118

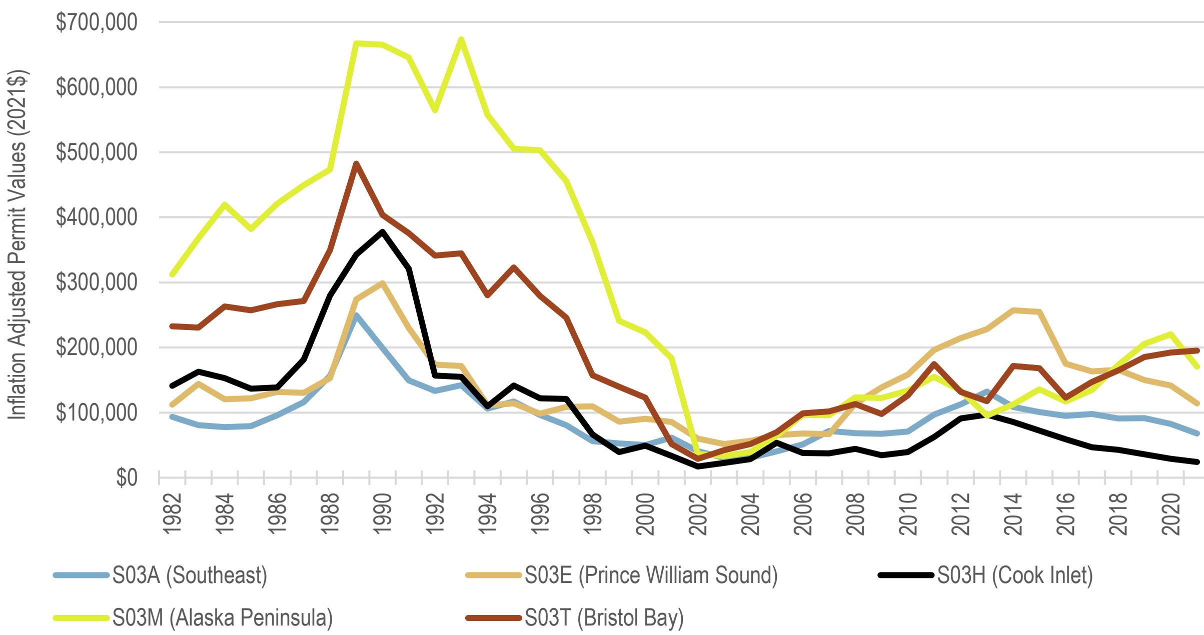
Source: Alaska Department of Labor and Workforce Development (2023)

4.5.1.3.4.6. Fishing Permit Values

CFEC permits for the UCI salmon drift gillnet fishery and other Alaska salmon fisheries may be bought and sold. Changes in the market value of CFEC permits reflect differences in expected potential revenue and profits in a fishery, with permit value often lagging one to two years behind fishery performance. Because a CFEC permit, along with a vessel and fishing gear, are among a fishing operation's primary economic assets, the effect of a decline in permit value is a financial loss to the fishing operation (Knapp et al. 2007).[76]

As presented in Figure 4-28, the value of a S03H permit experienced a sharp rise in the late 1980s through the early 1990s concomitant with high salmon ex-vessel prices (Section 4.5.1.3.4.2) and gross revenue per active permit (Section 4.5.1.3.4.3). However, as discussed above, beginning in the mid-1990s and continuing into the early 2000s the price of salmon dropped across the State. A S03H permit had an inflation adjusted apex value of around $378,000 in 1990. The value fell to $17,000 in 2002 before increasing through 2013 to $96,000. Since 2014 permit values have declined to $24,000 in 2021. Figure 4-28 shows that four other drift gillnet permits showed generally similar price trends with respect to a high around 1990 and a low in the early 2000s, although prices for Bristol Bay Permits have been increasing since 2016.

Figure 4-28 Value (inflation adjusted) of drift gillnet permits by fishery, 1982–2021.



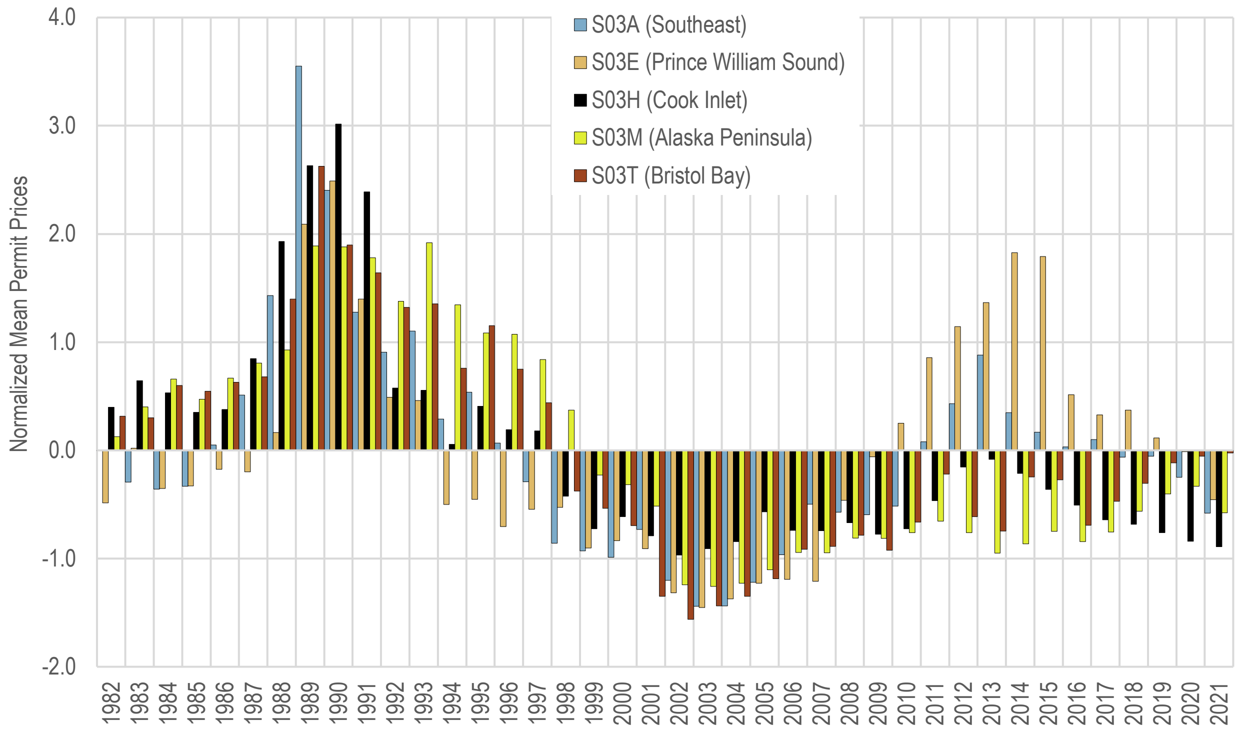
Notes: Permit values are adjusted for inflation to 2021 dollars.
Source: Developed by Northern Economics based on data from Alaska Commercial Entry Commission (2022).

An alternative method for comparing trends in the value of different drift gillnet permits is to normalize the permit value of each fishery relative to that fishery's long-term average permit value and standard deviation (Figure 4-29). Prior to 1988, permit values from Prince William Sound and Southeast Alaska were below average and drift gillnet permit values from other fisheries were above average. From 1988–1993 permit values of all of Alaska's drift gillnet fisheries were above average. From 1999–2009 permit values of all of Alaska's drift gillnet fisheries were below average. Since 2010, Prince William Sound and

[76] An asset is a resource that an individual or firm owns with the expectation that it will provide a future economic benefit.

Southeast Alaska permit prices have rebounded, while Cook Inlet, Bristol Bay, and Alaska Peninsula permits have remained below average.

Figure 4-29 Permit value anomalies for drift gillnet fisheries, 1982–2021.

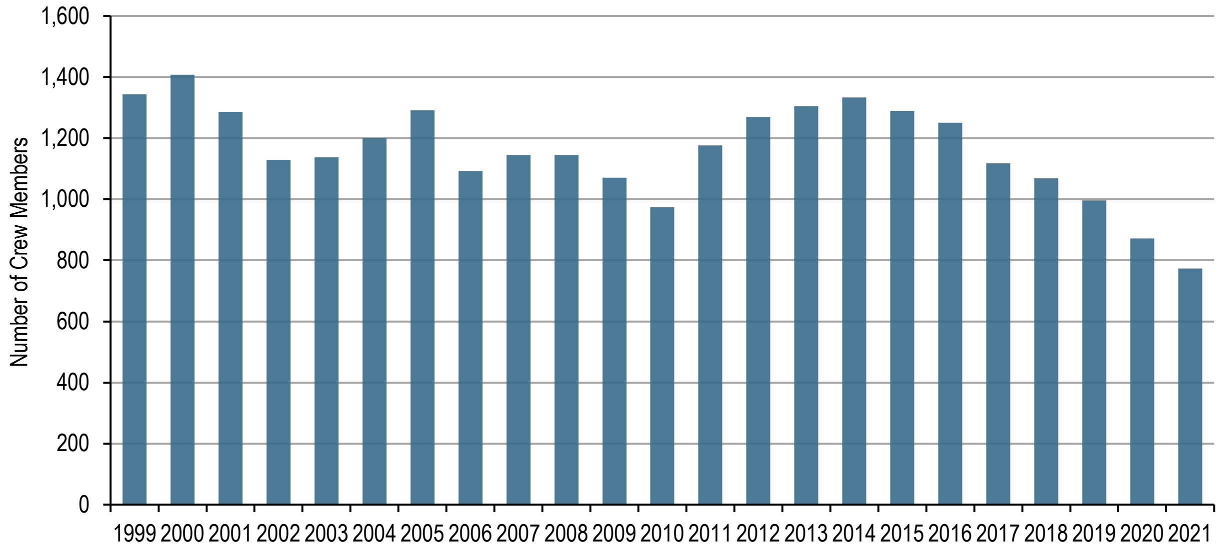


Note: For purposes of comparison permit prices are normalized so that the mean permit price for each fishery from 1982–2021 is zero and the standard deviation is 1. Permit prices were adjusted for inflation to 2021$ prior to normalization.
Source: Developed by Northern Economics using permit value data from Alaska Commercial Fishing Entry Commission (2022).

4.5.1.3.5. Harvester Employment

The Alaska Department of Labor and Workforce Development uses surveys of CFEC permit holders to estimate crew factors in Alaska's commercial fisheries. The crew factor is equal to the estimated average size of vessel crew in a fishery, excluding the skipper. As of November 2021, the Alaska Department of Labor and Workforce Development assumes a crew factor of 1.76 crew members in the in the Cook Inlet drift gillnet fishery (ADOLWD 2021). Using this crew factor plus the skipper and assuming that each vessel fished corresponds to a separate fishing operation, the annual number of harvester jobs in the UCI salmon drift gillnet fishery was estimated from 1999–2021 (Figure 4-30). The average annual number of positions in the fishery over the time period was 1,160. The number of separate persons that were active in the fishery is likely larger due to turnover in positions.

Figure 4-30 Crew employment in the UCI salmon drift gillnet fishery, 1999-2021.



Source: Developed by Northern Economics based on active vessels (AKFIN, 2022) and crew factors from ADOLWD (Warren, 2021).

4.5.1.4. Processors/Buyers

4.5.1.4.1. Processor/Buyer Participation and Dependency

The processing sector of the UCI salmon drift gillnet fishery is relatively diverse. Unlike some fisheries in other regions of Alaska, it is not dominated by one or two shorebased plants.[77] Table 4-10 shows that an average of 12 shorebased processors were active in the fishery annually from 2009–2021. The table also shows that the number of plants experienced a downward trend over this period. Facilities likely closed due to some of the same economic difficulties experienced by the harvesting sector, including variability in the scale of salmon runs.

Table 4-10 Number of shorebased processors active in the UCI salmon drift gillnet fishery, 2009–2021.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2009–2021 Average
	Number of Shorebased Processors Active in the UCI Salmon Drift Gillnet Fishery													
	16	16	13	11	14	12	12	11	12	11	14	9	9	12
Fishery	Number of Shorebased Processors Active in the UCI Salmon Drift Gillnet Fishery that are Also Active in Other Fisheries													
Other Salmon	15	15	12	11	13	12	12	11	12	9	11	8	8	11
Halibut	9	9	8	7	8	7	6	6	6	4	6	5	6	7
Groundfish	5	8	8	6	7	5	5	5	7	5	4	4	5	6
All Other Fisheries	7	9	8	6	7	4	3	5	6	6	6	5	5	6

Source: Developed by Northern Economics based on data compiled by AKFIN (2022).

Due to the location of many Kenai Peninsula communities on the road system and the Kenai Peninsula's proximity to the heavily populated Anchorage/Mat-Su region, some drift gillnet fishermen are able to sell their catch directly to consumers (McDowell Group 2015). Table 4-11 summarizes the activity of catcher-

[77] Shorebased processor: Operates a facility/business located onshore that can buy fishery resources and process, export, and/or be a custom processor or has another facility process on their behalf. A cannery license is required if any canning is to be conducted (Alaska Department of Fish and Game 2020g)

sellers[78] and direct marketing[79] operations that participated in the UCI salmon drift gillnet fishery from 2009–2021. These operations generated an average of $$81,300 per year in total ex-vessel value. Additional information on direct marketers and catcher-sellers is provided in Section 4.5.1.6.

Table 4-11 Number and ex-vessel value (inflation-adjusted) of catcher-sellers and direct marketers active in the UCI salmon drift gillnet fishery, 2009–2021.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2009–2021 Average
	Number of Operations Active in the UCI Salmon Drift Gillnet Fishery													
Catcher-Sellers	NA	4	5	5	5	5	10	7	5	4	4	4	3	5
Direct Marketers	9	5	4	3	6	6	8	8	10	8	7	4	7	7
	Ex-Vessel Value from UCI Salmon Drift Gillnet Fishery (1,000s of dollars)													
Catcher-Sellers	NA	$48.3	$7.7	$9.1	$16.9	$15.5	$28.7	$12.2	$11.4	$6.0	$9.3	$3.4	$9.2	$14.8
Direct Marketers	$40.4	$86.5	$67.4	$51.7	$82.3	$112.7	$63.2	$54.1	$111.3	$60.5	$54.0	$29.5	$51.2	$66.5

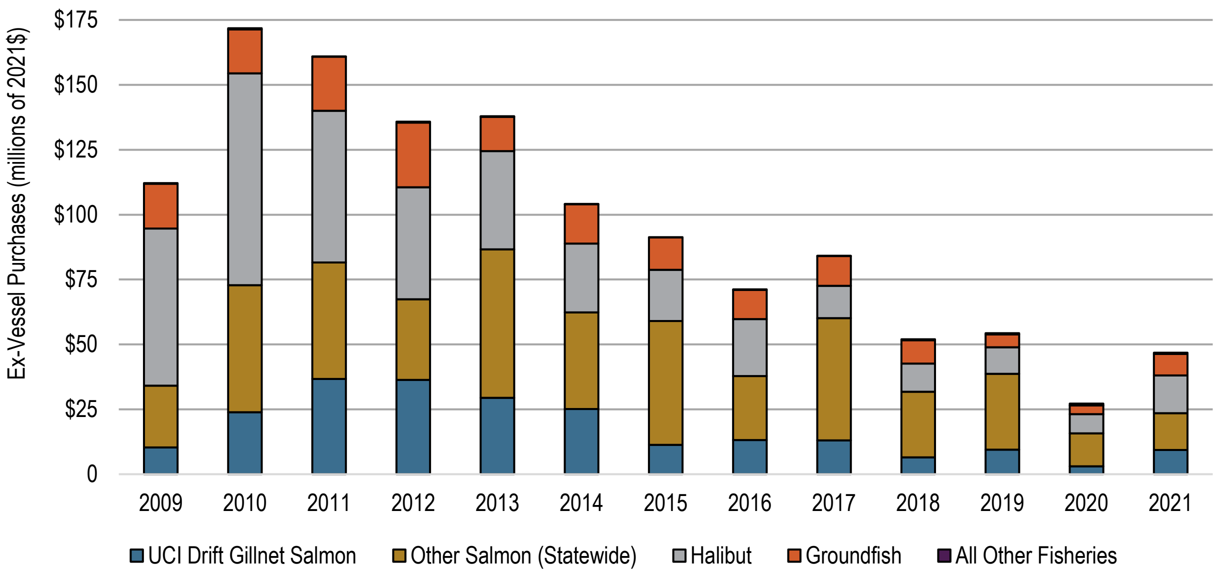
Notes: Nominal gross revenue adjusted for inflation to 2021 dollars.
NA = Data are masked for confidentiality.
Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2022).

Other types of processors/buyers are also active in the UCI salmon drift gillnet fishery, including floating processors, buyer-exporters, and catcher-exporters, although only one or two of each type may be active in a given year. Shorebased processors are by far the largest purchasers of salmon harvested in the fishery, receiving 99% of the salmon landed from 2009–2021. Table 4-10 shows that many of these shorebased processors were also active in other salmon fisheries around the State as well as halibut and groundfish fisheries. Figure 4-31 presents the ex-vessel payments made by shorebased processors to harvesters in various fisheries from 2009–2021. Over that period, shorebased processors paid out an inflation-adjusted average of $17.4 million annually to harvesters in the UCI salmon drift gillnet fishery, with another $34.2 million paid to harvesters in other salmon fisheries from around the State. Harvesters in halibut, groundfish, and other finfish and shellfish fisheries received another $42.2 million on average. Ex-vessel payments to harvesters in the UCI salmon drift gillnet fishery accounted for 19% of the total purchases of the shorebased processors.

[78] Catcher-seller: Sells unprocessed and unpackaged fishery resources at the dock directly to the public or to food establishments that have a seafood processing waiver. Catcher-sellers are required to have code plates and complete fish tickets (Alaska Department of Fish and Game 2020g)

[79] Direct marketer: An individual who sells or exports only their own catch. Their catch can be processed on their vessel, processed at a shore-side plant or custom-processed by a licensed vessel or facility. Fish caught by another fisherman cannot be purchased and sold with this license.

Figure 4-31 Ex-vessel gross payment (inflation adjusted) diversification of shorebased processors accepting deliveries of UCI drift gillnet-caught salmon, 2009–2021.



Notes: Nominal ex-vessel gross payments adjusted for inflation to 2021 dollars.
Source: Developed by Northern Economics based on ADF&G data compiled by AKFIN (2022).

Table 4-12 takes a more in-depth look at the relative dependence of shorebased processors that have accepted deliveries of UCI drift gillnet-caught salmon from 2009–2021. The focus is on two groups of shorebased processors categorized by the ex-vessel value of UCI drift gillnet-caught salmon purchases: 1) the "Top Six" processing facilities; and 2) the remaining shorebased processing facilities. From 2009–2021, the Top Six processors accounted for an average of 92.3% of the ex-vessel value of the UCI drift gillnet fishery harvest; the remaining shorebased processors accounted for 7.1% of the ex-vessel value; and all other types of processors (catcher-sellers, direct marketers, etc.) accounted for the remaining 0.6% of the ex-vessel value. The processing facilities comprising the Top Six have been relatively stable; from 2009–2021, only 16 different facilities ranked among the Top Six.

Table 4-12 also divides the Top Six shorebased processors into two sub-groups: 1) The three facilities that were the most dependent on the UCI drift gillnet fishery, and 2) the three facilities that were the least dependent. From 2009–2021, the UCI salmon drift gillnet fishery accounted for an average of 70% of the total seafood purchases (salmon, halibut, crab, etc.) of the three most dependent facilities. The fishery accounted for an average of 31% of the total purchases of the three least dependent within the top six facilities. Despite their differences in relative dependence, each sub-group accounted for an average of 35% of all ex-vessel purchases of UCI drift-gillnet caught salmon.

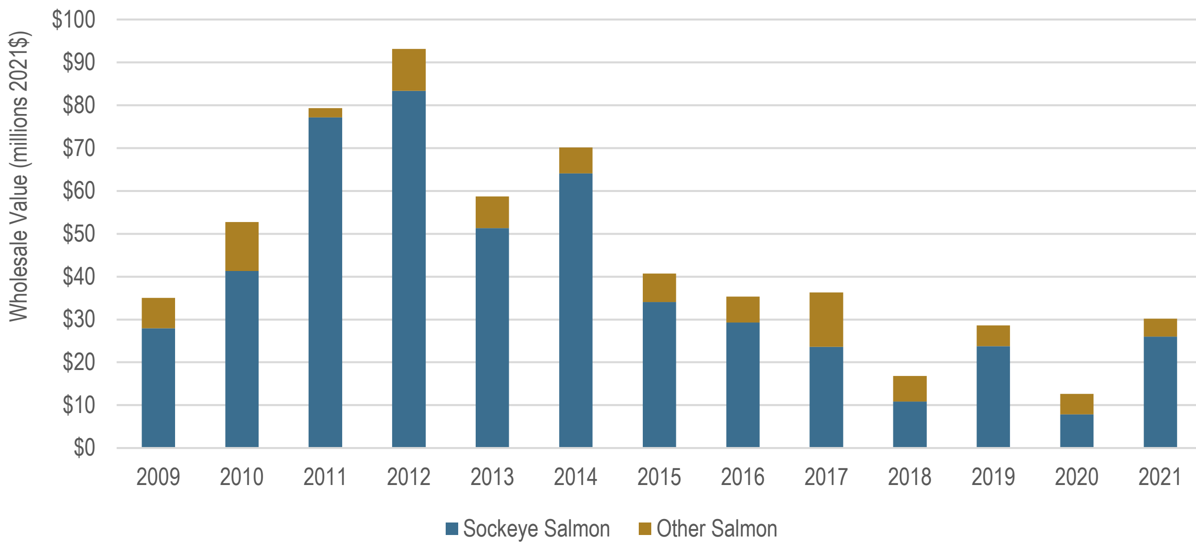
Table 4-12 Relative dependency of shorebased processors on the UCI drift gillnet fishery, 2009–2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Top Six Shorebased Processors Accepting Deliveries of UCI Drift Gillnet-Caught Salmon													
Average Dependency on UCI Drift Gillnet Fishery	12.8%	17.2%	26.2%	29.6%	24.1%	28.0%	15.4%	24.0%	16.5%	12.3%	17.3%	11.1%	20.0%
Percent of Ex-vessel Value in UCI Drift Gillnet Fishery	84.3%	84.6%	92.7%	94.5%	90.9%	90.7%	92.5%	95.8%	95.2%	96.8%	96.7%	98.2%	99.1%
All Other Shorebased Processors Accepting Deliveries of UCI Drift Gillnet-Caught Salmon													
Count of Processors Outside Top Six	10	10	7	5	8	6	6	5	6	5	8	3	3
Average Dependency on UCI Drift Gillnet Fishery	10.2%	6.4%	8.5%	9.8%	9.5%	9.7%	3.2%	2.5%	5.6%	21.1%	14.4%	2.4%	3.0%
Percent of Ex-vessel Value in UCI Drift Gillnet Fishery	15.0%	14.7%	7.1%	5.3%	8.5%	8.8%	6.6%	3.5%	3.7%	2.0%	2.4%	0.3%	0.1%
All Shorebased Processors Accepting Deliveries of UCI Drift Gillnet-Caught Salmon													
Count of All Shorebased Processors	16	16	13	11	14	12	12	11	12	11	14	9	9
Average Dependency on UCI Drift Gillnet Fishery	9.0%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
Percent of Ex-vessel in UCI Drift Gillnet Fishery	99.3%	99.4%	99.8%	99.8%	99.4%	99.5%	99.2%	99.4%	98.9%	98.8%	99.1%	98.4%	99.3%
Three Most Dependent of Top Six Shorebased Processors Accepting Deliveries of UCI Drift Gillnet-Caught Salmon													
Average Dependency on UCI Drift Gillnet Fishery	40.3%	48.8%	52.3%	57.8%	52.9%	61.8%	61.8%	56.3%	45.5%	30.6%	34.6%	22.4%	32.1%
Percent of Ex-vessel Value in UCI Drift Gillnet Fishery	38.5%	35.9%	43.0%	50.1%	38.2%	43.2%	40.5%	48.8%	48.1%	71.6%	69.6%	74.6%	72.1%
Three Least Dependent of Top Six Shorebased Processors Accepting Deliveries of UCI Drift Gillnet-Caught Salmon													
Average Dependency on UCI Drift Gillnet Fishery	8.1%	11.7%	18.3%	19.1%	17.3%	18.7%	9.7%	15.0%	10.0%	4.6%	7.6%	4.3%	8.1%
Percent of Ex-vessel Value in UCI Drift Gillnet Fishery	45.8%	48.7%	49.7%	44.4%	52.7%	47.5%	52.0%	47.0%	47.1%	25.2%	27.1%	23.6%	27.0%

Note: Within each group, relative dependency is calculated as the weighted average of each included facility's dependency percentage.
Source: Developed by Northern Economics based on data compiled by AKFIN (2022).

First wholesale value is the value of seafood products when sold to buyers outside a processor's affiliate network. This is the value of the raw fish delivered to the processor (ex-vessel value) plus the value added by the first processor (McDowell Group 2017b). The first wholesale value generated from landings in the UCI salmon drift gillnet fishery was estimated based on data reported by processors to ADF&G in the Commercial Operator Annual Reports (COAR). Because processors may buy salmon or other species from a wide range of fisheries, it is generally not possible from the COAR data to determine the precise amount of processed product and value that is generated from an individual salmon fishery. For example, processors of salmon harvested in the UCI salmon drift gillnet fishery also may have purchased significant quantities of salmon from the Prince William Sound salmon fishery and are also likely to have purchased salmon from the set gillnet or purse seine fisheries in Cook Inlet. In this assessment, COAR data reported by shorebased processors located on the Cook Inlet side of the Kenai Peninsula Borough are summarized by year. The total wholesale value for each species is divided by the total pounds purchased of each species from all salmon fisheries statewide. This yields an estimate of the average round-weight wholesale value for each salmon species by year. This value is then applied to the pounds of UCI drift gillnet salmon by species to generate an estimated to total wholesale value. Figure 4-32 shows the estimated wholesale value generated from landings in the UCI salmon drift gillnet fishery.

Figure 4-32 Wholesale value (inflation adjusted) of landings in the UCI salmon drift gillnet fishery, 2009–2021.



Notes: Adjusted for inflation to 2021 dollars.
Source: Developed by Northern Economics based data compiled by AKFIN (2022).

In addition to adding significant value to the salmon harvested in UCI salmon drift gillnet fishery, processors/buyers contribute to the economy with the wages and salaries they pay their workers. Table 4-13 shows the employment and wages of Kenai Peninsula shorebased processors that were active in the UCI salmon drift gillnet fishery from 2009–2021. Most seafood processing jobs require relatively little on-the-job training and less than a high school diploma (Strong 2014).

Table 4-13 Employment and wages in Kenai Peninsula shorebased processors active in the UCI salmon drift gillnet fishery, 2009–2021.

Year	Number of Firms	Total Compensation	First Quarter Employees	Second Quarter Employees	Third Quarter Employees	Fourth Quarter Employees	Annual Average Employees
2009	20	$13,385,937	161	1,074	1,414	275	731
2010	19	$16,394,039	287	946	1,496	316	761
2011	19	$17,184,435	286	1,023	1,639	312	815
2012	19	$16,803,166	317	1,031	1,622	274	811
2013	17	$19,694,798	302	1,085	1,783	301	868
2014	17	$17,505,491	366	1,138	1,796	513	953
2015	18	$19,409,464	309	988	1,887	325	877
2016	16	$13,286,684	318	662	1,458	283	680
2017	14	$12,133,442	273	648	1,040	304	566
2018	15	$9,768,539	156	581	845	280	466
2019	8	$16,441,397	198	756	1,143	317	604
2020	5	$8,310,532	310	276	464	126	294
2021	7	$9,328,557	89	320	482	224	279

Note: Total Compensation has been adjusted for inflation to 2021 dollars.
Source: Warren (2020, 2023).

Alaska's seafood processing industry is well known for the many nonresidents who come to the State in the summer to work the processing lines (Kreiger 2016). One reason for the heavy reliance on nonresident workers to fully staff production jobs in seafood processors is the seasonality of many Alaska fisheries, especially salmon. As shown in the quarterly employment data in Table 4-13, this seasonality has a significant effect on the number of seafood processing jobs across the year. Employment typically increases during the summer salmon season and falls in the winter (McDowell Group 2015).

According to data compiled by the Alaska Department of Labor and Workforce Development (2023), in 2021, 53%% of the seafood processing jobs in the Kenai Peninsula Borough were held by persons who were not Alaska residents. However, this nonresident workforce is smaller than that of many other seafood processors in Alaska. For example, 91% of the workers at Bristol Bay Borough seafood processors were nonresidents in 2021. Moreover, seafood processing continues to be a career for many resident workers in Kenai Peninsula processors, with nearly 18% having worked in the industry for five consecutive years (Alaska Department of Labor and Workforce Development 2020b). As a result of this job longevity, residents are more likely to be employed in management and maintenance positions, and therefore, they earn a disproportionately high share of processing wages (McDowell Group 2017b).

4.5.1.5. Fishing Communities

For this fishing community assessment, a two-part approach was used. First, tables based on existing quantitative fishery information were developed to identify patterns of engagement in and dependence on the relevant sectors of the UCI salmon drift gillnet fishery (i.e., the sectors most likely to be directly affected by one or more of the alternatives).[80] This is consistent with NS 8 guidelines, which state:

> *To address the sustained participation of fishing communities that will be affected by management measures, the analysis should first identify affected fishing communities and then assess their differing levels of dependence on and engagement in the fishery being regulated* (50 CFR 600.345).[81]

Following an overview of community engagement in the fishery from 1975 through 2021 (Section 4.5.1.5.1), tabular information and accompanying narrative developed under this approach are presented for the most recent ten years for which data are available (2009-2021) in Section 4.5.1.5.2. However, data confidentiality restrictions place limitations on the data that can be utilized for these purposes. For example, where a community is the site of one or two shorebased processors, no information can be disclosed about the volume or value of local landings. This severely limits a quantitative community-level analysis of the potential impacts of the proposed action and alternatives.

The second approach involved selecting a subset of Alaska communities participating in the fishery for characterization of the community context of the fishery to support analysis of the range, direction, and order of magnitude of potential social- and community-level impacts of the proposed action and alternatives. Using a subset of communities rather than all the communities in the region(s) involved in the UCI salmon drift gillnet fishery is consistent with NS 8 guidelines, which State:

> *The best available data on the history, extent, and type of participation in these fishing communities in the fishery should be incorporated into the social and economic information presented in the FMP. The analysis does not have to contain an exhaustive listing of all communities that might fit the definition; a judgment can be made as to which are primarily affected* (50 CFR 600.345).

[80] Dependence on a fishery can be measured in multiple ways and is a complex concept with economic, social, and other dimensions. In the case of the referenced summary tables, the economic dimension of dependence is characterized simply as the proportional contribution of vessel gross revenue (for harvesters) or first wholesale gross revenue (for processors) resulting from engagement in the relevant fishery relative to the overall vessel gross revenue or first wholesale gross revenue generated by vessels or shorebased processors from their engagement in all species, gear, and area fisheries.

[81] NS 8 guidelines available at https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=6b0acea089174af8594db02314f26914&mc=true&r=SECTION&n=se50.12.600_1345.

Communities (and types of potential community/social impacts) vary based upon the type of engagement of the individual community in the fishery, whether it is through being home to a portion of the UCI salmon drift gillnet fleet, the location of shorebased processing, or the location of fishery support sector businesses. In short, this second approach uses the community or region as the frame of reference or unit of analysis (as opposed to the fishery sector as used in the first approach); within the community or region, the local nature of engagement or dependence on the fishery varies in terms of the various sectors present in the community and the relationship of those sectors (in terms of size and composition, among other factors) to the rest of the local social and economic context.

This approach then qualitatively provides a context for potential community impacts that may occur because of fishery management-associated changes to the locally present sectors in combination with other community-specific attributes and socioeconomic characteristics. The characterization of the relevant communities has been largely undertaken with existing information, supplemented with phone and email contact with a limited number of individuals. Information on the community context of the fisheries is presented in Section 4.5.1.5.3. Finally, information on community level fishery tax related revenue is presented in Section 4.5.1.5.4.

The following figures show the geographic relationship among the communities engaged in or dependent on the fishery. Also shown is the spatial relationship between the State and Federal waters and the proximity of the relevant fishing communities to those areas. Specifically:

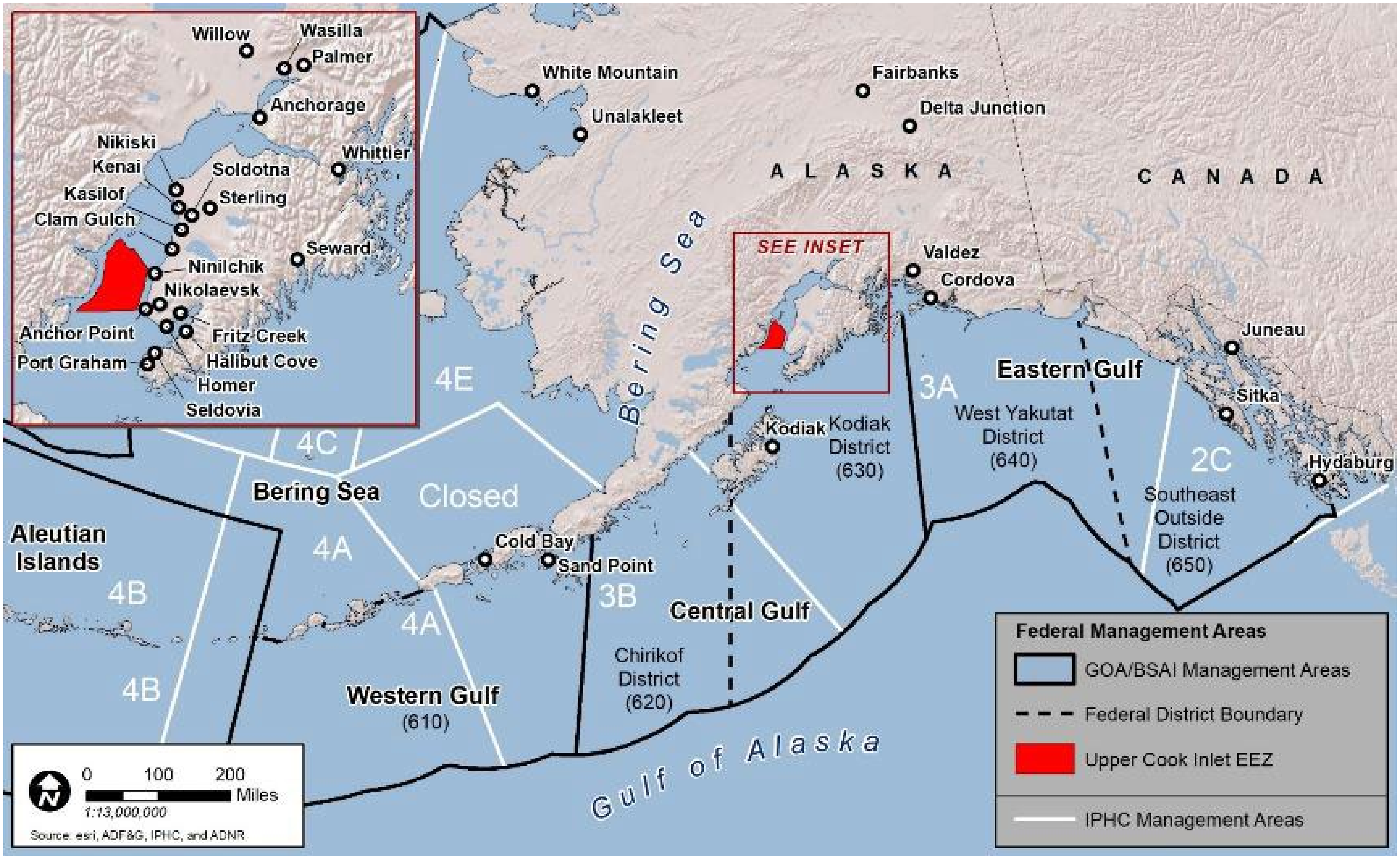
- Figure 4-33 shows the location of Alaska communities engaged in the fishery through local ownership of one or more vessels or the local operation of one or more shorebased processors (or both) that participated in the fishery in any year from 2009–2021.

- Figure 4-34 shows the location of selected communities outside of Alaska that were engaged in the fishery through local ownership, on an annual average basis, of one or more vessels that participated in the fishery from 2009–2021.

- Figure 4-35 shows the overlap of the EEZ waters of Upper Cook Inlet with existing ADF&G management area districts, subdistricts, and sections. This figure also shows the location of communities in the immediate vicinity that were engaged in the UCI salmon drift gillnet fishery through local ownership of one or more vessels, or the local operation of one or more shorebased processors (or both) that participated in the fishery one or more years from 2009–2021.

- Figure 4-36 shows the distance by water, in nautical miles, from nearby coastal communities engaged in the UCI salmon drift gillnet fishery to the closest point of the Cook Inlet EEZ. It is important to note that there are no harbors north of the Kenai River where drift gillnet salmon fishing originates and, unless a boat anchors up for the night, there are no harbors or other areas from which drift fishing originates on the western shore of Upper Cook Inlet. Further, it is important to note that the spatial pattern of fishing effort, including effort inside the Cook Inlet EEZ, is not static over the course of a run of a given salmon stock. As described elsewhere, the concentration of UCI salmon drift gillnet fishing effort generally shifts from south to north as the run of a stock of interest progresses. In other words, from early to late in the run of a given stock of interest, the distance from communities to favored fishing areas progressively increases for communities in the southern portion of the area shown and decreases for communities in the northern portion of the area shown. As detailed in Section 1, the FMP currently prohibits all commercial salmon fishing in the EEZ south of the Anchor Point Line.

Figure 4-33 Map of selected Alaska communities engaged in the UCI salmon drift gillnet fishery from 2009–2021 and adjacent North Pacific and International Pacific Halibut Commission Fisheries regulatory areas.



Source: Developed by Wislow Research based on NOAA-supplied boundary data and ADF&G fish ticket data compiled by AKFIN (2020, 2022).

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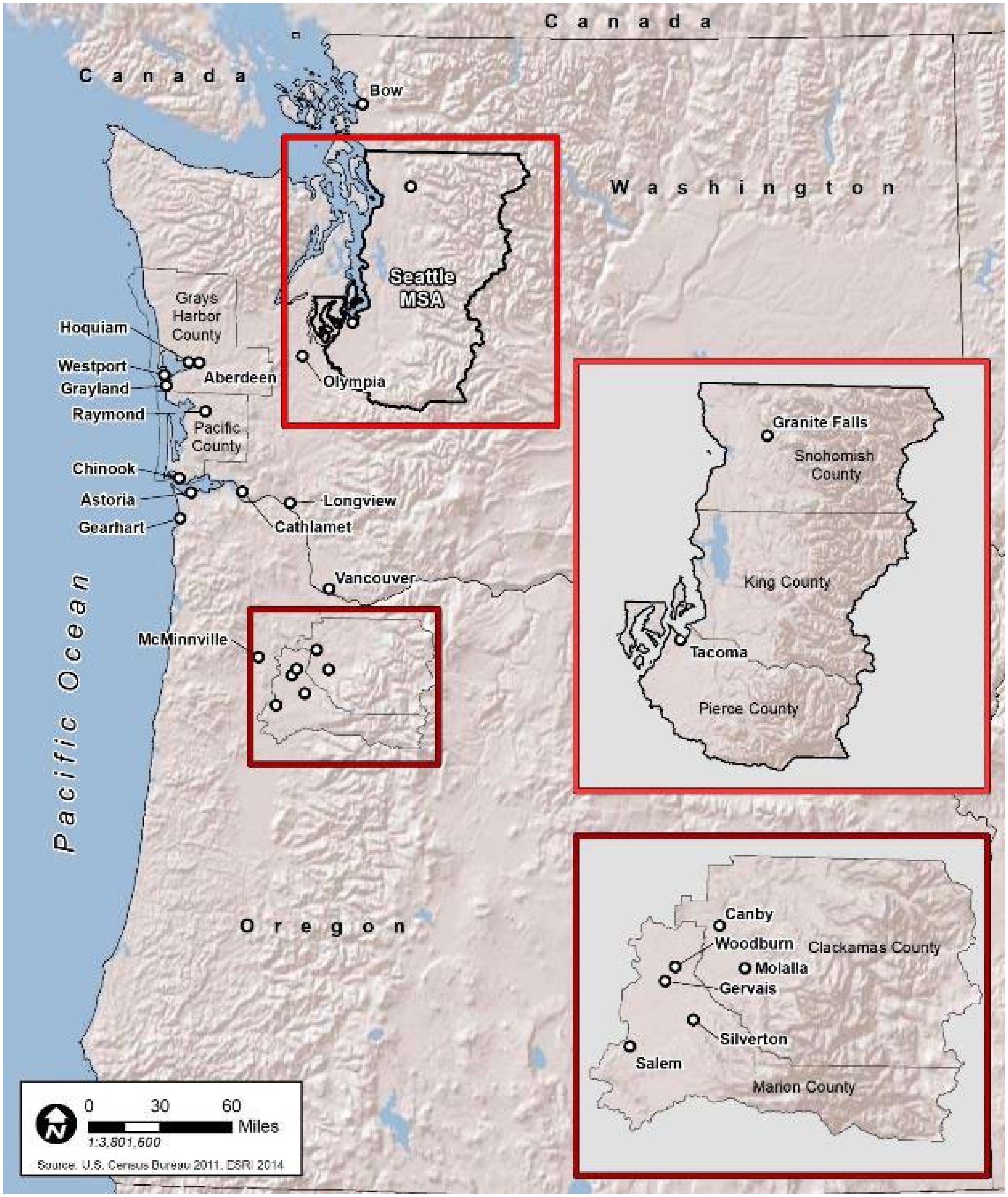
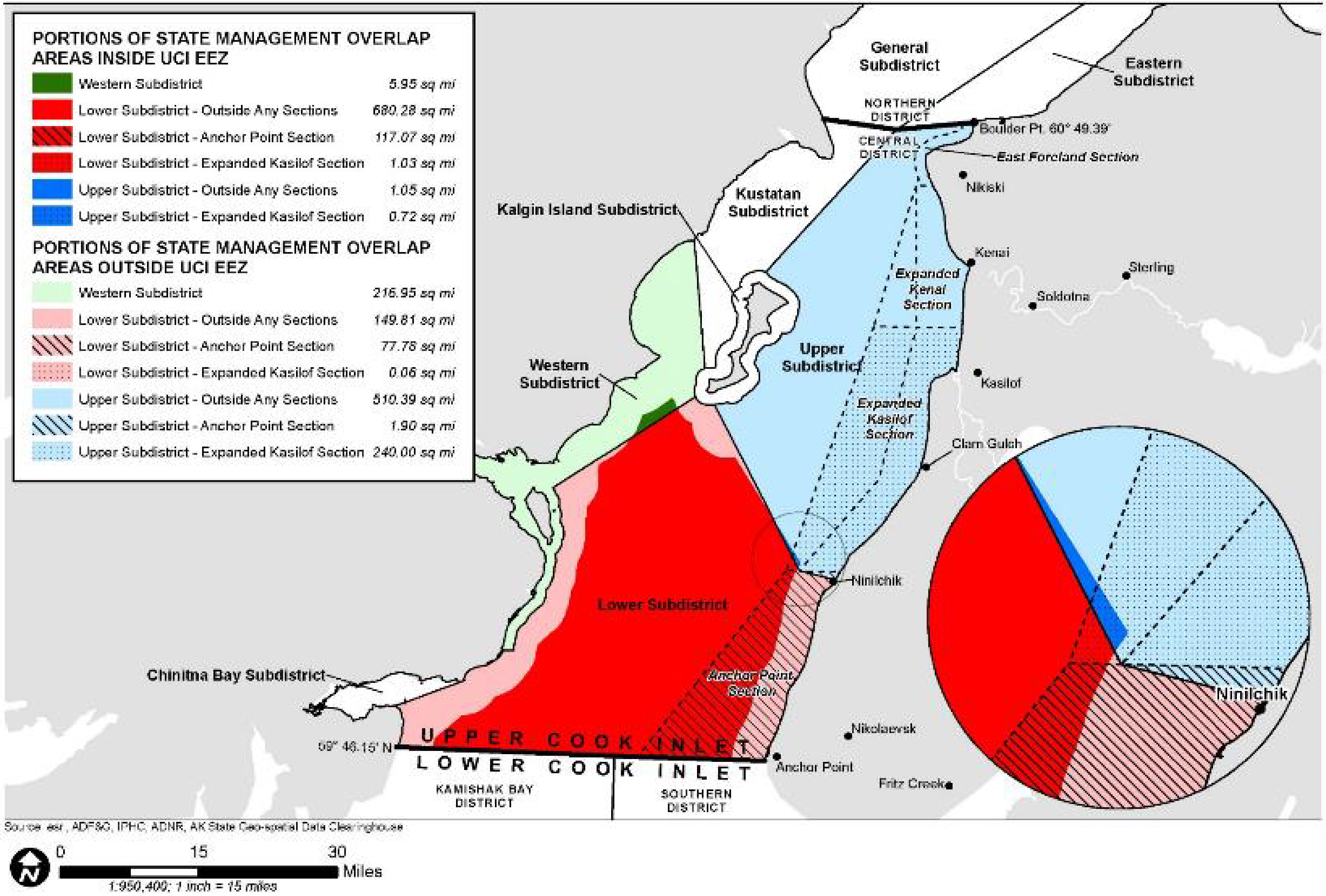
Figure 4-34 Map of selected Washington and Oregon communities engaged in the UCI salmon drift gillnet fishery, 2009–2021.



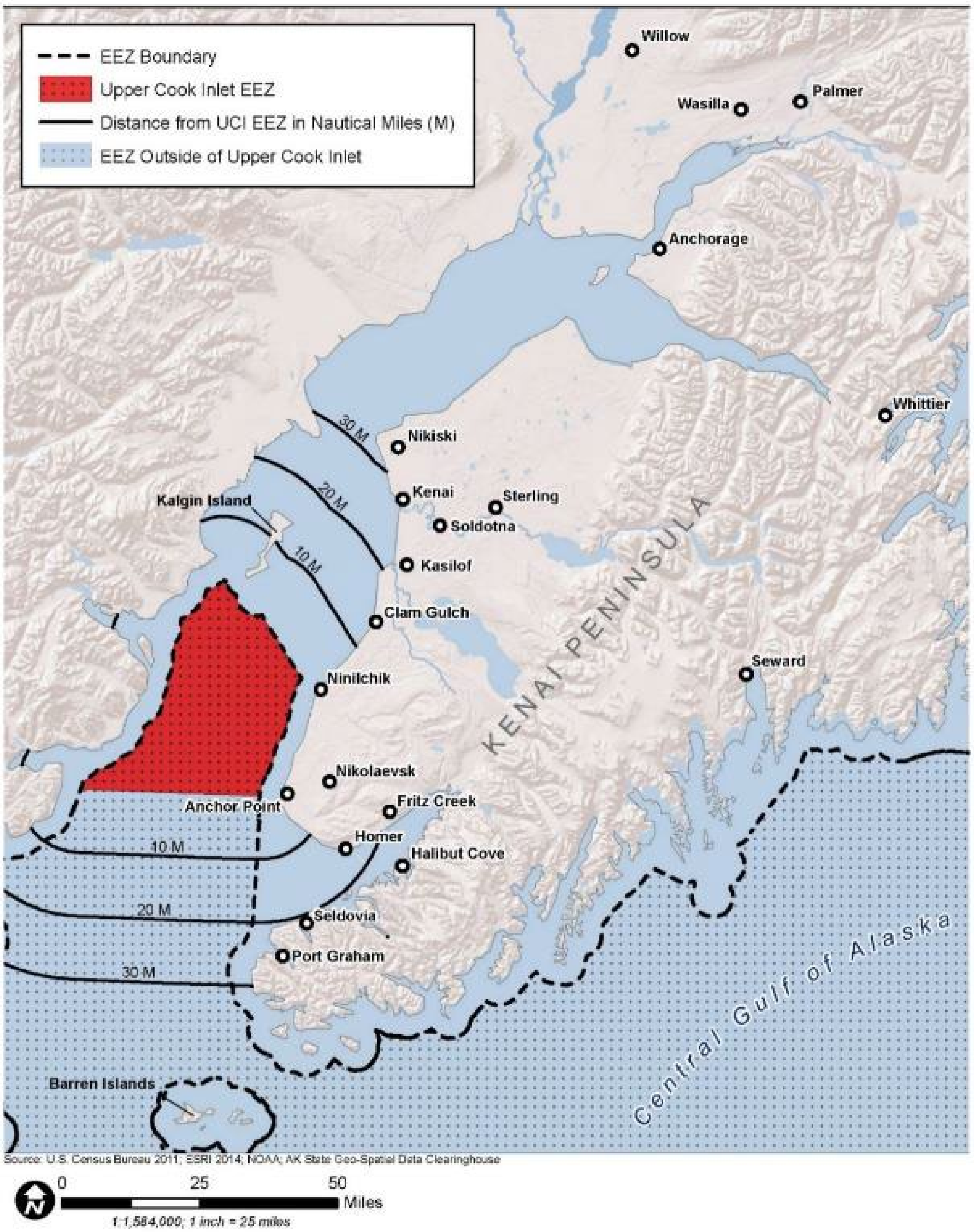
Source: Developed by Wislow Research based on ADF&G fish ticket data compiled by AKFIN (2020, 2022).

Figure 4-35 Map of coincidence of Cook Inlet EEZ with ADF&G management areas and nearby Alaska communities engaged in the UCI salmon drift gillnet fishery, 2009–2021.



Source: Developed by Wislow Research based on ADF&G and NOAA supplied boundary data and ADF&G base map.

Figure 4-36 Map of distance from Cook Inlet EEZ to coastal communities engaged in the UCI salmon drift gillnet fishery, 2009–2021.

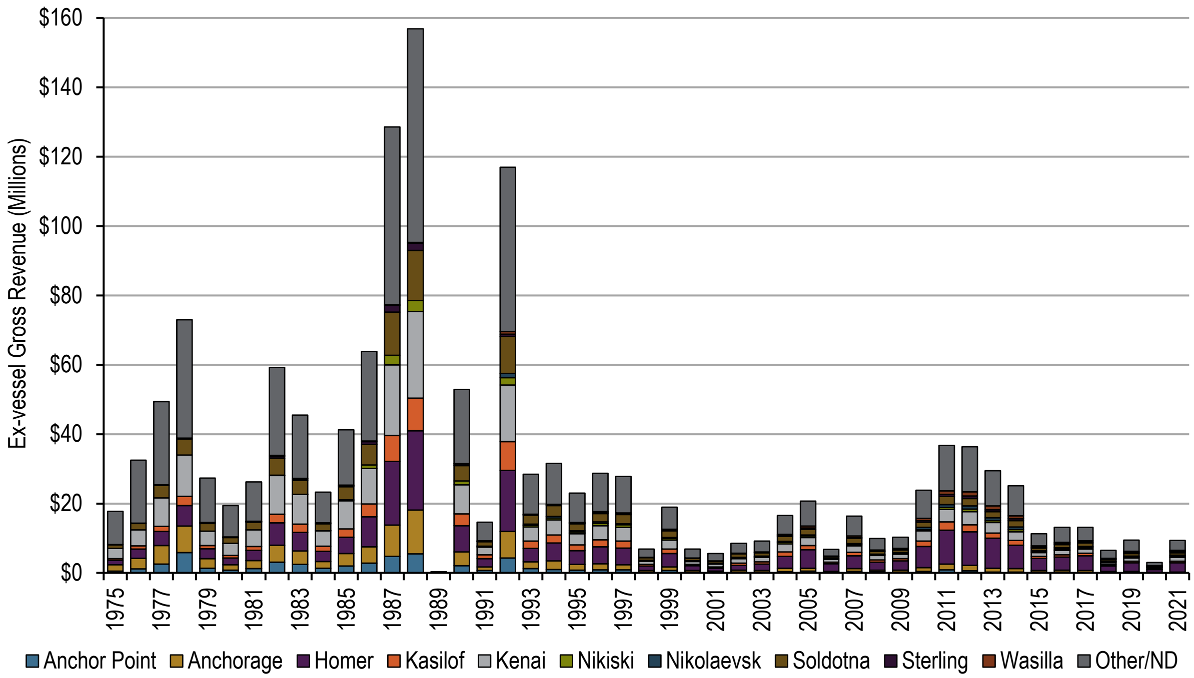


Source: Developed by Wislow Research based on NOAA boundary data and ADF&G fish ticket data compiled by AKFIN (2020, 2022).

4.5.1.5.1. Overview of Community Fishery Engagement 1975-2021

Figure 4-37 illustrates the distribution of vessel gross revenue across the ten communities with the greatest number of S03H permit holders from 1975–2021.[82] Eight of the top ten earning communities are located within the Kenai Peninsula Borough, with two other Alaska communities (Anchorage and Wasilla) rounding out the top ten. Communities outside of Alaska with notable concentrations of permit holders in recent years (2009–2021) include Cathlamet, Washington and Astoria, Molalla, Salem, and Woodburn, Oregon. Homer is the most common community of residence for S03H permit holders. In recent years (2009–2021), Homer had an annual average of 99 permit holders who were active in the UCI salmon drift gillnet fishery, with a combined annual average estimated gross revenue of $4.8 million[83] from harvests in the fishery (see Table 4-23).

Figure 4-37 Ex-vessel gross revenue (in 2021$) for the ten communities with the greatest number of S03H permit holders, 1975–2021.



Notes:
Nominal gross revenue adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.
The 1989 fishing season was cut short due to the Exxon Valdez oil spill that occurred in Prince William Sound that year.
"Other/ND" is a combination of all other ports and listed ports for which data are not disclosed (ND) to protect confidentiality.
Source: Adapted from Watson (2019) and ADF&G fish ticket data compiled by AKFIN (2020, 2022).

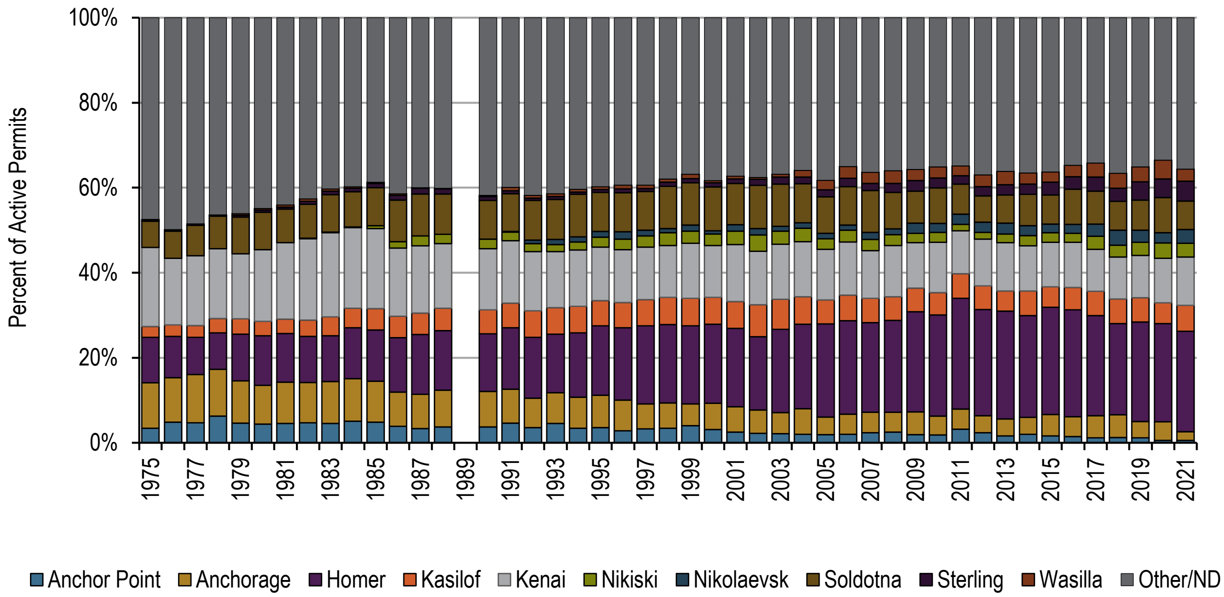
Figure 4-38 shows a relatively stable participation in the UCI salmon drift gillnet fishery (based on a S03H permit being active in a season) by community. One issue previously noted by the Cook Inlet Salmon Committee[84] as a change in participation in the fishery over the years has been the “graying of the fleet.” That issue is described in detail in Section 4.5.1.3.2.

[82] Additional information on longer term socioeconomic trends in the fishery not presented at the individual community level may be found in preceding sections including, for example, harvest trends 1966–2021 (section 4.5.2.2).

[83] Nominal gross revenue adjusted for inflation to 2021 dollars.

[84] https://meetings.npfmc.org/CommentReview/DownloadFile?p=8e26e4b6-4a36-4958-93ad-ae7afabcb22f.pdf&fileName=REPORT%20Cook%20Inlet%20Salmon%20Committee%20.pdf accessed 11/9/2022.

Figure 4-38 Percentage of S03H permits fished in a given year by the community in which the permit is registered, 1975–2021.



Notes: The 1989 fishing season was cut short due to the *Exxon Valdez* oil spill that occurred in Prince William Sound that year. "Other/ND" is a combination of all other ports and listed ports for which data are not disclosed (ND) to protect confidentiality.
Source: Adapted from Watson (2019) and ADF&G fish ticket data compiled by AKFIN (2020, 2022).

Figure 4-39 shows volume of landings and Figure 4-40 shows the value landings of UCI drift gillnet-caught salmon for the period 1978–2018.[85] Landings differentiated by individual port are only shown for 1992-2018 (as the data from 1978-1991, shown on the figures as "all ports" combined, are not of a quality comparable to that of data available for more recent years). It is important to note that the port of landing (reflected in fish ticket data) and the community where processing takes place (reflected in COAR data) are not always be the same, as salmon landed by harvest vessels or tenders in one port may be trucked to another road-connected community for processing. For example, as noted in the Cook Inlet Salmon Committee meeting report of September 2019, while offloading occurs in Homer, Ninilchik, and Kasilof, processing occurs elsewhere, including Seward, which was specifically noted by the committee as an important processing (but not landing) location for Cook Inlet salmon.[86,87]

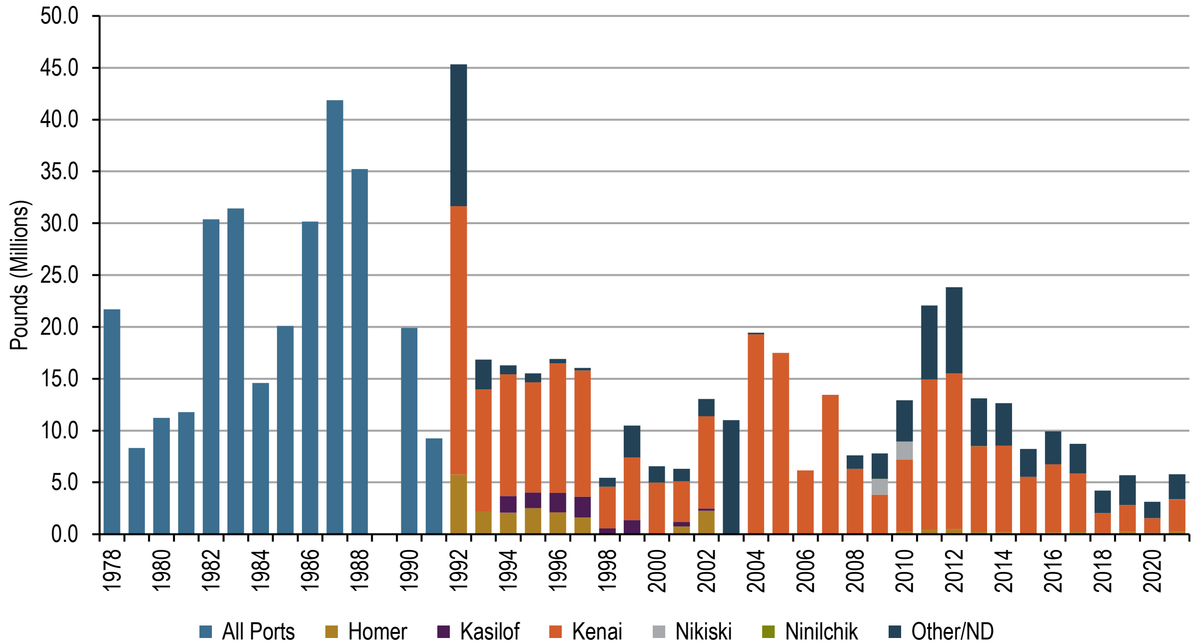
Among the top five ports of landing shown in the figures, the majority of landings were made in the port of Kenai, but the port's dominance relative to other ports has varied over time. In the years shown, where confidentiality constraints do not allow the display of information from one or more of top five landing ports, confidential data are combined into another/not disclosed ("Other/ND") category on the figures.

[85] Data for 2019–2021 to update this and the following paragraph (and associated figures) were not available in time for inclusion in this initial review draft document. These will be updated in the next version of the document.

[86] https://meetings.npfmc.org/CommentReview/DownloadFile?p=8e26e4b6-4a36-4958-93ad-ae7afabcb22f.pdf&fileName=REPORT%20Cook%20Inlet%20Salmon%20Committee%20.pdf accessed 11/9/2022.

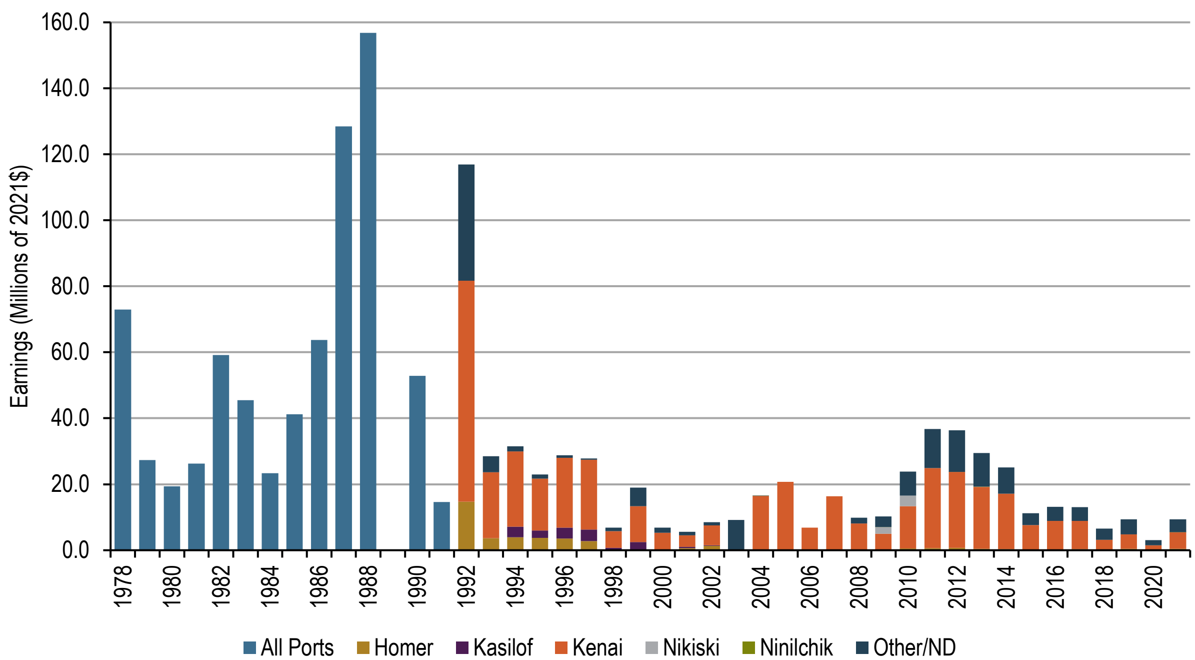
[87] Processing data shown in Table 4-18 show that for the period 2009-2021 at least some landings of UCI drift gillnet-caught salmon have been processed by one or more shorebased processors in Homer each year during that period, in two of the 13 years in the period by one shorebased processor operating Ninilchik, and one of the 13 years in the period by one shorebased processor operating in Kasilof.

Figure 4-39 Volume of landings of UCI drift gillnet-caught salmon by port, 1978–2021.



Note: "Other/ND" is a combination of all other ports and listed ports for which data are not disclosed (ND) to protect confidentiality.
Source: Adapted from Watson (2019) and ADF&G fish ticket data compiled by AKFIN (2020, 2022).

Figure 4-40 Value of landings of UCI drift gillnet-caught salmon by port, 1978–2021 (in 2021$).



Note: "Other/ND" is a combination of all other ports and listed ports for which data are not disclosed (ND) to protect confidentiality.
Source: Adapted from Watson (2019) and ADF&G fish ticket data compiled by AKFIN (2020, 2022).

4.5.1.5.2. Quantitative Indicators of Community Fishery Engagement and Dependency, 2009-2021

The sections below provide more detailed, quantitative participation information for the communities most directly engaged in or dependent upon relevant sectors in the UCI salmon drift gillnet fishery for the 13 most recent years for which data are available (2009-2021). Specifically, Sections 4.5.1.5.2.1 and 4.5.1.5.2.2 include tables containing quantitative information describing the distribution of sector-specific community engagement (or participation) in and dependency (or reliance) on the commercial UCI salmon drift gillnet fishery for the harvesting and shorebased processing sectors, respectively. Analogous tables and accompanying discussion for S03H permits are presented in Section 4.5.1.5.2.3.

For this analysis, assignment of vessels to a community is based upon ownership addresses listed in CFEC vessel registration files. Thus, caution in the interpretation of this information is warranted. Vessels may have complex ownership structures involving more than one entity in more than one region. Further, ownership address does not directly indicate where a vessel spends most of its time, purchases services, or hires its crew. For example, some of the Pacific Northwest-owned vessels spend a great deal of time in Alaska and hire at least some crew from these ports. However, the location of ownership address provides a rough indicator of the direction or nature of ownership ties (and a proxy for associated economic activity, as no existing datasets provide information on vessel spending patterns). Ownership location has further been chosen rather than other indicators, such homeport information, as previous NPFMC FMP social impact assessments (e.g., AECOM (2010)) have noted the problematic nature of homeport data. For shorebased processors, community designation was based on the operating location to provide a relative indicator of the local fishery-related economic activity, which can also serve as a rough proxy for the relative level of associated employment and local government revenue. S03H permits have been assigned based on permit ownership address. These assignments are consistent with established NPFMC FMP social impact assessment practice.

4.5.1.5.2.1. Harvesting Vessels

The following tables provide a series of quantitative indicators of harvesting sector engagement in and dependency on the UCI salmon drift gillnet fishery by community or regional geography (or both), depending on data confidentiality restrictions.

Table 4-14 provides a count of UCI salmon drift gillnet vessels by historical ownership address community from 2009–2021.[88] The table is separated into Alaska communities, Washington communities, Oregon communities, and all communities (combined) outside the States of Alaska, Washington, and Oregon. The table also shows annual average counts and percentages for community and community groups, together with the number of unique vessels participating in the UCI salmon drift gillnet fishery from 2009–2021.[89] Vessel ownership is concentrated in the Kenai Peninsula Borough, which on an average annual basis accounted for 64% of all the vessels participating in the UCI salmon drift gillnet fishery and featured nine communities with an annual average of five or more vessels active in the fishery from 2009–2021. The only communities outside of the Kenai Peninsula Borough annually averaging five or more vessels active in the fishery during that period were Anchorage and Wasilla, Alaska; the Seattle MSA (taken as a whole); and Astoria, Oregon.

[88] "Historical ownership address" is defined as the ownership address for a vessel during the 2009–2018 period (as opposed to the most recent year ownership address of a vessel, if different).

[89] This table is unique in this fishing communities section in providing a complete listing of communities directly engaged in the fishery as determined by ownership address of catcher vessels, in combination with the relevant map figures above, to give a sense of the geosocial scale of participation in the fishery and the myriad communities involved. All subsequent tables aggregate Alaska communities below participation thresholds noted in the text, Washington communities by status inside or outside of the Seattle Metropolitan Statistical Area (MSA), Oregon communities by county, or otherwise as required by data confidentiality constraints.

Table 4-14 Vessel participation in the UCI salmon drift gillnet fishery by community of vessel historical ownership address, 2009–2021.

Geography	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009–2021 (number)	Annual Average 2009–2021 (percent)	Unique Vessels 2009–2021 (number)
ALASKA																
Anchor Point	10	8	13	12	7	8	8	8	4	4	4	2	2	6.9	1.72%	25
Fritz Creek	3	4	5	5	5	6	6	5	5	4	4	3	2	4.4	1.09%	9
Homer	91	83	105	119	123	122	118	114	97	90	75	70	61	97.5	24.17%	209
Kasilof	25	21	24	23	24	26	25	26	26	22	22	18	17	23.0	5.70%	48
Kenai	43	41	46	52	55	51	50	50	37	38	37	36	33	43.8	10.84%	90
Nikiski	10	8	8	8	10	12	11	10	13	12	13	14	11	10.8	2.67%	22
Nikolaevsk	6	6	6	9	12	12	12	10	11	11	11	9	9	9.5	2.36%	17
Ninilchik	4	5	7	9	8	7	7	5	6	6	6	5	5	6.2	1.52%	14
Soldotna	29	29	31	28	30	32	34	36	32	28	29	30	25	30.2	7.49%	71
Sterling	10	9	9	11	12	13	13	12	13	12	12	11	12	11.5	2.84%	23
Other KPB - Clam Gulch	2	2	1	1	1	1	1	1	1	2	2	2	2	1.5	0.36%	3
Other KPB - Halibut Cove	3	2	2	2	2	2	2	2	2	2	2	2	2	2.1	0.51%	3
Other KPB - Port Graham	0	0	0	2	2	2	2	3	2	2	1	1	1	1.4	0.34%	3
Other KPB - Seldovia	2	2	3	3	2	4	3	4	4	3	2	3	3	2.9	0.72%	6
Other KPB - Seward	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	0.08%	1
Subtotal, Other KPB Communities	8	7	7	9	7	9	8	10	9	9	7	8	8	8.2	2.02%	16
Subtotal, All KPB Communities	239	221	261	285	293	298	292	286	253	236	220	206	185	251.9	62.42%	458
Anchorage	21	20	26	27	24	26	30	29	26	22	17	15	7	22.3	5.53%	54
Wasilla	12	9	9	12	13	11	10	11	11	12	10	9	7	10.5	2.59%	30
Other AK - Cold Bay	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	0.04%	1
Other AK - Cordova	1	0	0	0	0	1	0	1	0	0	0	0	0	0.2	0.06%	3
Other AK - Delta Junction	4	3	4	5	6	6	5	6	4	5	3	2	3	4.3	1.07%	10
Other AK - Fairbanks	0	0	0	0	0	0	0	1	1	0	0	0	0	0.2	0.04%	1
Other AK - Hydaburg	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	0.04%	1
Other AK - Juneau	1	0	0	1	2	2	2	2	2	1	1	2	3	1.5	0.36%	5
Other AK - Kodiak	3	3	4	4	5	5	5	3	1	3	4	3	1	3.4	0.84%	14
Other AK - Palmer	3	2	2	3	3	3	2	3	2	2	2	2	2	2.4	0.59%	7
Other AK - Sand Point	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	0.02%	1
Other AK - Sitka	0	0	0	1	1	1	1	1	1	1	1	1	1	0.8	0.19%	1
Other AK - Unalakleet	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	0.02%	1
Other AK - Valdez	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	0.06%	1
Other AK - White Mountain	0	0	0	0	0	0	0	0	0	1	1	1	0	0.2	0.06%	1
Other AK - Whittier	0	1	1	1	2	2	2	2	2	1	1	1	0	1.2	0.30%	2
Other AK - Willow	1	2	2	2	2	2	2	1	2	2	2	2	1	1.8	0.44%	3
Subtotal, Other AK Communities	14	12	14	18	22	23	19	20	15	17	16	15	11	12.3	3.05%	51
Subtotal, All AK Communities Outside KPB	47	41	49	57	59	60	59	60	52	51	43	39	25	49.4	12.24%	135
Alaska Total	**286**	**262**	**310**	**342**	**352**	**358**	**351**	**346**	**305**	**287**	**263**	**245**	**210**	**301.3**	**74.65%**	**525**
WASHINGTON																
Arlington	0	0	0	0	0	0	1	2	2	2	2	2	1	0.9	0.23%	2
Black Diamond	0	0	0	0	0	0	0	1	1	1	1	0	0	0.3	0.08%	1
Buckley	0	0	0	0	0	0	0	0	0	0	1	0	1	0.2	0.04%	1
Edmonds	0	0	1	2	1	0	0	0	0	0	0	0	0	0.3	0.08%	2
Everett	1	1	2	1	1	1	1	1	1	1	0	0	0	0.8	0.21%	2
Gig Harbor	1	1	1	1	1	1	1	0	0	0	1	0	0	0.6	0.15%	1
Graham	0	0	0	0	1	1	1	0	0	0	0	0	0	0.2	0.06%	1
Granite Falls	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	0.25%	1
Mukilteo	1	1	1	1	1	1	1		1	1	0	0	0	0.8	0.19%	1
Puyallup	0	0	1	2	1	1	1	1	1	1	1	1	1	0.9	0.23%	2
Seattle	0	0	0	0	1	1	1	1	1	2	0	0	0	0.5	0.13%	2
Shoreline	1	1	2	1	1	0	0	0	0	0	0	1	1	0.6	0.15%	3
Tacoma	2	1	1	1	1	1	1	1	1	2	1	1	1	1.2	0.29%	3
University Place	0	0	0	0	0	0	0	1	1	1	0	0	0	0.2	0.06%	1
Seattle MSA* Subtotal	7	6	10	10	10	8	9	9	10	12	8	6	6	8.5	2.12%	20

Geography	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009–2021 (number)	Annual Average 2009–2021 (percent)	Unique Vessels 2009–2021 (number)
Aberdeen	0	1	2	3	3	3	3	2	3	3	3	3	2	2.5	0.61%	3
Elma	2	2	2	0	0	0	0	0	0	0	0	0	0	0.5	0.11%	2
Grayland	0	0	0	2	3	3	2	1	1	1	1	0	0	1.1	0.27%	3
Hoquiam	2	2	2	1	1	1	1	1	1	1	1	1	1	1.2	0.30%	2
McCleary	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.02%	1
Westport	2	2	2	1	1	1	1	2	2	2	1	1	0	1.4	0.34%	3
Grays Harbor Co. Subtotal	8	7	8	7	8	8	7	6	7	7	6	5	3	6.7	1.66%	12
Chinook	1	1	1	2	2	2	2	2	0	0	1	0	0	1.1	0.27%	3
Naselle	0	0	1	1	1	1	1	1	1	1	1	1	0	0.8	0.19%	1
Raymond	2	4	3	3	4	4	4	4	3	3	3	3	3	3.3	0.82%	5
Tokeland	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	0.02%	1
Pacific County Subtotal	3	5	5	6	7	7	7	7	4	4	5	5	3	5.2	1.30%	10
Airway Heights	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	0.04%	1
Bow	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	0.25%	1
Camano Island	0	0	0	0	0	0	0	0	0	0	1	1	2	0.3	0.08%	2
Cathlamet	8	6	6	6	5	4	4	3	3	3	2	2	2	4.2	1.03%	9
Coupeville	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	0.04%	1
Eatonville	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	0.02%	1
Ellensburg	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	0.04%	1
Ford	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	0.02%	1
Kennewick	0	0	0	0	1	1	1	1	1	1	1	1	1	0.7	0.17%	1
Kingston	0	0	0	0	1	1	1	1	0	0	0	0	0	0.3	0.08%	1
Langley	0	0	0	0	0	1	1	1	1	1	1	0	0	0.5	0.11%	1
Longview	2	1	1	1	1	1	1	1	1	1	1	0	1	1.0	0.25%	2
Lynden	0	0	3	1	0	0	0	0	0	0	0	0	0	0.3	0.08%	3
Moses Lake	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.02%	1
Oak Harbor	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	0.17%	1
Olympia	1	4	4	3	2	2	1	1	1	0	1	0	0	1.5	0.38%	5
Port Townsend	0	0	0	0	0	0	1	1	1	1	1	0	1	0.5	0.11%	1
Reardan	1	1	2	2	2	2	0	0	0	0	0	0	0	0.8	0.19%	2
Riverside	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	0.02%	1
Rosburg	0	0	2	2	2	2	1	1	1	0	0	0	0	0.8	0.21%	2
Seabeck	1	1	1	1	1	1	1	0	0	0	0	0	1	0.6	0.15%	1
Tenino	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	0.04%	1
Vancouver	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	0.25%	1
Woodland	0	1	1	0	0	0	0	0	0	0	1	0	0	0.2	0.06%	2
Other Washington Subtotal	17	17	24	20	18	19	16	14	13	10	11	8	12	15.3	3.79%	38
Washington Total	**35**	**35**	**47**	**43**	**43**	**42**	**39**	**36**	**34**	**33**	**30**	**24**	**24**	**35.8**	**8.86%**	**69**
OREGON																
Boring	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	0.02%	1
Canby	2	2	3	2	2	3	2	2	2	2	1	0	0	1.8	0.44%	5
Milwaukie	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	0.06%	1
Molalla	2	3	3	4	5	7	5	3	4	4	5	6	5	4.3	1.07%	11
Mulino	0	0	1	1	1	0	0	0	0	0	0	0	0	0.2	0.06%	1
Oregon City	0	0	1	1	1	0	0	0	0	0	0	0	0	0.2	0.06%	1
Clackamas County Subtotal	6	7	8	7	8	11	7	5	6	6	6	6	5	6.8	1.68%	17
Aurora	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	0.08%	1
Gervais	2	2	2	2	2	1	2	1	1	1	0	0	0	1.2	0.30%	2
Hubbard	0	0	0	1	1	1	1	1	1	1	1	1	0	0.7	0.17%	1
Keizer	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	0.02%	1
Mount Angel	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	0.23%	1
Salem	4	4	5	6	6	5	4	4	4	4	4	4	2	4.3	1.07%	6
Silverton	3	3	3	3	4	4	3	3	3	3	4	1	2	3.0	0.74%	5
Woodburn	3	2	3	4	1	3	5	4	4	3	3	2	3	3.1	0.76%	10
Marion County Subtotal	13	13	15	18	16	15	16	14	14	14	13	8	8	13.6	3.37%	27
Astoria	8	4	7	10	8	8	5	7	4	3	3	1	1	5.3	1.32%	14
Bend	1	1	1	1	1	1	1	1	1	1	1	1	0	0.9	0.23%	1
Gearhart	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	0.25%	1
Grants Pass	0	0	0	0	0	0	0	0	0	1	1	0	1	0.2	0.06%	1
McMinnville	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	0.25%	1
Pendleton	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.02%	1

Geography	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009–2021 (number)	Annual Average 2009–2021 (percent)	Unique Vessels 2009–2021 (number)
Portland	1	1	1	1	1	1	1	0	1	1	1	1	1	0.9	0.23%	1
Prineville	0	0	0	0	0	0	1	1	1	1	1	0	1	0.5	0.11%	1
Tualatin	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	0.04%	1
Vale	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	0.02%	1
Warrenton	1	1	1	1	1	1	1	0	1	1	1	0	0	0.8	0.19%	1
Other Oregon Subtotal	15	10	12	15	14	13	11	11	10	10	10	5	6	10.9	2.71%	24
Oregon Total	**34**	**30**	**35**	**40**	**38**	**39**	**34**	**30**	**30**	**30**	**29**	**19**	**19**	**31.3**	**7.76%**	**61**
Other States	34	27	34	35	40	41	42	41	36	37	38	27	26	35.2	8.73%	86
Grand Total	**389**	**354**	**426**	**460**	**473**	**480**	**466**	**453**	**405**	**387**	**360**	**315**	**279**	**403.6**	**100.00%**	**645**

*Seattle MSA includes all communities in King, Pierce, and Snohomish counties.
Notes: Due to vessel ownership movement between communities over the years shown, total unique vessels per community may not sum to State or grand totals.
Source: ADF&G fish ticket data compiled by AKFIN (2022).

Table 4-15 shows the distribution across communities of UCI salmon drift gillnet vessel gross revenue from salmon harvesting from 2009–2021. The table presents annual averages of gross revenue in terms of dollars and percentages. The gross revenue of the UCI salmon drift gillnet fleet was concentrated in Alaska (approximately 76%), with the Kenai Peninsula Borough communities of Homer and Kenai together accounting for approximately 39% of all gross revenue and over half of the Alaska total. There was a relatively even distribution of annual average gross revenue among vessels from Washington (8.3%), Oregon (7.3%), and all States other than Alaska, Washington and Oregon combined (8.3%).

Table 4-15 Gross revenue (in 2021$) of UCI salmon drift gillnet vessels by community of vessel historical ownership address, 2009–2021.

Geography	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009–2021	Annual Average 2009–2021 (%)
ALASKA															
Anchor Point	$306,306	$498,173	$986,517	$673,767	$499,696	$316,360	$191,502	$225,215	$124,944	$47,990	$42,625			$305,575	1.7%
Fritz Creek	$83,210	$251,141	$394,814	$380,556	$296,806	$253,904	$110,780	$112,436	$207,099	$65,373	$104,225			$181,964	1.0%
Homer	$2,779,924	$6,275,400	$10,175,865	$10,420,568	$9,181,288	$7,261,381	$3,694,413	$3,871,381	$4,259,437	$1,689,343	$2,550,923	$939,164	$2,940,959	$5,080,004	29.0%
Kasilof	$745,303	$1,493,059	$2,287,264	$1,795,051	$1,387,239	$1,211,840	$571,222	$675,569	$807,646	$365,044	$517,755	$128,683	$431,841	$955,193	5.5%
Kenai	$1,235,309	$2,907,639	$3,650,289	$3,654,091	$2,931,986	$2,491,144	$1,120,910	$1,271,351	$1,087,326	$562,224	$828,629	$289,405	$1,075,481	$1,777,368	10.1%
Nikiski	$248,621	$409,298	$764,816	$700,668	$625,999	$581,851	$225,696	$404,812	$397,756	$239,670	$377,058	$134,997	$304,066	$416,562	2.4%
Nikolaevsk	$153,400	$459,567	$619,757	$899,792	$714,196	$749,644	$314,033	$301,071	$416,297	$221,692	$300,221	$89,775	$270,898	$423,873	2.4%
Ninilchik	$71,669	$318,322	$501,717	$577,317	$452,603	$337,497	$148,220	$162,976	$222,595	$114,751	$167,419	$67,367	$173,839	$255,100	1.5%
Soldotna	$702,263	$1,575,585	$2,288,408	$1,921,356	$1,641,977	$1,583,504	$762,443	$947,470	$952,481	$486,609	$705,732	$246,597	$776,035	$1,122,343	6.4%
Sterling	$209,483	$511,327	$593,030	$743,599	$663,015	$559,721	$273,561	$279,639	$307,657	$189,837	$344,886	$105,895	$431,044	$400,976	2.3%
Other KPB	$206,393	$511,659	$731,956	$660,680	$543,836	$569,878	$233,381	$297,977	$307,417	$180,025	$207,816	$103,122	$239,528	$368,744	2.1%
Subtotal, KPB	$6,741,880	$15,211,171	$22,994,434	$22,427,444	$18,938,641	$15,916,723	$7,646,160	$8,549,898	$9,090,654	$4,162,557	$6,147,288	$2,154,581	$6,758,695	$11,287,702	64.5%
Anchorage	$529,588	$1,230,101	$1,895,123	$1,934,045	$1,306,388	$1,148,052	$495,908	$671,262	$666,628	$343,112	$368,286	$106,235	$146,210	$833,918	4.8%
Wasilla	$231,223	$594,064	$755,460	$940,893	$889,350	$573,787	$258,285	$343,795	$270,873	$148,286	$240,858	$75,521	$159,793	$421,707	2.4%
All Other AK	$423,317	$825,590	$1,279,313	$1,380,419	$1,355,920	$1,189,639	$482,065	$552,647	$563,463	$257,605	$393,443	$119,932	$350,340	$705,669	4.0%
Subtotal, Non-KPB	$1,184,127	$2,649,756	$3,929,897	$4,255,357	$3,551,658	$2,911,478	$1,236,258	$1,567,703	$1,500,964	$749,003	$1,002,588	$301,688	$656,344	$1,961,294	11.2%
Alaska Total	**$7,926,008**	**$17,860,926**	**$26,924,330**	**$26,682,801**	**$22,490,299**	**$18,828,201**	**$8,882,418**	**$10,117,602**	**$10,591,618**	**$4,911,560**	**$7,149,876**	**$2,456,269**	**$7,415,038**	**$13,248,996**	**75.7%**
WASHINGTON															
Seattle MSA*	$107,101	$308,726	$690,962	$866,626	$536,618	$401,603	$155,364	$224,198	$218,582	$175,455	$178,521	$36,771	$167,692	$312,940	1.8%
Grays Harbor Co.	$179,493	$473,774	$534,593	$579,736	$452,518	$371,058	$102,489	$165,535	$155,605	$117,632	$120,134	$30,401	$53,073	$256,618	1.5%
Pacific Co.	$93,971	$393,983	$428,460	$480,513	$427,137	$434,665	$116,259	$247,629	$122,263	$76,210	$142,810	$55,463	$141,476	$243,141	1.4%
All Other WA	$361,350	$1,057,886	$1,860,205	$1,475,392	$871,657	$825,197	$340,474	$425,908	$329,017	$185,700	$249,672	$53,118	$302,887	$641,420	3.7%
WA Total	**$741,916**	**$2,234,369**	**$3,514,219**	**$3,402,268**	**$2,287,929**	**$2,032,522**	**$714,586**	**$1,063,270**	**$825,467**	**$554,997**	**$691,137**	**$175,754**	**$665,128**	**$1,454,120**	**8.3%**
OREGON															
Clackamas Co.	$226,522	$636,032	$1,122,963	$970,403	$795,152	$692,864	$188,667	$150,212	$225,366	$114,324	$142,324	$57,634	$166,913	$422,260	2.4%
Marion Co.	$338,074	$809,555	$1,279,168	$1,294,953	$874,930	$655,764	$353,850	$321,927	$346,221	$136,295	$335,335	$84,689	$228,411	$543,013	3.1%
All Other OR	$275,985	$564,935	$869,064	$1,135,138	$711,090	$568,352	$153,532	$214,653	$145,380	$118,540	$192,779	$31,558	$134,830	$393,526	2.2%
Oregon Total	**$840,581**	**$2,010,522**	**$3,271,195**	**$3,400,493**	**$2,381,171**	**$1,916,980**	**$696,049**	**$686,792**	**$716,966**	**$369,160**	**$670,438**	**$173,880**	**$530,155**	**$1,358,799**	**7.8%**
Other States	**$758,218**	**$1,735,122**	**$3,048,849**	**$2,872,510**	**$2,316,496**	**$2,337,591**	**$955,737**	**$1,279,647**	**$961,028**	**$685,196**	**$896,738**	**$227,143**	**$765,127**	**$1,449,185**	**8.3%**
Grand Total	**$10,266,722**	**$23,840,940**	**$36,758,594**	**$36,358,072**	**$29,475,895**	**$25,115,294**	**$11,248,789**	**$13,147,311**	**$13,095,079**	**$6,520,913**	**$9,408,189**	**$3,033,046**	**$9,375,448**	**$17,511,099**	**100.0%**

*Seattle MSA includes all communities in King, Pierce, and Snohomish counties.

Notes:

Nominal gross revenue adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.
Due to vessel ownership movement between communities over the years shown, total unique vessels per community may not sum to State or grand totals.
Red cells indicate confidential data or data suppressed to protect confidential data in other cells.
Source: ADF&G fish ticket data compiled by AKFIN (2022).

Table 4-16 provides information on the dependency of UCI salmon drift gillnet vessels on the UCI salmon drift gillnet fishery compared to other fisheries in which these vessels participate. From 2009–2021, UCI drift gillnet-caught salmon accounted for approximately 48% of the total gross revenue of vessels with Alaska ownership addresses; 68% of the total gross revenue of vessels with Washington ownership addresses; and 64% of the total gross revenue of vessels with Oregon ownership addresses. The level of dependency differed widely across communities. For example, UCI drift gillnet-caught salmon accounted for 94% or greater of the total gross revenue of the UCI salmon drift gillnet vessels in the Kenai Peninsula Borough communities of Kasilof, Kenai, and Nikiski, but 33% to 37% of the total gross revenue of the UCI salmon drift gillnet vessels in the Kenai Peninsula Borough communities of Anchor Point, Fritz Creek, Homer, and Sterling. As discussed in Section 4.5.1.2.3, the boundaries of EEZ waters in Cook Inlet do not align with the areas used by ADF&G fish tickets to record the location of salmon harvests. Consequently, there are insufficient data to accurately determine how much of a community's UCI drift gillnet-caught salmon was harvested in the Cook Inlet EEZ. However, based on the methodology described in Section 4.5.1.2.3, it is estimated that the EEZ accounted for approximately 48.6% of the total UCI salmon drift gillnet fishery catch from 2009–2021. Table 4-16 applies this percent to estimate the proportion of UCI drift gillnet-caught salmon harvested in the Cook Inlet EEZ for each community.

Table 4-16 Gross revenue (in 2021$) diversification of UCI salmon drift gillnet vessels by community of vessel historical ownership address, 2009–2021.

Geography	Annual Average Number of UCI Drift Gillnet Salmon CVs 2009-2021	UCI Salmon Drift Gillnet CVs Annual Average Ex-Vessel Gross Revenues from ALL UCI Drift Gillnet-Caught Salmon 2009-2021	UCI Drift Gillnet Salmon CVs Annual Average Ex-Vessel Gross Revenues from Estimated EEZ UCI Drift Gillnet-Caught Salmon Only 2009-2021*	UCI Salmon Drift Gillnet CVs Annual Average Total Ex-Vessel Gross Revenues from All Area, Gear, and Species Fisheries 2009-2021	UCI Salmon Drift Gillnet CVs Ex-Vessel Gross Revenue from ALL UCI Drift Gillnet-Caught Salmon as a Percentage of Total Ex-Vessel Gross Revenue Annual Average 2009-2021	UCI Salmon Drift Gillnet CVs Ex-Vessel Gross Revenue from Estimated EEZ UCI Drift Gillnet-Caught Salmon Only as a Percentage of Total Ex-Vessel Gross Revenue Annual Average 2009-2021*
ALASKA						
Anchor Point	6.9	$305,575	$148,508	$918,082	33.3%	16.2%
Fritz Creek	4.4	$181,964	$88,434	$517,524	35.2%	17.1%
Homer	97.5	$5,080,004	$2,468,860	$13,567,385	37.4%	18.2%
Kasilof	23.0	$955,193	$464,220	$979,489	97.5%	47.4%
Kenai	43.8	$1,777,368	$863,793	$1,891,558	94.0%	45.7%
Nikiski	10.8	$416,562	$202,447	$421,695	98.8%	48.0%
Nikolaevsk	9.5	$423,873	$206,000	$576,279	73.6%	35.7%
Ninilchik	6.2	$255,100	$123,977	$479,384	53.2%	25.9%
Soldotna	30.2	$1,122,343	$545,454	$1,433,406	78.3%	38.1%
Sterling	11.5	$400,976	$194,873	$1,092,802	36.7%	17.8%
Other KPB Communities	8.2	$368,744	$179,208	$688,085	53.6%	26.0%
Subtotal, KPB Communities	251.9	$11,287,702	$5,485,774	$22,565,688	50.0%	24.3%
Anchorage	25.7	$833,918	$405,281	$1,108,927	75.2%	36.5%
Wasilla	11.2	$421,707	$204,948	$519,746	81.1%	39.4%
All Other Alaska Communities	12.6	$705,669	$342,952	$1,902,255	37.1%	18.0%
Subtotal, Non-KPB Communities	54.3	$1,961,294	$953,180	$3,530,928	55.5%	27.0%
Alaska Total	**301.3**	**$13,248,996**	**$6,438,955**	**$27,668,976**	**47.9%**	**23.3%**
WASHINGTON						
Seattle MSA	8.5	$312,940	$152,087	$693,759	45.1%	21.9%
Grays Harbor County	6.7	$256,618	$124,715	$256,985	99.9%	48.5%
Pacific County	5.2	$243,141	$118,166	$357,928	67.9%	33.0%
All Other Washington	15.3	$641,420	$311,727	$824,558	77.8%	37.8%
Washington Total	**35.8**	**$1,454,120**	**$706,696**	**$2,133,230**	**68.2%**	**33.1%**
OREGON						
Clackamas County	6.8	$422,260	$205,216	$852,162	49.6%	24.1%
Marion County	13.6	$543,013	$263,902	$851,590	63.8%	31.0%
All Other Oregon	10.9	$393,526	$191,252	$412,287	95.4%	46.4%
Oregon Total	**31.3**	**$1,358,799**	**$660,370**	**$2,116,039**	**64.2%**	**31.2%**
OTHER STATES	35.2	$1,449,185	$704,298	$39,289,712	3.7%	1.8%
Grand Total	**403.6**	**$17,511,099**	**$8,510,319**	**$71,207,956**	**24.6%**	**12.0%**

*Estimated EEZ amount shown is based on an estimated average harvest split of 51.4% State waters/48.6% EEZ waters from 2009–2021.

Notes: Nominal gross revenue adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.

Source: Developed by Wislow Research based on ADF&G fish ticket data compiled by AKFIN (2022).

Table 4-17 provides information on the dependency of "community harvesting sectors" on the UCI salmon drift gillnet fishery compared to other fisheries in which these sectors participate. A community harvesting sector is defined as all the commercial fishing vessels with ownership addresses in a community that had at least one vessel active in the UCI salmon drift gillnet fishery from 2009–2021. Over that period, UCI drift gillnet-caught salmon accounted for less than 10% of the total gross revenue of harvesting sectors in many communities. However, they accounted for between 18% and 39% of the total gross revenue of the harvesting sectors in six Kenai Peninsula Borough communities (Kasilof, Kenai, Nikolaevsk, Ninilchik, Soldotna, and Sterling), and 57% of the total gross revenue of the Nikiski harvesting sector.

Table 4-17 Gross revenue (inflation adjusted) diversification of community harvesting sector by community of vessel historical ownership address, 2009–2021.

Geography	Annual Average Number of UCI Salmon Drift Gillnet CVs 2009-2021	Annual Average Number of All Commercial Fishing CVs in those Same Communities (the "Community CV Fleet") 2009-2021	UCI Salmon Drift Gillnet CVs Annual Average Ex-Vessel Gross Revenues from ALL UCI Drift Gillnet Salmon 2009-2021	UCI Salmon Drift Gillnet CVs Annual Average Ex-Vessel Gross Revenues from Estimated EEZ UCI Drift Gillnet-Caught Salmon Only 2009-2021*	All Commercial Fishing CVs Annual Average Total Ex-Vessel Gross Revenues from All Areas, Gears, and Species Fisheries 2009-2021	All Commercial Fishing CVs Ex-Vessel Gross Revenue from ALL UCI Drift Gillnet-Caught Salmon as a Percentage of Total Ex-Vessel Gross Revenue Annual Average 2009-2021	All Commercial Fishing CVs Ex-Vessel Gross Revenue from Estimated EEZ UCI Drift Gillnet-Caught Salmon Only as a Percentage of Total Ex-Vessel Gross Revenue Annual Average 2009-2021*
ALASKA							
Anchor Point	6.9	17.6	$305,575	$148,508	$3,273,310	9.3%	4.5%
Fritz Creek	4.4	10.0	$181,964	$88,434	$2,149,442	8.5%	4.1%
Homer	97.5	380.2	$5,080,004	$2,468,860	$98,265,774	5.2%	2.5%
Kasilof	23.0	35.7	$955,193	$464,220	$3,289,144	29.0%	14.1%
Kenai	43.8	59.2	$1,777,368	$863,793	$4,514,537	39.4%	19.1%
Nikiski	10.8	14.3	$416,562	$202,447	$736,495	56.6%	27.5%
Nikolaevsk	9.5	14.3	$423,873	$206,000	$1,980,785	21.4%	10.4%
Ninilchik	6.2	12.0	$255,100	$123,977	$861,114	29.6%	14.4%
Soldotna	30.2	51.2	$1,122,343	$545,454	$4,412,615	25.4%	12.4%
Sterling	11.5	17.4	$400,976	$194,873	$2,265,325	17.7%	8.6%
Other KPB Communities	8.2	36.8	$368,744	$179,208	$8,338,386	4.4%	2.1%
Subtotal, KPB Communities	251.9	648.7	$11,287,702	$5,485,774	$130,086,926	8.7%	4.2%
Anchorage	25.7	236.2	$833,918	$405,281	$76,978,847	1.1%	0.5%
Wasilla	11.2	81.5	$421,707	$204,948	$17,347,416	2.4%	1.2%
All Other Alaska Communities	12.6	818.4	$705,669	$342,952	$204,832,174	0.3%	0.2%
Subtotal, Non-KPB Communities	54.3	1,136.0	$1,961,294	$953,180	$281,442,539	0.7%	0.3%
Alaska Total	**301.3**	**1,784.7**	**$13,248,996**	**$6,438,955**	**$402,861,765**	**3.3%**	**1.6%**
WASHINGTON							
Seattle MSA	8.5	178.6	$312,940	$152,087	$194,257,109	0.2%	0.1%
Grays Harbor County	6.7	28.8	$256,618	$124,715	$4,063,647	6.3%	3.1%
Pacific County	5.2	24.2	$243,141	$118,166	$5,796,631	4.2%	2.0%
All Other Washington	15.3	80.5	$641,420	$311,727	$13,422,869	4.8%	2.3%
Washington Total	**35.8**	**312.2**	**$1,454,120**	**$706,696**	**$217,540,256**	**0.7%**	**0.3%**
OREGON							
Clackamas County	6.8	20.2	$422,260	$205,216	$2,655,995	15.9%	7.7%
Marion County	13.6	30.8	$543,013	$263,902	$2,918,469	18.6%	9.0%
All Other Oregon	10.9	56.8	$393,526	$191,252	$11,457,044	3.4%	1.7%
Oregon Total	**31.3**	**107.8**	**$1,358,799**	**$660,370**	**$17,031,508**	**8.0%**	**3.9%**
OTHER STATES	35.2	41.5	$1,449,185	$704,298	$2,332,504	62.1%	30.2%
Grand Total	**403.6**	**2,246.1**	**$17,511,099**	**$8,510,319**	**$639,766,033**	**2.7%**	**1.3%**

*Estimated EEZ amount shown is based on an estimated average harvest split of 51.4% State waters/48.6% EEZ waters from 2009–2021.

Notes: Nominal gross revenue adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.

Source: Developed by Wislow Research based on ADF&G fish ticket data compiled by AKFIN (2022).

4.5.1.5.2.2. Shorebased Processors

The following tables provide a series of quantitative indicators of processing sector engagement in and dependency on the UCI salmon drift gillnet fishery by community or regional geography (or both), depending on data confidentiality restrictions.

Table 4-18 shows the distribution across communities of Alaska shorebased processors[90] that accepted deliveries of UCI drift gillnet-caught salmon from 2009–2021. The table also shows annual average counts and percentages for communities, together with the number of unique processors participating in the UCI salmon drift gillnet fishery from 2009–2021. Eight Alaska communities had shorebased processors active in the UCI salmon drift gillnet fishery, but four of those communities (Kasilof, Nikiski, Ninilchik, and Soldotna) averaged less than one processor active in the fishery on an annual average basis from 2009–2021. Of the other four communities, one (Seward) had a single processor active in the fishery each year, and one (Anchorage) had a single processor active in nine of the 13 years and multiple processors in the remaining four years. Homer had multiple processors active in the fishery each year except 2018, when only one processor was active. Kenai had multiple processors active in the fishery all years except the two most recent years, when only one processor was active. Except for Anchorage, all communities with shorebased processors active in the fishery 2009-2021 were located within the Kenai Peninsula Borough.

Table 4-18 Number of Alaska shorebased processors accepting deliveries of UCI drift gillnet-caught salmon by community of operation, 2009–2021.

Community	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009-2021 (number)	Annual Average 2009-2021 (percent)	Unique SBPRs 2009-2021 (number)
Anchorage	1	1	1	1	1	1	1	1	2	3	3	2	1	1.5	13.29%	5
Homer	3	5	4	3	4	3	2	3	3	1	3	3	3	3.1	27.97%	8
Kasilof	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	0.70%	1
Kenai	7	6	5	5	5	5	7	4	4	3	3	1	1	4.3	39.16%	11
Nikiski	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1.40%	1
Ninilchik	1	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1.40%	2
Seward	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	9.09%	1
Soldotna	1	1	1	0	1	1	0	0	1	1	2	0	1	0.8	6.99%	2
Grand Total	**15**	**15**	**12**	**10**	**12**	**11**	**11**	**9**	**11**	**9**	**12**	**8**	**8**	**11.0**	**100.00%**	**29**

Source: ADF&G fish ticket data compiled by AKFIN (2022).

Table 4-19 shows the distribution across communities of ex-vessel gross payments for UCI drift gillnet-caught salmon deliveries to shorebased processors from 2009–2021. Due to data confidentiality constraints, information cannot be provided for any individual community for every year. It is apparent, however, that processing of UCI drift gillnet-caught salmon is concentrated in Kenai, which accounted for about 62% of all ex-vessel gross payments on an annual average basis from 2009–2021. While no community-specific information can be disclosed for Anchorage, Kasilof, Nikiski, Ninilchik, Seward, and Soldotna (with the potential exception of Anchorage in 2018 and 2019), combined these communities accounted for about 36% of ex-vessel gross payments. Although Homer had multiple shorebased processors participating in the UCI salmon drift gillnet fishery in all but one year (2018), it accounted for only 2% of annual average ex-vessel gross payments for UCI drift gillnet-caught salmon during this period.

[90] Defined for the purposes of this analysis as those identified by F_ID (intent to operate) and SBPR (shorebased processor) codes in AKFIN data. The data also contained one entity that was flagged as operating in Oregon, however, additional research suggests that it is likely that operations actually took place in Kenai. For the purposes of this analysis data from this entity were aggregated with Kenai data. The operation in question is or was of modest scale and its inclusion with Kenai or its exclusion from the data altogether does not materially change the analysis.

Table 4-19 Shorebased processor ex-vessel gross payments (inflation adjusted) for UCI drift gillnet-caught salmon by community of operation, 2009–2021.

Community	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009-2021 (dollars)	Annual Average 2009-2021 (percent)
Homer	$38,138	$442,807	$639,503		$454,660	$364,534		$187,405	$300,906		$374,695	$131,070	$391,164	$335,133	1.95%
Kenai	$4,945,946	$12,843,997	$24,252,898	$22,947,860	$18,695,471	$16,795,379	$7,492,697	$8,723,940	$8,529,901	$2,961,230	$4,379,873			$10,693,593	62.20%
All Others	$5,125,613	$10,247,600	$11,378,198		$9,829,616	$7,526,294		$3,877,279	$3,943,102		$4,386,853			$6,163,910	35.85%
Grand Total	**$10,109,697**	**$23,534,404**	**$36,270,599**	**$35,653,107**	**$28,979,747**	**$24,686,207**	**$11,026,291**	**$12,788,624**	**$12,773,910**	**$6,316,867**	**$9,141,421**	**$2,973,251**	**$9,250,133**	**$17,192,635**	**100.00%**

Note:

Nominal ex-vessel gross payments adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.
Red cells indicate confidential data or data suppressed to protect confidential data in other cells.
Source: ADF&G fish ticket data compiled by AKFIN (2022).

Table 4-20 provides information on the dependency of shorebased processors on the UCI salmon drift gillnet fishery compared to other fisheries in which these processors participate, as measured by ex-vessel payments for UCI salmon drift gillnet deliveries as a proportion of total ex-vessel payments for all deliveries in all fisheries combined during the same period. From 2009–2021, deliveries of UCI drift gillnet-caught salmon accounted for approximately 33% of the total ex-vessel gross payments by Kenai processors, and about 2% of the total ex-vessel gross payments by Homer processors. Deliveries of UCI drift gillnet-caught salmon accounted for around 13% of the total ex-vessel gross payments for shorebased processors participating in the fishery in all other communities combined. In addition, the table shows processor dependency on UCI drift gillnet-caught salmon harvested in the Cook Inlet EEZ which, based on the estimation methodology described in Section 4.5.1.2.3, accounted for approximately 48.6% of the total UCI salmon drift gillnet fishery catch from 2009–2021.

Table 4-20 Ex-vessel gross payment (inflation adjusted) diversification of shorebased processors accepting deliveries of UCI drift gillnet-caught salmon by community of operation, 2009–2021.

Community	Annual Average Number of UCI Drift Gillnet Salmon Processors	UCI Drift Gillnet Salmon Processors Annual Average Ex-Vessel Gross Payments for ALL UCI Drift Gillnet Salmon	UCI Drift Gillnet Salmon Processors Annual Average Ex-Vessel Gross Payments for Estimated EEZ UCI Drift Gillnet Salmon Only *	UCI Drift Gillnet Salmon Processors Annual Average Ex-Vessel Gross Payments for All Area, Gear, and Species Fisheries	UCI Drift Gillnet Salmon Processors Ex-Vessel Gross Payments for ALL UCI Drift Gillnet Salmon as a Percentage of Total Ex-Vessel Gross Payments Annual Average	UCI Drift Gillnet Salmon Processors Ex-Vessel Gross Payments for Estimated EEZ UCI Drift Gillnet Salmon Only as a Percentage of Total Ex-Vessel Gross Payments Annual Average*
		Millions of Dollars			(%)	
Homer	3.1	0.34	0.16	14.64	2.3%	1.1%
Kenai	4.3	10.69	5.20	31.99	33.4%	16.2%
All Others	3.6	6.16	3.00	47.16	13.1%	6.4%
Grand Total	**11.0**	**17.19**	**8.36**	**93.79**	**18.3%**	**8.9%**

* *Estimated EEZ amount shown is based on an estimated average harvest split of 51.4% State waters/48.6% EEZ waters from 2009–2018.

Notes: Nominal ex-vessel gross payments adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.

Source: Developed by Wislow Research based on ADF&G fish ticket data compiled by AKFIN (2022).

Table 4-21 provides information on the dependency of “community processing sectors” on the UCI salmon drift gillnet fishery compared to other fisheries in which these sectors participate, again as measured by the proportion of total ex-vessel payments. A community processing sector is defined as all the shorebased processors in a community that had at least one UCI drift gillnet-caught salmon processor from 2009–2021. Over that period, UCI drift gillnet-caught salmon accounted for about 33% of total ex-vessel gross payments by Kenai’s community processing sector; 2% of total ex-vessel gross payments by Homer’s community processing sector; and 6% of total ex-vessel gross payments by all other community processing sectors combined. In addition, the table shows the dependency of community processing sectors on UCI drift gillnet-caught salmon harvested in the Cook Inlet EEZ, which, based on the estimation methodology described in Section 4.5.1.2.3, accounted for approximately 48.6% of the total UCI salmon drift gillnet fishery catch from 2009–2021.

Table 4-21 Ex-vessel gross payment (inflation adjusted) diversification of community processing sectors by community of operation, 2009–2021.

Community	Annual Average Number of UCI Drift Gillnet Salmon SBPRs 2009-2021	Annual Average Number of All SBPRs in those Same Communities (the "Community SBPR Sector") 2009-2021	All Community SBPRs Annual Average Ex-Vessel Payments for ALL UCI Drift Gillnet-Caught Salmon 2009-2021	All Community SBPRs Annual Average Ex-Vessel Gross Payments for Estimated EEZ UCI Drift Gillnet-Caught Salmon Only 2009-2021*	All Community SBPRs Annual Average Total Ex-Vessel Gross Payments for All Area, Gear, and Species Fisheries 2009-2021	All Community SBPRs Average Annual Ex-Vessel Gross Payments for ALL UCI Drift Gillnet-Caught Salmon as a Percentage of Total Annual Average Ex-Vessel Gross Payments for All Area, Gear, and Species Fisheries 2009-2021	All Community SBPRs Average Annual Ex-Vessel Gross Payments for Estimated EEZ UCI Drift Gillnet-Caught Salmon Only as a Percentage of Total Annual Average Ex-Vessel Gross Payments for All Area, Gear, and Species Fisheries 2009-2021*
			Millions of Dollars			(%)	
Homer	3.1	4.0	0.34	0.16	15.06	2.2%	1.1%
Kenai	4.3	5.9	10.69	5.20	32.62	32.8%	15.9%
All Others	3.6	16.1	6.16	3.00	111.19	5.5%	2.7%
Grand Total	**11.0**	**25.9**	**17.19**	**8.36**	**158.87**	**10.8%**	5.3%

*Estimated EEZ amount shown is based on an estimated average harvest split of 51.4% State waters/48.6% EEZ waters from 2009–2021.

Notes: Nominal ex-vessel gross payments adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.

Source: Developed by Wislow Research based on ADF&G fish ticket data compiled by AKFIN (2022).

Caution in the interpretation of these data is warranted as wholesale gross revenue data would be a better indicator of economic dependence than ex-vessel gross payment data, but first wholesale data are unavailable. Further, a general knowledge of the industry and previous community analyses would suggest that from 2009–2021, even where ex-vessel payments for UCI drift gillnet-caught salmon were a relatively modest proportion of overall processing ex-vessel payments, it is important to note that: 1) the returns to the processors from this fishery likely varied considerably from year to year and may have been substantial in absolute terms for at least some years; 2) the timing of the UCI drift-gillnet-caught salmon processing activities is likely to have been important to the operational flow of the plant and provided an important source of labor hours for processing staff; and 3) the processing of UCI drift gillnet-caught salmon deliveries in any given community may have been strategically important to the overall operations of one or more processors looking to continued access to the fishery as important to maintaining a desired flexibility and diversity of operations and to maintaining mutually beneficial relationships with the owners and operators of some of the delivering vessels that also participated in other fisheries with the plant.

4.5.1.5.2.3. S03H Permit Holders

Table 4-22 provides a count of S03H permits by historical ownership address community from 2009–2021. The table is separated into Alaska communities, Washington communities, Oregon communities, and all communities outside the States of Alaska, Washington, and Oregon. The table also shows annual average counts and percentages for community and community groups, together with the number of unique permits from 2009–2021. Like what was seen for UCI salmon drift gillnet vessel ownership (Table 4-14), permit ownership is concentrated in the Kenai Peninsula Borough, which on an average annual basis accounted for 61% of all S03H permits and featured nine communities with five or more permits active annually in the fishery from 2009–2021. The only communities outside of the Kenai Peninsula Borough annually averaging five or more permits active in the fishery during that time period were Anchorage and Wasilla, Alaska; the Seattle MSA (taken as a whole); and Molalla, Oregon.

Table 4-22 S03H permit participation in the UCI salmon drift gillnet fishery by community of permit historical ownership address, 2009–2021.

Geography	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009–2021 (number)	Annual Average 2009–2021 (percent)	Total Unique Vessels 2009-2021 (number)
ALASKA																
Anchor Point	3	3	9	9	6	10	7	7	5	5	6	3	2	5.8	1.36%	19
Clam Gulch	2	2	1	2	2	1	1	1	1	2	2	3	2	1.7	0.40%	4
Fritz Creek	3	4	3	3	3	3	6	5	3	3	2	2	2	3.2	0.76%	9
Halibut Cove	2	2	4	3	3	4	4	3	3	4	3	3	4	3.2	0.76%	4
Homer	92	86	117	123	128	114	118	116	98	85	78	68	61	98.8	23.20%	225
Kasilof	24	21	27	26	25	27	22	21	21	20	20	17	17	22.2	5.20%	50
Kenai	45	46	47	54	53	52	51	50	44	42	44	37	37	46.3	10.88%	89
Nikiski	9	9	9	10	12	12	13	13	14	13	15	14	12	11.9	2.80%	24
Nikolaevsk	11	9	12	11	11	11	10	12	14	15	13	10	11	11.5	2.71%	29
Ninilchik	5	6	8	6	5	7	6	5	6	5	5	5	5	5.7	1.34%	14
Port Graham	0	0	0	2	2	2	2	2	2	2	1	1	1	1.3	0.31%	2
Seldovia	3	3	3	3	2	2	3	4	4	3	3	3	3	3.0	0.70%	6
Seward	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	0.07%	1
Soldotna	31	31	33	32	37	43	38	39	34	28	28	28	23	32.7	7.68%	64
Sterling	14	12	14	15	17	16	18	16	14	12	12	11	12	14.1	3.31%	23
Subtotal, KPB	245	235	288	300	306	304	299	294	263	239	232	205	192	261.7	61.47%	562
Anchorage	24	18	26	24	24	22	26	24	24	25	18	19	9	21.8	5.11%	51
Delta Junction	5	3	3	6	5	5	6	6	6	5	4	2	3	4.5	1.07%	14
Fairbanks	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	0.02%	1
Juneau	1	1	1	2	3	3	3	2	2	3	3	2	3	2.2	0.52%	3
Kodiak	3	3	3	4	2	3	3	3	2	3	3	2	1	2.7	0.63%	6
Palmer	2	1	3	3	3	2	2	2	3	2	2	2	2	2.2	0.52%	6
Sitka	0	0	0	1	1	1	1	1	1	1	1	1	1	0.8	0.18%	1
Valdez	2	2	2	2	2	1	1	1	0	0	0	0	0	1.0	0.23%	2
Wasilla	15	13	15	16	18	22	18	17	16	14	14	12	8	15.2	3.58%	31
White Mountain	0	0	0	0	1	1	1	1	1	1	1	1	0	0.6	0.14%	1
Whittier	0	1	1	1	1	1	1	1	1	1	1	1	0	0.8	0.20%	1
Willow	1	1	1	2	2	2	3	2	2	2	2	2	1	1.8	0.42%	4
Subtotal, Other Alaska	53	43	55	61	62	64	65	60	58	57	49	44	28	53.8	12.63%	121
Alaska Total	**298**	**278**	**343**	**361**	**368**	**368**	**364**	**354**	**321**	**296**	**281**	**249**	**220**	**315.5**	**74.11%**	**683**
WASHINGTON																
Seattle MSA Subtotal	7	6	10	11	11	7	10	8	8	8	6	6	5	7.9	1.86%	23
Grays Harbor Co. Subtotal	6	6	8	9	9	8	7	6	6	5	4	4	3	6.2	1.46%	12
Pacific County Subtotal	4	4	5	5	5	5	5	5	4	4	4	4	3	4.4	1.03%	6
All Other WA Subtotal	22	23	21	21	22	21	20	19	16	15	13	10	12	18.1	4.25%	35
Washington Total	**39**	**39**	**44**	**46**	**47**	**41**	**42**	**38**	**34**	**32**	**27**	**24**	**23**	**36.6**	**8.60%**	**76**
OREGON																
Clackamas County Subtotal	11	11	10	13	12	12	9	5	7	6	6	5	5	8.6	2.02%	21
Marion County Subtotal	14	14	18	20	19	20	18	13	11	12	11	8	8	14.3	3.36%	30
All Other Oregon Subtotal	14	9	13	14	13	14	10	14	11	10	8	6	7	11.0	2.58%	24
Oregon Total	**39**	**34**	**41**	**47**	**44**	**46**	**37**	**32**	**29**	**28**	**25**	**19**	**20**	**33.9**	**7.97%**	**75**
OTHER STATES	**35**	**30**	**37**	**47**	**42**	**46**	**53**	**49**	**40**	**40**	**42**	**28**	**27**	**39.7**	**9.32%**	**93**
Grand Total	**411**	**381**	**465**	**501**	**501**	**501**	**496**	**473**	**424**	**396**	**375**	**320**	**290**	**425.7**	**100.00%**	**927**

*Seattle MSA includes all communities in King, Pierce, and Snohomish counties.

Notes: Due to permit ownership movement between communities over the years shown, total unique permits per community may not sum to State or grand totals.

Source: ADF&G fish ticket data compiled by AKFIN (2022).

The pattern of distribution of ownership address for S03H permits is like that of distribution of ownership address for UCI salmon drift gillnet harvest vessels. Among Alaska communities, the only communities that appear as ownership addresses for one but not the other during the period 2009–2021 are Cordova, Sand Point, and Unalakleet. All three had relatively modest participation of vessels with local ownership addresses in the fishery. Cordova had three unique vessels participate in the fishery one year each (2009, 2014, and 2016), Sand Point had one vessel participate in the fishery in one year (2012), and Unalakleet had one vessel participate in the fishery in one year (2020). None of these communities appear in the data as an ownership address of any S03H permits in any year 2009–2021. Alaska ownership addresses accounted for roughly three-quarters of all S03H permits held on an annual average basis 2009–2021, with the remainder almost evenly split among ownership addresses in Washington, Oregon, and all other states (outside of Alaska) combined, with between eight and nine percent each.

Table 4-23 provides information on the dependency of S03H Alaska ownership address permit holders on their S03H permits compared to other commercial fishery permits held by those individuals, as measured in gross revenue on an annual average basis for the years 2009 through 2021. As shown, S03H permits accounted for roughly half of the total gross revenue deriving from the portfolio of all permits held by S03H permit holders for Alaska as a whole as well as for S03H permit holders in the Kenai Peninsula Borough. It is important to note, however, that there is considerable variation between communities as, for example, the S03H permit holders in the Kenai Peninsula Borough communities of Kasilof, Kenai, Nikiski, and Seldovia derived over 80 percent of their total gross revenue (from all permits in all fisheries combined) from their S03H permits alone over this period.

Table 4-23 Annual average gross revenue (inflation adjusted) diversification of S03H permit holders by community of permit ownership address, Alaska communities only, 2009-2021.

Geography	Number of S03H Permit Holders, Annual Average 2009-2021	Ex-Vessel Gross Revenues from S03H Permits Only, Annual Average 2009-2021	Ex-Vessel Gross Revenues from All Permits in All Fisheries Held by S03H Permit Holders, Annual Average 2009-2021	Ex-Vessel Gross Revenues from S03H Permits as a Percentage of Ex-Vessel Gross Revenues from Permits in All Fisheries Held by S03H Permit Holders, Annual Average 2009-2021
Anchor Point	5.8	$196,808	$310,630	63.4%
Clam Gulch	1.7	$95,093	$192,852	49.3%
Fritz Creek	3.2	$116,720	$206,630	56.5%
Halibut Cove	3.2	$136,069	$286,077	47.6%
Homer	98.8	$4,823,037	$11,778,786	40.9%
Kasilof	22.2	$948,377	$1,060,216	89.5%
Kenai	46.3	$1,787,358	$2,151,265	83.1%
Nikiski	11.9	$449,540	$538,538	83.5%
Nikolaevsk	11.5	$451,233	$880,704	51.2%
Ninilchik	5.7	$230,019	$420,295	54.7%
Port Graham	1.3			
Seldovia	3.0	$90,485	$99,979	90.5%
Seward	0.3			
Soldotna	32.7	$1,264,421	$2,830,153	44.7%
Sterling	14.1	$486,741	$1,034,800	47.0%
Subtotal, KPB Communities	**261.7**	**$11,127,805**	**$21,842,830**	**50.9%**
Anchorage	21.8	$793,720	$1,410,909	56.3%
Wasilla	15.2	$589,163	$1,051,026	56.1%
All Other Alaska Communities	16.8	$658,006	$1,332,212	49.4%
Subtotal, AK Outside the KPB	**53.8**	**$2,040,889**	**$3,794,148**	**53.8%**
Alaska Total	**315.5**	**$13,168,695**	**$25,636,978**	**51.4%**

Notes:

Nominal gross revenue adjusted for inflation to 2021 dollars using Federal Reserve Bank of St. Louis Gross Domestic Product: Chain-type Price Index.

Red cells indicate confidential data or data suppressed to protect confidential data in other cells.
Source: ADF&G fish ticket data compiled by AKFIN (2022).

4.5.1.5.3. Community Context of the UCI Salmon Drift Gillnet Fishery

4.5.1.5.3.1. Community Demographic and Institutional Indicators

Table 4-24 presents selected demographic indicators for the Kenai Peninsula Borough communities identified as engaged in or dependent upon the UCI salmon drift gillnet fishery in one or more years from 2009–2021. The table also shows comparative data for Anchorage and the State of Alaska as a whole. For these same communities, Table 4-25 presents information on the types of municipal governments, relationships to Alaska Native Claims Settlement Act (ANCSA) regional and village corporations, and the presence (or absence) of a federally recognized tribe. As shown, considerable variation among these indices occurs across the communities.

Table 4-24 Demographic indicators for selected Alaska communities engaged in the UCI salmon driftnet fishery.

Community	Total Population	Alaska Native(1) Residents (percent of total population)	Minority(2) Residents (percent of total population)	Residents Living in Group Quarters(3) (percent of total population)	Per Capita Income (dollars)	Median Household Income (dollars)	Number of Family Households	Median Family Income (dollars)	Low-Income(4) Residents (percent of total population)
Kenai Peninsula Communities									
Anchor Point	2,105	8.3%	15.5%	0.8%	$31,832	$54,024	561	$75,417	12.5%
Clam Gulch	207	11.1%	11.6%	0.0%	$27,677	NA	35	$85,417	11.7%
Fritz Creek	2,248	5.9%	13.6%	0.0%	$37,670	$70,897	534	$88,000	6.3%
Halibut Cove	60	6.7%	8.3%	0.0%	$34,806	$73,000	54	$93,077	7.8%
Homer	5,522	9.4%	18.5%	1.5%	$37,499	$63,854	1,298	$86,406	12.9%
Kasilof	525	13.7%	17.9%	0.0%	$43,580	$NA	94	NA	8.9%
Kenai	7,424	19.3%	30.6%	0.5%	$33,422	$70,732	1,605	$83,828	14.1%
Nikiski	4,456	15.0%	23.6%	0.6%	$25,658	$60,913	916	$82,500	15,2%
Nikolaevsk	328	8.2%	19.5%	0.0%	$32,515	$54,167	39	$107,679	19.2%
Ninilchik	845	16.9%	23.8%	0.0%	$30,067	$51,958	250	$68,333	17.2%
Port Graham	162	93.2%	95.1%	0.0%	$25,766	$41,389	33	NA	29.3%
Seldovia	235	25.5%	34.0%	0.0%	$42,778	$78,750	55	$82,614	0.0%
Seldovia Village CDP (5)	199	24.6%	36.7%	0.0%	$37,235	$71,458	64	$87,083	13.0%
Seward	2,717	18.8%	33.8%	4.7%	$30,932	$75,050	545	$81,776	10.1%
Soldotna	4,342	11.5%	23.5%	0.8%	$37,130	$60,833	1,076	$78,438	19.0%
Sterling	5,918	8.3%	16.4%	0.3%	$59,704	$99,093	1,076	$128,243	8.9%
Anchorage, Wasilla, and the State of Alaska									
Anchorage	291,247	14.8%	45.7%	1.2%	$43,125	$88,871	69,003	$106,497	9.1%
Wasilla	9,054	14.6%	27.7%	0.8%	$34,791	$62,292	2,238	$80,905	15.2%
State of Alaska	733,391	21.9%	42.5%	2.2%	$39,236	$80,287	170,981	$96,658	10.4%

Notes:

(1) Includes individuals self-identified in the census as American Indian or Alaska Native exclusively or in combination with some other category.

(2) Includes all individuals except those self-identified as both White and of non-Hispanic origin.

(3) Includes "Other Noninstitutional" group quarters only (e.g., the type of group housing facilities provided for employees at some seafood processing plants as well as group homes; this category excludes adult correctional facilities, such as the Spring Creek Correctional Center in Seward, nursing homes, and hospice facilities).

(4) Defined as those persons living below the poverty threshold by the U.S. Census Bureau in the 2017–2021 American Community Survey. As a point of reference, a family of four (two adults and two children) had a poverty threshold of $27,479 in 2021.

(5) Seldovia Village, an unincorporated Census Designated Place (CDP) first appearing in the U.S. Census in 2000, is adjacent to, but outside of, the city limits of the City of Seldovia.

NA = Data not available.

Source: U.S. Census Bureau (2020), U.S. Census Bureau (2022).

Table 4-25 Institutional indicators for selected Alaska communities engaged in the UCI salmon driftnet fishery

Community	Traditional Community Name and Translation	Borough	Municipal Government (Incorporation Status, Date)	ANCSA Regional Corporation (1)	ANCSA Village Corporation	Federally Recognized Tribe and Tribal Government
Anchor Point	K'kaq' (Dena'ina) "River Mouth"	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Clam Gulch	information unavailable	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Fritz Creek	information unavailable	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Halibut Cove	information unavailable	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Homer	information unavailable	KPB	City of Homer (1st Class City, 1964)	--	None (not an ANCSA village)	None
Kasilof	Ggasilat (Dena'ina)	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Kenai	Shk'ituk't (Dena'ina) "Where We Slide Down"	KPB	City of Kenai (Home Rule City, 1960)	Cook Inlet Region, Inc.	Kenai Natives Association, Inc. Salamatof Native Association, Inc.(2)	Kenaitze Indian Tribe Kenaitze Tribal Council Salamatof Tribe(2)
Nikiski	information unavailable	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Nikolaevsk	information unavailable	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Ninilchik	Niqnilchint (Dena'ina) "Lodge is Built Place"	KPB	None (Unincorporated CDP)	Cook Inlet Region, Inc.	Ninilchik Natives Association, Inc.	Ninilchik Village Tribe Ninilchik Traditional Council
Port Graham	Paluwik (Sugt'stun) "Place of Sadness"	KPB	None (Unincorporated CDP)	Chugach Alaska Corporation	Port Graham Corporation	Native Village of Port Graham Port Graham Tribal Council
Seldovia	Angagkitaqnuuq (Sugt'stun and Dena'ina)	KPB	City of Seldovia (1st Class City, 1945)(3)	Cook Inlet Region, Inc.	Seldovia Native Association, Inc.	Seldovia Village Tribe Seldovia Tribal Council
Seward	Qutalleq (Sugt'stun)	KPB	City of Seward (Home Rule City, 1912)	--	None (not an ANCSA village)	None
Soldotna	Ts'eldat'nu (Dena'ina) "Trickling Down Creek"	KPB	City of Soldotna (Home Rule City, 1967)	--	None (not an ANCSA village)	None
Sterling	information unavailable	KPB	None (Unincorporated CDP)	--	None (not an ANCSA village)	None
Anchorage	Dgheyaytnu; Dgheyay Kaq' (Dena'ina) "Needlefish River;" "Mouth of Needlefish River"	see cell to right	Unified Home Rule Borough (Incorp.1920 [City], 1964 [Borough], 1975 [Unified Municipality]	Cook Inlet Region, Inc.	Eklutna, Inc.(4)	Native Village of Eklutna(4) Eklutna Traditional Tribal Council(4)
Wasilla	Information unavailable	Mat-Su	City of Wasilla (1st Class City, 1974)	--	None (not an ANCSA village)	None

Notes:

(1) Regional ANCSA corporations are listed only for those communities where they are affiliated with an ANCSA village corporation, but they also serve shareholders in other communities. All of the KPB communities listed as "not an ANCSA community" are within the regional boundaries of Cook Inlet Region, Inc., except Seward, which is within the regional boundaries of the Chugach Alaska Corporation.

(2) Salamatof is an ANCSA village (and an unincorporated CDP first appearing in the U.S. Census in 1980), located between the City of Kenai to the south and the unincorporated CDP of Nikiski to the north. Salamatof was not identified as a community engaged in or dependent upon relevant sectors in the UCI salmon drift gillnet fishery for the 13 most recent years for which data are available (2009–2021), but the Salamatof Native Association and the Salamatof Tribe are headquartered in Kenai and are listed with that community due to close working relationships between the two communities relevant to this analysis (e.g., the Kenaitze Indian Tribe and the Salamatof Tribe have a shared Hunting, Fishing and Gathering Commission).

(3) Seldovia Village, an unincorporated CDP first appearing in the U.S. Census in 2000, is adjacent to, but outside of, the city limits of the City of Seldovia.

(4) Eklutna is a small ANCSA village located within the much larger boundaries of the Unified Home Rule Municipality of Anchorage and is one of the villages within the Cook Inlet Region, Inc. family of villages; Anchorage itself is not an ANCSA village.

Source: Alaska Department of Commerce, Community, and Economic Development (2022).

4.5.1.5.3.2. Determining Communities for Further Characterization

In selecting communities for further characterization, consideration was given to the large number of communities participating in the UCI salmon drift gillnet fishery; the desire to focus on the communities most clearly substantially engaged in or substantially dependent on the fishery (and therefore most likely to be directly affected by the proposed action and alternatives); and a recognition that communities with multi-sector activity may be more or less vulnerable to potential adverse impacts related to the proposed action and alternatives based on the particular sectors present in specific communities. Table 4-26 and Table 4-27 provide information on engagement level from 1991–2021, as determined by a principal components factor analysis (PCFA), which appears as an appendix to this EA/RIR (Appendix 15).

Table 4-26 Selected UCI salmon drift gillnet fishery community harvesting level of engagement indicators[1] for selected Kenai Peninsula Borough and other Alaska communities,1991–2021.

Community	Medium	Medium-High	High
Kenai Peninsula Borough Communities			
Anchor Point	15	10	0
Clam Gulch	0	0	0
Fritz Creek	0	0	0
Halibut Cove	0	0	0
Homer	0	0	31
Kasilof	0	6	25
Kenai	0	0	31
Nikiski	26	5	0
Nikolaevsk	12	0	0
Ninilchik	23	0	0
Port Graham	0	0	0
Seldovia	0	0	0
Seward	1	0	0
Soldotna	0	0	31
Sterling	17	3	0
Other Alaska Communities			
Anchorage	1	7	23
Delta Junction	1	0	0
Kodiak	5	0	0
Wasilla	18	0	0

Note: [1] For engagement level greater than “Low”(as determined by PCFA)
Source: Kasperski (2022).

Table 4-27 Selected UCI salmon drift gillnet fishery community processing level of engagement indicators[1] for selected Kenai Peninsula Borough and other Alaska communities,1991–2021.

Community	Medium	Medium-High	High
Kenai Peninsula Borough Communities			
Anchor Point	0	0	0
Clam Gulch	0	0	0
Fritz Creek	0	0	0
Halibut Cove	0	0	0
Homer	3	10	10
Kasilof	12	7	5
Kenai	0	0	31
Nikiski	2	1	1
Nikolaevsk	0	0	0
Ninilchik	3	2	0
Port Graham	0	0	0
Seldovia	0	0	0
Seward	2	1	0
Soldotna	1	0	0
Sterling	0	0	0
Other Alaska Communities			
Anchorage	1	1	0
Delta Junction	0	0	0
Kodiak	0	0	0
Wasilla	0	0	0

Note: [1] For engagement level greater than “Low”(as determined by PCFA)
Source: Kasperski (2022).

The PCFA adapts a framework developed by NMFS to create quantitative indices of fisheries engagement to explore the degree to which communities have been engaged in Cook Inlet salmon drift gillnet harvesting and processing during the years 1991–2021 and how their participation has changed over that time. The PCFA considers two somewhat distinct aspects of community engagement in commercial fisheries in Alaska: a) commercial processing engagement reflects activities associated with vessel landings and actual fish deliveries in the community and associated processing employment, municipal tax revenues, demand for supplies, and profits; b) commercial harvesting engagement reflects activities associated with the community of residence of the vessel owners engaged in this fishery because that community also benefits from the fisheries activity and associated income, and some portion of crew and other supplies will also be procured in this location. One of the advantages of using a PCFA approach is that it considers multiple dimensions of community engagement in a single indicator and thereby allows for a portrayal of relative levels of engagement across communities, including smaller communities where data confidentiality considerations would otherwise preclude such analyses.

The engagement level data resulting from the PCFA summarized in Table 4-26 and Table 4-27 were used to select the individual communities[91] to be carried forward for more detailed characterization. Specifically:

Communities listed with no level of engagement indicators in either the harvesting or processing category higher than the "low" category for any year 1991–2021 included Clam Gulch, Fritz Creek, Halibut Cove, Port Graham, and Seldovia, all in the KPB. Delta Junction (Interior) each had a single year out of the 31 in the 1991–2021 period in the "medium" harvest engagement category. These six communities were not carried forward for further characterization.

A total of eight communities in the KPB had multiple years of "medium-high" or "high" harvesting engagement or processing engagement, or both (Anchor Point, Homer, Kasilof, Kenai, Nikiski, Ninilchik, Soldotna, and Sterling). These communities are further characterized below.

- Anchorage also had multiple years of "medium-high" and "high" harvesting engagement. However, unlike the other communities in this category, the total ex-vessel gross revenue generated by Anchorage ownership address UCI salmon drift gillnet vessels accounted for relatively little (less than 1%) of the combined ex-vessel gross revenue of the community commercial fishing fleet vessels (participating in all area, species, and gear fisheries) on an annual average basis from 2009–2021 (Table 4-17). Given this low level of dependency on the UCI salmon drift gillnet fishery over the past decade, Anchorage was not carried forward for further characterization.

Seward had only a single year of medium-high processing engagement but has been a has had a local processing plant engaged in the fishery all 31 years of the period and as described elsewhere was specifically noted by the Cook Inlet Salmon Committee as an important processing (but not landing) location for Cook Inlet salmon that are initially offloaded elsewhere and trucked to Seward for processing. Given this continuity of engagement and recognized importance, Seward is characterized below.

One community, Nikolaevsk (in the KPB), had multiple years of "medium" level harvest engagement, but no "medium-high" or "high" engagement years (and no years with processing engagement above a "low" level). Nikolaevsk is also carried forward for further characterization below as it averaged approximately 10 local ownership address vessels participating in the fishery from 2009–2021

[91] The PCFA also analyzed five larger groups of communities as wholes (Seattle MSA, Other Washington, Oregon, California, and Other US) for which engagement indices were calculated (see Table 5 in Section 14). These groupings of communities are not described in this section.

(Table 4-14) and the annual average gross ex-vessel revenue from the UCI salmon drift gillnet fishery accounted for approximately 21 percent of the annual average combined ex-vessel gross revenue for the entire community commercial fishing fleet (vessels participating in all area, species, and gear fisheries) over those same years (Table 4-17).

- Wasilla (Matanuska-Susitna Borough) also had multiple years of “medium” level harvest engagement, but no “medium-high” or “high” engagement years and an annual average of 11 local ownership address vessels participating in the UCI salmon drift gillnet fishery from 2009–2021 (Table 4-14). However, unlike Nikolaevsk, the total ex-vessel gross revenue generated by Wasilla ownership address UCI salmon drift gillnet vessels accounted for relatively little (about 2%) of the total ex-vessel gross revenue of the community commercial fishing fleet vessels on an annual average basis from 2009–2021 (Table 4-17). Given this low level of dependency on the UCI salmon drift gillnet fishery over the past decade, Wasilla was not carried forward for further characterization.
- Kodiak (Kodiak Island Borough) also had multiple years of “medium” level harvest engagement, but no “medium-high” or “high” engagement years. Kodiak had an annual average of 3.4 local ownership address vessels participated in the UCI salmon drift gillnet fishery 2009-2021 with a range of one to five vessels participating in any given year (Table 4-14) and 2.7 individual S03H permits with Kodiak addresses were active in the fishery on an annual average basis 2009-2021 with a range of one to four permits active in any given year (Table 4-22). No Kodiak shorebased processors accepted deliveries of UCI drift gillnet-caught salmon during the years 2009-2021 (Table 4-18). Given this low level of participation in the UCI salmon drift gillnet fishery over the 2009-2021 period, Kodiak was not carried forward for further characterization.

4.5.1.5.3.3. Community Characterizations

The communities selected for additional characterization are all located in the Kenai Peninsula Borough. The community background information presented in this section is from *Community Profiles for North Pacific Fisheries—Alaska* (Himes-Cornell et al. 2013), unless otherwise indicated.

The contemporary economy of the Kenai Peninsula is dependent on a few key industries, including oil and gas, commercial fishing, tourism, and retail. As with other areas of Alaska outside of urban centers, government, utility, education, and health service sectors also provide employment opportunities for residents. The Kenai Peninsula can arguably lay claim to being the place of origin of the modern Alaska oil and gas industry, with the first commercially viable oil field discovered in 1957 in the Cook Inlet Basin. Oil production has waned in recent years, but natural gas extraction, timber, coal mining, and commercial ranching continue to be present in the Kenai Peninsula and provide employment opportunities for area residents.

The commercial harvest of salmon within Cook Inlet began in 1882 with the establishment of a cannery near the mouth of the Kasilof River. Commercial halibut and groundfish fishing began in the 1920s with this diversification fueled in part by the development of diesel-powered vessels. The herring and crab fisheries developed in the 1920s and 1930s; however, these fisheries have experienced closures due to low biomass. The proximity of the region to some of the State’s most productive commercial fisheries in combination with road connectivity to Anchorage and beyond has continued to make the region an important area for commercial fleets and seafood processing operations, as well as an area with concentration of commercial fisheries support service providers. The Kenai, Kasilof, Russian, Anchor, and Ninilchik rivers support Chinook and sockeye salmon runs, while other drainages in the Kenai Peninsula support coho, steelhead, and Dolly Varden. In recent decades, the tourism industry in the region has grown, with Seward and Whittier as cruise line transfer ports, as has the sport fishing industry.

Recreational fishing and charter operations are located throughout the Kenai Peninsula Borough, with marked concentrations in Soldotna, Homer, and Kenai.

Anchor Point

Anchor Point is located approximately 14 miles northwest of Homer and 112 miles southwest of Anchorage. Archaeological evidence suggests that the area was originally settled at least 3,000 years ago by the Kachemak tradition of Tanaina Athabascans. Captain James Cook documented the area and its people in 1778 and, according to legend, gave Anchor Point its name after losing a kedge anchor to tidal currents nearby. The goldrush of the late 1800s brought prospectors into the area and homesteaders began to settle more of Anchor Point throughout the 1900s. The community's current economy is focused on the commercial fishing industry and tourism, as its location provides easy access to saltwater and freshwater marine habitats. Commercial fisheries active in Anchor Point include salmon, halibut, groundfish, scallop, sablefish, cod, pollock, and other species. The community was once home to a more robust herring fishery but that has since been closed to allow for stock rebuilding. Anchor Point does not have highly developed fishery support service sector, with most services present in nearby Homer.

Homer

Homer is located 227 road miles south of Anchorage, at the end of the Sterling Highway, on the north shore of Kachemak Bay. Archaeological evidence suggests that the area around Kachemak Bay, including the area that would eventually become Homer, was an important gathering site for Dena'ina Athabascans and may have also been an important settlement for Alutiiq peoples as long as 4,500 years ago. Archaeological sites near what is now Homer suggest that the area was inhabited for many centuries before European contact. The Homer area has been home to the Kenaitze tribe for millennia. Historically, the Kenaitze had summer fish camps along the rivers and shores of Cook Inlet.

The community of Homer in its contemporary form traces its roots to 1896 when Homer Pennock arrived with 50 miners in a search for coal and gold. Coal mining remained the primary economic driver for the community into the early twentieth century. Other industries, including fur farming and commercial fishing, increased as a result of early homesteaders settling in or near the community. As in many Alaska communities, subsistence harvest has remained an important part of the local way of life.

Commercial fisheries began to develop in the Cook Inlet area in the mid-1800s. Salmon and herring were two of the earliest commercial fisheries in Alaska, with commercial exploitation of halibut and groundfish extending into the Gulf of Alaska in the 1920s. The first year-round processing facility in Homer specialized in frozen king crab and shrimp (Wise, et al, 2021). Before the 1960s, however, the commercial fishing industry around Kachemak Bay was centered on Seldovia, with Homer playing a relatively small, supporting role within the region. However, the Good Friday Earthquake in 1964 destroyed much of Seldovia's fishing infrastructure and Homer filled the vacuum of a local fishing center. Currently, commercial fishing underpins much of Homer's economy, although tourism, sportfishing, and hunting are also large components. Homer is a major regional hub for fishery landing and processing activities, with residents involved in the salmon, halibut, crab, groundfish, herring, and other fisheries. According to the most recent NOAA Fisheries Annual Community Engagement and Participation Overview (ACEPO), over the 2015–2019 period, salmon accounted for approximately 59 percent of the average ex-vessel share of harvest revenue by species for resident-owned vessels, with the balance consisting of halibut (15 percent), Pacific cod (9 percent), sablefish (8 percent), crab (6 percent), and other species (3 percent) (Wise, et al, 2021)

As a key community for the commercial fleet in the region, Homer has a wide array of supporting infrastructure and support service businesses that draw business from many nearby communities, including multiple yard options for storage and repair services. City of Homer marine support infrastructure at the city's port and harbor includes a deep-water dock (also known as the cargo dock), the Pioneer Dock (used by the Alaska state ferry), an ice plant and fish dock, two tidal grids (one steel and one wood) for vessel maintenance, a large vessel haul-out and repair facility, public cranes, vessel launching and loading ramps, vehicle and trailer parking, and reserved and transient moorage. According to industry participants, the gear shed in Homer does a large volume of gillnets for all regions of Alaska, including Cook Inlet, although there are also numerous independent net hangers that provide services up and down the Kenai Peninsula for those fishers who do not utilize services in Homer or prefer to do it all in house. Also according to industry participants, communities on the south side of Kachemak Bay have tie-ups/buoys that are utilized by the commercial fleet during salmon fishing, with tie-ups used by specific vessels varying based in part on the processor to whom the vessel is delivering, as the processors use service provision one of a set of incentives to stay competitive in retaining a delivery fleet, and in part on the movement of stocks (and therefore the location of fishing effort) during the course of a particular run.

Kasilof

Kasilof is located approximately 15 miles south of Kenai, 13 miles southwest of Soldotna, and 70 miles southwest of Anchorage, along the Sterling Highway. European explorers documented a Dena'ina settlement in what would become Kasilof and other seasonal camps located along the Kasilof River. Russian fur traders established a trading station at the mouth of the Kasilof River in the late 1700s. Commercial fisheries began in the area when a salmon cannery was established at the mouth of the Kasilof River in 1882. Fox farming was a large component of the Kasilof economy in the early twentieth century, but that sector waned in importance through the 1930s, leaving commercial salmon fishing as the key component of the community's economy. Currently, the economy of Kasilof is focused on oil and gas processing, commercial and sportfishing, government services, healthcare, retail, and tourism.

Those residents of Kasilof who are involved in the commercial fishery are engaged in salmon, herring, halibut, groundfish, sablefish, crab, and other fisheries. Kasilof is home to a few small-scale fish processing or buying facilities and the community's relatively diverse economy includes some fishery support service businesses including fabrication and an icehouse (Alaska Department of Commerce, Community, and Economic Development 2020a). According to industry participants, some of the processors in the area will offer mooring buoys at the mouth of the Kasilof River and tie-ups near the processor during the season, as well as haul-out services to the fleet. The area is also served by a few mobile repair companies offer limited repair/refreshing services, often at local processor storage yards.

Kenai

Kenai is located approximately 65 miles southwest of Anchorage and 11 miles off the Sterling Highway, on the eastern shore of Cook Inlet at the mouth of the Kenai River. When Russian fur traders arrived in the area, they documented approximately 1,000 Dena'ina people in a village of *Shk'itk't*, which was located on the same site as the contemporary community of Kenai is now. Following the population losses to epidemics of the late nineteenth and early twentieth centuries described above, the remaining Dena'ina maintained ties to their historical village camps through the 1930s and 1940s. The overall population of the community continued to grow in the following decades with the discovery of oil 20 miles northeast of Kenai, in 1957, and the discovery of offshore oil in 1965. Kenai's contemporary economy is focused on the oil and gas industry, with many of the support businesses in town providing services to Cook Inlet's oil and gas drilling platforms. Kenai's economy also includes substantial tourism, commercial fishing, and fish processing sectors.

Those residents of Kenai involved in the commercial fishery are generally engaged in the salmon and halibut fisheries, with others involved in the herring, groundfish, sablefish, crab, and other fisheries. The

City of Kenai operates a dock and boat ramp and there are other moorage opportunities present along the Kenai River. Other commercial fishery support service businesses are also present in Kenai and nearby communities. According to industry participants, similar to what was described for the Kasilof area, some of the processors in the area will offer buoys at the mouth of the Kenai River and tie-ups near the processor during the season as well as haul-out services to the fleet. Like the Kasilof area, the Kenai area is also served by a few mobile repair companies offer limited repair/refreshing services, often at local processor storage yards.

Nikiski

Nikiski is located approximately nine miles north of Kenai, along the Sterling Highway. The modern contemporary community of Nikiski was originally established to support the first cannery in the area, which was established in 1888. As was the case with Kenai, the area experienced an increase in population as a result of homesteading in the 1940s and additional settlement in support of the oil and gas discoveries of the 1950s and 1960s. Due to its proximity to Kenai, the economy of Nikiski is closely linked with that of its larger neighbor and is focused primarily on supporting the oil and gas sector with a large proportion of residents also involved in commercial fishing. Those residents of Nikiski involved in the commercial fishery are generally engaged in the salmon fishery, particularly drift and set gillnet fisheries. The docks in Nikiski are utilized by the oil and gas sector exclusively and Nikiski does not have a highly developed fishery support service sector, with most services present in nearby Kenai.

Nikolaevsk

Nikolaevsk is located approximately 115 miles southwest of Anchorage and ten miles north of Homer, several miles inland from Anchor Point. Nikolaevsk is unique among the communities included in this analysis because it is a settlement of *Staroveri*, or "Russian Old Believers" who fled religious persecution in Russia and ultimately settled on the Kenai Peninsula. Russian Old Believers are originally from a remote part of Siberia and left when the head of the Russian Orthodox Church changed a number of prayer books and traditions in 1666. A small sect within the Church resisted these changes and the conflict eventually became violent, with many imprisoned or burned at the stake due to their adherence to the older customs. Many fled Russia and found refuge in China; however, after World War II, the Chinese government forced the Russian Old Believers out and the various families found refuge in other countries around the world, including Turkey, Argentina, Australia, and Brazil. During the Cold War, then-Attorney General Robert F. Kennedy offered the Russian Old Believers asylum and many families settled in New Jersey and Oregon. While the families in Oregon generally found economic success, elders of the community believed that the younger generation was becoming too Americanized in Oregon and five families migrated to the current community of Nikolaevsk (Jonassen and Loughlin 2013). Ultimately, Nikolaevsk was one of four villages established in the 1960s in the area for Russian families who were eager to maintain their traditional way of life.[92]

Upon arrival to the region, many Nikolaevsk residents became engaged in the commercial fishery and it is not uncommon for Russian Old Believer fishermen to be engaged in commercial fishing throughout the year, in contrast to a substantial portion of other salmon drift gillnet fishers in Cook Inlet (Loring and Harrison 2013). The Russian families in Nikolaevsk generally lead a family-oriented, self-sufficient lifestyle of small-scale farming, gardening, fishing, and hunting. Nikolaevsk has a small tourism sector but is generally not engaged in any other major industry in the region aside from commercial fishing; no commercial fishery support service sector exists in the community, with needed services present in nearby Homer.

[92] The other communities include Voznesenka, Razdolna, and Kachemak Selo.

Ninilchik

Ninilchik is located approximately 38 miles southwest of Kenai and 188 road miles from Anchorage, along the Sterling Highway. The Ninilchik area was once used as a fishing and fur-farming location for Dena'ina Athabascan peoples. During the days of early Russian settlement (when Alaska was still a part of Russian America), Ninilchik was established as a retirement community for pensioners of the Russian American Company and became the permanent home for those too sick or infirm to travel back to Russia after their retirement. The original Russian residents of Ninilchik came from five families and through the early 1900s the community retained a largely Russian-speaking population with a Russian village school and a Russian Orthodox church. Non-Russian homesteaders began to arrive in Ninilchik in the 1930s and 1940s and the Sterling Highway was constructed through the community in 1950. The first commercial fishing cannery was established in the community in 1949. The contemporary economy of Ninilchik is based primarily on fishing, retail businesses, and tourism. Those residents of Ninilchik involved in the commercial fishery are engaged in the salmon, halibut, groundfish, herring, and crab fisheries. The harbor in Ninilchik is oriented toward smaller boats and the community does not have a highly developed fishery support service sector, with more services present in the relatively nearby communities of Kenai to the north and Homer to the south. While shorebased processing has occurred in Ninilchik, but as shown in Table 4-18, shorebased processing UCI drift gillnet-caught salmon has occurred in only two of the 13 years 2009–2021.[93]

Seward

Seward is located approximately 125 highway miles south of Anchorage, along Resurrection Bay on the east coast of the Kenai Peninsula. The original inhabitants of the area were the Unegkurmiut, who are a subgroup of the Chugach who lived elsewhere on the Kenai Peninsula. Russian explorer Alexander Baranof traveled into the bay on his way from Kodiak to Yakutat on the "Sunday of Resurrection" in the Russian Orthodox church and established a camp close to the site of the contemporary community of Seward.

Seward in its contemporary form traces its origins to the late 1800s when it was founded as a railroad terminus following the discovery of gold. Construction of the railroad was completed in 1923 and the community became a major rail link from the lower 48 to the interior of the State. The Good Friday Earthquake of 1964 destroyed an estimated 90% of the town's infrastructure. However, Seward was able to rebuild and has remained a major hub for trade and transportation. The contemporary economy of the community is focused on commercial fishing, fishing support service industries, coal transportation, education and research, and tourism, and benefits from the local presence of a correctional facility. Seward is broadly engaged in the commercial fishery as a base of operations for numerous vessels and

[93] As noted in former section 1-4 (under "Socio-economic issues" within the "Stakeholder Perspectives" discussion) of the Preliminary Review Draft of the EA reviewed at the June 2020 NPFMC meetings, the closing of two shorebased processors in Ninilchik resulted in a local loss of jobs. One of the local plants, owned by a firm with facilities in multiple communities, was destroyed by fire in 1979 (with local landings otherwise destined for delivery to this plant temporarily trucked to Homer for processing, according to a contemporaneous employee newsletter). According to present-day company management, the Ninilchik plant was not rebuilt post-fire because of restrictive tide access at the site, with the result being that since 1979, their remaining Ninilchik facilities have been used as a buying station only. With the loss of the Ninilchik plant, the firm started buying on tenders offshore and, in a pattern that has continued to the present, the tenders would then run to Homer to deliver the fish, which would subsequently be trucked to Seward for processing. While processing of UCI drift gillnet-caught salmon had also previously occurred at another plant owned by the same firm in Homer, that plant was destroyed by fire in 1998 and was not rebuilt, except for a 90-ton ice house; the site today functions as a buying station with a large gear storage yard, with all fish going to Seward for processing (Hoyt, personal communication, 2020). A second shorebased processor in Ninilchik that accepted deliveries of UCI drift gillnet-caught salmon, which was a relatively small, independent custom packing plant, began operating in community in the 1960s but closed 2011, according to a former plant manager (Berger, personal communication, 2020).

home to a local fleet and multiple locally operating shorebased processors. Those residents of Seward involved in the commercial fishery are engaged in the crab, halibut, herring, sablefish, groundfish, and salmon fisheries. According to the most recent ACEPO, over the 2015–2019 period, salmon accounted for approximately 41 percent of the average ex-vessel share of harvest revenue by species for resident-owned vessels, with the balance consisting of sablefish (35 percent), halibut (22 percent), and other species (2 percent) (Wise, et al. 2021)

While Seward has had little or no participation in the harvest sector of the UCI drift gillnet salmon fishery in recent years, as measured by the activity of vessels with local ownership addresses, shorebased processing in Seward, as noted earlier, benefits from landings by vessels and tenders to ports on the west side of the Kenai Peninsula that are then trucked to Seward for processing. The commercial fishing support service industry is relatively highly developed in Seward and the infrastructure present includes ample dock space, fuel, haul-out services, and emergency response services, among others.

Soldotna

Soldotna is located approximately 150 highway miles south of Anchorage and ten miles inland from Cook Inlet along the Kenai River. The area was and remains home to the Kenaitze people. The community is relatively young for the region and was established by homesteaders in the years immediately following World War II. The community became a stopping point along the Sterling Highway as it is the location of the highway bridge crossing for the Kenai River, with the retail sector forming the cornerstone of its early economy. The oil and gas discoveries of the late 1950s brought additional services and families to the community. The contemporary economy of Soldotna is focused on providing services to the oil and gas industry with other important sectors including commercial fishing, fish processing, government, agriculture, transportation, construction, and retail trade. Historically, residents of Soldotna have been involved in the primary commercial fisheries of the region, including salmon and herring throughout the twentieth century. Current residents of Soldotna involved in commercial fishing are engaged in the salmon, halibut, herring, sablefish, groundfish, shellfish, and other fisheries. As Soldotna is not adjacent to the coast, the community does not have a highly developed fishery support service sector, with more services present in nearby Kenai.

Sterling

Sterling is located approximately 18 miles east of Kenai along the Sterling Highway, near the junction of the Moose and Kenai rivers. Sterling is close to Soldotna and was (and remains) home to the Kenaitze people, who as previously noted, had summer fish camps along many of the rivers and along the shores of Cook Inlet, harvesting all five salmon species through a variety of means. Sterling developed in similar manner to Soldotna, with the settlement of homesteaders marking the origin of the community in its contemporary form in the years immediately following World War II. The community also became involved in providing services and support to the oil and gas sector at that time, with other residents involved in the predominant commercial fisheries in the area, including salmon and herring. The contemporary economy of Sterling is focused on oil and gas processing, timber, commercial fishing, government, retail, and tourism. Those current residents of Sterling involved in the commercial fishery are engaged in halibut, herring, and salmon. As Sterling is not adjacent to the coast, the community does not have a highly developed fishery support service sector, with more services present in nearby Kenai.

4.5.1.5.4. Fishery Tax Related Revenue

4.5.1.5.4.1. Tax Revenue Directly Generated by the UCI Salmon Drift Gillnet Fishery

Salmon harvested in the UCI salmon drift gillnet fishery are subject to three State of Alaska fisheries taxes listed below. The descriptions of these taxes are taken from Alaska Department of Revenue (2020), which provides additional information about resource taxes in Alaska. The first two fisheries taxes are levied as a percentage of ex-vessel value, while the third is based on first wholesale value.

- **Fisheries Business Tax**: The fisheries business tax is generally paid by the first processor of processed fish, or the exporter of unprocessed fish, based on the ex-vessel price of unprocessed fish. The rates vary depending on the type of processor, and on whether the species of fish is considered a "developing" species. Salmon species are considered established species. The key applicable rates for the species of salmon considered here are those for shorebased processors and direct marketers (3%), floating processors (5%), or salmon canneries (4.5%).

- **Seafood Marketing Assessment**: Any person processing or exporting more than $50,000 of seafood products in a calendar year is responsible for paying 0.5% of the ex-vessel value of the fish to support marketing efforts.

- **Salmon Enhancement Tax**. Salmon harvesters in a region may vote to assess themselves to support salmon enhancement programs in their regions. Assessments may vary from program to program. Assessments are collected by licensed fish buyers from CFEC permit holders when they sell their salmon. CFEC permit holders who sell to unlicensed buyers or export their fish from the aquaculture region where they were caught must pay the assessment themselves. These revenues support salmon enhancement activity in the regions within which they are collected.

Unlike multiple communities in the Western GOA and Aleutian Islands that are substantially engaged in or dependent on federally managed commercial fisheries, the communities in the Kenai Peninsula Borough do not have their own city fish taxes.[94] Nor does the Kenai Peninsula Borough have its own borough fish tax that would generate landings related revenue in addition to the shared revenue received by these entities from State fishery taxes.

Although not a tax, harvesters also pay 2.0% of the ex-vessel value of the fish to support the Cook Inlet Aquaculture Association, a non-profit organization based in Kenai, and one of eight regional aquaculture associations in Alaska (Cook Inlet Aquaculture Association 2020). The Association's programs include hatcheries that produce salmon fry, which are released in streams and lakes; construction and maintenance of salmon migration routes, referred to as "fishways;" and scientific research into salmon breeding and behavior patterns.[95]

4.5.1.5.4.2. Fishery Tax Revenue Received by Communities Engaged in the UCI Salmon Drift Gillnet Fishery

Communities engaged in the UCI salmon drift gillnet fishery receive shared fishery tax revenues under programs administered by the Alaska Department of Revenue (ADOR) and the Alaska Department of Commerce, Community, and Economic Development (DCCED). These shared revenues derive from all commercial fisheries that include landings or product transfers that occur within the State.

Table 4-28 provides an overview of the fishery tax revenue sharing program administered by ADOR. In addition, item 4 in the Fisheries Business tax program describes the fishery tax revenue sharing program administered by DCCED. As noted, the shared revenue from both the State's Fisheries Business Tax (applied to ex-vessel value of landings from vessels to processors) and Fishery Resource Landing Tax

[94] Some communities that do not have municipal raw fish taxes do charge fees related to landings. For example, Homer charges fish wharfage in its harbor, which is currently at a rate of $4.76 per straight ton regardless of species (Woodruff, personal communication, 12/8/2022).

[95] Currently, there is a single hatchery that is fully operational in Upper Cook Inlet, the Trail Lakes facility operated by Cook Inlet Aquaculture Association. The Trail Lakes hatchery is in the upper Kenai River drainage near Moose Pass (Marston and Frothingham 2019).

(applied to processed products from catcher/processors and motherships, as calculated on the estimated ex-vessel value of the resources that were input for the processed products, at the point of landing/transfer) under the program administered by ADOR are directly proportional to the total fishery tax revenue generated from landings/transfers that occur in a given community or borough.

Table 4-28 Overview of shared State fishery tax revenue received by Kenai Peninsula Borough communities engaged in the UCI salmon drift gillnet fishery and Anchorage.

Tax Program	Share Provision	Share Cycle Disbursal Date	Share Cycle Period
Fisheries Business *AS 43.75.130*	50% of fisheries business taxes are shared with the municipalities where fishery resources were processed. Taxes are shared as follows: 1) If processing occurred within an incorporated city which is not located within an organized borough, 50% of the tax collected is shared with the city. 2) If processing occurred within an incorporated city which is located within an organized borough, 25% of the tax collected is shared with the city and 25% of the tax is shared with the borough. 3) If processing occurred at a location within an organized borough but not within an incorporated city, 50% of the tax is shared with the borough. 4) If processing occurred in the unorganized borough, 50% of the tax is shared with municipalities Statewide through an allocation program administered by DCCED.	August (FY2009) September (FY2010–2014) December (FY2015–2016) October (FY2017–2019) November (FY2020-2021)	Preceding Fiscal Year
Fishery Resource Landing *AS 43.77.060*	50% of fishery resource landing taxes are shared with the municipality where fishery resources were landed. The mechanics for sharing landing taxes are the same as fisheries business taxes, except that the proration applies to boroughs incorporated after January 1, 1994.	September (FY2009–2014) December (FY2015–2016) October (FY2017–2019) November (FY2020) September (FY2021)	Preceding Fiscal Year

Source: Alaska Dept of Revenue (2022).

Table 4-29 provides eligibility and funding information for the fishery tax revenue sharing program administered by DCCED.[96] As noted, the revenue received from the program by any given community is not directly proportion to commercial fishing landings/transfers made in that community. Revenue received under both ADOR and DCCED programs is not differentiated by fishery. Consequently, it is not possible from existing data to determine the tax revenue generated specifically by the UCI salmon drift gillnet fishery (although it is known that all shared tax revenue associated with that fishery occurs in the form of Fishery Business Tax revenue). Further, aggregate tax contributions from all fisheries include salmon (and other species) caught in both Federal and State waters.

[96] As with the ADOR fishery tax revenue sharing program, there is a lag time in the DCCED program between collection of the taxes and the distribution of revenue to the municipalities. For example, tax revenue collected in the 2017 calendar year was distributed in March 2019.

Table 4-29 Description, eligibility, and funding specifications of the DCCED fishery tax revenue sharing program.

Program Description	The purpose of the Shared Fisheries Business Tax Program is to provide for an annual sharing of fish tax collected outside municipal boundaries to municipalities that can demonstrate they suffered significant effects from fisheries business activities. This program is administered separately from the State fish tax sharing program administered by ADOR, which shares fish tax revenue collected inside municipal boundaries.
Program Eligibility	To be eligible for an allocation under this program, applicants must: 1. Be a municipality (city or borough); and 2. Demonstrate the municipality suffered significant effects as a result of fisheries business activity that occurred within its respective fisheries management area(s).
Program Funding	The funding available for the program this year is equal to half the amount of State fisheries business tax revenue collected outside of municipal boundaries during a given calendar year. Program funding is allocated in two stages:
	1st Stage: Nineteen Fisheries Management Areas (FMAs) were established using existing commercial fishing area boundaries. The annual available funding is allocated among these 19 FMAs based on the pounds of fish and shellfish processed in the whole State during the preceding calendar year. For example, if an area processed 10% of all the fish and shellfish processed in the whole State during a calendar year, then that area would receive 10% of the funding available for the program the following year.
	2nd Stage: The funding available within each FMA will be allocated among the municipalities in that area based on the level of fishing industry significant effects suffered by each municipality compared to the level of effects experienced by the other municipalities in that FMA.
	Some boroughs, because of their extensive area, are included in more than one FMA. In these cases, the borough must submit a separate program application for each area.

Source: Adapted from text supplied by DCCED (personal communication, K. Phillips, October 14, 2019).

Table 4-30 shows the Fishery Business Tax revenue received from ADOR by Kenai Peninsula Borough communities engaged in the UCI salmon drift gillnet fishery from FY 2009 through FY 2021. In addition, the revenue received by the Kenai Peninsula Borough itself and Anchorage is shown. Revenue from the program varied widely across Kenai Peninsula Borough communities. Table 4-31 provides parallel information for the Fishery Business Tax program administered by DCCED. Revenue from this program was relatively evenly distributed across communities.

Table 4-30 State Fishery Business Tax shared revenue received from ADOR by Kenai Peninsula Borough communities engaged in the UCI salmon drift gillnet fishery, the Kenai Peninsula Borough, and Anchorage, FY 2009–FY 2021.

Geography	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009-2021
Homer	$93,132	$73,801	$117,556	$64,617	$37,136	$54,283	$21,004	$20,456	$43,242	$59,449	$56,729	$69,693	$65,487	$59,737
Kenai	$208,989	$148,581	$276,547	$291,597	$197,541	$289,411	$195,703	$161,515	$115,821	$126,185	$60,284	$78,289	$60,284	$170,057
Seldovia	$845	$5,249	$2,367	$150	$0	$0	$0	$0	$0	$0	$0	$0	$0	$662
Seward	$417,356	$298,316	$596,097	$519,689	$480,290	$482,543	$334,691	$280,935	$440,958	$456,144	$350,482	$179,066	$350,482	$399,004
Soldotna	$1,151	$1,049	$2,020	$1,594	$685	$1,969	$2,841	$586	$1,765	$2,775	$2,733	$3,096	$2,733	$1,923
Kenai Peninsula Borough	$740,339	$621,786	$1,004,361	$952,078	$774,646	$919,123	$629,725	$541,757	$771,171	$860,097	$635,611	$530,894	$635,611	$739,785
Anchorage	$157,650	$143,049	$119,063	$170,617	$221,337	$181,607	$202,096	$122,012	$92,250	$53,269	$126,871	$530,894	$126,871	$172,891

Source: Alaska Department of Revenue (2022).

Table 4-31 State Fishery Business Tax shared revenue received from DCCED by Kenai Peninsula Borough communities engaged in the UCI salmon drift gillnet fishery, the Kenai Peninsula Borough, and Anchorage, FY 2009–FY 2021.

Geography	2009*	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Average 2009-2021**
Homer	NA	$2,144	$3,547	$5,791	$4,206	$4,016	$3,086	$2,800	$3,450	$2,454	$2,143	$645	$525	$2,900
Kenai	NA	$4,199	$3,655	$6,029	$4,374	$4,169	$3,211	$2,910	$3,572	$2,549	$2,228	$667	$543	$3.176
Seldovia	NA	$3,645	$3,180	$5,250	$3,814	$3,638	$2,798	$2,539	$0	$2,193	$1,893	$567	$467	$2,499
Seward	NA	$3,834	$3,342	$5,528	$4,017	$3,831	$2,930	$2,675	$3,309	$2,320	$2,006	$602	$493	$2,907
Soldotna	NA	$3,950	$3,440	$5,695	$4,143	$3,950	$3,036	$2,757	$3,402	$2,409	$2,095	$628	$511	$3,001
Kenai Peninsula Borough	NA	$7,913	$6,883	$11,528	$8,388	$7,993	$6,135	$5,588	$6,530	$5,188	$4,728	$1,427	$1,119	$6,118
Anchorage	NA	$26,689	$23,340	$38,442	$27,934	$26,651	$20,531	$18,607	$20,644	$17,663	$16,473	$4,927	$3,737	$20,469

*Notes: Information for FY2009 was entered prior to the institution of DCCED's current database program and the previous database program is no longer accessible (personal communication, K. Phillips, October 8, 2019).

** Annual averages were calculated using only the years for which data are available.

NA = Data not available.

Source: Spreadsheet supplied by DCCED (personal communication, K. Phillips, November 16, 2022).

Table 4-32 provides information on annual average revenue from FY 2009–FY 2021 from shared Fishery Business Tax and Fishery Resource Landing Tax sources. The revenue received by the jurisdictions of interest from Fishery Resource Landing Tax sources is modest, ranging from less than 1% of the total shared fisheries tax revenue for Homer, Kenai, the Kenai Peninsula Borough, and Anchorage, to roughly 1, 2, and 3% of the total shared fisheries tax revenue for Seward, Soldotna, and Seldovia, respectively.

Table 4-32 Average annual State shared fisheries tax revenue received by Kenai Peninsula Borough communities engaged in the UCI salmon drift gillnet fishery, the Kenai Peninsula Borough, and Anchorage, FY 2009–FY 2021.

Tax	Agency	Homer	Kenai	Seldovia	Seward	Soldotna	Kenai Peninsula Borough	Anchorage
Fisheries Business Tax	DOR	$59,737	$170,057	$662	$399,004	$1,923	$739,785	$172,891
	DCCED*	$2,900	$3,176	$2,499	$2,907	$3,001	$6.12	$20,469
	Subtotal	**$62,638**	**$173,233**	**$3,161**	**$401,911**	**$4,924**	**$745,903**	**$193,361**
Fishery Resource Landing Tax	DOR	$248	$0	$0	$4,998	$0	$5,587	$0
	DCCED*	$112	$126	$109	$115	$119	$249	$840
	Subtotal	**$369**	**$126**	**$109**	**$5,113**	**$119**	**$5,836**	**$840**
Combined	**Total**	**$63,007**	**$173,359**	**$3,270**	**$407,024**	**$5,043**	**$751,739**	**$194,200**

*Notes: DCCED data represented in these columns are the annual average for 2010–2021 (i.e., annual averages were calculated using only the years for which data were available). Data from 2009 are not available (see note on previous table).

Source: Alaska Department of Revenue (2022) and spreadsheet supplied by DCCED (personal communication, K. Phillips, November 16, 2022).

Table 4-33 shows average annual shared fisheries tax revenue from FY 2009–FY 2021 as a percentage of annual average general fund revenue from FY 2009–FY 2021 in the jurisdictions of interest. While shared fisheries taxes represent a small portion of total revenue, these taxes may benefit local economies in a number of ways, including through smaller community sales tax or property tax assessments, among others (North Pacific Fishery Management Council 2018). Additionally, communities benefit from revenues generated by other taxes on transactions associated with other UCI salmon drift gillnet fishery related activities, including taxes applied to expenditures across a wide range of goods and services including, but not limited to, gear, fuel, provisions, vessel maintenance and repair, and the like. Beyond general fund revenues, communities may benefit from a range of special fund revenues associated with taxes or fees related to fisheries infrastructure use, such as moorage and wharfage fees, among others. Communities also benefit from tax revenues associated with the activities of fishery support service sector entities themselves, as well local spending of earnings by individuals whose incomes in whole or in part are directly or indirectly attributable to the fishing industry.

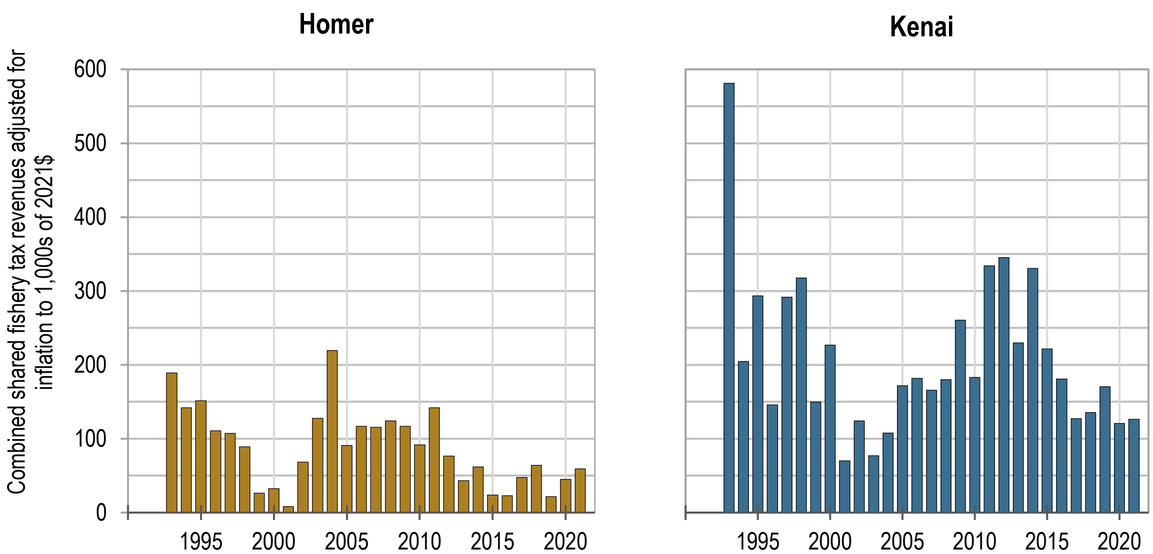
Table 4-33 Average annual shared fisheries tax revenue from FY 2009–FY 2021 as a percentage of annual average total FY 2019-2021 general fund revenue in Kenai Peninsula Borough communities engaged in the UCI salmon drift gillnet fishery and Anchorage.

Geography	2009–2021 Annual Average Shared Fishery Tax Revenue	2009–2021* Annual Average General Fund Revenue	2009–2021 Annual Average Shared Fishery Tax Revenue as a Percent of 2009–2021 Annual Average General Fund Revenue
Homer	$63,007	$13,166,702	0.5%
Kenai	$173,359	$14,513,973	1.2%
Seldovia	$3,270	$621,793	0.5%
Seward	$407,024	$11,412,133	3.6%
Soldotna	$5,043	$9,952,364	0.1%
Kenai Peninsula Borough	$751,739	$80,093,464	0.9%
Anchorage	$194,200	$653,833,714	0.03%

*Data not available for: Homer for 2009–2013, 2016, and 2021; Seldovia for 2009–2013 and 2021; Seward for 2009–2012, 2019, and 2021; Soldotna for 2009–2013 and 2020; KPB for 2009–2013, 2017, and 2021; and Anchorage for 2021. Annual averages were calculated using only the years for which data were available.
Source: Fishery tax revenue from the previous table. General fund revenue from audited annual financial reports, DCCED (2022).

Figure 4-41 illustrates long-term trends in the shared fisheries tax revenue received by Homer and Kenai.

Figure 4-41 Shared fishery tax revenue received by Homer and Kenai, 1993–2021.



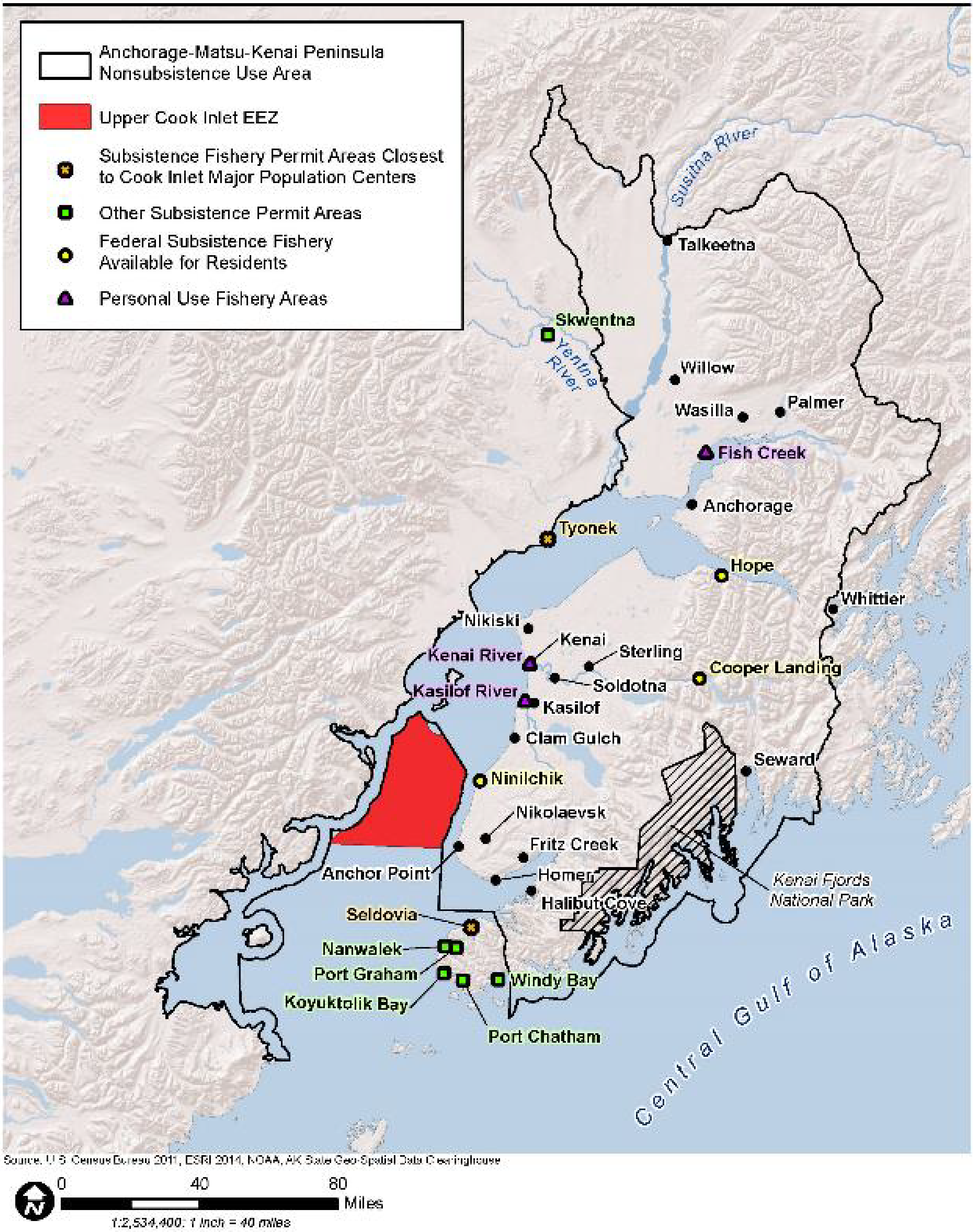
Source: Developed by Northern Economics using data from Alaska Department of Revenue (2022).

4.5.1.5.5. Community Engagement in Subsistence and Personal Use Salmon Fisheries in or near Upper Cook Inlet

Most of the waters of the ADF&G Cook Inlet Management Area are within the Anchorage-Matsu-Kenai Peninsula Nonsubsistence Use Area as established by the Alaska Joint Board of Fisheries and Game (5 AAC 99.015 (3)). Because subsistence fisheries are not permitted within nonsubsistence use areas, noncommercial harvesting opportunities occur under State sport, personal use, and educational fishing regulations (as well as limited opportunity under Federal regulations). Commercial harvesters may retain finfish from their lawfully taken commercial catch for home use ("home pack"). These fish are required to be reported on commercial fish tickets rather than on the subsistence salmon permit or personal use permit (Fall 2019).

Figure 4-42 shows the location of the Anchorage-Matsu-Kenai Peninsula Nonsubsistence Use Area relative to the location of the Cook Inlet EEZ. The Cook Inlet EEZ is outside of, but adjacent to, the nonsubsistence use area. Also shown in the figure are communities that were engaged in or dependent on the commercial UCI salmon drift gillnet fishery from 2009–2021; communities that are otherwise in or near subsistence salmon fishery permit areas or personal use fishery areas (or both); and communities where Federal subsistence salmon permits are available to residents.

Figure 4-42 Map of the subsistence and personal use salmon fishery areas in or near Upper Cook Inlet.



Source: Developed by Wislow Research using data from https://www.adfg.alaska.gov/index.cfm?adfg=subsistence.nonsub_detail&area=Anchorage.

In two instances (Seldovia and Port Graham), communities identified as engaged in or dependent on the commercial UCI salmon drift gillnet fishery from 2009–2021 are immediately adjacent to State subsistence salmon fishery permit areas.[97] Both of these communities are located to the southeast of the Cook Inlet EEZ, near the southwestern tip of the Kenai Peninsula and outside of the Anchorage-Matsu-Kenai Peninsula Nonsubsistence Use Area.[98] Additional subsistence salmon fishery permit areas shown on Figure 4-42 (but farther removed from the Cook Inlet EEZ) include the Tyonek permit area, which is located in waters adjacent to lands owned by the Native Village of Tyonek, and the Yentna fish wheel fishery permit area, located on the Yentna River upstream of the nonsubsistence use area boundary in the vicinity of the community of Skwentna.[99] Neither Tyonek nor Skwentna was identified as a community engaged in or dependent on the UCI salmon drift gillnet fishery from 2009–2021. Additional information on State permitted subsistence fisheries in the region (as well as educational fisheries in the region, which in the Central District of Upper Cook Inlet include permits held by eight groups including multiple Alaska Native entities, such as the Kenaitze Tribal Group, the Ninilchik Traditional Council, Ninilchik Native Descendants, and the Southcentral Foundation) is provided in Section 4.6.4.1.[100]

Federal subsistence salmon permits are available to the residents of one community (Ninilchik) identified as engaged in or dependent on the commercial UCI salmon drift gillnet fishery from 2009–2021 that is located within the Anchorage-Matsu-Kenai Peninsula Nonsubsistence Use Area. Federal subsistence fishery permits are also available to residents of two other communities located within the same nonsubsistence use area (Hope and Cooper Landing), but neither was identified as engaged in or dependent on the UCI salmon drift gillnet fishery from 2009–2021.[101] Additional information on Federal subsistence fisheries in the region is provided in Section 4.6.4.2.

Two other communities (Kenai and Kasilof) identified as engaged in or dependent on the commercial UCI salmon drift gillnet fishery from 2009–2021 are adjacent to personal use salmon fishery areas encompassing three personal use fisheries (the Kenai River dip net fishery, the Kasilof River dip net fishery, and the Kasilof River set gillnet fishery). A fourth personal use salmon fishery area in the region, at Fish Creek on the northwestern shore of Knik Arm (the Fish Creek dip net fishery), is located roughly equidistant (approximately 15 miles) from two communities (Anchorage and Wasilla) identified as engaged in or dependent on the commercial UCI salmon drift gillnet fishery. All four of these communities are located within the Anchorage-Matsu-Kenai Peninsula Nonsubsistence Use Area.[102] Additional information on personal use fisheries is provided in Section 4.6.3.

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[97] The predominantly Alaska Native community of Nanwalek, which was not identified as engaged in or dependent on the UCI salmon drift gillnet fishery from 2009–2021, is in the Port Graham subdistrict subsistence permit area.

[98] There are three other subdistrict subsistence fishery permit areas near the southwestern tip of the Kenai Peninsula, outside of the Anchorage-Matsu-Kenai Peninsula Nonsubsistence Use Area. The Koyuktolik (Dogfish) Bay, Port Chatham, and Windy Bay subsistence permit areas, unlike the Port Graham subsistence permit area, are not adjacent to contemporary communities. The fisheries for the Port Graham, Koyuktolik Bay, Port Chatham, and Windy Bay subdistricts are all under one permit issued by ADF&G; the fishery in the Seldovia area is under a separate permit, also issued by ADF&G.

[99] Specifically, it is located in the mainstem of the Yentna River from its confluence with Martin Creek upstream to its confluence with the Skwentna River. The subsistence fish wheel fishery began in 1996 as a personal use fishery and was reclassified as a subsistence fishery by the Joint Board of Fisheries and Game in 1998 (Fall 2019).

[100] As also noted in that same section, in the Northern District of Cook Inlet, farther removed from the Upper Cook Inlet EEZ area, permits for educational fisheries are held by seven groups. These include Alaska Native entities such as the Knik Tribal Council, the Native Village of Eklutna, the Native Village of Tyonek (Tyonek Subsistence Camp), Intertribal Native Leadership, and Chickaloon Native Village.

[101] Since 2007, Federal regulations allow for the harvest of salmon, trout, and Dolly Varden by residents of Cooper Landing, Hope, and Ninilchik in the Kenai National Wildlife Refuge and Chugach National Forest (Fall 2019).

[102] A fifth personal use fishery, the Beluga River Personal Use Salmon Fishery, occurs within the Beluga River upstream from the northwestern shore of Cook Inlet, roughly ten miles northeast of Tyonek. As it is limited to Alaska residents 60 years or older, it is not further considered in this section.

4.5.1.6. Target Products and Markets

One of the most important fisheries that helped shape the history of Alaska is the Cook Inlet commercial salmon fishery (Sechrist and Rutz 2014). Since the end of the nineteenth century, the Kenai Peninsula has seen a history of salmon canneries and buying stations. During the early 1900s thousands of salmon were harvested primarily by fish traps, sent off to the canneries, packed, and shipped to the Lower 48 States.[103] Cook Inlet salmon harvests plummeted in the 1940s due to overfishing, but the stocks gradually recovered after the State of Alaska took management control of its salmon resources soon after Statehood in 1959. By the 1980s commercial harvests were at or near record levels (Sechrist and Rutz 2014).

However, during the late 1990s rapid and sustained growth in world farmed salmon production fundamentally transformed world salmon markets with respect to total supply, prices, products, timing of production, quality standards, and organization of the industry (Knapp et al. 2007). These factors led to a marked reduction in the prices paid for wild-caught salmon (Figure 4-22), forcing many fishermen in Cook Inlet commercial salmon fisheries to both search for markets where they could receive higher prices for their catches and to change the way they handled their fish at the time of catch (Shields and Dupuis 2012).

In the early 2000s a brand marketing program for Cook Inlet sockeye salmon was implemented as a way to add value and name recognition to the salmon, and thereby spur demand for the product in the face of domestic market gluts caused by farm-raised salmon. Under this regional branding effort, sockeye salmon caught in Cook Inlet that met quality standards were marketed with the “Kenai Wild” brand. Third party quality assurance inspectors were contracted for the purpose of maintaining defined quality standards for the program (Knapp et al. 2007). Within a few years the program was supported by about 250 fishermen and four processors. To fund the program, participating processors assessed a per-pound tax on fish certified under program standards. In addition, support from the State came via the salmon revitalization program, which funded purchases of ice machines and insulated totes (Roeske 2007).

The regional marketing effort was eventually terminated for a number of reasons, the major one being harvesters and processors did not necessarily receive—or perceive—any immediate benefits in higher prices to compensate for the additional operational costs the program imposed (Knapp et al. 2007). However, the commercial salmon fishing industry in Cook Inlet has continued to emphasize quality of the final product. According to United Cook Inlet Drift Association (2015), salmon commercially harvested in Cook Inlet occupy a unique and preferred market status due to their larger size and high quality. Fishermen handle the fish utilizing bleeding techniques, icing and slush icing, refrigerated sea water, and smaller brailer bags. After being delivered promptly to processors/buyers, most of the fish are quickly processed and shipped to markets.

Currently, the majority of salmon products originating from the UCI drift gillnet fishery are transported to markets in the lower 48 States by sea, air, and road (United Cook Inlet Drift Association 2015).[104] Fresh salmon is available during harvest and shipped as fillets or head-and-gutted product, while frozen salmon is available year-round in a variety of packaging and product forms. Fresh and smoked fillets add the most value to Alaska salmon products (McDowell Group 2015). Some processors also produce salted salmon roe prepared in skeins (*sujiko*) and salted salmon roe separated from skeins (*ikura*). Japan is the

[103] Several gear types were used during the early decades of the fishery, including drift gillnets, but fish traps were the favored gear because they allowed canneries to maximize yield while minimizing labor and equipment costs (Petterson and Glazier 2004).

[104] Seafood can be trucked from Alaska communities directly to wholesale and retail customers in the lower 48 States. Driving around-the-clock with two drivers allows a shipment of seafood to arrive in Seattle in approximately two days or Chicago in less than three days (McDowell Group 2015).

primary market for these roe products, although they are also consumed in South Korea and other niche markets (McDowell Group 2017a).

Markets for these products have been bolstered by Marine Stewardship Council (MSC) certification of the UCI salmon drift gillnet fishery and other Alaska salmon fisheries as "well managed and sustainable" (Marine Stewardship Council 2020).[105] The State's salmon fisheries originally received the MSC label in 2000, when they were the first U.S. fisheries to achieve MSC certification (Marine Stewardship Council 2014). The Alaska salmon fishing industry's early commitment to third-party certification has reaped benefits in the form of price premiums and a secure position in the rapidly expanding market for "eco-labeled" seafood products. With more than 360 MSC-labeled Alaska salmon products on the market, the Alaska salmon fisheries produce more products bearing the MSC label than any other MSC-certified fishery. Moreover, Alaska salmon products are the most widely distributed products certified under the MSC program, with markets in 21 countries (Marine Stewardship Council 2014).

The emphasis on quality and sustainability has played an important role in an increase in the price that Cook Inlet commercial salmon fishermen receive from marketing their own catch as well as from selling to shorebased processors (Shields and Dupuis 2012). Direct marketing emerged in Cook Inlet commercial salmon fisheries on a significant scale in the 2000s. With direct marketing, fishermen sell their product directly to the consumer either at the dock, over the Internet, or by subscription. It also includes fishermen selling their product to food service operators and retailers, who in turn sell it to the ultimate consumer (UC Santa Barbara 2014).

The early efforts of Cook Inlet commercial salmon fishermen to market their own catch was supported by the concurrent rise of independent (non-processor-owned) docks providing services to any fisherman requesting them. Prior to the development of these docks, it was difficult for fishermen to be independent of the processors to whom they sold their fish (Anonymous 2005).[106] In addition, beginning in 2005, ADOR initiated a specific fisheries business license type, called a direct marketing license, which allowed fishermen to sell their fish to anyone without restriction (Hutter 2016b).[107]

However, a direct marketing license itself does not allow a fisherman to process fish themselves—to do that they have to apply to the Alaska Department of Environmental Conservation for a seafood processor permit. Otherwise, to process their fish they must have it custom-processed in a permitted processing facility (Alaska Department of Environmental Conservation 2020). Another option for fishermen is to obtain a catcher-seller permit from ADF&G that allows them to sell their catch directly off their vessel without processing (Hutter 2016a).[108]

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105 The London-based MSC is a non-profit, non-governmental, international organization established to promote sustainable fisheries and responsible fishing practices worldwide. The MSC has developed a globally recognized sustainability label for seafood products from certified fisheries.

106 As discussed in section 4.5.4.1, the ability of Cook Inlet commercial salmon fishermen to market their own catch is also facilitated by the Kenai Peninsula's extensive road system and its proximity to the Anchorage/Mat-Su region. Harvesters in the Cook Inlet. salmon set gillnet fishery may be more likely to sell their own catch that those in the drift gillnet fishery because they operate closer to shore and have greater road access (Berger 2020).

107 The minimum qualifications for a fisherman to become a direct marketer are that the vessel responsible for the harvesting must not exceed 65 ft in length; the boat must be U.S. Coast Guard registered; the fisherman must operate as a sole-proprietorship; and the fisherman must have a CFEC permit (Hutter 2016b). Fishermen who sell their catch in the Kenai Peninsula Borough must register with the borough to charge a sales tax.

108 A "catcher-seller" is defined in 5 AAC 39.130(k) as a "commercial fisherman who sells or attempts to sell unprocessed fish that were legally harvested by the catcher-seller." These fish may be sold 1) to the general public for use for noncommercial purposes; 2) for use as bait for commercial or noncommercial purposes; 3) to restaurants, grocery stores, and established fish markets; or 4) by shipping the fish to a licensed buyer, processor, or exporter within the State. A catcher-seller permit is associated with the individual, and not a particular vessel or fishery,

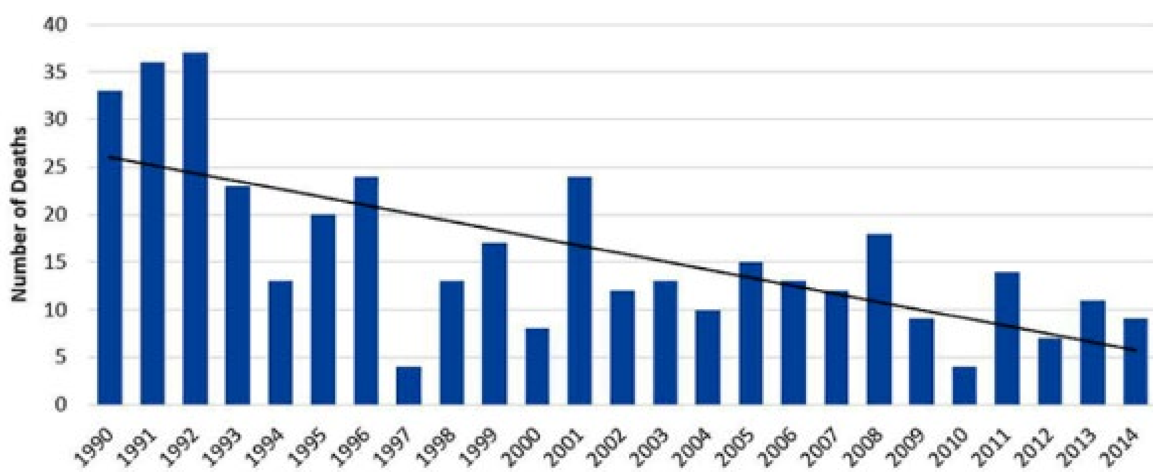
A major benefit of marketing one's own catch is the ability to bypass middlemen (processors, wholesalers, etc.). Fishermen with a direct marketing license or catcher-seller permit can cater to niche markets with their small-scale operations, high value product, and compelling stories (Alaska Department of Commerce, Community, and Economic Development 2020b). However, as shown in Table 4-11, the number of harvesters in the UCI salmon drift gillnet fishery who obtained and used a direct marketing license or catch-seller permit fluctuated from 2009–2021, with the combined total peaking at 18 in 2015 before falling to a low of 8 in 2021. Johnson (2018) notes that fishermen potentially face a number of impediments when trying to market their own fish, including remote fishing locations that lack transportation access; lack of refrigeration and other product handling facilities; lack of willing, skilled, and affordable help; lack of experience in, or dislike of, business management and bookkeeping; and a shortage of startup and operating capital.

4.5.1.7. Safety Considerations

Alaska's commercial fishermen work in one of the world's harshest environments and experience conditions that have a strong impact on their safety. One-third (399) of all work-related deaths that took place in Alaska during 1990–2014 occurred in the fishing industry (Centers for Disease Control and Prevention 2017). The turbulent rip tides of Cook Inlet discussed in Section 4.5.1.2.1 can create especially challenging fishing conditions. Cook Inlet has one of the world's largest tidal ranges, sometimes reaching 35 ft. Currents can reach seven and eight knots, and wind waves are characteristically steep (Glazier et al. 2006).

While commercial fishing remains a high-risk occupation, the number of fishing fatalities due to traumatic injury in Alaska has decreased by 73% since the early 1990s (Figure 4-43).[109] Safety improvements in Alaska occurred as a result of a combination of activities, including safety regulations and fishery-specific interventions focusing on unique hazards of each fishery (Centers for Disease Control and Prevention 2017).

Figure 4-43 Alaska commercial fishing fatalities, 1990–2014.



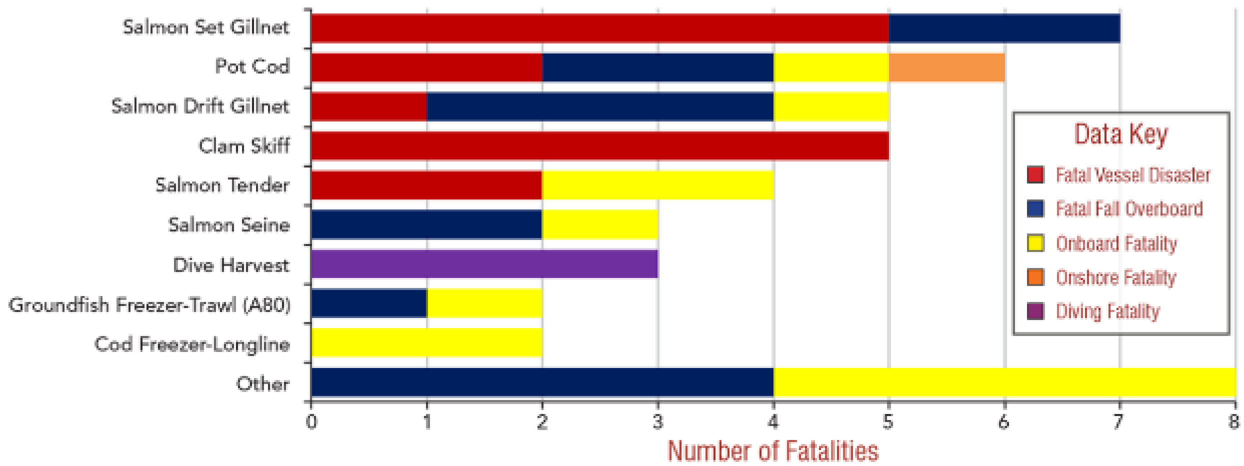
Source: Centers for Disease Control and Prevention (2017).

meaning one catcher-seller permit covers all activities for that fisherman, provided that they have a CFEC permit. Crewmembers are not eligible for a catcher-seller permit (Hutter 2016a).

109 From 2000-2014, there were no overall trends in fatality rates for most Alaska fleets, except for the halibut/sablefish longline and Bering Sea crab fleets, which experienced significant decreases in their fatality rates (National Institute for Occupational Safety and Health 2017).

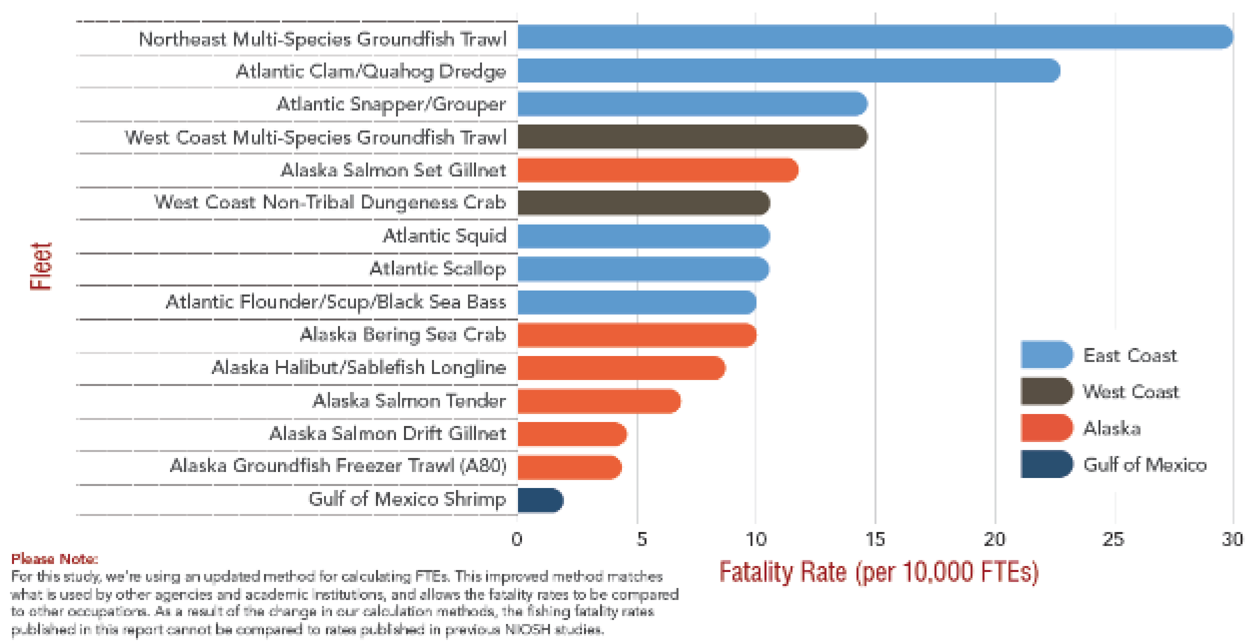
From 2010–2014, the fatality rates in Alaska's salmon set gillnet fleets and salmon drift gillnet fleets were among the highest of any of the State's commercial fishing fleets (Figure 4-44). Salmon drift gillnet fleets experienced five deaths from 2000–2014; one crewmember died during a vessel disaster, one fatality occurred on board, and three crewmembers died after falling overboard. None of the crewmembers were wearing a personal flotation device when they drowned (National Institute for Occupational Safety and Health 2017). As shown in Figure 4-45, however, the fatality rate in Alaska's salmon drift gillnet fleets from 2005–2014 was lower than that of several other U.S. commercial fishing fleets whose fatality rates were calculated for that time period.

Figure 4-44 Alaska commercial fishing fatalities in Alaska by fleet, 2010–2014.



Source: National Institute for Occupational Safety and Health (2017).

Figure 4-45 U.S. commercial fishing fatality rates by fleet, 2005–2014.



Source: National Institute for Occupational Safety and Health (2017).

As described in North Pacific Fishery Management Council (2018), the BOF addresses specific fishery safety issues disclosed through its public process. The Board modifies its regulations, as necessary, in order to increase safety and minimize risk of injury or death for all fishery participants. In addition, ADF&G promotes safety whenever possible in its salmon fisheries through management practices, support in the regulation formation process, and through assistance to enforcement agencies. Examples of safety supported through management practices include daytime openings, when possible, of salmon fisheries by EO allowing fishermen to harvest and deliver fish during daylight hours; and delays in opening weekly fishing periods when severe weather is forecast and extending fishing time after severe weather thereby encouraging fishermen to seek shelter and still be able to fish when the weather moderates. An example of safety supported through regulation includes limits on salmon net length and size, which moderate harvest levels to manageable quantities that are safer for fishermen to handle. Additionally, ADF&G promotes safety through direct assistance to enforcement agencies. ADF&G provides information on harvest patterns, fishing effort, and lists of registered vessels to NMFS, the U.S. Coast Guard, and the Alaska Department of Public Safety, Division of Alaska Wildlife Troopers. This allows these enforcement agencies to focus efforts in areas where the fishing fleets are concentrated, thus providing on-scene presence of enforcement personnel, vessels, and aircraft, which provides expedited reaction times when accidents occur (North Pacific Fishery Management Council 2018).

4.5.2. Description of the Upper Cook Inlet Saltwater Sport Fishery

Aside from the drift gillnet fishery, the only other fishery harvesting salmon inside the UCI EEZ is the saltwater recreational (sport) fishery. This section describes the saltwater sport fishery and includes sections on management and harvest.

4.5.2.1. Management of Sport Fisheries for Both Saltwater and Freshwater

The ADF&G Division of Sport Fisheries manages the State's sport fisheries. Alaska statute defines sport fishing as the taking of or attempting to take for personal use, and not for sale or barter, any fresh water, marine, or anadromous fish, by hook-and-line held in the hand, or by hook-and-line with the line attached to a pole or rod that is held in the hand or closely attended, or by other means defined by the BOF (AS 16.05. 940(31)). The Division's mission is to protect and improve the State's recreational fisheries resources. An ADF&G sport fishing license is required for all resident anglers 18 and older and nonresident anglers 16 and older to fish in all fresh and salt waters of Alaska. Chinook salmon are a prized fish in Alaska's sport fisheries, and most anglers fishing for sea-run Chinook salmon must have purchased (and have in their possession) a current year's Chinook salmon stamp. Further information on State management of sport fisheries can be found on the ADF&G website: www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main.

Data for both saltwater and freshwater sportfish harvests are collected by ADF&G using the annual Alaska Sport Fishing Harvest Survey (SFHS)—a mailout survey of a subset of all sportfish license holders each year, and through logbook data submitted by sport-fishing guides.

The SFHS is a sample-based survey of households of licensed anglers. In 2017, 47,000 households were mailed surveys and a total of 16,181 response were received (Romberg 2021). The SFHS has been generally viewed as a reliable source of data on sport harvests and ADF&G indicates that its objective is to "estimate participation, catch, and harvest for Alaska sport-caught species statewide, by area, and by fishery, such that statewide estimates of participation and harvest would be within 15% of actual values 95% of the time."

For saltwater harvests in Cook Inlet, the SFHS collects data for several areas in within Cook Inlet including "the area north of Bluff Point", which contains the entirety of the "Upper Cook Inlet" as defined for this regulatory action, plus an additional area (approximately 6 × 35 nautical miles) that lies between the Anchor Point Line and the Bluff Point Line as shown in Figure 4-46. According to ADF&G staff (Reimer 2023) the area between the Anchor Point Line and the Bluff Point Line has substantial amounts of fishing effort, and therefore the SFHS—if unadjusted—substantially overstates the actual saltwater harvest amounts within the Upper Cook Inlet.

Logbook data are a second source that can be used to estimate salmon harvests in Upper Cook Inlet. As per Alaska Fish and Game Law and Regulations (5 AAC 75.075I), the ADF&G Division of Sport Fish is also responsible for overseeing the annual registration of sport fish businesses and guides. A “sport fishing guide” means a person who provides sport fishing guide services to persons who are engaged in sport fishing (5 AAC 75.995(41)). “Sport fishing guide services” means assistance, for compensation or with the intent to receive compensation, to a sport fisherman to take or to attempt to take fish by accompanying or physically directing the sport fisherman in sport fishing activities during any part of a sport fishing trip. Salmon is one of the primary fish targeted in the State’s sport fishing guide industry.[110] Because guided vessel-based harvests of salmon are required by law to be reported on the day of the harvest by a third party (i.e. the guide), they are less likely to be subject to recall bias and statistical inference errors that are inherent in estimates of sportfish harvests generated in the SFHS.

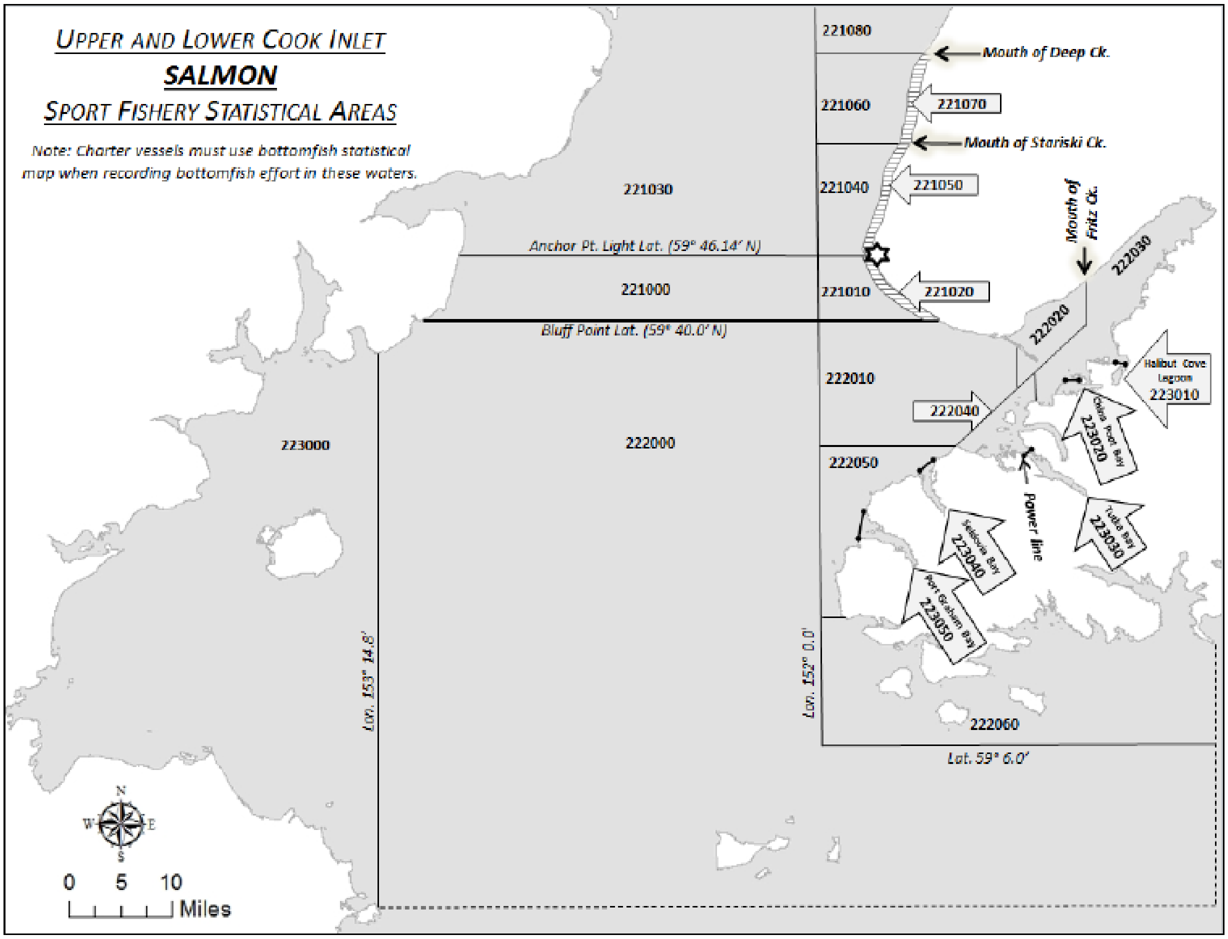
Figure 4-46 shows the logbook reporting areas that have been used since 2015. These areas clearly show the demarcation between the Anchor Point Line and the Bluff Point Line. Note that logbook statistical areas 221000, 221010, and 221020 comprise the entire area between Bluff Point and Anchor Point, while areas to the north and to the south use their own distinct set of statistical areas. Therefore, it is believed that charter logbook data can be combined with SFHS data to generate more reliable estimates of vessel-based saltwater salmon harvests.[111, 112]

[110] For further information on professional licenses for sportfish guides, refer to the ADF&G website at https://www.adfg.alaska.gov/index.cfm?adfg=SFGuidesLicense.main.

[111] Prior to 2015 (i.e., from 2004–2014) the reporting areas used in logbook reports used in Cook Inlet did not fully distinguish between harvests north of the Anchor Point Line, harvests south of the Bluff Point Line and harvest between Bluff Point and Anchor Point.

[112] Logbook reporting was also required of freshwater guides, but the requirement was rescinded on May 19, 2019.

Figure 4-46 Salmon Statistical Area for Charter Logbook Reporting in Upper and Lower Cook Inlet.



Source: Excerpted directly from Booz et al. (2019).**Estimates of Saltwater Sportfish Salmon Harvests in the Upper Cook Inlet**

Because of the mismatch of reporting areas between the SFHS and the UCI as defined in this EA/RIR, estimates of vessel-based saltwater sportfish harvests from the SFHS are adjusted downward. The process used to estimate saltwater guided vessel-based harvests of salmon in the UCI and more particularly in the EEZ of the UCI is described in Appendix 16 and was developed by ADF&G's Sport Fish Division (Reimer 2023). Unguided vessel-based harvests were estimated by Northern Economics based on methods and data provided by ADF&G in Appendix 16, and discussions with ADF&G staff (Reimer 2023). The process which is described below relies heavily on harvest estimates from logbook data from charter harvests in Cook Inlet from 2015–2021 and combines harvests of chum and pink salmon as "other salmon".

1) Using logbook data, estimate annual saltwater harvests of guided vessel-based caught chinook, coho, sockeye, and other salmon in all statistical areas north of the Anchor Point Line—the area that corresponds to the Upper Cook Inlet as defined in this analysis. This is assumed to equal the actual harvests of guided vessel-based salmon by year and species in the UCI.

2) Obtain saltwater harvest estimates from the SFHS by year, species and activity type where activity types are defined as: i) guided vessel-based, ii) unguided vessel-based and iii) unguided shoreline.

3) Calculate the ratio of logbook harvests north of Anchor Point relative to SFHS estimates of guided vessel-based harvests north of Bluff Point. It is assumed that this ratio is equal to the ratio of actual unguided vessel-based harvests relative to unguided vessel-based harvests estimated in the SFHS.

4) Multiply the ratio in #3 by SFHS estimates of unguided vessel-based harvests north of Bluff Point. This is assumed to equal the adjusted estimate of unguided vessel-based harvest in the UCI.

There does not appear to be a reliable means to adjust estimates of saltwater shoreline harvests given the difference in vessel-based methods, access to deeper waters and differences in shore-based fishing methods. It is also noted that due to the lack of road access and relatively shallow waters, shoreline harvests in saltwater between the Anchor Point Line and the Bluff Point Line are assumed to be zero, and therefore estimates of shoreline harvests do not need to be adjusted to account for the differences between reporting areas.[113]

Table 4-34 Estimates of Saltwater Sportfish Salmon Harvests in the UCI by Activity Type, 2015 –2021

Year	Angler Type	Chinook	Coho	Sockeye	Other	Total
Guided Vessel-Based Harvests						
2015	Guided Vessel-Based	816	101	1	57	975
2016	Guided Vessel-Based	593	57	2	15	667
2017	Guided Vessel-Based	784	82	4	51	921
2018	Guided Vessel-Based	569	53	1	12	635
2019	Guided Vessel-Based	398	62	7	47	514
2020	Guided Vessel-Based	293	8	1	11	313
2021	Guided Vessel-Based	387	3	0	2	392
Unguided Vessel-Based Harvests						
2015	Unguided Vessel-Based	681	41	1	57	780
2016	Unguided Vessel-Based	544	42	3	26	615
2017	Unguided Vessel-Based	806	34	6	54	900
2018	Unguided Vessel-Based	1,089	27	1	29	1,145
2019	Unguided Vessel-Based	233	27	15	9	284
2020	Unguided Vessel-Based	609	7	1	6	623
2021	Unguided Vessel-Based	223	1	0	1	225
Shoreline Harvests						
2015	Shoreline	69	427	463	104	1,063
2016	Shoreline	167	136	348	593	1,244
2017	Shoreline	21	87	703	47	858
2018	Shoreline	0	800	151	0	951
2019	Shoreline	35	179	363	0	577
2020	Shoreline	48	94	299	44	485
2021	Shoreline	32	659	546	431	1,668
All Sportfish Harvests						
2015	All Sportfish Harvests	1,566	569	465	218	2,818
2016	All Sportfish Harvests	1,304	235	353	634	2,526
2017	All Sportfish Harvests	1,611	203	713	152	2,679
2018	All Sportfish Harvests	1,658	880	153	41	2,731
2019	All Sportfish Harvests	666	268	385	56	1,375
2020	All Sportfish Harvests	950	109	301	61	1,421
2021	All Sportfish Harvests	642	663	546	434	2,285

Note: Guided vessel-based and unguided vessel-based harvest estimates have been adjusted based on logbook data as described above. Shoreline harvests have not been adjusted from estimate provided in the SFHS.
Sources: Guided vessel-based harvests were developed by Reimer (2023), Unguided vessel-based estimates were developed by Northern Economics. Shoreline harvests are taken directly from the SFHS.

Estimates of vessel-based harvests in the EEZ of Upper Cook Inlet were developed by staff of ADF&G's Sport Fish Division using the methodology described in Appendix 16. These estimates reproduced in Table 4-35. Percentages of harvests by species in the Upper Cook Inlet that are estimated to have occurred in the EEZ are shown in Table 4-36.

[113] Estimates of saltwater shoreline harvests of salmon as reported in the SFHS were 10.3% of all saltwater harvests north of Bluff Point as reported in the SFHS.

Table 4-35 Estimates of saltwater sportfish salmon in the EEZ of Upper Cook Inlet, 2015 –2021

Year	2015	2016	2017	2018	2019	2020	2021
Chinook	59	60	71	125	28	36	30
Coho	15	3	13	12	5	0	0
Sockeye	0	0	0	0	3	0	0
Total	**74**	**63**	**84**	**137**	**36**	**36**	**30**

Source: Reimer (2023)

Table 4-36 Estimated percentages of all UCI harvest by species that were taken in the EEZ, 2015–2021

Year	2015	2016	2017	2018	2019	2020	2021
Chinook	3.8%	4.6%	4.4%	7.5%	4.2%	3.8%	4.7%
Coho	2.6%	1.3%	6.4%	1.4%	1.9%	0.0%	0.0%
Sockeye	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%

Source: Developed by Northern Economics using data from Reimer (2023).

4.5.2.1.1. Guided fishery participation and harvests

This section provides a more in-depth examination of guided saltwater fishery in the Upper Cook Inlet for the years 2015–2021. Data for this section were provided by special request from ADG&G's Sport Fish Division and are based entirely on logbook data. The following definitions are used:

- Upper Cook Inlet: All saltwater areas north of the Anchor Point Line including the following salmon statistical areas from Figure 4-46; 221030, 221040, 221050, 221060, 221070, and 221080.
- Salmon Trip: Any guided trip in saltwater in which fishing for salmon was undertaken regardless of whether other species were targeted, and regardless of the numbers of salmon harvested.
- Salmon Only Trip: Any salmon trip in which fishing for salmon was the only activity.
- Non-Salmon Trips: Any guided trip in saltwater in which fishing for salmon did not occur.
- Guide Pool: the Guide Pool is determined annually as all licensed guides with at least one salmon trip within the UCI during the year.

Table 4-37 provides the number of guides in the Upper Cook Inlet Salmon guide pool by year. The "Guide Pool" is defined annually for this analysis as all guides that had at least one salmon trip during the year in the Upper Cook Inlet (i.e., north of the Anchor Point Line) from 2015–2021. A "salmon trip" is any guided trip during which any effort for salmon was reported in the logbook regardless of whether any salmon were caught. The number of guides in the pool each non-pandemic year has varied from the low seventies to the low 90s. The number of guides taking non-salmon trips has historically been more than double the number of salmon only trips. However, the numbers of guides taking non-salmon versus only salmon trips in other saltwater areas tend to be more equally distributed. Unfortunately, freshwater guided trip information is not available at this time.

Table 4-37 Number of Guides in the Upper Cook Inlet Salmon Guide Pool by Year (2015–2021).

Year	2015	2016	2017	2018	2019	2020	2021
Total Number of guides in the Guide Pool by Year	86	87	91	78	73	36	65
Guides with Non-Salmon Trips in the UCI	75	71	81	73	64	35	61
Guides with Salmon Only Trips in the UCI.	26	21	37	43	31	19	24
Guides with Salmon Trips in Other Saltwater Areas	61	58	71	57	56	32	48
Guides with Non-Salmon Trips in Other Saltwater Areas	48	56	56	54	50	29	45

Source: Reimer (2023).

Table 4-38 provides information on the types of trip guide pool members have taken by year. Non-salmon trips in the charter non-salmon UCI are the dominant trip type; however, the numbers of these trips taken has declined over time, likely due to more restrictive management and also due to the pandemic. Similar patterns have occurred in the other trip categories. Also evident is that charter trips, in most categories, have more than doubled from 2020 to 2021 as the pandemic has eased.

Table 4-38 Numbers of Trips of Upper Cook Inlet Guide Pool Members by Trip Type and Year (2015–2021).

Year	2015	2016	2017	2018	2019	2020	2021
Salmon Trips in the UCI	655	554	648	474	431	186	393
Salmon-Only Trips in the UCI	49	48	76	57	45	9	9
Non-Salmon Trips in the UCI	2308	1949	2104	2132	1754	1065	1996
Salmon Trips in Other Saltwater Areas	1032	1234	904	576	753	261	622
Non-Salmon Trips in Other Saltwater Areas	382	683	480	505	304	202	406
Non-member Non-Salmon Trips in the UCI	743	875	713	924	1126	1057	1523

Note: By definition there could be no salmon trips in the UCI by guides that are not part of the guide pool.
Source: Reimer (2023).

Table 4-39 provides the numbers of angler days in the UCI by trip type and year and broken out by resident and non-resident anglers. It is apparent that non-resident angler days in the guide pool non-salmon category is the dominant trip type followed by non-resident days in the non-salmon, non-pool member, category. Within the resident angler categories, non-salmon guide pool trips dominate and are followed by resident non-salmon trips with non-pool guides. In general, resident and non-resident angler days taken on salmon-only trips have been substantially fewer than taken on non-salmon trips.

Table 4-39 Numbers of Resident and Non-resident Angler-Days in the Upper Cook Inlet by Trip Type and Year (2015–2021)

Year	2015	2016	2017	2018	2019	2020	2021
Resident Angler-Days on guided trips in the UCI.	901	800	907	739	631	672	773
Non-Resident Angler-Days on guided trips in the UCI	2,106	1,750	2,082	1,488	1,398	220	1,213
Resident Angler-Days on guided Salmon-only trips in the UCI	38	13	61	32	22	16	13
Non-Resident Angler-Days on guided Salmon-only trips in the UCI	190	188	277	223	149	13	27
Resident Angler-Days on Non-Salmon trips with Guide Pool Members in the Charter not in the UCI	2,718	2,161	2,047	1,924	1,640	2,430	2,226
Non-Resident Angler-Days on Non-Salmon trips with Guide Pool Members in the in the UCI	10,084	87,13	9,649	10,010	7,993	3,434	9,141
Resident Angler-Days on Non-Salmon trips with guides that are **not Guide Pool Members** in the UCI	836	787	807	756	940	1,808	1,702
Non-Resident Angler-Days on Non-Salmon trips with guides that are **not Guide Pool Members** in the UCI	3,213	4,212	3,948	4,796	5,811	4,223	9,261

Source: Reimer (2023).

Table 4-40 provides the numbers of salmon kept, by species, on guide pool salmon trips in the UCI by year. Large King salmon kept by non-resident anglers dominates the retained salmon catch, followed by resident angler large King salmon retention. Coho salmon retained by non-resident anglers has historically been the next largest category; however, coho retention in this category dropped off precipitously in 2020 and remained unusually low in 2021. Small King salmon retention by non-residents and residents are the next largest categories of retained catch, respectively. Sockeye and other salmon (chum and pink) represent the small remainder of retained catch in the guided UCI salmon fishery.

Table 4-40 Numbers of Salmon Kept by Species in Guide Pool Salmon Trips in the Upper Cook Inlet by Year (2015–2021)

Species	2015	2016	2017	2018	2019	2020	2021
Large King Salmon kept by Resident Anglers on Guided Trips	246	131	188	143	89	231	103
Large King Salmon Kept by Non-Resident Anglers on Guided Trips	460	400	548	329	253	40	218
Small King Salmon Kept by Resident Anglers on Guided Trips	31	17	20	35	8	19	28
Small King Salmon Kept by Non-Resident Anglers on Guided Trips	79	45	28	62	48	3	38
Coho Salmon Kept by Resident Anglers on Guided Trips	4	0	4	1	0	2	0
Coho Salmon Kept by Non-Resident Anglers on Guided Trips	97	57	78	52	62	6	3
Sockeye Salmon Kept in the Charter Salmon Kept by Resident Anglers on Guided Trips	0	0	0	0	1	0	0
Sockeye Salmon Kept by Non-Resident Anglers on Guided Trips	1	2	4	1	6	1	0
Other Salmon Kept by Resident Anglers on Guided Trips	2	0	3	0	4	0	1
Other Salmon Kept by Non-Resident Anglers on Guided Trips	55	15	48	12	43	11	1

Source: Reimer (2023).

4.5.2.2. UCI Saltwater Sport Salmon Fishery Related Communities

Community engagement in the UCI saltwater sport salmon fishery may take many forms, such as through direct employment of local residents or being the location of sport fishery support sector businesses (e.g., fuel, food and beverage, lodging, gear supply, or vessel repair enterprises) or public or private infrastructure utilized by fishery participants that, in turn, may generate other private or public sector economic activity or otherwise contribute to community economies and social institutions. In this section, the geographic footprint of direct engagement of communities in the UCI saltwater salmon sport charter fishery is portrayed through two primary indicators: the community of residence of guides who participate in the fishery and the trip-ending community or port of landing of relevant salmon trips. Also included are estimates of the number of salmon harvested from the Upper Cook Inlet EEZ during saltwater sport UCI salmon trips 2015–2019 to allow an order-of-magnitude view of that portion of the fishery.
Consistent with the previous section, guide pool members, for the purpose of this analysis, are defined as all guides who had at least one salmon trip (salmon effort) in the UCI charter salmon fishery in one or more of the charter logbook salmon statistical areas that include portions of the UCI EEZ (areas 221030, 221040, 221060, or 221080) or that are located between the western shore of the Kenai Peninsula from Deep Creek to Anchor Point and the charter logbook salmon statistical areas that include the UCI EEZ in part (areas 221050 and 221070) in one or more years 2015–2021. Table 4-41 provides information on the number of charter saltwater sport UCI salmon guide pool members by place of residence by year, 2015-2021. As shown, 11 Kenai Peninsula Borough communities are represented in the data, with communities varying substantially in the number of resident guides per community. As shown, the communities with the highest annual average number of resident guides 2015–2021 (excluding the “other states” aggregate category) were Ninilchik, Anchorage, Soldotna, and Homer.

Within Alaska but outside of the Kenai Peninsula Borough, three aggregations of communities are shown: the Municipality of Anchorage, the Matanuska-Susitna Borough, and “Other Alaska.” For the first two, the communities that comprise the aggregation are also shown. The “Other Alaska” aggregation includes a total of eight communities, five of which were the community of residence for one guide in one year only[114] with the other three communities having somewhat greater, but still relatively little engagement of resident guides in the fishery.[115] Outside of Alaska, there were no Pacific Northwest communities that had more than minimal guide residency. Four different Washington communities had one resident guide in one year each and in Oregon there were eight different communities that had one resident guide in one year each, 2015–2021. A total of 25 different states were represented in the “other states” guide residence

[114] Bethel, Gustavus, Klawock, Kodiak, and North Pole.

[115] Juneau had 1 guide in 2 years, Craig had 1 guide in 3 years, and Fairbanks had 1 guide in 2 years and 2 guides in one year.

location data, which excludes Alaska, Washington, and Oregon information. Together, these "other states" accounted for approximately 15 percent of the saltwater sport UCI salmon guide pool members on an annual average basis over the years 2015–2019.

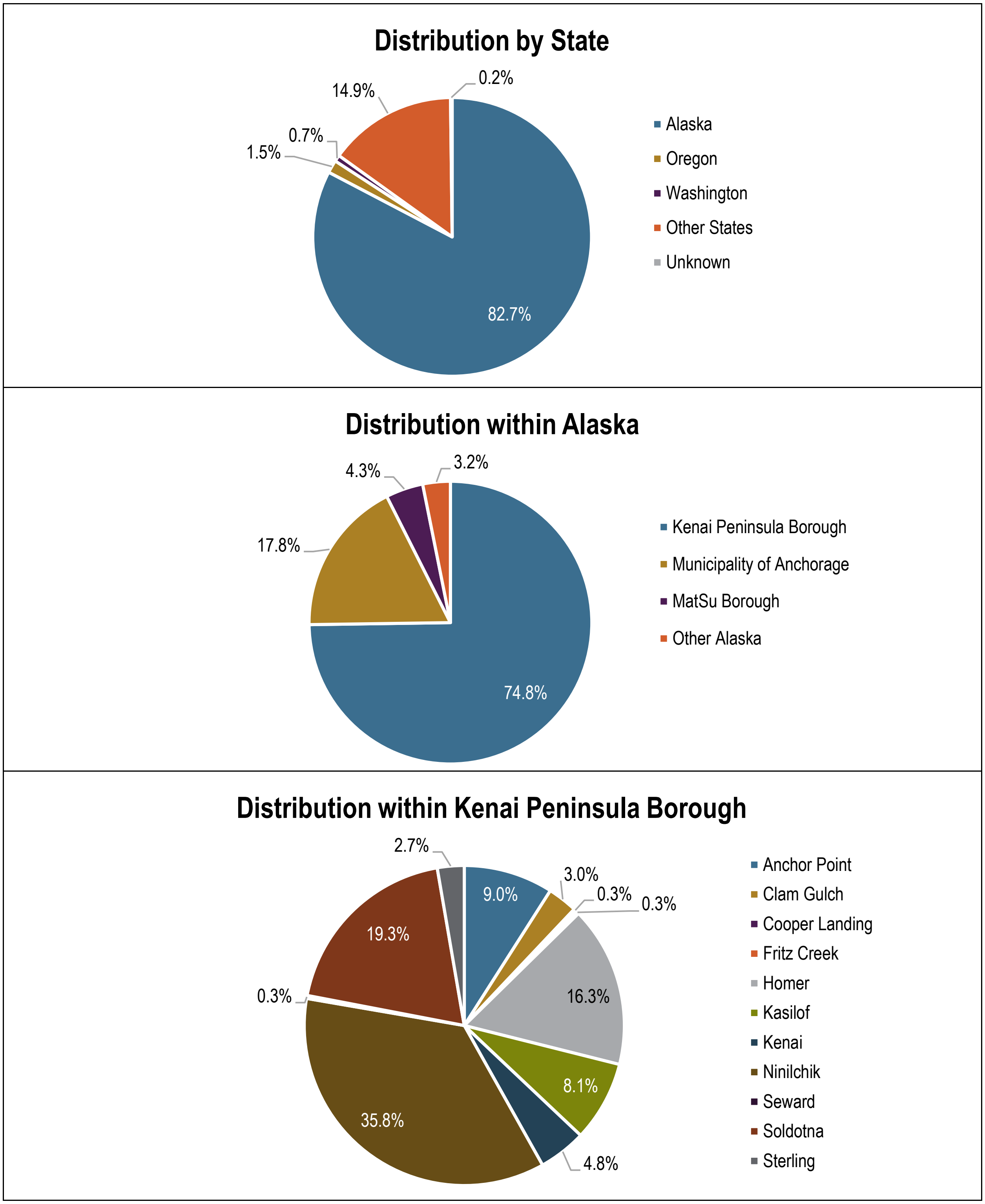
Table 4-41 Number of Saltwater Sport UCI Salmon Guide Pool Members by Place of Residence by Year, 2015-2021.

Geography	2015	2016	2017	2018	2019	2020	2021	Annual Average 2015-2021	Annual Average 2015-2021 (%)
Anchor Point	5	4	8	5	2	3	3	4.3	5.6%
Clam Gulch	1	2	1	2	2	1	1	1.4	1.9%
Cooper Landing	0	1	0	0	0	0	0	0.1	0.2%
Fritz Creek	0	0	1	0	0	0	0	0.1	0.2%
Homer	4	12	8	9	10	5	6	7.7	10.1%
Kasilof	6	4	3	3	4	3	4	3.9	5.0%
Kenai	3	1	2	4	3	2	1	2.3	3.0%
Ninilchik	24	17	22	19	14	8	15	17.0	22.2%
Seward	0	0	0	0	0	0	1	0.1	0.2%
Soldotna	8	9	17	12	8	3	7	9.1	11.9%
Sterling	2	2	1	1	1	1	1	1.3	1.7%
Subtotal Kenai Peninsula Borough	53	52	63	55	44	26	39	47.4	61.8%
Anchorage	11	12	12	11	11	4	6	9.6	12.5%
Chugiak	0	2	0	0	0	0	0	0.3	0.4%
Eagle River	2	2	3	1	2	0	0	1.4	1.9%
Subtotal Municipality of Anchorage	13	16	15	12	13	4	6	11.3	14.7%
Palmer	0	0	1	0	1	0	1	0.4	0.6%
Wasilla	2	2	1	1	1	1	3	1.6	2.0%
Willow	0	1	1	1	1	1	0	0.7	0.9%
Subtotal Mat-Su Borough	2	3	3	2	3	2	4	2.7	3.5%
Other Alaska	3	3	2	3	3	0	0	2.0	2.6%
ALASKA TOTAL	**71**	**74**	**83**	**72**	**63**	**32**	**49**	**63.4**	**82.7%**
Washington	2	0	1	0	1	0	0	0.6	0.7%
Oregon	2	2	1	0	0	1	2	1.1	1.5%
Other States	11	11	11	16	12	4	15	11.4	14.9%
Unknown	0	0	0	1	0	0	0	0.1	0.2%
GRAND TOTAL	**86**	**87**	**96**	**89**	**76**	**37**	**66**	**76.7**	**100.0%**

Source: Developed by Wislow Research based on Alaska Sport Fishing Logbook data provided on request by the Alaska Department of Fish and Game (2023)

Figure 4-47 graphically portrays the distribution of place of residence for guides who participated in the UCI saltwater salmon sport charter fishery on an annual average basis for 2015–2021 by state, by borough or municipality within the state of Alaska, and then by community within the Kenai Peninsula Borough. As shown, over 80 percent of guide pool members reported their residence as being in Alaska. Within Alaska, three-quarters reported their residence as being within the Kenai Peninsula Borough. Within the Kenai Peninsula Borough, one-third lived in Ninilchik and over half lived in Ninilchik and Soldotna combined.

Figure 4-47 Annual Average Percentage Distribution of Saltwater Sport UCI Salmon Guide Pool Members by Selected Geographic Grouping by Year, 2015-2021.



Source: Developed by Wislow Research based on Alaska Sport Fishing Logbook data provided on request by the Alaska Department of Fish and Game (2023)

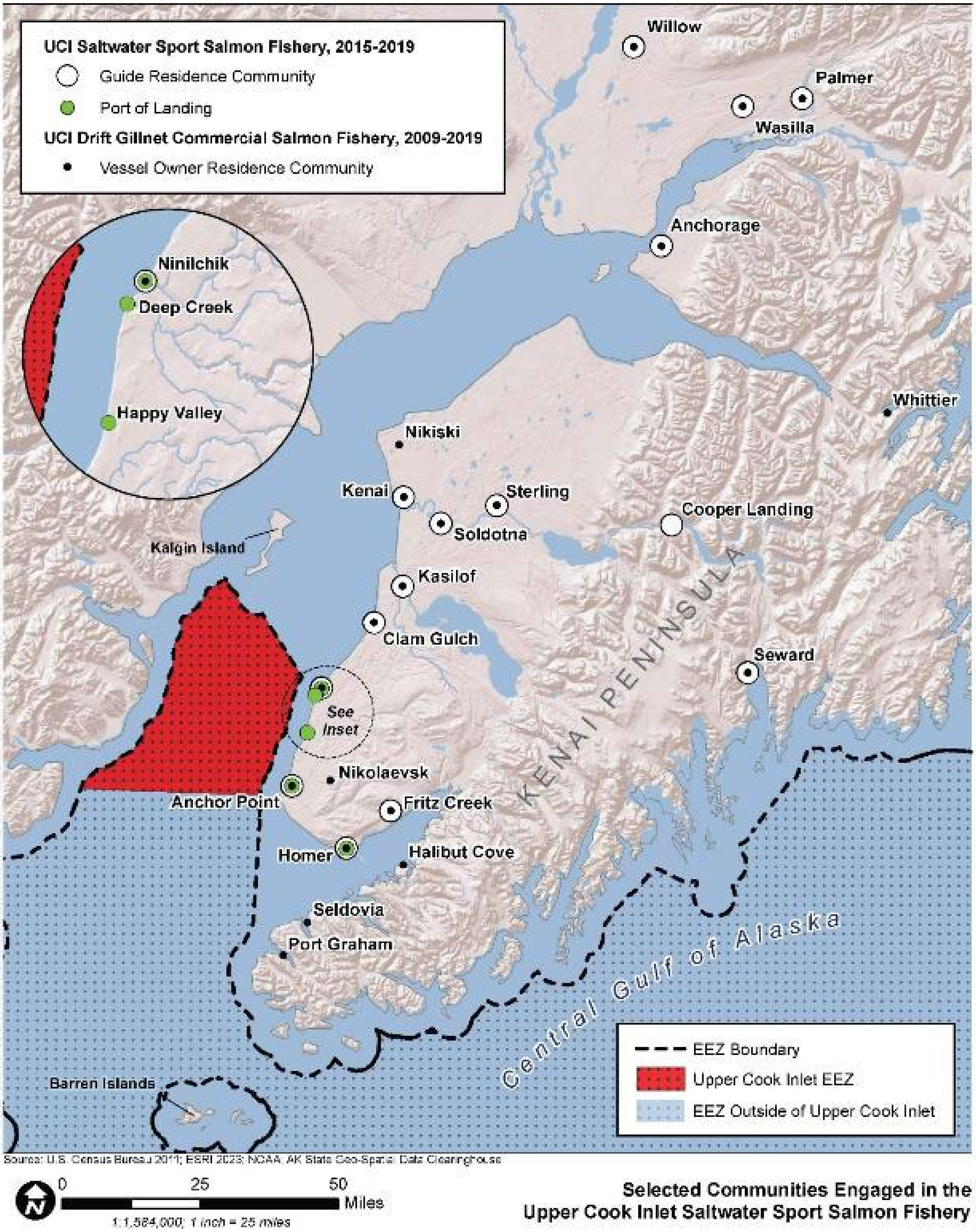
Figure 4-48 shows the community of guide residence for the UCI saltwater salmon sport charter fishery (2015–2021) as well as the community of vessel ownership for UCI commercial salmon fishery drift gillnet vessels (2009–2021) in the vicinity of Upper Cook Inlet. Of the 15 communities within the map extent that are shown as guide residence communities, all but one (Cooper Landing[116]) are also UCI drift gillnet commercial salmon fishery vessel owner residence communities. Conversely, of the 15 communities shown, 5 (Halibut Cove, Nikiski, Port Graham, Seldovia, and Whittier) are UCI commercial salmon fishery drift gillnet vessel owner residence communities but not UCI saltwater salmon sport charter fishery guide residence communities.

Shown on this same figure are the five trip-ending communities or ports of landing for relevant UCI saltwater salmon sport charter fishery trips that appear in the data during the 2015–2021 period. As shown, three of these five communities or ports (Anchor Point, Homer, and Ninilchik) are also UCI commercial salmon fishery drift gillnet vessel owner residence communities and are UCI saltwater salmon sport charter fishery guide residence communities. The other two communities/ports (Deep Creek and Happy Valley) are neither UCI commercial salmon fishery drift gillnet vessel owner residence communities nor UCI saltwater salmon sport charter fishery guide residence communities. These two communities/ports are further discussed below.

Figure 4-49 provides a more detailed view of the charter logbook salmon statistical areas that are used in the definition of UCI salmon trips (221030, 221040, 221050, 221060, 221070, and/or 221080), the Upper Cook Inlet EEZ, nearby UCI saltwater salmon sport charter fishery guide residence communities, trip-ending communities or ports of landing for relevant UCI saltwater salmon sport charter fishery trips, and UCI commercial salmon fishery drift gillnet vessel owner residence communities. Also shown for context are charter logbook salmon statistical areas 221000, 221010, and 221020, the east-west tier of statistical areas to the south of the UCI EEZ (south of the Anchor Point Light line and north of the Bluff Point Line) that were not included in the definition of UCI salmon trips used in this portion of the analysis.

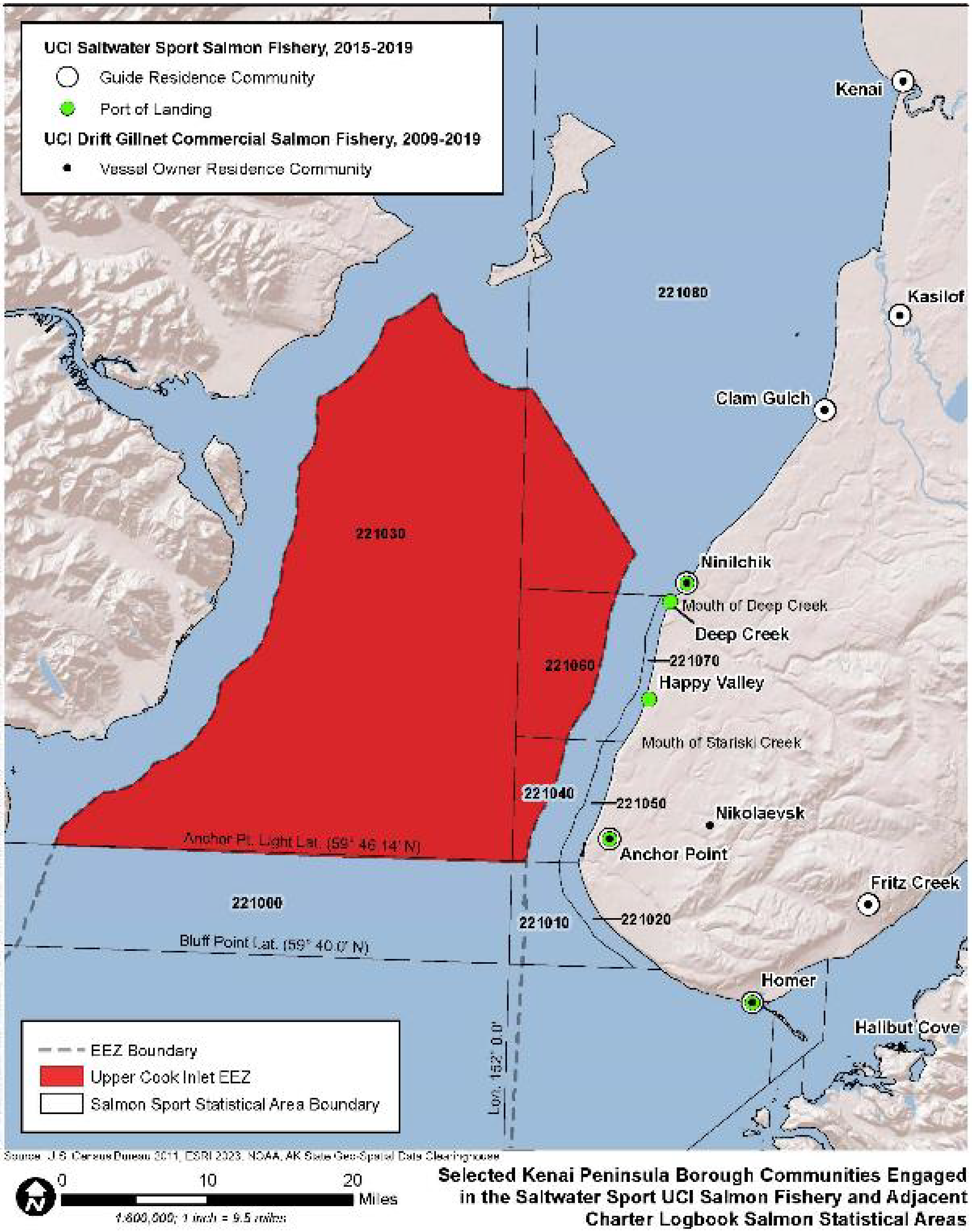
[116] Cooper Landing is an unincorporated community in the Kenai Peninsula Borough, located at the west end of Kenai Lake on a stretch of the Sterling Highway 30 miles north of Seward. A Census Designated Place, the population of Cooper Landing was estimated as 363 for 2021. It is within the geographic footprint of Cook Inlet Region, Inc., the regional ANCSA corporation but it is neither an ANCSA listed community nor home to a federally recognized tribe (DCRA Community Database, https://dcra-cdo-dcced.opendata.arcgis.com/, accessed 2/19/2023).

Figure 4-48 Selected Alaska Communities Engaged in the Saltwater Sport UCI Salmon Fishery.



Source: Developed by Wislow Research based on NOAA boundary data and Alaska Sport Fishing Logbook data provided on request by the Alaska Department of Fish and Game (2023).

Figure 4-49 Selected Kenai Peninsula Borough Communities Engaged in the Saltwater Sport UCI Salmon Fishery and Adjacent Charter Logbook Salmon Statistical Areas.



Source: Developed by Wislow Research based on NOAA and ADF&G boundary data and Alaska Sport Fishing Logbook data provided on request by the Alaska Department of Fish and Game (2023)

Table 4-42 shows the number of UCI saltwater salmon sport charter fishery trips by place of guide residence. For the purposes of this analysis, a UCI salmon trip is one that involved salmon fishing effort, thus trips that include both salmon and groundfish effort would be included in the table as a salmon trip.[117] As shown, the guide residence communities with greatest number of trips (excluding the "other states" aggregate category) include Ninilchik, Anchorage, Kasilof, and Soldotna.

Table 4-42 Number of Saltwater Sport UCI Salmon Trips by Guide Pool Member Place of Residence by Year, 2015-2021.

Geography	2015	2016	2017	2018	2019	2020	2021	Annual Average 2015-2021	Annual Average 2015-2021 (%)
Anchor Point	26	36	60	39	5	4	13	26.1	5.3%
Clam Gulch	5	12	16	15	21	11	11	13.0	2.7%
Cooper Landing	0	1	0	0	0	0	0	0.1	0.0%
Fritz Creek	0	0	1	0	0	0	0	0.1	0.0%
Homer	4	29	26	12	23	18	8	17.1	3.5%
Kasilof	61	46	76	53	58	32	50	53.7	11.0%
Kenai	29	4	11	28	13	9	13	15.3	3.1%
Ninilchik	170	99	162	109	90	38	100	109.7	22.4%
Seward	0	0	0	0	0	0	1	0.1	0.0%
Soldotna	62	53	106	63	34	12	13	49.0	10.0%
Sterling	13	9	9	4	5	4	8	7.4	1.5%
Subtotal Kenai Peninsula Borough	370	289	467	323	249	128	217	291.9	59.7%
Anchorage	77	78	65	54	106	33	53	66.6	13.6%
Chugiak	0	4	0	0	0	0	0	0.6	0.1%
Eagle River	16	15	29	3	4	0	0	9.6	2.0%
Subtotal Municipality of Anchorage	93	97	94	57	110	33	53	76.7	15.7%
Palmer	0	0	4	0	5	0	4	1.9	0.4%
Wasilla	18	11	8	12	7	10	34	14.3	2.9%
Willow	0	5	2	3	3	5	0	2.6	0.5%
Subtotal Mat-Su Borough	18	16	14	15	15	15	38	18.7	3.8%
Other Alaska	3	18	2	6	11	0	0	5.7	1.2%
ALASKA TOTAL	**484**	**420**	**577**	**401**	**385**	**176**	**308**	**393.0**	**80.4%**
Washington	22	0	8	0	1	0	0	4.4	0.9%
Oregon	31	22	13	0	0	2	7	10.7	2.2%
Other States	118	112	63	110	51	18	92	80.6	16.5%
Unknown	0	0	0	1	0	0	0	0.1	0.0%
GRAND TOTAL	**655**	**554**	**661**	**512**	**437**	**196**	**407**	**488.9**	**100.0%**

Source: Developed by Wislow Research based on Alaska Sport Fishing Logbook data provided on request by the Alaska Department of Fish and Game (2023)

Table 4-43 provides a count of guide pool members using each of the listed UCI saltwater salmon sport charter fishery trip-ending communities with at least one trip in any year, 2015–2021. Note that these numbers may not match the numbers provided for total trips presented in an earlier section of this RIR as trips can offload in more than one community. The five communities listed vary widely in their port infrastructure and local availability of fishery support service providers. Homer has extensive port facilities that support a large multi-fishery and multi-area fleet. Ninilchik has a small boat harbor.[118] At Anchor Point, Happy Valley, and Deep Creek, small charter sport boats are launched by tractor across the beach. The Anchor Point and Deep Creek launch areas are a part of Anchor Point State Recreational Area and Deep Creek State Recreational Area, respectively, which both include campgrounds and tractor-assisted launching services that are provided by a private firm operating under permit from Alaska State

[117] The ADF&G code used for the data included in this table looks at instances where salmon statistical areas are listed (indicating salmon effort), as opposed to or in addition to separate and distinct groundfish statistical areas.

[118] Anchor Point, Homer, and Ninilchik were previously described in Section 4.5.1.5.

Parks. Unlike Deep Creek, the unincorporated communities of Anchor Point and Happy Valley are Census Designated Places.[119] As shown, despite a lack of extensive infrastructure, over half of all guides used Deep Creek as a UCI salmon trip-ending community on an annual average basis over the years 2015–2021.

Table 4-43 Count of Guide Pool Members using each of the listed Trip-Ending Communities in at least one Saltwater Sport UCI Salmon Trip by Year, 2015-2021.

Trip-Ending Community	2015	2016	2017	2018	2019	2020	2021	Annual Average 2015-2021	Annual Average 2015-2021 (%)
Anchor Point*	18	13	16	15	12	0	6	13.3	14.0%
Deep Creek	50	51	60	47	45	22	40	52.5	55.3%
Happy Valley	14	7	10	10	3	3	4	8.5	8.9%
Homer	7	16	12	15	16	10	17	15.5	16.3%
Ninilchik	6	10	5	3	4	1	2	5.2	5.4%
Total	**95**	**97**	**103**	**90**	**80**	**36**	**69**	**95.0**	**100.0%**

*Note: Anchor Point includes a value of 1 in 2018 that was attributed to Anchor River.
Source: Developed by Wislow Research based on Alaska Sport Fishing Logbook data provided on request by the Alaska Department of Fish and Game (2023)

Table 4-44 provides information on the number of saltwater sport charter UCI salmon trips by port of landing, 2015–2021. As shown, Deep Creek and Happy Valley together were the ports of landing for over 80 percent of all trips on an annual average basis during this period, with Deep Creek alone accounting for 60 percent of all trips.

Table 4-44 Number of Saltwater Sport UCI Salmon Trips by Port of Landing by Year (2015-2019).

Port of Landing	2015	2016	2017	2018	2019	2020	2021	Annual Average 2015-2021	Annual Average 2015-2021 (%)
Anchor Point*	63	53	63	44	27	0	15	44.2	7.9%
Deep Creek	369	294	377	282	258	135	286	333.5	59.9%
Happy Valley	168	125	155	105	94	26	61	122.3	22.0%
Homer	12	39	28	23	29	24	26	30.2	5.4%
Ninilchik	43	43	25	20	23	1	5	26.7	4.8%
Total	**655**	**554**	**648**	**474**	**431**	**186**	**393**	**556.8**	**100.0%**

*Note: Anchor Point includes a value of 1 in 2018 that was attributed to Anchor River.
Source: Developed by Wislow Research based on Alaska Sport Fishing Logbook data provided on request by the Alaska Department of Fish and Game (2023)

Table 4-45 provides an estimate of the number of salmon harvested from the Upper Cook Inlet EEZ during saltwater sport UCI salmon trips 2015–2021. These estimates and the methodology behind them are presented in more detail in Appendix 16. As shown, it is estimated that king salmon (Chinook) accounted for 89 percent of the harvest on an annual average basis, or approximately 58 fish per year, over this period, while annual average coho and sockeye harvest estimates were seven and less than one fish per year, respectively. These numbers include fish harvested during both guided and unguided sport trips, with unguided trips presumed to have been geographically distributed in the same relative proportions across statistical areas as the guided trips recorded in logbook data.

[119] Happy Valley is an unincorporated community in the Kenai Peninsula Borough. It is located on Happy Valley Creek, 22 miles northwest of Homer on the Sterling Highway. A Census Designated Place, the population of Cooper Landing was estimated as 695 for 2021. It is a roadhouse community whose residents rely on Homer, Anchor Point, and Ninilchik for supplies and services. It is within the geographic footprint of Cook Inlet Region, Inc., the regional ANCSA corporation but it is neither an ANCSA listed community nor home to a federally recognized tribe (DCRA Community Database, https://dcra-cdo-dcced.opendata.arcgis.com/, accessed 2/19/2023).

Table 4-45 Estimated Harvest of Salmon (number of fish) within the Upper Cook Inlet EEZ in the Saltwater Sport UCI Salmon Fishery, by Species and Year (2015-2021).

Species	2015	2016	2017	2018	2019	2020	2021	Annual Average 2015-2021	Annual Average 2015-2021 (%)
Coho (Silver)	15	3	13	12	5	0	0	6.9	10.4%
King (Chinook)	59	60	71	125	28	36	30	58.4	88.9%
Sockeye (Red)	0	0	0	0	3	0	0	0.4	0.7%
Total	74	63	84	137	36	36	30	65.7	100.0%

Source: Developed by Wislow Research based on Reimer (2023)

4.6. Description of Other Potentially Affected Salmon Fisheries

Figure 4-6 compares the salmon harvest in the UCI salmon drift gillnet fishery to salmon harvests in other Upper Cook Inlet fisheries, both commercial and non-commercial. The other commercial salmon fishery occurring in Upper Cook Inlet besides the drift gillnet fishery is the set gillnet fishery. The non-commercial salmon fisheries include the sport, personal use, and subsistence/educational fisheries. From 1999–2018, the UCI salmon drift gillnet fishery accounted for 42% of the total sockeye salmon harvest in all Upper Cook Inlet salmon fisheries; 1% of the total Chinook salmon harvest; 26% of the total coho salmon harvest; 52% of the total pink salmon harvest; and 89% of the total chum salmon harvest. Over all species combined, the UCI salmon drift gillnet fishery accounted for 55% of the total harvest. As shown in Figure 4-6, from 1999–2018, the UCI salmon drift gillnet fleet harvested an overall increasing percentage of the total salmon catch and catch of each species, with the exception of sockeye salmon—the fleet accounted for a relatively flat proportion of the Upper Cook Inlet sockeye harvest. If this action results in increased harvests by the drift gillnet fleet, other user groups may have reduced salmon harvest opportunity as a result. Conversely, decreases in overall salmon catch by the drift gillnet fleet as a result of this action may provide additional harvest opportunity to other salmon user groups.

The following sections describe the Upper Cook Inlet set gillnet, sport, personal use, and subsistence/educational fisheries in more detail.

4.6.1. Commercial Set Gillnet Fishery

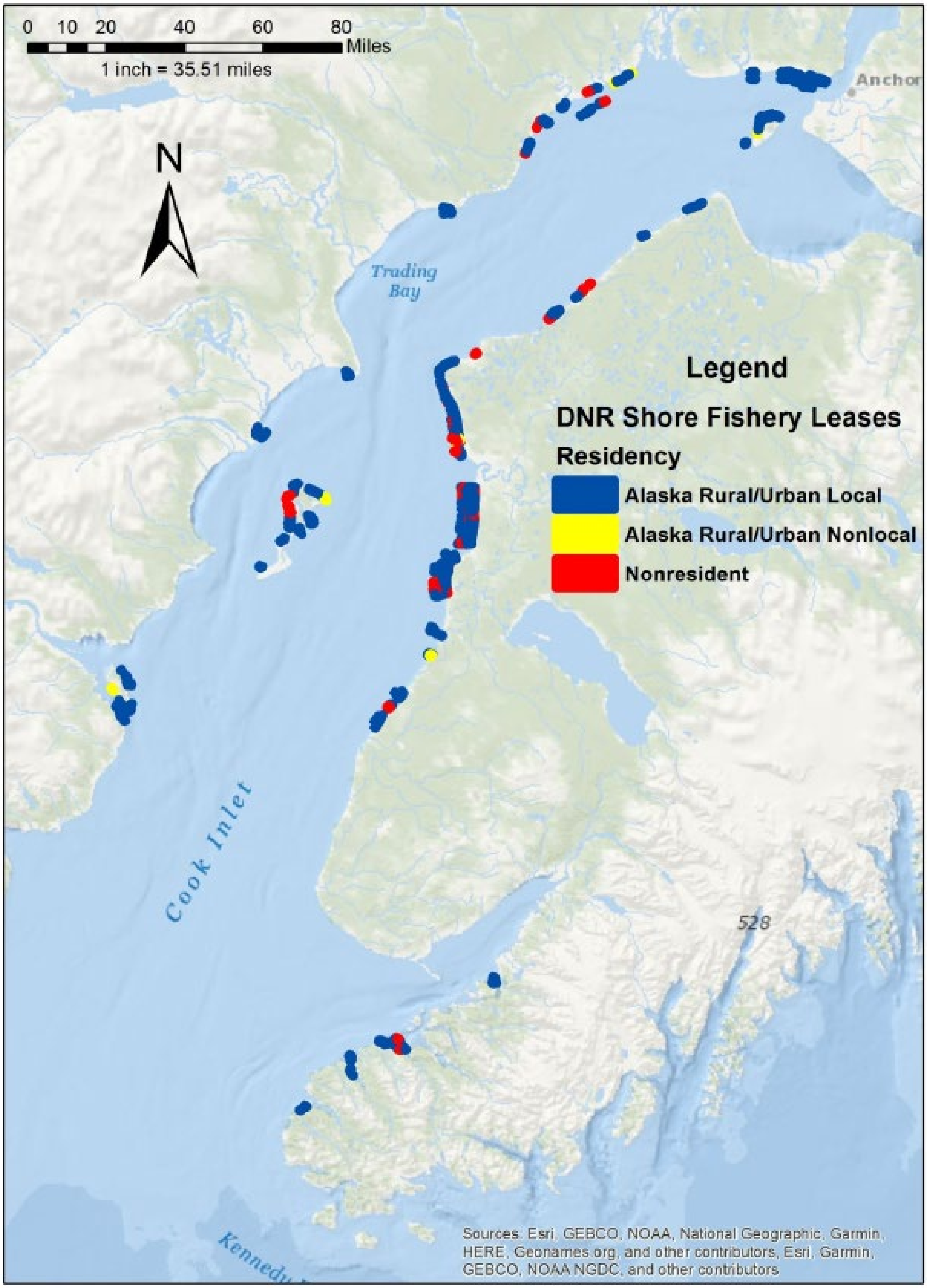
In the Cook Inlet salmon set gillnet fishery, nylon gillnets are placed in rivers, tidelands and near shore in submerged lands. Typically, a large anchor is used to secure one end of the gillnet, while the other end is fixed near the tide line. As salmon move along the shore, fish will be entangled or caught by the gills in the net (Gho et al. 2012). In Upper Cook Inlet, the catch is picked from the net each day during a slack tide (National Marine Fisheries Service 2019b). Set gillnets are allowed out to 1.5 miles of the mean high tide mark south of the Kenai River, and one mile of the mean high tide mark north of the Kenai River. The time and length of the fishing season in the Cook Inlet salmon set gillnet fishery varies depending upon management requirements. In general, the fishery operates from June through September. As with the salmon drift gillnet fishery, salmon may only be harvested in the salmon set gillnet fishery during openers established by ADF&G inseason (National Marine Fisheries Service 2019b).

The permits for the Cook Inlet salmon set gillnet fishery are designated as S04H permits. From 1975–2018, the annual number of S04H permits (both interim-entry permits and permanent permits) with landings averaged around 580 (Alaska Commercial Fisheries Entry Commission 2019). Stacked permit operations were granted by the BOF for the fishery in 2011.

The Cook Inlet salmon set gillnet fishery is characterized by a high concentration of permit holders who fish in small, defined areas, especially along the eastern shore of Upper Cook Inlet north of Anchor Point. Other places in Cook Inlet have less fishing effort, which is likely related to site accessibility and relative salmon abundance (Gho et al. 2012). In 1964, DNR began a program to lease tide and submerged lands for the purposes of set gillnet fishing, thereby resolving conflicts over prime salmon sites. Although a set gillnet permit owner does not need a lease in order to fish, leaseholders have the ability to exclude other individuals from fishing on established sites, subject to a varied number of provisions and restrictions (Gho et al. 2012). Individuals who hold a DNR shore fishery lease are required by regulation to fish at least four openings in years when they hold a lease, unless they refrain for no more than one year from using the site (11 AAC 64.180).

Figure 4-50 shows that many set gillnet fishermen have established leases along the eastern shore of Upper Cook Inlet near the productive Kenai and Kasilof Rivers. On average, from 2006–2015, 63% of the active S04H permit owners had leases during a given year (Alaska Commercial Fisheries Entry Commission 2019).

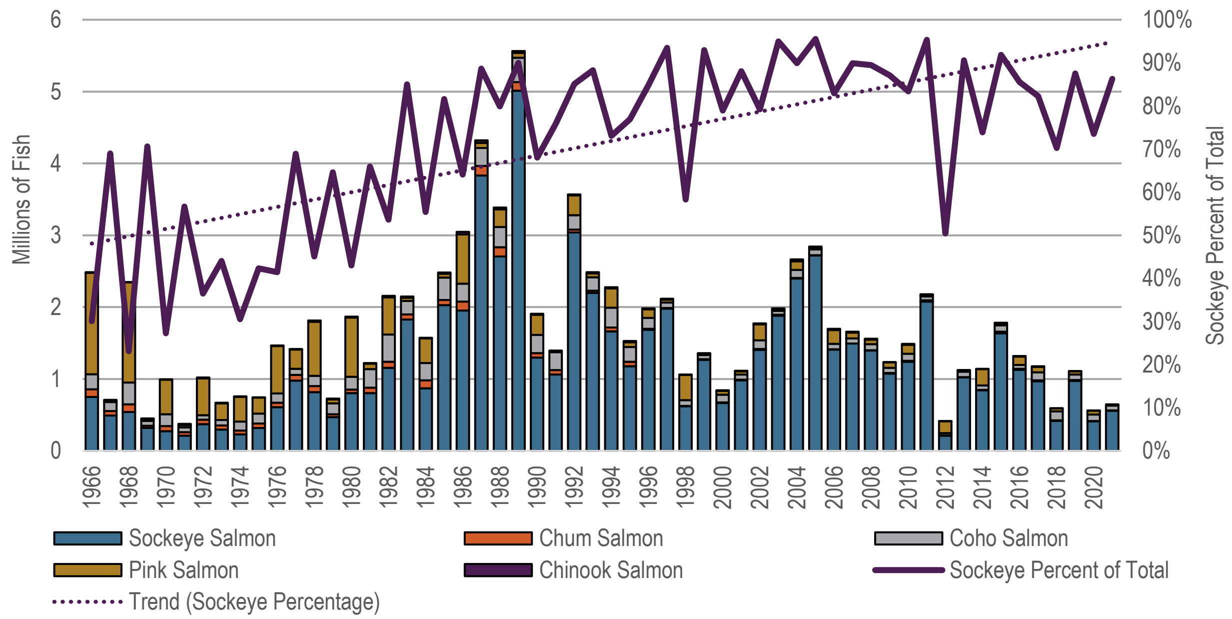
Figure 4-50 Map of Alaska Department of Natural Resources shore fishery leases by resident type, 2019.



Notes: "Local" means residing in the ADF&G Cook Inlet Management Area, including Anchorage.
Source: Alaska Commercial Fisheries Entry Commission (2019).

From 1966–2021, an average of 1.69 million salmon were harvested annually in the Cook Inlet salmon set gillnet fishery north of Anchor Point (Figure 4-51). Although all five species of Pacific salmon are caught in the fishery, sockeye salmon accounted for 75% of the salmon harvest north of Anchor Point from 1966–2021. As in the UCI salmon drift gillnet fishery (Section 4.5.1.2.2), the sockeye harvest percentage has increased due to State fishery management regulations and policies implemented in the late 1980s.

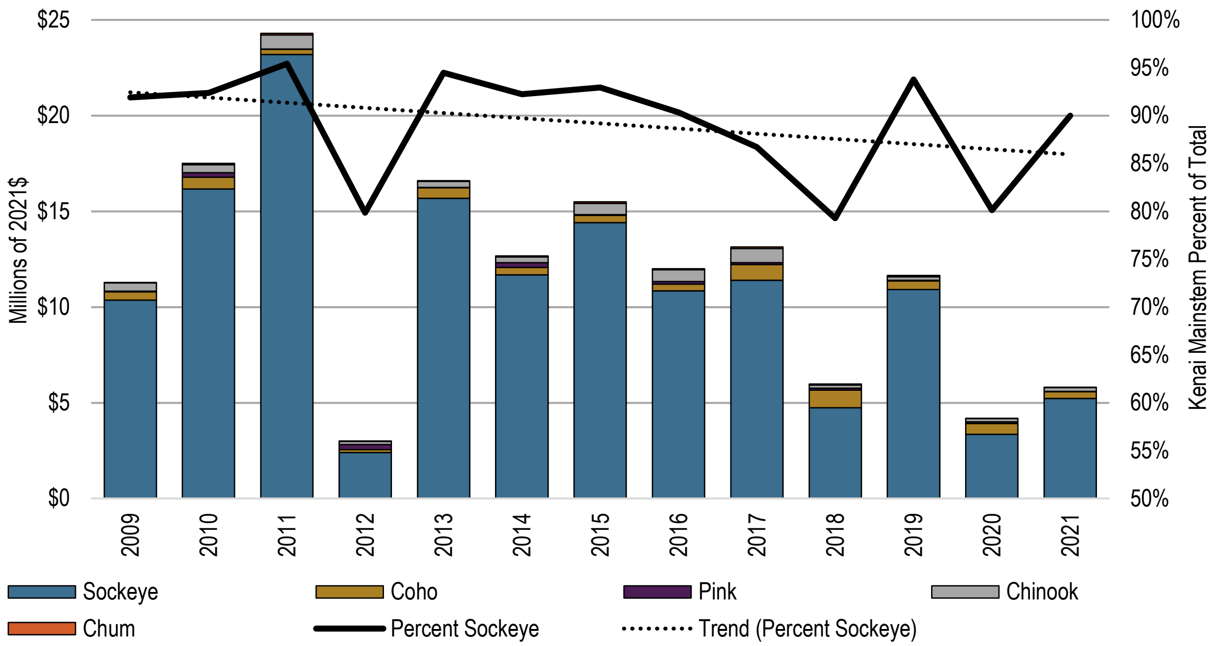
Figure 4-51 Harvest (in numbers of fish) in the Cook Inlet salmon set gillnet fishery north of Anchor Point by species, 1966–2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020, 2022).

Figure 4-52 shows the gross revenue from salmon harvests in the UCI salmon set gillnet fishery from 2009–2021. During this period, sockeye salmon accounted for 91% of the gross revenue in the fishery. In recent years salmon ex-vessel prices have increased (Figure 4-22). Since 2015, however, this price increase has not been sufficient to offset the decrease in landings (Figure 4-51), and gross revenue in the fishery has declined as a result.

Figure 4-52 Gross revenue (inflation adjusted) from salmon harvests in the UCI salmon set gillnet fishery, 2009–2021.



Notes: Nominal gross revenue adjusted for inflation to 2021 dollars using U.S. Bureau of Labor Statistics Producer Price Index by Commodity for Processed Foods and Feeds: Unprocessed and Prepared Seafood (Not Seasonally adjusted).
Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2022).

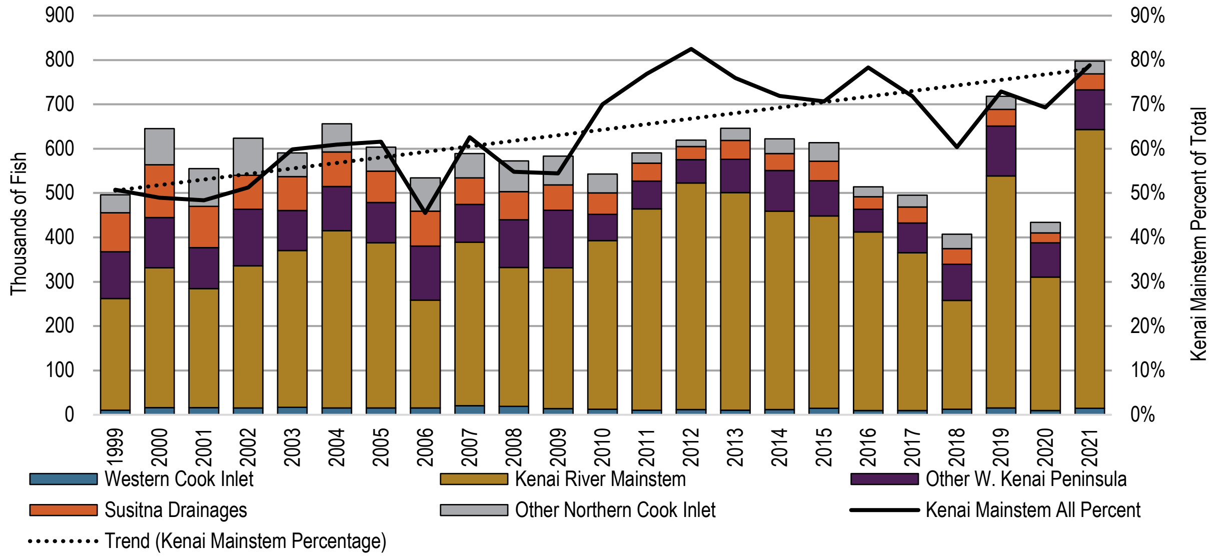
4.6.2. Freshwater Sport Fisheries[120]

4.6.2.1. Freshwater Sport Fishery Harvests

The freshwater drainages of Upper Cook Inlet support extensive sport fisheries for five species of Pacific salmon. The Kenai River, which drains the central Kenai Peninsula, is one of the State's primary rivers for sport salmon fishing, with the mainstream of the river accounting on average for more than half of the annual harvest in Upper Cook Inlet freshwater sport salmon fisheries from 1999–2021 (Figure 4-53). The Russian River, a tributary of the Kenai River, is also one of the most popular fishing destinations in the State. Part of the attraction of Upper Cook Inlet's freshwater sport salmon fisheries is their proximity to major population centers and the relative ease of access. Upper Cook Inlet is located in the southcentral region of Alaska, which accounts for more than half of the State's population and contains most of the State's public roads, offering more easily reached, relatively inexpensive highway access to sport fishing than any other region of Alaska (Alaska Department of Fish and Game 2023).

[120] The management of freshwater sport fisheries is included in the description of the management of saltwater sport fisheries in Section 4.5.2.1.

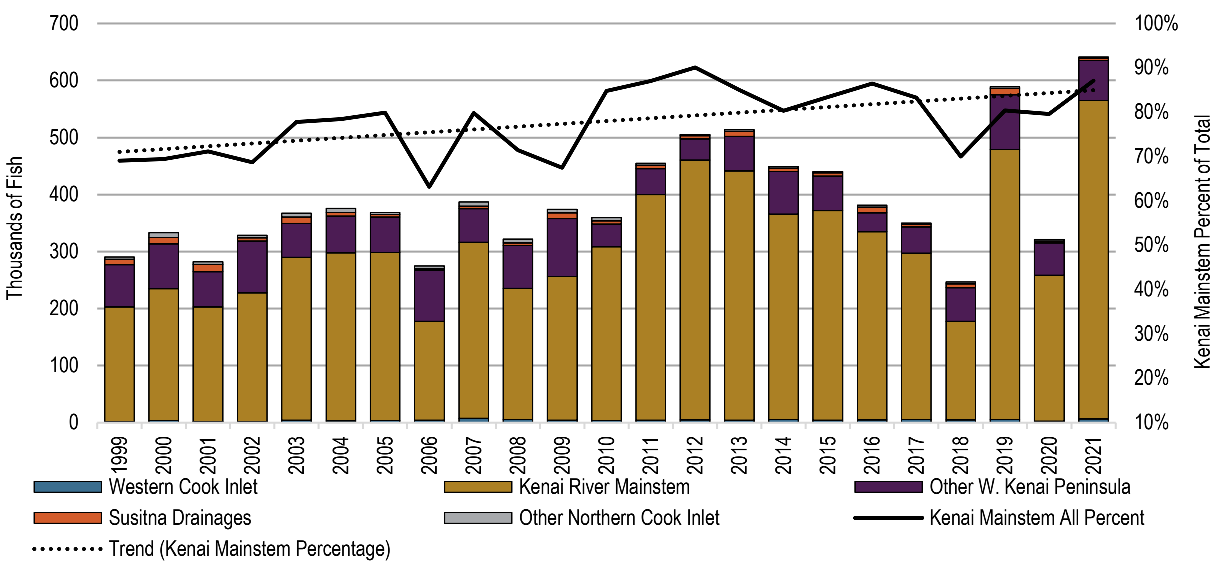
Figure 4-53 Salmon harvest (in numbers of fish) in Upper Cook Inlet freshwater sport salmon fisheries by area fished, 1999–2021.



Source: Developed by Northern Economics based on data from ADF&G (2023).

Figure 4-54 shows that the Kenai River has been the primary source of the sockeye salmon catch, which accounted for more than half of the total harvest in Upper Cook Inlet freshwater sport salmon fisheries from 1999–2021.

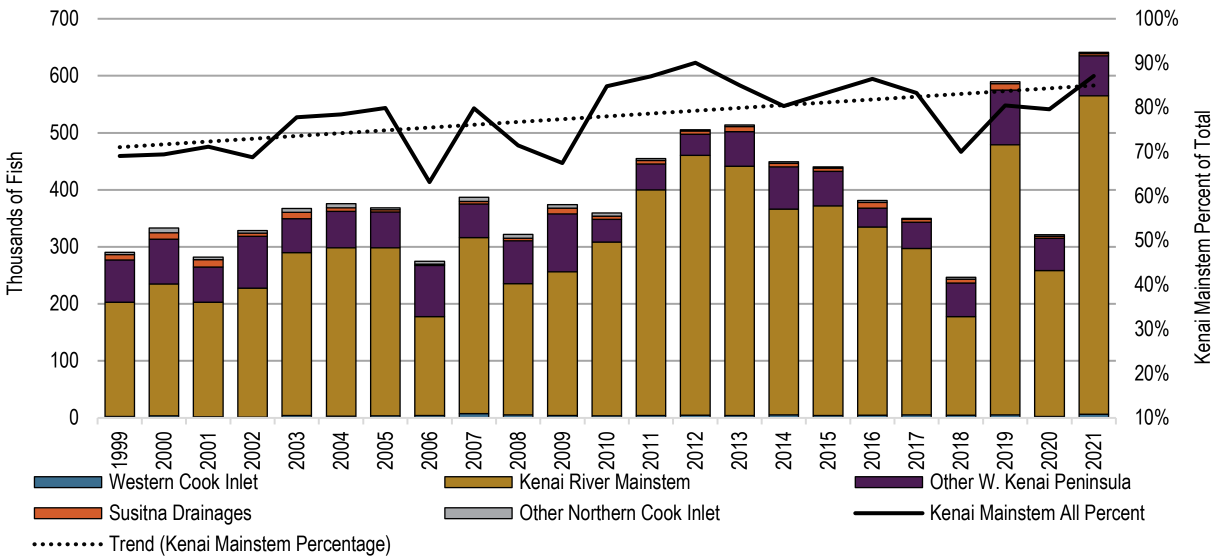
Figure 4-54 Sockeye harvest (in numbers of fish) in Upper Cook Inlet freshwater sport salmon fisheries by area fished, 1999–2021.



Source: Developed by Northern Economics based on data from ADF&G (2023)

While sockeye is the predominant species caught in the Kenai River, the river is especially famous for its large Chinook salmon, with the world record caught in 1985. As shown in Figure 4-55, recent years have seen a sharp downturn in the Chinook salmon harvest, but the Kenai River continues to be the most heavily fished river in Alaska. Because of the high level of participation in relation to the total number of Chinook salmon in the runs, the fishery is strictly regulated (Lipka et al. 2020).[121]

Figure 4-55 Chinook harvest (in numbers of fish) in Upper Cook Inlet freshwater sport salmon fisheries by area fished, 1999–2021.



Source: Developed by Northern Economics based on data from ADF&G (2023).

A large proportion of the salmon caught in Upper Cook Inlet sport fisheries are released by anglers. On average from 2004–2017, the annual percentages of fish caught in the Northern Cook Inlet sport fish management area that were released were 69.9% for Chinook salmon; 48.2% for sockeye salmon; 40.3% for coho salmon; 93.9% for pink salmon; and 90.8% for chum salmon (Oslund et al. 2020).[122]

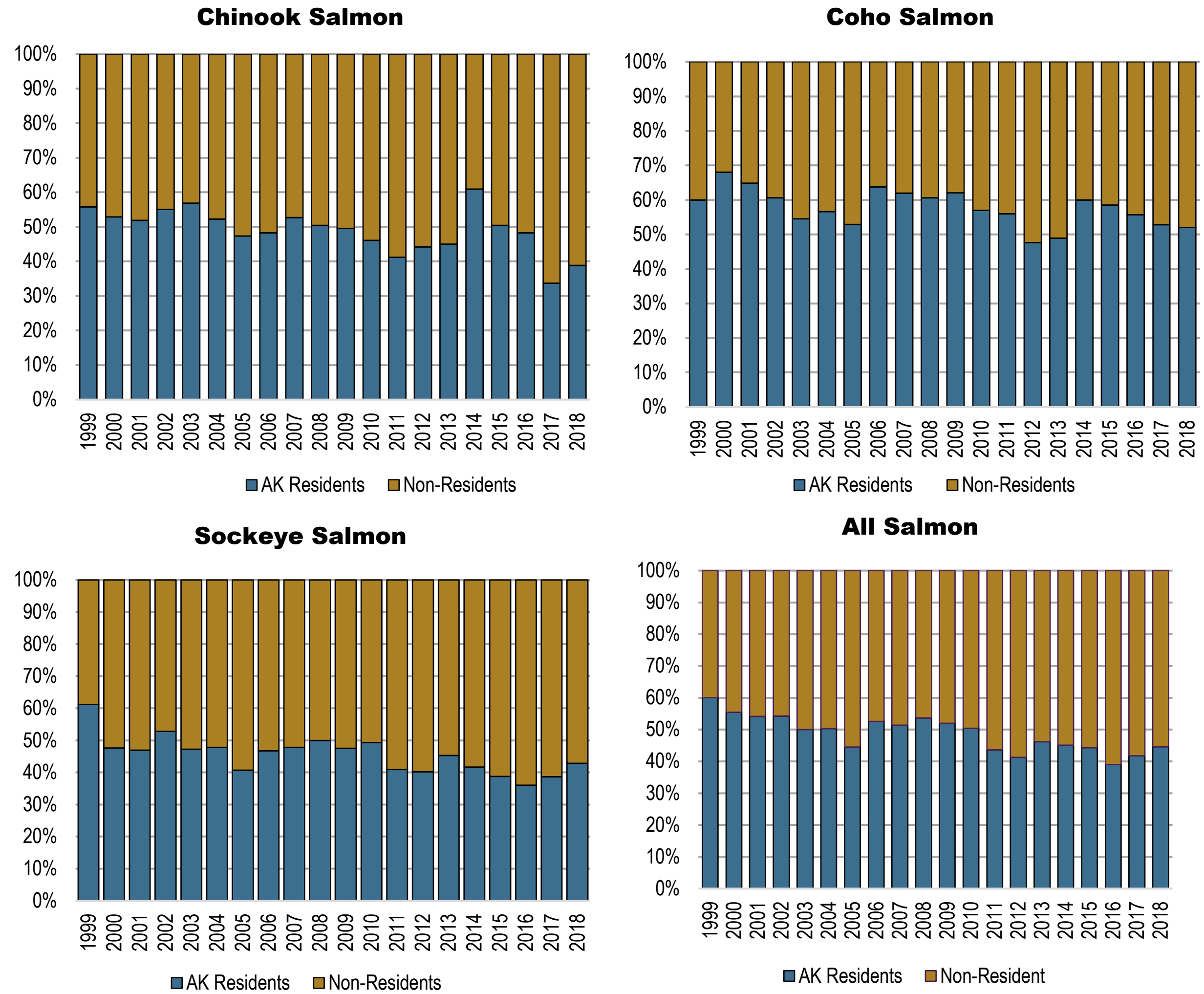
Figure 4-56 shows the harvest in Upper Cook Inlet freshwater sport salmon fisheries by resident type and species from 1999–2018.[123] On average during this time period, residents accounted for 49% of the Chinook harvest; 58% of the coho harvest; 46% of the sockeye harvest; and about half of the harvest of all salmon species combined.

[121] Currently, Chinook salmon fishing in the Kenai River is limited to a 50-mile area downstream from Skilak Lake from January 1 through July 31. By regulation, the early-run Kenai River Chinook salmon fishery ends on June 30. The daily bag and possession limits are one Chinook salmon 20 inches or greater in length, with a protective maximum size of retention limit (no retention, must be released) for Chinook salmon greater than 36 inches. From July 1 through July 31 from the mouth of the Kenai River to a marker downstream of Slikok Creek, the bag and possession limit remains the same, but Chinook salmon of any size may be retained. The annual (January 1–December 31) limit is two fish. However, Chinook salmon harvested prior to July 1 that are 20 inches or more in length but less than 28 inches in length do not count toward the annual limit of two fish. The majority of the harvest is taken by anglers in boats. After retaining a Chinook salmon that counts toward the annual limit, an angler is prohibited from fishing from a boat in the Kenai River downstream from Skilak Lake for the remainder of that day (Lipka et al. 2020).

[122] The Northern Cook Inlet sport fish management area includes all freshwater drainages and adjacent marine waters of Upper Cook Inlet between the southern tip of Chisik Island and the Eklutna River, excluding the upper Susitna River drainage upstream of the Oshetna River confluence (Oslund et al. 2020).

[123] Residence data for recreational harvests for 2019–2021 were not available at the time of this publication.

Figure 4-56 Salmon harvest (in numbers of fish) in Upper Cook Inlet freshwater sport salmon fisheries by resident type and species, 1999–2018.



Source: Developed by Northern Economics based on Alaska Sport Fishing Harvest Survey data provided on request by Alaska Department of Fish and Game (2020d)

4.6.3. Personal Use Fisheries

The State of Alaska defines personal use fishing as the taking, fishing for, or possession of finfish, shellfish, or other fishery resources, by Alaska residents for personal use and not for sale or barter, with gill or dip net, seine, fish wheel, longline, or other means defined by the BOF (AS 16.05.940(27)). Personal use fisheries differ from subsistence fisheries because they either do not meet the criteria established by the Joint Board of Fisheries and Game (Joint Board) for identifying customary and traditional fisheries (5 AAC 99.010) or because they occur within designated nonsubsistence areas.

The Joint Board is required to identify "nonsubsistence areas," where "dependence upon subsistence is not a principal characteristic of the economy, culture, and way of life of the area or community" (AS 16.05.258(c)). The BOF may not authorize subsistence fisheries in nonsubsistence areas. Personal use fisheries provide opportunities for harvesting fish with gear other than rod and reel in nonsubsistence areas. The Joint Board has identified Ketchikan, Juneau, Anchorage-Matsu-Kenai, Fairbanks, and Valdez as nonsubsistence areas (5 AAC 99.015). Persons may participate in personal use or sport harvests for consumptive uses within nonsubsistence areas, but such noncommercial harvests do not have a preference in those areas.

Generally, fish may be taken for personal use purposes only under authority of a permit issued by ADF&G. Personal use fishing in Cook Inlet is primarily managed by ADF&G, Division of Sport Fish, but some regional or area fisheries for various species of fish are managed by the Division of Commercial Fisheries (e.g., Kasilof River set gillnet salmon personal use fishery). Further information on State management of personal use fisheries can be found on the ADF&G website at: http://www.adfg.alaska.gov/index.cfm?adfg=fishingPersonalUse.main.

In 1996, the current personal use fisheries in Upper Cook Inlet were adopted by the BOF, and the BOF put a permit requirement into regulation so that the number of fish harvested could be estimated. (Sechrist and Rutz 2014). Four personal use fisheries were opened to all Alaska residents: the Kasilof River set gillnet fishery, Kasilof River dip net fishery, Kenai River dip net fishery, and, in some years, Fish Creek dip net fishery.[124] In addition, in 2008, the BOF authorized a new Upper Cook Inlet personal use fishery referred to as the Beluga River Senior Citizen dip net fishery (salmon may be taken in the fishery only by persons 60 years of age or older) (Oslund et al. 2020). At the March 2020 Upper Cook Inlet meeting, the BOF adopted a sixth Upper Cook Inlet personal use fishery in the lower Susitna River. All the personal use fisheries primarily target sockeye salmon, although Chinook, coho, pink and chum salmon are also harvested.[125] The annual limits are 25 salmon per head of household, and ten additional salmon for each household member (Oslund et al. 2020).

The Kasilof River gillnet fishery opens on June 15 and takes place from 6:00 AM until 11:00 PM daily. The fishery remains open until 11:00 PM on June 24, regardless of how many fish are harvested. The Kasilof River dip net personal use fishery occurs from June 25 through August 7, 24 hours per day. The Kenai River dip net fishery is open from July 10 through July 31, 7 days per week, but only from 6:00 AM to 11:00 PM daily, subject to the requirement of achieving the lower bound of the Kenai River late-run sockeye salmon escapement goal. If ADF&G determines that the abundance of Kenai River late-run sockeye salmon is greater than 2.3 million fish, this fishery may be extended to 24 hours per day. The Beluga River Senior Citizen dip net fishery is open 24 hours per day from July 10 through August 31. The Fish Creek dip net fishery is open from July 15 through July 31 only if ADF&G projects that the escapement of sockeye salmon into Fish Creek will exceed 35,000 fish (Oslund et al. 2020). The Susitna River personal use fishery occurs from July 10 through July 31, 2 days per week, on Wednesday and Saturday from 6:00 AM to 11:00 PM.

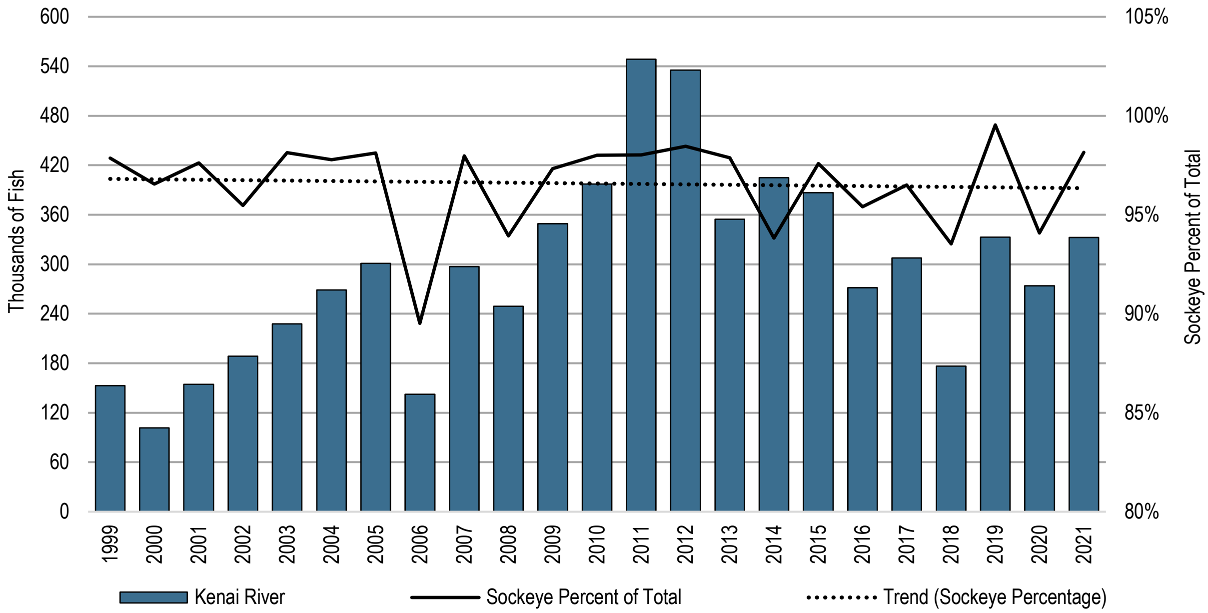
For around two decades, the popularity of the Upper Cook Inlet personal use fisheries steadily grew (Sechrist and Rutz 2014). In 1996, approximately 14,500 permits were issued for the fisheries, and by 2013, the number of permits exceeded 35,000. More recently, the number of permits has dropped, with 24,722 issued in 2018 (Alaska Department of Fish and Game 2020c).

The majority of participants fish the Kenai dip net fishery, which has grown since 1996 with few exceptions. From 1999–2021, this fishery accounted for around three-quarters of the total harvest across all personal use fisheries (Figure 4-57). The Kasilof River set gillnet and dip net fisheries accounted for about one-fifth of the total harvest during that time period (Figure 4-58), while the combined catch of the Fish Creek and Beluga River Senior Citizen dip net fisheries represented less than 2% of the total.

[124] The Fish Creek dip net fishery is open only if ADF&G projects that the escapement of sockeye salmon into Fish Creek will exceed 35,000 fish (Marston and Frothingham 2019).

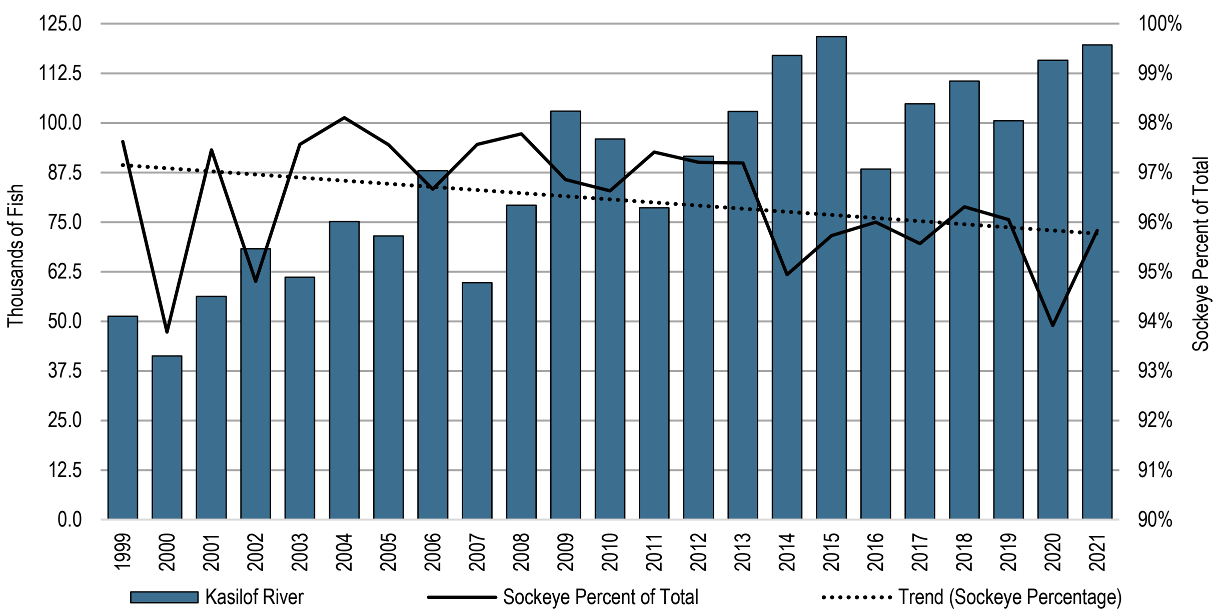
[125] In the Kasilof River dip net fishery, Chinook salmon may not be retained and must be released immediately to the water unharmed. In the Kenai River and Beluga River Senior Citizen dip net fisheries, one Chinook salmon may be retained per household (Lipka et al. 2020; Oslund et al. 2020). There are no Chinook salmon harvest restrictions in the Kasilof River gillnet personal use fishery (Marston and Frothingham 2019).

Figure 4-57 Salmon harvest (in numbers of fish) in the Kenai dipnet personal use salmon fishery, 1999–2021.



Source: Developed by Northern Economics based on data from Lipka et al. (2020) and ADF&G 2023).

Figure 4-58 Salmon harvest (in numbers of fish) in the Kasilof River set gillnet and dip net personal use salmon fisheries, 1999–2021.



Source: Developed by Northern Economics based on data from Lipka et al. (2020) and ADF&G (2023).

4.6.4. Subsistence and Educational Fisheries

4.6.4.1. State Subsistence and Educational Fisheries

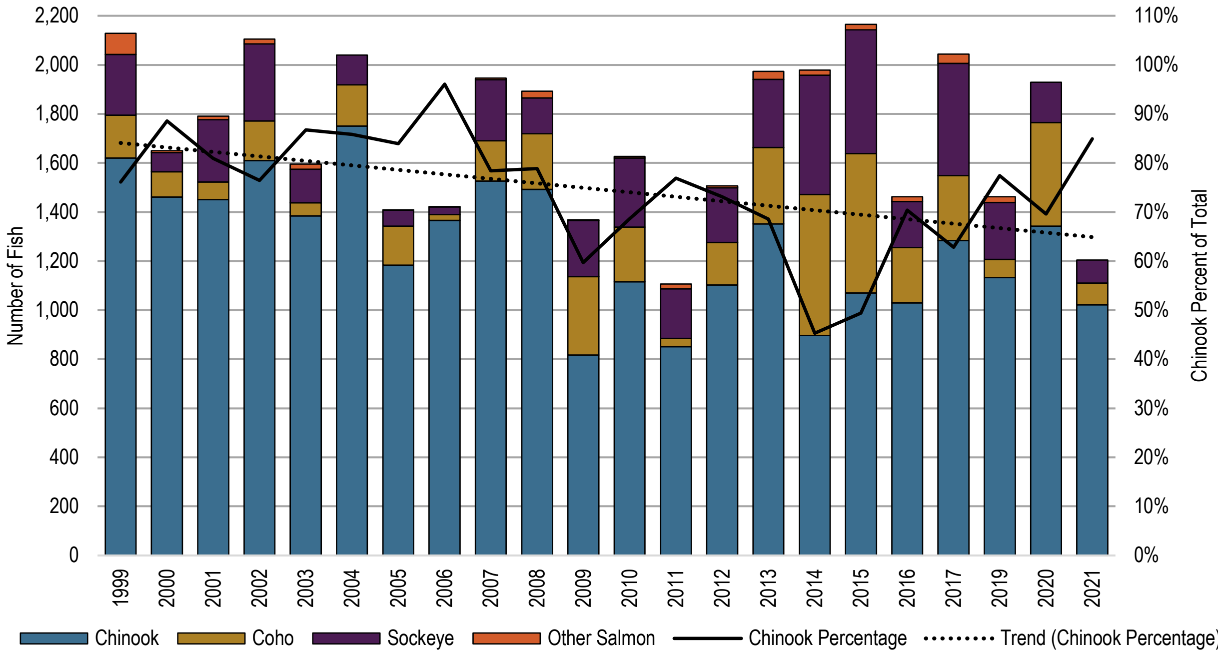
The State of Alaska defines subsistence uses of wild resources as noncommercial, customary, and traditional uses for a variety of purposes. These include direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; and for the customary trade, barter, or sharing for personal or family consumption (AS 16.05.940).

ADF&G, under the direction of the BOF, manages subsistence salmon harvests in waters within the State of Alaska out to the three-nautical-mile limit. The State has 82 local fish and game advisory committees that review, make recommendations, submit proposals, and testify to the BOF concerning subsistence and other uses in their areas.

Under Alaska's subsistence statute, the BOF must identify fish stocks that support subsistence fisheries and, if there is a harvestable surplus of these stocks, determine the amount of the harvestable surplus that is reasonably necessary for subsistence uses, and adopt regulations that provide reasonable opportunities for these subsistence uses to take place. Statute defines "reasonable opportunity" as an opportunity that allows a subsistence user to participate in a subsistence fishery that provides a normally diligent participant with a reasonable expectation of success of taking of fish (AS 16.05.258(f)). The BOF evaluates whether reasonable opportunities are provided by existing or proposed regulations by reviewing harvest estimates relative to the "amount reasonably necessary for subsistence use" findings as well as subsistence fishing schedules, gear restrictions, and other management actions. Whenever it is necessary to restrict harvest, subsistence fisheries have a preference over other uses of the stock (AS 16.05.258). ADF&G, Division of Commercial Fisheries, manages subsistence fisheries in the area of potential effect of this proposed Chinook Prohibited Species Catch action. Subsistence and other uses may be restricted or closed to provide for sustainability, based upon relevant adopted fishery management plans. Further information on State management of subsistence fisheries can be found on the ADF&G website at: http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistence.main.

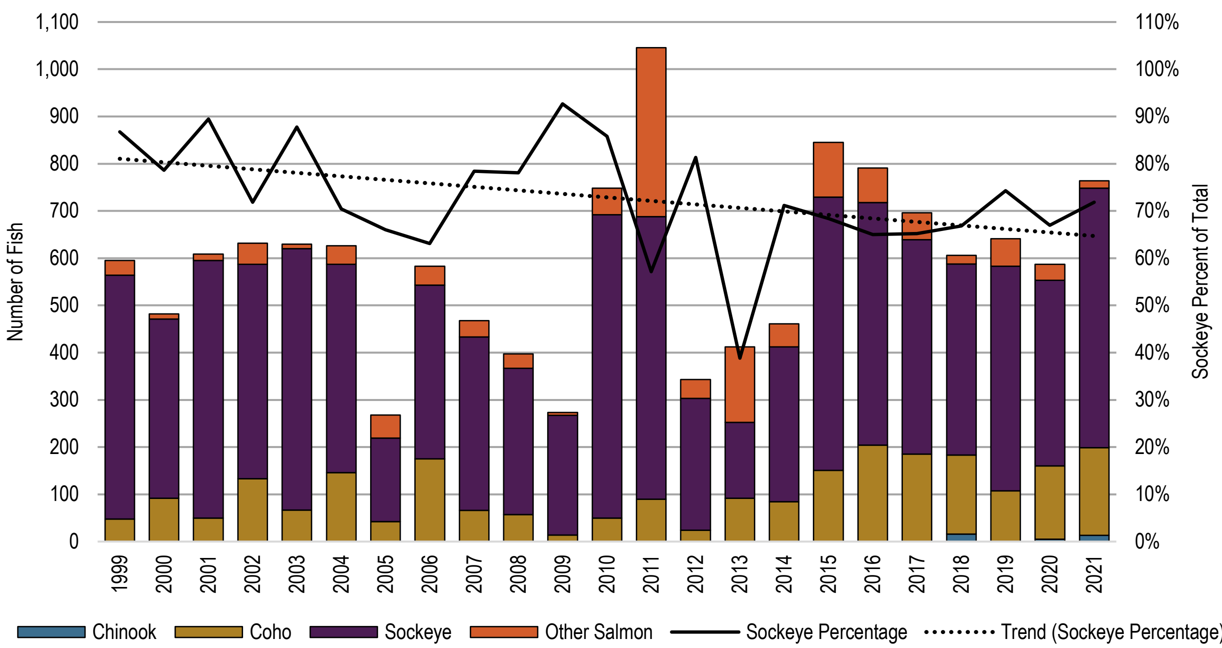
In Upper Cook Inlet, subsistence fishing is allowed in the Tyonek Subdistrict of the Northern District and in the Yentna River drainage outside the Anchorage-Matsu-Kenai Nonsubsistence Area. From 1999–2018, an average of 85 permits were issued annually in the Tyonek subsistence fishery, while an average of 22 permits were issued annually in the Yentna subsistence fishery (Marston and Frothingham 2019). Figure 4-59 and Figure 4-60 show the salmon harvests in the Tyonek subsistence fishery and Yentna subsistence fishery, respectively, from 1999–2021. and 1999–2018. Chinook salmon was the primary species caught in the Tyonek subsistence fishery, while sockeye salmon dominated the catch of the Yentna subsistence fishery.

Figure 4-59 Salmon harvest (in numbers of fish) in the Tyonek subsistence salmon fishery by species, 1999–2021.



Notes: Data from returned permit logs.
Source: Developed by Northern Economics based on data from Oslund et al. (2020) and Marston and Frothingham (2022).

Figure 4-60 Salmon harvest (in numbers of fish) in the Yentna subsistence salmon fishery by species, 1999–2021.



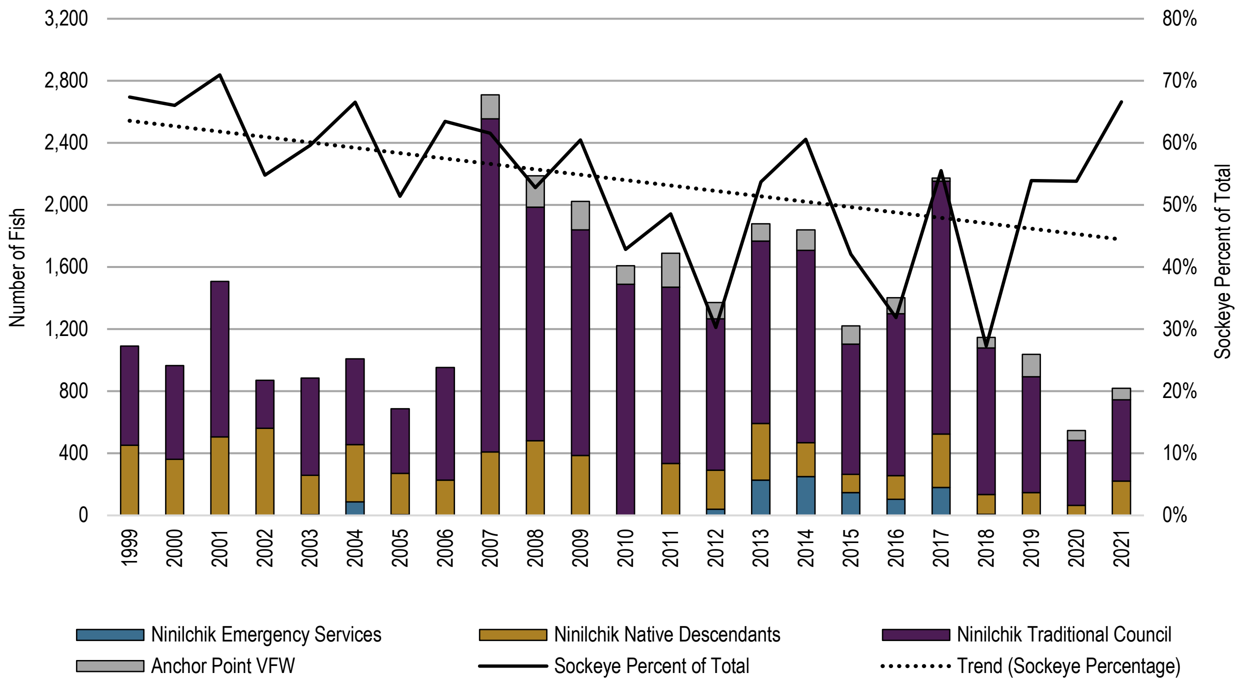
Notes: Data from returned permit logs.
Source: Developed by Northern Economics based on Oslund et al. (2020) and Marston and Frothingham (2022).

The objectives for educational fisheries are specified in 5 AAC 93.235 as "educating persons concerning historical, contemporary, or experimental methods for locating, harvesting, handling, or processing fishery resources." The first educational fishery was the 1989 Kenaitze Tribal fishery (on the Kenai Peninsula), which originated as a Federal court-ordered subsistence fishery after extensive legislation and litigation related to both State and Federal interpretation of subsistence. Prior to the 1993 fishing season, the Alaska Superior Court, in negotiations with ADF&G and the Kenaitze Tribe, ordered ADF&G to issue educational fishing permits (Oslund et al. 2020).

In the past two decades many groups have been issued permits by ADF&G to operate educational fishery programs in Upper Cook Inlet. In the Central District of Upper Cook Inlet, eight groups have been permitted to conduct educational fisheries, including the Kenaitze Tribal Group, Ninilchik Traditional Council, Ninilchik Native Descendants, Ninilchik Emergency Services, Anchor Point Veterans of Foreign Wars, Homer Sons of the American Legion Post 16, Kasilof Regional Historical Association, and the Southcentral Foundation. In the Northern District of Upper Cook Inlet, seven groups have been granted permits for educational fisheries, including the Knik Tribal Council, Big Lake Cultural Outreach, Native Village of Eklutna, Native Village of Tyonek (Tyonek Subsistence Camp), Alaska's Territorial Homestead Lodge, Intertribal Native Leadership, and Chickaloon Native Village.

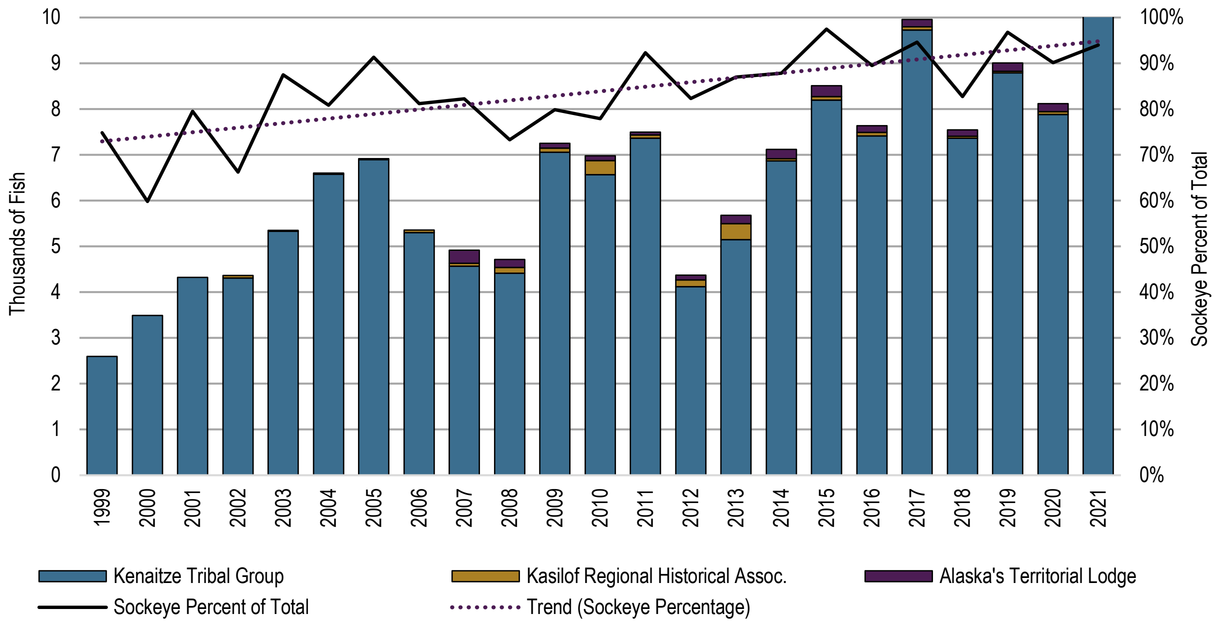
While all the groups with educational fishery permits have reported harvests, the fishing activity of some groups has been very intermittent. Figure 4-61 through Figure 4-63 show the harvests of groups whose participation in Upper Cook Inlet educational fisheries has been fairly consistent over the years.

Figure 4-61 Salmon harvest (in numbers of fish) in Ninilchik and Anchor Point Area Educational salmon fisheries by species, 1999–2021.



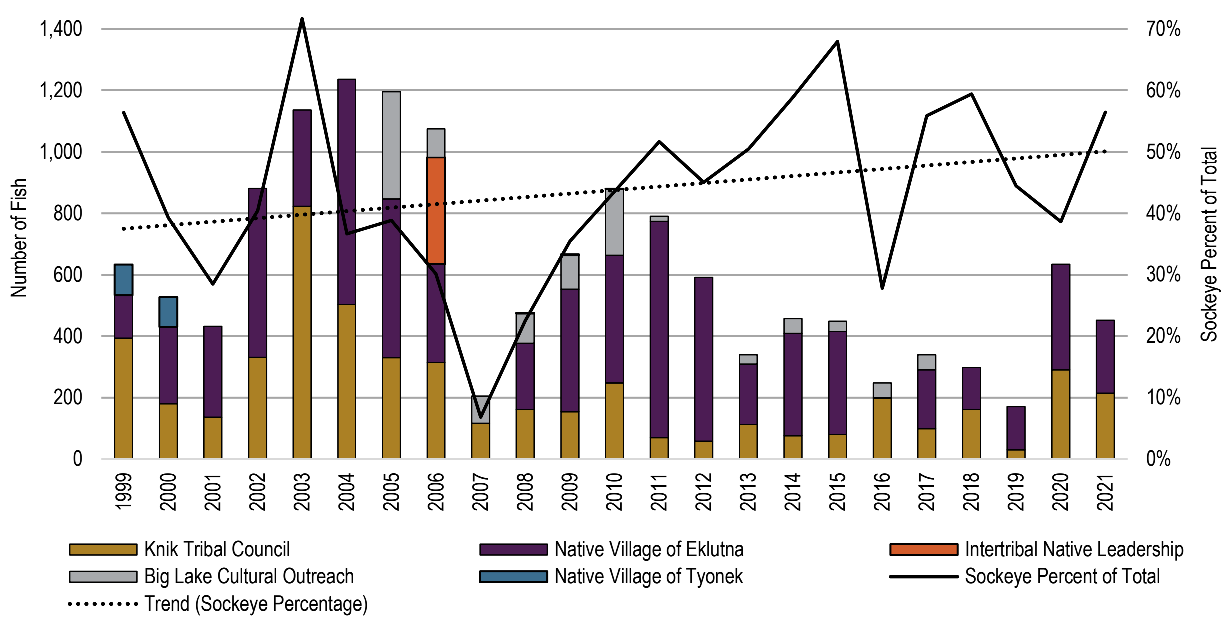
Notes: Data from returned permit logs.
Source: Developed by Northern Economics based on data from Booz et al. (2019) and Marston and Frothingham (2022).

Figure 4-62 Salmon harvest (in numbers of fish) in the Kenaitze Tribal Group, Kasilof Regional Historical Association, and Alaska's Territorial Homestead Lodge educational salmon fisheries by species, 1999–2021.



Notes: Data from returned permit logs.
Source: Developed by Northern Economics based on data from Lipka et al. (2020).

Figure 4-63 Salmon harvest (in numbers of fish) in the Knik Tribal Council, Big Lake Cultural Outreach, and Native Village of Eklutna educational salmon fisheries by species, 1999–2021.



Notes: Data from returned permit logs.
Source: Developed by Northern Economics based on Oslund et al. (2020) and Marston and Frothingham (2022).

4.6.4.2. Federal Subsistence Fisheries

The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 mandates that, among consumptive uses of fish and wildlife, rural residents of Alaska be given a priority opportunity for customary and traditional subsistence use on Federal lands. In 1986, Alaska amended its subsistence law, mandating a rural subsistence priority to bring it into compliance with ANILCA. However, in the 1989 McDowell decision, the Alaska Supreme Court ruled that the priority in the State's subsistence law could not be exclusively based on location of residence under provisions of the Alaska Constitution. Other Federal court cases regarding the State's administration of Title VIII of ANILCA ruled that the State would not be given deference in interpreting Federal statute. Proposed amendments to ANILCA and the constitution were not adopted to rectify these conflicts. Therefore, the Secretaries of Interior and of Agriculture implemented a duplicate regulatory program to assure the rural subsistence priority is applied under ANILCA on Federal lands. As a result, beginning in 1990, the State and Federal governments both provide subsistence uses on Federal public lands and waters in Alaska, which covers about 230 million acres or 60% of the land within the State.[126] In 1992, the Secretaries of the Interior and of Agriculture established the Federal Subsistence Board and ten Regional Advisory Councils to administer the responsibility. The Board's composition includes a chair, appointed by the Secretary of the Interior with concurrence of the Secretary of Agriculture; the Alaska Regional Director, U.S. Fish and Wildlife Service; the Alaska Regional Director, National Park Service; the Alaska State Director, Bureau of Land Management; the Alaska Regional Director, Bureau of Indian Affairs; and the Alaska Regional Forester, U.S. Department of Agriculture Forest Service.

Through the Federal Subsistence Board, these agencies participate in developing regulations which establish the program structure, determine which Alaska residents are eligible to take specific species for subsistence uses, and establish seasons, harvest limits, methods and means for subsistence take of species in specific Federal areas. The Regional Advisory Councils provide recommendations and information to the Federal Subsistence Board; review proposed regulations, policies, and management plans; and provide a public forum for subsistence issues. Each Regional Advisory Council consists of residents representing subsistence, sport, and commercial fishing and hunting interests. Further information on the Federal Subsistence Management Program can be found at https://www.doi.gov/subsistence.

Since 2007, Federal regulations allow for the harvest of salmon, trout, and Dolly Varden in the Kenai National Wildlife Refuge and Chugach National Forest by residents of Cooper Landing, Hope, and Ninilchik. In 2016, the most recent year for which data are available, a total of 227 permits were issued to these communities, with 102 permits issued to residents of Cooper Landing, 27 to residents of Hope, and 98 to residents of Ninilchik. The total harvest in the Federal subsistence fishery on the Kenai and Kasilof Rivers in 2016 was 2,514 salmon, most (2,500) of which were sockeye salmon, 12 were coho salmon, and two were Chinook salmon (Fall 2019).

4.7. Analysis of Impacts

4.7.1. Impacts of Measures Managing Target Species Harvest

This section describes potential changes in benefits and costs to firms or individuals in the UCI salmon drift gillnet fishery as a result of proposed management measures that may restrict the harvest of salmon species in the Cook Inlet EEZ.

4.7.1.1. Alternative 1, No Action

Alternative 1 would not change the State's management of the salmon drift gillnet fishery in either Federal or State waters. Therefore, the alternative would not alter the State's escapement-based Cook Inlet management program. Furthermore, ADF&G would continue to manage the salmon drift gillnet fishery in accordance with the Central District Drift Gillnet Fishery Management Plan. The management

[126] The U.S. Supreme Court has ruled that ANILCA's use of "in Alaska" refers to the boundaries of the State of Alaska and concluded that ANILCA does not apply to the outer continental shelf region (*Amoco Prod. Co. v. Village of Gambell*, 480 U.S. 531, 546-47 (1987)). However, NMFS aims to protect such uses pursuant to other laws, such as NEPA and the MSA.

plan sets forth time and area restrictions for the fishery that are intended to ensure adequate escapement and a harvestable surplus of salmon into the Northern District drainages.

Current trends in salmon harvest levels by the salmon drift gillnet fleet are expected to continue. As in the past (Figure 4-5), harvest levels will likely fluctuate dramatically from year to year due to the inherent annual variability in the scale of wild salmon runs. Catches by the drift gillnet fleet in the EEZ and State waters of Cook Inlet would be expected to fall within recently observed ranges (Figure 4-9). In addition, the proportion of the Upper Cook Inlet salmon harvest caught by the salmon drift gillnet fleet is expected to continue to follow the current trend. As shown in Figure 4-6, from 1999–2021, the UCI salmon drift gillnet fleet harvested an overall increasing percentage of the total salmon catch and catch of each species, with the exception of sockeye salmon—the fleet accounted for a relatively flat proportion of the Upper Cook Inlet sockeye harvest.

Regarding the saltwater recreational salmon fishery in the Cook Inlet EEZ, current trends are expected to continue. Harvest levels, which are estimated to be extremely small relative to most other Cook Inlet commercial and non-commercial salmon fisheries, will likely continue to fluctuate within recently observed ranges (Table 4-35).

The next regularly scheduled meeting of the BOF that will review Upper Cook Inlet finfish regulations occurs in the 2023–2024 meeting cycle.[127] At that time, the BOF will consider any proposed changes to regulations in the Central District Drift Gillnet Fishery Management Plan and recreational fishery management measures submitted by members of the public, local Fish and Game Advisory Committees, and ADF&G. If adopted, these proposals could change the amount of salmon caught in the UCI salmon drift gillnet fishery or other salmon fisheries in Upper Cook Inlet. However, it is uncertain what proposals will be submitted and approved by the BOF during the next meeting cycle.

4.7.1.2. Alternative 2

If none of the postseason ACLs established under the three-tier system are exceeded, and if no stock or stock complex is declared overfished and no overfishing is occurring, then harvest level trends in the Cook Inlet EEZ salmon drift gillnet and saltwater recreational fishery sectors are expected to be appreciably similar to those under Alternative 1. In addition, harvest level trends in other salmon fisheries in Upper Cook Inlet, including the set gillnet, freshwater recreational, personal use, and subsistence/educational fisheries, would be similar to those under Alternative 1. As under Alternative 1, the BOF could amend the Central District Drift Gillnet Fishery Management Plan or management of recreational fisheries in a way that would change the amount of salmon caught in the UCI salmon drift gillnet fishery or other salmon fisheries in Upper Cook Inlet. Given that a management plan amendment would likely affect the salmon drift gillnet fishery in both State and Federal waters, it is expected that any amendments to the Central District Drift Gillnet Fishery Management Plan would be reviewed by the Joint Protocol Committee of the Council and BOF.

If any of the postseason ACLs are exceeded, or if a stock or stock complex is declared overfished or if overfishing is occurring, the Council would request that the State report to the Council the remedial management measures the State proposes to implement. If the Council and NMFS deem the State's proposed measures sufficient to comply with Magnuson-Stevens Act requirements, the measures may be adopted without an FMP amendment to assure timely implementation. If the Council and NMFS do not deem the State's proposed measures sufficient to comply with Magnuson-Stevens Act requirements, the

[127] The BOF could consider a proposed change to the regulations in the Central District Drift Gillnet Fishery Management Plan before the next scheduled meeting if it is determined that the proposal addresses an emergency, which is defined as "an unforeseen, unexpected event that either threatens a fish or game resource, or an unforeseen, unexpected resource situation where a biologically allowable resource harvest would be precluded by delayed regulatory action and such delay would be significantly burdensome to the petitioners because the resource would be unavailable in the future" (5 AAC 96.625(f)).

Council would adopt remedial measures for recommendation to NMFS. Adoption of some measures, such as a stock or stock complex rebuilding program, would require implementation either through an FMP amendment or notice and comment rule-making process. No Cook Inlet salmon stocks are currently in an overfished status that would require a rebuilding plan. State management action has been largely effective in maintaining salmon stocks above the thresholds that would trigger a Federal rebuilding plan (Section 3.1.2).

Either a State or Federal rebuilding program for a stock or stock complex in the Cook Inlet EEZ would likely be complex and contentious given the mix of salmon stocks caught. Measures designed to protect and rebuild one or more overfished salmon stocks may require a substantial curtailment of catches of healthy salmon stocks because of the limited selectivity of the commercial drift gillnet fishing gear in the multispecies, mixed-stock fishery. Removals by the recreational fishery in the EEZ would also be considered, and may also require closure or prohibiting harvest of specific stocks or species as allowed by more selective recreational fishing gear. Over the longer term, a successful rebuilding program is expected to increase fishery profitability as stocks return to productive levels. However, requiring a reduction in fishing effort would directly impact fishermen and reduce their income in the near-term to the extent they relied on that fishery.

If the State of Alaska does not implement the required management measures delegated under Alternative 2, the Cook Inlet EEZ would be closed to salmon fishing. The impacts of this would be consistent with Alternative 4, with the additional implementation of the Federal regulatory framework and the associated requirements. Impacts of closure to guided and unguided recreational fishermen, which are not considered under Alternative 4, are expected to be relatively small given the very limited salmon harvest in the area (Table 4-35) relative to other Cook Inlet marine waters (Table 4-34 and Table 4-36). Recreational anglers could continue to target halibut and groundfish in the Cook Inlet EEZ, and salmon in Cook Inlet State waters if open. Available information indicates that salmon harvested in the Cook Inlet EEZ are landed in Anchor Point, Deep Creek, Happy Valley, Homer, and Ninilchik. To the extent that a recreational salmon fishing closure reduces salmon fishing activities, these communities could experience marginal reductions in use of support services by anglers and the associated economic benefits.

4.7.1.3. Alternative 3

Under Alternative 3, the Council would control harvest through annually setting TACs for salmon drift gillnet fishing in the Cook Inlet EEZ. The establishment of TACs would require a process to coordinate expected salmon harvests in the salmon drift gillnet fleet in both State and Federal waters. TACs would account for scientific and management uncertainty, and may be more conservative as a result, particularly in the initial years of Federal management. TACs would also account for removals by the recreational salmon fishery in the Cook Inlet EEZ, but that is not expected to have a substantive impact on harvest available to the commercial fishery sector given the small number of EEZ recreational fishery sector removals. Given the constraints of the annual process for setting ACLs described in Section 2.5.3, and the requirements associated with TACs and any inseason adjustments described in Section 2.5.13, it would be more difficult for Federal managers to respond to inseason information (e.g., run strength, timing, or escapement information) with adjustments to fishery management in the Cook Inlet EEZ. As described in Section 3.1.3, while there are uncertainties as a result of the interaction between run size and State and EEZ waters harvest proportions, potential BOF action, and Federal TAC setting considerations, harvests are expected to remain near or marginally below status quo levels.

As described in Section 3.1.3, NMFS proposes implementing this alternative with a commercial fishery season end date in the event that one or more TACs are not reached prior to that date. With a season closure date of August 15, it would potentially allow for the harvest of more than 99% of Chinook, sockeye, pink, and chum salmon as well as more than 95% of coho salmon relative to the historical annual average. Additionally, there could be one additional EEZ opening per week from July 16 until July

31 when compared to the status quo. Because drift gillnet catches often peak during this period, the proportion harvested by date may increase relative to the data presented in Table 4-46 and total harvests may increase. This would allow for the drift gillnet fleet to achieve harvests consistent with recent historical ranges.

Table 4-46 Average cumulative catch in the EEZ (2013 to 2021) on selected days as a percentage of total EEZ landings.

Date	% of EEZ Chinook	% of EEZ Sockeye	% of EEZ Coho	% of EEZ Pink	% of EEZ Chum
July 7	28.1%	6.2%	0.5%	0.9%	3.6%
July 9	57.6%	18.7%	4.8%	6.9%	16.1%
July 15	82.3%	56.0%	20.5%	48.9%	46.1%
July 21	91.2%	78.3%	34.2%	77.9%	62.8%
July 27	95.9%	88.9%	57.2%	88.5%	76.3%
Aug 2	97.9%	94.2%	71.1%	92.6%	87.0%
Aug 8	99.4%	99.0%	88.7%	97.4%	97.4%
Aug 14	99.8%	99.9%	94.8%	99.9%	99.5%
Aug 20	99.9%	>99.9%	97.4%	>99.9%	99.9%
Aug 26	>99.9%	>99.9%	98.9%	>99.9%	>99.9%
Sept 1	>99.9%	>99.9%	99.4%	>99.9%	>99.9%

Source: Developed by Northern Economics based on ADF&G fish ticket data (2022).

For recreational salmon fishing in the Cook Inlet EEZ, harvests are also expected to continue at or near existing levels (Table 4-35) with bag limits that are approximately equivalent to the status quo. Additionally, in the event of a closure or conservation concern, the recreational sector is able to release specific species or stocks with limited mortality and therefore may be able to maintain opportunity to catch other stocks. However, if there are significant increases in recreational salmon harvest in the Cook Inlet EEZ, or a conservation concern is too severe to allow for even incidental catch and release mortality, the Cook Inlet EEZ recreational fishery sector may experience more restrictive management, which may impact a limited number of recreational fishermen to the extent they rely on the Cook Inlet EEZ.

The impact of Alternative 3 on the harvests of salmon drift gillnet vessels, as well as impacts to associated processors and communities, would be proportional to the extent that they are dependent on salmon harvested in the Cook Inlet EEZ Area. As noted in Section 4.5.1.2.3, the entire active salmon drift gillnet fleet likely fishes in the EEZ at some time during each fishing season, but over the entire season vessels differ with respect to their level of economic dependency on fishing grounds in the EEZ. While the difference between vessel groups is small, the analysis in Section 4.5.1.2.3 shows that the EEZ accounted for more of the annual catch for vessels that generally catch the fewest fish during a season. Any impacts from this action would be limited to differences in harvest between what would have been implemented under status quo State management compared to under this action for a given fishing year.

Over the long term, harvest level trends in the salmon drift gillnet fleet are expected to be appreciably similar to those under Alternative 1. As with existing State management, when the abundance of one or more salmon stocks is low, or uncertainty is high, commercial fishing time and harvests in the EEZ are expected to be limited. When Cook Inlet EEZ harvests are near existing levels, harvest level trends in other salmon fisheries in Upper Cook Inlet, including the set gillnet, freshwater recreational, personal use, and subsistence/educational fisheries, are also expected to be similar to those under Alternative 1.

Impacts on fishery participants, compared to status quo conditions, would largely depend on the degree to which TACs established based on pre-season data are able to account for uncertainty in run projections to set catch limits consistent with historical EEZ harvests. Management uncertainty at the time of implementation is expected to reduce over time, but cannot be completely eliminated. Due to data limitations, it is not possible to estimate the maximum amount of commercial fishing revenue that would be at risk under Alternative 3—i.e., the fishing revenue that would be foregone if fishing vessel operators in the salmon drift gillnet fleet cannot offset the revenue loss of an EEZ closure by fishing in a different location—but, in general, Alternative 3 is expected to maintain near status quo opportunities for participants that choose to participate in the Federal fishery. A revenue-at-risk estimate would require historical data on the amount of salmon available for harvest within the EEZ at a given point in time across the fishing season, and these data are unavailable. Across years there is a high level of variability in the spatial and temporal distributions of salmon stocks migrating through the Central District due to changes in wind, tide, water temperature, salmon abundance, and other factors.

There may be years in which run forecasts are poor or involve a lot of uncertainty and NMFS therefore establishes a low preseason TAC to ensure conservation objectives are met. If salmon returns are better than anticipated, NMFS may not be able to provide as much additional EEZ harvest opportunity in response to real-time data as the State can under status quo conditions. This is because NMFS may need to amend its harvest specifications through rulemaking, and that may not be possible before the end of the fishing season. However, given that there has been consistent fishing opportunity provided to the drift gillnet fleet in Federal waters through ~July 15 across a broad range of salmon abundances, including recent low abundance years, complete closures are not expected.

If the Cook Inlet EEZ is closed under Alternative 3 before sockeye salmon harvests begin to slow (typically around July 23 as shown in Figure 4-1) and there is still a harvestable surplus available, it is expected that ADF&G fishery managers would make time and area adjustments, thereby enabling the drift gillnet fleet to achieve the same harvest it would have attained in the absence of a reduction in EEZ harvests. ADF&G fishery managers could adjust openings for the salmon drift gillnet fishery in State waters to the extent allowed by the Central District Drift Gillnet Fishery Management Plan. One possibility would be that State managers would allow more frequent openers of the Expanded Kenai and Kasilof Sections or the State waters portion of Area 1. The BOF could also amend the Central District Drift Gillnet Fishery Management Plan to facilitate increased harvest in State waters. It is expected that any amendments to the Central District Drift Gillnet Fishery Management Plan would be reviewed by the Joint Protocol Committee of the Council and BOF.

Because EEZ fishing opportunity is expected to be similar to the status quo under Alternative 3, major reductions in EEZ harvest are not anticipated. In the event Alternative 3 does result in salmon drift gillnet fleet harvest reductions—beyond restrictions that would likely be implemented under the status quo in response to low returns—and additional harvest did not occur in State waters, firms and individuals in the processing sector that accept deliveries of salmon caught in the Cook Inlet EEZ could experience a reduction in their overall level of production for that fishing year. Smaller operations, including catcher-sellers, direct marketers, and small shorebased processors, would probably be more affected by changes in salmon landings than larger buyers, because smaller buyers tend to be less diversified in the range of species handled. In addition, as shown in Table 4-12, a number of large shorebased processors are heavily dependent on UCI drift gillnet-caught salmon. Substantial decreases in production could lead to a temporary shutdown or permanent closing of some processing businesses. However, if NMFS closed the EEZ under Alternative 3, that likely means fishery conditions would also be expected to result in EEZ closure or severe restrictions under status quo management by the State. The most likely reason for closure is the low abundance of stocks that pass through the EEZ as they move into the Northern District of Cook Inlet. Thus, as compared to the status quo, no substantial reductions in EEZ harvest are anticipated when considered in the context of run strength in a given fishing season. Moreover, as noted above, the impact of a closure on the harvest of the salmon drift gillnet fishery would depend on the timing and duration of the closure, whether the State would have made a similar management decision, together with opportunities that the salmon drift gillnet fleet have to offset a reduction in EEZ harvests through increasing effort inside State waters.

Should Alternative 3 result in lower harvests by the drift gillnet fleet in the EEZ, the harvests of other user groups, primarily Northern District and Upper Subdistrict set gillnet, Susitna and Matanuska river sport and personal use, and Kenai and Kasilof commercial set gillnet and sport and personal use fishermen, could increase. If harvest by these other users does not completely offset reduced EEZ drift gillnet harvests, then overall levels of inriver passage could increase, in which case it is likely sport and personal use fisheries for sockeye and coho salmon in northern Cook Inlet would experience fewer restrictions (Alaska Department of Fish and Game 2020b). However, it is not possible to estimate the magnitude of the harvest benefits to these other user groups because of the complexities of Upper Cook Inlet mixed-stock fisheries and intertwined State management and allocation plans. For example, the Upper Subdistrict and Northern District set gillnet fisheries may see increased harvests of sockeye salmon if the EEZ harvest by the UCI drift gillnet fleet is reduced, but they may not be able to fully utilize this benefit in years when set gillnet fisheries are restricted to conserve Chinook or coho salmon (Alaska Department of Fish and Game 2020b). If this occurs, escapement levels may increase.

Some individual vessels may experience reduced harvests compared to the status quo, either because they choose not to participate in the Federal fishery or because preseason harvest limits result in some reductions in total EEZ harvest. However, decreases in harvest by some vessels in the fleet may allow other vessels and harvesters located throughout Cook Inlet to increase their harvests, particularly if there were fewer total vessels in the EEZ. Overall, because harvest levels of each sector are expected to remain more or less consistent with status quo conditions, no long term community level impacts are expected under Alternative 3. If EEZ harvests are more significantly reduced from the status quo in any given year—either due to scientific uncertainty identified by the SSC or because preseason estimates of run strength were too low and TACs were constraining— then communities likewise could be negatively affected as less income flows through different sectors of the local economy during that fishing season. As described in Section 4.7.1.4, a reduction in the harvest levels of the drift gillnet fleet, together with accompanying changes in the spatial distribution of fishing effort, would differentially affect communities based on their specific location relative to the Cook Inlet EEZ and their harvesting, processing, and fishery support service sectors' relative engagement in, and dependency on, the drift gillnet fishery.

4.7.1.4. Alternative 4

Under Alternative 4, commercial salmon fishing would be prohibited in the Cook Inlet EEZ; therefore, the salmon drift gillnet fleet harvest in the EEZ would be zero. In contrast to Alternative 3, the complete closure of the Cook Inlet EEZ to commercial salmon fishing would be permanent. It is possible to estimate the maximum amount of commercial fishing revenue that would be at risk under Alternative 4. Table 4-47 shows the gross revenue of the salmon drift gillnet fishery inside the EEZ from 2009–2021 for all salmon species. During that period, it is estimated that an average of 46.9% of gross revenue, or $13.9 million, was generated in the EEZ. In the most recent 5-year period, from 2017 to 2021, an average of 42.1% of gross revenue, or $7.3 million, was generated in the EEZ. Also note that in 2020, the percent of value generated in the EEZ was only 18.5%.

Table 4-47. Gross revenue (inflation adjusted to millions of 2021 dollars) from salmon harvests in the UCI salmon drift gillnet fishery inside the EEZ, 2009–2021.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average
EEZ	$10.1	$16.0	$30.8	$26.8	$21.1	$18.8	$9.3	$11.2	$11.4	$6.3	$8.4	$2.1	$8.3	$13.9
State Waters	$8.1	$11.1	$36.6	$27.3	$18.1	$20.5	$14.8	$18.4	$15.1	$5.0	$9.3	$9.1	$11.5	$15.8
All Waters	$18.2	$27.1	$67.4	$54.1	$39.2	$39.3	$24.1	$29.6	$26.4	$11.3	$17.7	$11.2	$19.9	$29.6
EEZ Percentage	55.7%	58.9%	45.7%	49.6%	53.8%	47.9%	38.7%	37.9%	42.9%	55.6%	47.5%	18.5%	42.0%	46.9%

Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020) and ADF&G (2022).

The impact of Alternative 4 on the harvests of individual UCI salmon drift gillnet vessels would be proportional to the extent that they rely on the EEZ for target fishing. As noted in Section 4.5.1.2.3, the entire active UCI salmon drift gillnet fleet likely fishes in the EEZ at some time during each fishing season, but over the entire season, vessels differ with respect to their level of economic dependency on fishing grounds in the EEZ. While the difference between vessel groups is small, the analysis in Section 4.5.1.2.3 shows that the EEZ accounted for more of the annual catch of vessels that generally catch the fewest fish during a season.

Those salmon drift gillnet vessels displaced by a permanent EEZ closure would have the options of ceasing to fish or relocating their fishing activities to State waters in Upper Cook Inlet. However, a number of factors may potentially make it difficult for vessels to fully offset the loss of access to the EEZ by increasing effort inside State waters. The catch rates of Kenai River late-run and Susitna River sockeye salmon and Susitna River coho salmon in State waters are likely lower than in Federal waters (Alaska Department of Fish and Game 2020b), translating into less harvesting revenue for any given effort level. As discussed in Section 4.5.1.2.1, much of the southwestern range of the salmon drift gillnet fleet approximates the boundaries of the Cook Inlet EEZ because the rip tide zones favored for salmon drift gillnet fishing are located in the EEZ. However, without any commercial fishery interception of salmon in the EEZ, it is possible that State waters catch rates by salmon drift gillnet vessels may improve over what has been historically observed.

If UCI salmon drift gillnet vessels displaced by a permanent EEZ closure shift their fishing effort to State waters in Upper Cook Inlet, both displaced vessels and vessels that only fish in State waters may incur congestion costs. For example, gear conflicts could be exacerbated, and gear may be lost due to entanglement. These potential congestion effects are especially likely to occur if a “line fishery” develops, whereby the bulk of the salmon drift gillnet fleet is positioned near the EEZ boundary to harvest fish as they enter State waters (Alaska Department of Fish and Game 2020b). Finally, a permanent EEZ closure may mean some vessels travel farther to the fishing grounds than previously, thereby increasing operating costs such as fuel expenses. The combination of adverse effects on the profitability of fishing operations resulting from a permanent closure of the EEZ may cause the UCI drift gillnet fleet size to shrink, as some fishermen may choose not to participate in the fishery or shift their fishing effort to other areas.

Alternative 4 could indirectly lead the BOF to amend the Central District Drift Gillnet Fishery Management Plan in order to compensate the drift gillnet fleet for closure of the Cook Inlet EEZ as current management measures are designed around the availability of opportunity in the EEZ. For example, the BOF could direct ADF&G to provide drift gillnet fishing opportunity in Drift Gillnet Area 2. However, this would likely result in increased harvest of Susitna River, Knik Arm, and Matanuska River stocks, which would have a negative impact on the harvests of the other user groups of these stocks. Moreover, it is likely that the drift gillnet fleet would experience a lower catch rate of Kasilof and Kenai river sockeye salmon stocks in Drift Gillnet Area 2 than in the EEZ (Alaska Department of Fish and Game 2020b).

A predictable closure of the EEZ under Alternative 4 would allow the BOF and ADF&G to design State Cook Inlet management plans and management measures with greater certainty relative to Alternative 3. More consistent salmon fishery conditions in Cook Inlet and a lack of additional management uncertainty would be expected to allow the refinement of management measures that optimize and maximize salmon utilization in State waters over time.

To the extent that Alternative 4 would result in a decrease in the amount of salmon harvested by the UCI salmon drift gillnet fleet despite management adjustments in State waters and shifts in the fleet’s fishing effort, firms and individuals in the processing sector that previously accepted deliveries of salmon caught in the Cook Inlet EEZ would experience a reduction in their overall level of production if they are unable to offset a reduction in salmon from the drift gillnet fishery with salmon from other fisheries. Smaller operations would probably be more affected by changes in salmon landings than larger buyers because smaller buyers tend to be less diversified in the range of species handled. In addition, as shown in Table 4-12, a number of large shorebased processors are heavily dependent on drift gillnet-caught salmon. Substantial decreases in production could lead to a temporary shutdown or permanent closing of some processing businesses. As noted above, the impact of the Cook Inlet EEZ closure on the harvest of the UCI salmon drift gillnet fleet would depend on the fleet's ability to offset a reduction in EEZ harvests by increasing effort inside State waters.

As under Alternative 3, should Alternative 4 result in lower harvests by the drift gillnet fleet, the harvests of other user groups, primarily Northern District and Upper Subdistrict set gillnet, Susitna and Matanuska River sport and personal use, and Kenai and Kasilof commercial set gillnet and sport and personal use fishermen, could increase. Alternatively, overall levels of escapement could increase, in which case it is likely sport and personal use fisheries for sockeye and coho salmon in northern Cook Inlet would experience fewer restrictions. However, it is not possible to estimate the magnitude of the harvest benefits to these other user groups because of the complexities of Upper Cook Inlet mixed-stock fisheries and intertwined State management/allocation plans.

Communities would be affected differently by an EEZ closure based on their specific location relative to the Cook Inlet EEZ. For example, drift gillnet vessels based in communities to the south of the EEZ would experience longer run times. An EEZ closure could also impact where drift gillnet vessels would spend larger or smaller portions of the fishing season, which, in turn, could impact communities where goods and services were obtained by those vessels and their crews.

Changes in the harvest levels of the drift gillnet fleet due to an EEZ closure would also have the potential to differentially affect communities, including communities associated with the UCI drift gillnet fishery and those associated with other salmon user groups. With respect to the former, communities would be affected differently based on their relative engagement in and dependency on the drift gillnet fleet, as measured by gross revenue diversification of locally owned drift gillnet vessels, gross revenue diversification of the larger "community harvesting sector," gross revenue diversification of local S03H permit holders (see Table 4-16, Table 4-17, and Table 4-23, respectively), or some combination thereof, or the PCFA used to categorize levels of community engagement (see Table 4-26 and Table 4-27). While a few different communities ranked high on a single engagement or dependency indicator, the data in Sections 4.5.1.5.2.1, 4.5.1.5.2.3, and 4.5.1.5.3.2 taken together suggest that the communities of Kasilof, Kenai, Nikiski, Nikolaevsk, Ninilchik, and Soldotna are among the communities potentially the most vulnerable to community-level adverse impacts specifically associated with the drift gillnet harvesting sector resulting from an EEZ closure, although the larger and more diversified Homer fleet has, by far, more revenue at potential risk in absolute terms than the fleet of any other community (see Table 4-17).

Similarly, because of differences in the economic diversity of local processing operations (see Table 4-21 for the few data that are not confidential), communities would be differentially vulnerable to shorebased processing impacts resulting from reductions in drift gillnet fleet harvests under Alternative 4, with the available data suggesting the vulnerability of Kenai in particular (see Section 4.5.1.5.2.2).[128] As noted in Section 4.5.1.5.2.2 however, the historical timing of the drift-gillnet-caught salmon processing activities, which would be altered if the Cook Inlet EEZ were permanently closed to commercial salmon fishing, is likely important to the operational flow of shorebased processors engaged in the fishery irrespective of community of operation. Further, potential changes in landing patterns of the salmon drift gillnet fleet

[128] As noted in section 4.5.5.2.2, data confidentiality constraints are especially problematic for understanding potential impacts to communities from potential adverse impacts to locally operating processors. For example, data for Seward are confidential, but it is assumed that the local processing of drift gillnet-caught Cook Inlet salmon is important to one or more processors operating in that community, given that the Cook Inlet Salmon Committee noted in its September 2019 report that Seward in particular has been an important processing location for drift gillnet caught Cook Inlet salmon.

under Alternative 4 could mean a shift in when and where drift gillnet-caught salmon enter local/community markets via catcher-sellers or direct marketers, disadvantaging catcher-sellers or direct marketers based in some communities (while potentially creating opportunities for others engaged in different gear type fisheries in those same communities) and potentially impacting the local availability or price of locally caught salmon in some communities. While the number of catcher-sellers and direct marketers (in all communities combined) and the ex-vessel value from the salmon drift gillnet fishery associated with these operations is relatively modest (see Table 4-11), the historical timing of the fishery in the Cook Inlet EEZ likely accentuated the importance of access to these salmon in at least some local markets.

Additionally, there are some communities associated with the drift gillnet fishery that would potentially experience aggregate impacts based on multiple forms of local engagement in that fishery (e.g. through any combination of locally owned catcher vessels, locally operating shorebased processors, or locally owned or operated fishery support service sector businesses; see Section 4.5.1.5.3) as well as through fishery related tax and fee derived public sector revenue (see Section 4.5.1.5.4). Homer, with its relatively large harbor and well-developed fishery support infrastructure, along with the number, range, and scale of fishery support service enterprises that operate in the community, is a prime example of this type of multi-sector fishery engagement. Homer is also an example of a community that would be disadvantaged by its southern location if salmon drift gillnet fishing effort and landings shift northward with the closure of the Cook Inlet EEZ. Ultimately, outcomes in individual communities in the aggregate would, like outcomes on individual operation and specific sector levels, depend on adaptive responses of individuals and entities engaged in the fishery as well as those of the State. The potential order of magnitude of impacts in any given community would also be shaped, in part, by the varying demographic and socioeconomic attributes of the engaged communities noted in Section 4.5.1.5.3 (e.g., relatively large and relatively economically diversified communities may experience different outcomes than other communities).

Alternative 4, like the other action alternatives, does not allocate or assign fishing privileges among commercial salmon fishery participants or other salmon user groups, but it may result in changes in historical patterns of harvest between user groups. With respect to communities associated with non-drift gillnet salmon user groups, as previously noted it is not possible to estimate the magnitude of potential harvest benefits to these groups, including increased access to salmon if the drift gillnet fleet is not able to sustain their historic proportion of overall harvest with a loss of access to the Cook Inlet EEZ, given the complexities involved. It is similarly not possible to estimate the distribution of these potential benefits across specific communities. In general, it is likely that this type of a beneficial impact would be distributed across a relatively large geography and among multiple communities given the different types of uses involved. However, it is likely that at least some of these benefits, whatever their magnitude, would accrue to some of communities that would potentially also experience adverse impacts based on their engagement in or dependence on the salmon drift gillnet fishery (e.g., Kenai and Kasilof, both of which have residents and business enterprises engaged in the commercial set gillnet, sport, and personal use salmon fisheries in addition to the salmon drift gillnet fishery).

4.7.2. Impacts of Monitoring, Recordkeeping, and Reporting Requirements

This section describes potential changes in benefits and costs to firms or individuals in the UCI salmon drift gillnet fishery as a result of proposed monitoring, recordkeeping, and reporting measures designed to collect data to effectively manage and conduct the fishery in Federal waters.

4.7.2.1. Alternative 1, No Action

Alternative 1 would not change the State’s management of the UCI salmon drift gillnet fishery or saltwater recreational fishery in either Federal or State waters. Therefore, the alternative does not substantially change existing State monitoring, recordkeeping, and reporting requirements in a way that is relevant to harvesting and processing sectors, government, or fishing communities.

Currently, ADF&G fish tickets are the primary source of data for the UCI salmon drift gillnet fishery. All State-licensed processors of raw fishery resources must complete and submit this form for each landing from a fishing permit holder. Information such as the vessel ADF&G number, number of crew onboard, fishing trip dates, State statistical areas, Federal areas, State and Federal fishing permits (as applicable), and species weights and dispositions are captured in the form. eLandings, which is an electronic version of ADF&G fish tickets, is required to be used by processors that submitted more than 2,000 salmon fish tickets or bought over 20 million pounds of salmon in any of the previous three calendar years (5 AAC 39.130(b)).

Under Alternative 1, the amount of salmon and other species harvested by the UCI salmon drift gillnet fleet in the EEZ versus State waters cannot be precisely determined because the boundaries of EEZ waters do not align with the areas used by fish tickets to record the location of salmon harvests. In addition. while there are currently accommodations in fish tickets for reporting at-sea discards, this information is not required to be reported.[129] Fish tickets are currently serving as the Standardized Bycatch Reporting Methodology for the commercial salmon troll fishery in the East Area of the Salmon Management Area.

Under Alternative 1, the number of marine mammal and seabird interactions in the UCI salmon drift gillnet fishery could be determined even though the fishery is under State jurisdiction. For example, the Cook Inlet salmon drift gillnet fishery was observed in 1999 and 2000 under NMFS' Alaska Marine Mammal Observer Program, which conducts observer coverage of State-managed fisheries. NMFS marine mammal observers were deployed aboard drift gillnet vessels at no financial cost to vessel owners. Observer coverage was 1.75% in 1999 and 3.73% in 2000. The Alaska Marine Mammal Observer Program monitored fisheries on rotational observation periods based on available funding. Recently, NMFS suspended the program due to a lack of resources (National Marine Fisheries Service 2020a).

For the recreational fishery, anglers must have a State of Alaska sport fishing license, must maintain a harvest record card for species for which there is an annual limit (i.e., Chinook salmon). Some anglers are also asked to complete the SWHS post-season to help provide an estimate of recreational fishery harvest. Among other administrative requirements, persons guiding saltwater anglers must complete and submit a saltwater guide logbook of all catch and harvest to ADF&G.

4.7.2.2. Alternatives 2 and 3

As described in Sections 2.4.8 and 2.5.6, under both Alternatives 2 and 3, the following fishery monitoring, recordkeeping, and reporting objectives must be addressed for the Cook Inlet EEZ drift gillnet salmon fishery:

- Accurate accounting of catch and discards of salmon, groundfish, and other species in the EEZ
- Accounting of marine mammal and seabird interactions
- Monitoring to ensure compliance with fishery open times and areas, as well as accurate reporting of catch and discards

In addition, Section 2.5.6 notes that Alternative 3 would require monitoring and recordkeeping measures to provide data for Federal inseason managers to precisely deduct catches from the EEZ catch limit and ensure compliance with EEZ fishery regulations.

Given these objectives, Sections 2.4.8 and 2.5.6 describe the proposed monitoring, recordkeeping, and reporting requirements under Alternatives 2 and 3, respectively. Under Alternative 2, Option 1, additional monitoring, recordkeeping, and reporting measures for S03H permit holders fishing in the Cook Inlet EEZ would be limited to a Federal Fisheries Permit (FFP) and Federal Daily Fishing Logbook

[129] Reporting of at-sea discards is not required because processors cannot be held responsible for determining discard amounts that they cannot verify.

requirement. Under Option 2, the Council could choose to recommend additional monitoring, recordkeeping, and reporting measures to obtain increased information from the fishery or improve the enforceability of fishery provisions. The proposed set of measures under Alternative 3, Option 1 (Preferred) for S03H permit holders fishing in the Cook Inlet EEZ includes a VMS requirement as well as an FFP and logbook requirement. In addition, eLandings would be required for all processors accepting deliveries of salmon caught in the Cook Inlet EEZ.

As described in Sections 2.4.8 and 2.5.6, under Alternatives 2 and 3, regulations relating to the disposition of bycatch may impact the monitoring, recordkeeping, and reporting tools selected for the UCI salmon drift gillnet fishery. Under Option 1 or Option 2 of both alternatives, the Council could require full retention of all fish (salmon and groundfish) caught, thus requiring that all fish remain onboard a vessel until offloaded to a processor, tender, or packer. The preferred option for Alternative 3 would allow for optional retention of non-salmon bycatch subject to maximum retainable amounts published in the annual GOA groundfish harvest specifications. Thus, vessels that do retain groundfish could continue to do so. Available information indicates groundfish are seldom retained and delivered in the drift gillnet fishery, therefore this is not expected to have an impact on fishery participants beyond the requirement that they record the amount, type, and disposition of groundfish bycatch in their federal fishing logbooks.

Characteristics of possible fishery monitoring, recordkeeping, and reporting measures that could be implemented under Alternatives 2 and 3 are presented in Table 4-48. For each measure, the table summarizes its purpose; how it would be applied to management of the UCI salmon drift gillnet fishery in Federal waters; qualitative assessments of the cost to industry of complying with the measure and the level of effort required by fishery managers to implement it; and any information gaps associated with the measure. These attributes of each measure are described in more detail in Section 4.7.2.2.1 through Section 4.7.2.2.7. Additional information on management and enforcement considerations under the action alternatives is provided in Section 4.7.and Appendix 8 provides an additional discussion of potential monitoring, recordkeeping, and reporting measures under Alternatives 2 and 3.

Table 4-48 Potential monitoring, recordkeeping, and reporting measures under Alternatives 2 and 3.

Monitoring, Recordkeeping, and Reporting Measure	Purpose	Application to UCI Salmon Drift Gillnet Fishery	Costs to the Industry of Compliance	Level of Effort to Implement	Information Gaps
Federal Fisheries Permit (preferred)	Identify vessels fishing in Federal waters	• Federal monitoring, recordkeeping, and reporting requirements can be tied to the permit	Low	Easier	
Federal Daily Fishing Logbook (eLogbook) (preferred)	Estimate effort levels Estimate catch location Estimate hail weight for each set by species Estimate level of discards by species Estimate total catch by species	• Inseason management catch estimates • Bycatch level monitoring	Low	Medium	Relies on self-reporting of data. Information can be verified by additional data collection efforts.
Full Retention of Groundfish	Prohibit discards of groundfish	• Bycatch prohibition enforcement	Low	Medium (Compliance monitoring may be expensive)	
Onboard Observers	Estimate level of discards by species Estimate hail weight for each set by species Estimate interactions with protected species	• Bycatch level monitoring • Bycatch prohibition enforcement • Protected species interaction monitoring	High	Difficult (Deployment may be expensive and logistically challenging because most drift gillnet vessels are smaller than 40 ft LOA)	.
Electronic Monitoring System (camera-based)	Estimate level of discards by species	• Bycatch level monitoring • Bycatch prohibition enforcement	Medium or High	Difficult (Technology may be expensive to develop for drift gillnet vessels)	
Vessel Monitoring System (preferred)	Track vessel movement and catch location	• Inseason management catch estimates • Area closure enforcement	Medium	Medium (Need to create algorithm to provide fishing effort information)	
eLandings Electronic Reporting System (preferred)	Measure total landings by species Estimate catch location Estimate level of discards by species	• Inseason management catch estimates • Bycatch level monitoring	Low or Medium	Easier (Already in place for most processors; may need modification to account for Federal/State waters line)	Relies on self-reporting of data. Information can be verified by additional data collection efforts.

The costs of additional monitoring, recordkeeping, and reporting measures incurred by participants in the UCI salmon drift gillnet fishery in Federal waters under Alternative 2, Option 1 are expected to be minimal. As shown in Table 4-48, the costs to S03H permit holders of complying with an FFP and Federal Daily Fishing Logbook requirement are low. As in the BSAI and GOA groundfish fisheries, NMFS would provide an FFP and logbook to UCI salmon drift gillnet vessels at no cost to vessel operators. A medium level of effort would be required by NMFS to develop and implement an eLogbook system for the UCI salmon drift gillnet fishery since the format would likely be based on a modified version of the existing groundfish eLogbook system.

Under Alternative 3, Option 1 (preferred), the costs of additional monitoring, recordkeeping, and reporting measures incurred by participants in the UCI salmon drift gillnet fishery in Federal waters would be substantially higher. S03H permit holders fishing in the Cook Inlet EEZ would have to comply with a VMS requirement as well as an FFP and logbook requirement. Federal funds may be available to qualified vessel owners or operators for reimbursement of the cost of purchasing type-approved VMS units. However, vessel operators would have to replace their VMS units at their own expense as units wore out or became technologically obsolete. The principal cost to NOAA Office of Law Enforcement (NOAA OLE) of extending VMS coverage to the UCI salmon drift gillnet fleet would be the salary and benefits for new VMS technicians, if required. In addition, Alternative 3, Option 1 (preferred) would require the use of eLandings by all processors accepting deliveries of salmon caught in the Cook Inlet EEZ. The equipment costs of an eLandings requirement could be a substantial economic burden for small processors, including those that directly market their catch or sell locally off the docks. An eLandings requirement would reduce printing and data entry costs for ADF&G as well as improve the agency's ability to track total landings in the UCI salmon drift gillnet fishery in a timely manner. However, the scale of these benefits would be modest because most large-scale processors participating in the fishery are already using eLandings.

Given the low level of bycatch and salmon discarding in the UCI salmon drift gillnet fishery, the costs of a full retention requirement to fishing operations are expected to be low. NMFS could verify that fish reported in the logbook were landed shoreside rather than discarded at sea. However, compliance monitoring of a full retention requirement would likely be costly for industry and government if onboard observers or an electronic monitoring system were used.

The economic impacts of the monitoring, recordkeeping, and reporting requirements under Alternatives 2 and 3 would likely be unevenly distributed across participants in the UCI salmon drift gillnet fishery in Federal waters. The costs of the measures would not account for the size or profitability of individual harvesters or processors. Smaller vessel operators and processors that participate in the fishery would face costs that are disproportionately high relative to their gross revenue. Similarly, the additional costs would have a higher marginal impact on harvesting and processing operations that are less profitable or less well capitalized. These distributional effects, in turn, could change the size, composition, and geographic distribution of the UCI salmon drift gillnet fleet. In general, the costs of additional monitoring, recordkeeping, and reporting requirements would be most disruptive to harvesters and processors in years when they are operating nearest their profit margin (e.g., during years when the sockeye salmon run in Cook Inlet is especially low).

For the recreational salmon fishery in the Cook Inlet EEZ, given the very limited estimated salmon harvest and existing State information collections, no additional federal recordkeeping, reporting, or monitoring requirements are proposed.

4.7.2.2.1. Federal Permits

Under Alternative 2 and Alternative 3 (preferred), all vessels fishing for salmon in Federal waters of Cook Inlet with drift gillnet gear would be required to hold an FFP. A number of the monitoring, recordkeeping, and reporting measures listed in Table 4-48, including VMS, groundfish retention, and observer coverage, could be tied to an FFP. This regulatory connection to an FFP would allow NMFS to require a UCI salmon drift gillnet vessel with an FFP to comply with these monitoring, recordkeeping, and reporting measures regardless of whether the vessel was fishing in State or Federal waters.

Some operators of UCI salmon drift gillnet vessels may choose to avoid the costs associated with the monitoring, recordkeeping, and reporting measures tied to an FFP by altering their operations so as to avoid fishing in Federal waters (thereby precluding their need to obtain an FFP). However, these changes could increase other types of adverse economic effects on vessel operators. For example, the catch rates of Kenai River late-run and Susitna River sockeye salmon and Susitna River coho salmon in State waters is likely lower than in Federal waters (Alaska Department of Fish and Game 2020b), translating into less harvesting revenue for any given effort level.

Costs to the Industry of Compliance

NMFS may assess and collect fees to recover the administrative costs incurred by the Federal government in processing applications for Federal permits required to participate in the fisheries managed under an FMP (16 U.S.C 1853(b)). However, as with the FFP for the BSAI and GOA groundfish fisheries, an FFP for the UCI salmon drift gillnet fishery would be a non-transferable, three-year permit issued on request and without charge to vessel owners.

As shown in Table 4-49, a number of active vessels in the UCI salmon drift gillnet fishery have participated in other Alaska fisheries in which an FFP is required. Although the percent of vessels that have an FFP in a given year shows a downward trend, the percent of vessels that held an FFP during at least one year from 2005–2021 has been fairly constant.

Table 4-49 Number of active vessels in the UCI salmon drift gillnet fishery with a Federal Fisheries Permit, 2005–2021.

	Number of Active Vessels	Number of Vessels with an FFP	Percent of Vessels with an FFP	Number of Vessels with an FFP for One or More Years from 2005–2018	Percent of Vessels with an FFP for One or More Years from 2005–2018
2005	467	157	34%	181	39%
2006	392	104	27%	151	39%
2007	414	113	27%	156	38%
2008	415	113	27%	154	37%
2009	388	90	23%	147	38%
2010	353	85	24%	138	39%
2011	420	99	23%	156	37%
2012	457	90	20%	165	36%
2013	471	95	20%	176	37%
2014	478	98	20%	173	36%
2015	463	81	17%	163	35%
2016	455	83	18%	157	35%
2017	404	79	19%	148	36%
2018	385	58	15%	142	37%
2019	362	54	15%	125	35%
2020	317	47	15%	103	32%
2021	281	33	12%	97	35%

Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020, 2022), and Federal Fishing Permit data from NMFS (2022b).

Under Alternative 3 (preferred), any entity receiving deliveries of Cook Inlet EEZ salmon, or harvesting vessels conducting dockside sales of EEZ salmon (e.g., catcher-sellers), would have to have either a Federal Processor Permit, or a Federal registered buyer permit similar to those that have been implemented for the Crab Rationalization and IFQ programs. These permits would be obtained at no cost from NMFS and are required to apply Federal catch reporting requirements to obtain timely information for Federal fishery managers. Information on the number of potentially affected entities is described in Section 4.5.1.4.

Management and Enforcement Considerations

The Council and NMFS have broad authority over vessels that hold Federal permits and licenses. As discussed above, tying monitoring, recordkeeping, and reporting measures implemented under Alternatives 2 or 3 to an FFP would allow NMFS to require a UCI salmon drift gillnet vessel with an FFP to comply with Federal regulations regardless of whether the vessel was fishing in State or Federal waters. In the absence of an FFP, active S03H permit holders that fish in both Federal and State waters could be subject to two different sets of regulations concerning management of the UCI salmon drift gillnet fishery. However, under Alternative 3 (preferred), a drift gillnet vessel could not fish in both State and EEZ waters during a single trip. Such Federal and State management inconsistencies could create confusion that may result in unintentional non-compliance.

A potential management issue related to an FFP could arise if UCI salmon drift gillnet vessels were allowed to surrender their FFPs at some point during the fishing season in order to avoid having to comply with Federal monitoring, recordkeeping, and reporting requirements while fishing in State waters. The Council could address this issue by placing restrictions on the ease with which vessels can surrender their FFPs during a fishing season. Because of this, under Alternative 3 (preferred), a vessel that surrenders a FFP could not obtain another FFP until the three-year permit cycle has occurred.

4.7.2.2.2. Federal Daily Fishing Logbook

A Federal Daily Fishing Logbook would provide on-the-water information for the UCI salmon drift gillnet fishery, including set number, time and date gear was set and hauled, starting and ending latitude and longitude for each set, permit numbers, and estimated number of fish and total hail weight for each set. Information on set location (deployment and retrieval) and species caught could be used to determine whether fishing occurred in the EEZ and whether fish were retained or discarded.

An eLogbook, which is an electronic version of a Federal Daily Fishing Logbook, would delineate harvest and effort relative to the EEZ in near real-time, thereby facilitating inseason management action in the UCI salmon drift gillnet fishery in Federal waters. With an eLogbook system, logbook data are transmitted from a vessel to a NMFS server via a secure website or email when the vessel is in Wi-Fi range (e.g., at the processing plant) or the vessel operator has access to email. Electronic logbooks provide detailed information on fishing effort that is not easily accessible from paper logbooks and not available on landing reports in eLandings.

Costs to the Industry of Compliance

As in the Alaska groundfish fisheries, NMFS would provide a paper or electronic logbook sheets to UCI salmon drift gillnet vessels on request at no cost to vessel operators. NMFS would provide logbook pages, user support, and training that is offered either in person or through the internet.

A number of active vessels in the UCI salmon drift gillnet fishery are currently participating, or have participated, in Alaska fisheries in which a Federal Daily Fishing Logbook is required, such as the sablefish and halibut IFQ fisheries. The operators of these vessels are likely proficient in logbook entries. For vessels that have not been subject to mandatory logbook reporting of fishing activity, some learning would be expected to be needed before vessel operators become proficient in the reporting requirements. However, the information required would not be complex or substantially beyond that necessary to meet the record-keeping needs of normal fishing business operational purposes. The use of electronic logbooks may confer benefits to vessel operators, including data entry time savings and improved accuracy of calculations. In general, vessel operators would likely prefer to use eLogbooks over paper logbooks because the electronic features generally make reporting and recordkeeping easier for vessel crew.

Management and Enforcement Considerations

NMFS can assess and collect fees to recover the administrative costs incurred by the Federal government in processing applications for Federal permits required to participate in the fisheries managed under the *Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska*, as authorized by the Magnuson-Stevens Act (16 U.S.C 1853(b)).

A logbook for the UCI salmon drift gillnet fishery is in development since there currently is not a State or Federal logbook for the fishery (or any other Alaska commercial salmon fishery). The use of an eLogbook in the fishery would require developing a fishery-specific logbook application (likely a modification of the groundfish logbook and backend functionality).

An upper bound approximation of the costs associated with developing and implementing an eLogbook system is provided by the Pacific States Marine Fisheries Commission (PSMFC), which recently estimated the costs of an eLogbook system for the Crab Rationalization Program fisheries in the BSAI (North Pacific Fishery Management Council 2020). After consulting with their software development staff, PSMFC estimated a range of $200,000–$300,000 based on experience with eLogbooks. However, developing and implementing an eLogbook system for the UCI salmon drift gillnet fishery is expected to be considerably less expensive since it would be simpler, with a focus on set location and the amount of fish retained and discarded. The format would likely be based on a modified version of the existing groundfish eLogbook system.

A Federal Daily Fishing Logbook requirement would be relatively easy to enforce. At-sea boarding by USCG and random dockside inspections by NOAA OLE officers and Alaska Wildlife Troopers can verify the presence and use of paper or electronic logbooks. Since a logbook relies on self-reporting of data, it is possible for vessel operators to submit incorrect information either intentionally or unintentionally. The accuracy of recorded landings can be validated during dockside inspections, and other logbook information can be verified by additional data collection efforts, such as onboard observers, ADF&G fish tickets (including eLandings), and VMS.[130]

4.7.2.2.3. Full Retention of Groundfish

When combined with a compliance monitoring tool (e.g., EM, observers), requiring full groundfish retention for vessels operating in the UCI salmon drift gillnet fishery would provide fishery managers with an accurate picture of groundfish catch in the fishery.

Costs to the Industry of Compliance

The economic impacts of a 100% groundfish retention requirement on vessel operators is hard to quantify. However, given the low level of bycatch in the UCI salmon drift gillnet fishery as described in Section 4.5.1.2.4, the potential economic impacts of this requirement on fishing operations are expected to be small. With few, if any, groundfish caught during a typical fishing trip, the requirement would only minimally reduce hold space for more valuable species. Moreover, vessels typically do not load the boat to capacity and have space for additional harvest of non-target species. In the rare event that large amounts of groundfish are encountered, the retention of groundfish may require vessel operators to end trips when the hold space is full. Smaller vessels may be disproportionately affected by a groundfish retention requirement because they are more likely constrained by hold space during a fishing trip.

It is conceivable that the commercial value of a vessel's salmon catch could be reduced by mixing groundfish in the fish hold. For example, placing groundfish with salmon in the same storage compartment could damage the scales and flesh of the salmon through abrasion. However, these potential issues may be dealt with by segregating the bycatch from the salmon catch contained in the brailer bag in a given hold, or alternatively, using an entirely separate hold to store bycatch. Incidentally-caught sharks may also require onboard processing in order to remove as much of the non-protein nitrogen compounds in the flesh as possible before storing in a hold.[131] The economic costs of these additional steps in vessel

[130] With an eLogbook system the potential to misreport fishing locations can also be mitigated through automation and integration with a global positioning system.

[131] When a shark dies bacteria rapidly convert the non-protein nitrogen compounds in the shark's flesh to ammonia, which contributes to spoilage and contamination of target catch.

operations would be minimal because so few non-target fish are caught in the UCI salmon drift gillnet fishery.

A full retention requirement would allow vessel operators to sell incidentally caught groundfish, thereby at least partially offsetting the cost of the requirement to operators. However, the decision to purchase, process, or discard groundfish would be at the discretion of each individual processor. Given that the total amount of groundfish caught annually in the UCI salmon drift gillnet fishery is small and that there are multiple processors receiving deliveries from the fishery, the impact to a specific processor from the retention of groundfish is likely to be negligible.

Management and Enforcement Considerations

If a full retention requirement is combined with a Federal Daily Fishing Logbook requirement, NMFS could verify that fish reported in the logbook were landed shoreside rather than discarded at sea. Fish landed shoreside would be reported to NMFS through ADF&G fish tickets/eLandings.

While the costs of storage, handling, and delivery of incidentally caught groundfish are expected to be minimal, some vessel operators might choose to violate the full retention requirements (i.e., vessel operators may discard some or all of their groundfish catch). In some instances, crewmembers might report illegal discarding, but overall, discards would be difficult for NOAA OLE to monitor. Due to the risk of gear entanglement, monitoring vessels while they are actively fishing presents logistical challenges. However, the use of onboard observers and EM can assist in monitoring compliance of a full retention requirement.

4.7.2.2.4. Full Retention of Salmon

When combined with a compliance monitoring tool (e.g., EM, observers), requiring full salmon retention for vessels operating in the UCI salmon drift gillnet fishery would help provide fishery managers with an accurate picture of total salmon catch in the fishery and avoid potential discarding behavior that could occur to keep from exceeding a TAC amount which would close commercial salmon fishing in the EEZ.

Costs to the Industry of Compliance

The economic impacts of a 100% salmon retention requirement on vessel operators is hard to quantify. There are no data on salmon discards in the drift gillnet fishery. However, salmon discards are reported to be very minimal, and largely limited the occasional individual fish damaged by marine mammals. Therefore, the potential economic impacts of this requirement on fishing operations are expected to be small. Another potential impact could occur if vessels discard low value pink or chum salmon to make room for additional high value sockeye and coho salmon. There are no data available to inform how frequently this occurs, and what quantity of fish it may impact. Smaller vessels would be disproportionately affected by a salmon retention requirement because they are more likely constrained by hold space during a fishing trip.

Management and Enforcement Considerations

If a full retention requirement is combined with a Federal Daily Fishing Logbook requirement, NMFS could verify that fish reported in the logbook were landed shoreside rather than discarded at sea. Fish landed shoreside would be reported to NMFS through ADF&G fish tickets/eLandings.

Under Alternative 3, a major concern related to salmon retention are TAC amounts that may result in a fishery closure. If there is a TAC for a salmon species that may be exceeded, it could incentivize vessels to discard that species to keep the fishery open longer.

While the costs of storage, handling, and delivery of incidentally caught salmon are expected to be minimal, some vessel operators might choose to violate the full retention requirements (i.e., vessel operators may discard some or all of their salmon catch). In some instances, crewmembers might report illegal discarding, but overall, discards would be difficult for NOAA OLE to monitor. Due to the risk of gear entanglement, monitoring vessels while they are actively fishing presents logistical challenges. However, the use of onboard observers and EM could assist in monitoring compliance of a full retention requirement.

4.7.2.2.5. Onboard Observers

Information about at-sea discards of groundfish and interactions with protected species could be collected for the UCI salmon drift gillnet fishery through the North Pacific Observer Program (NPOP). Estimates of groundfish discards and protected species interactions would be recorded by observers deployed on selected vessels active in the UCI salmon drift gillnet fishery. Onboard observer information could be used to extrapolate to unobserved vessels and estimate at-sea discards and protected species interactions. The amount of observer effort would be set to achieve a desirable level of precision.[132]

Costs to the Industry of Compliance

Under the Alaska Marine Mammal Observer Program, NMFS deployed marine mammal observers on vessels participating in the UCI salmon drift gillnet fishery in 1999 and 2000, with observer coverage levels of 1.75% and 3.73%, respectively. NMFS marine mammal observers were deployed aboard drift gillnet vessels at no financial cost to vessel owners.

Section 313(a)(2) of the MSA specifically prohibits the Council from establishing an observer fee system for a salmon fishery under its jurisdiction.[133] Therefore, a stable funding source for an observer program in the UCI salmon drift gillnet fishery would need to be developed. Two potential funding sources are 1) Federal funding, or 2) direct industry funding for observer coverage. Given the current funding shortfall in the North Pacific Observer Program (NPOP), it is unlikely NMFS would have the funding to support an observer program in the fishery.

Assuming vessels in the UCI salmon drift gillnet fishery are placed in the partial coverage category, vessels randomly selected for coverage could contract with observer providers and pay directly for coverage.[134] Under this approach to funding, which is called "pay-as-you-go", vessel operators would pay all of the direct costs of placing observers on their vessels, including salary, insurance, housing, and transportation. According to the *2021 Observer Program Annual Report*, the average cost per observer sea day in the partial coverage category was $1,393 in 2021 (National Marine Fisheries Service 2022).[135] This cost is a combination of a daily rate, which is paid for the number of days the observer is on a vessel, and reimbursable travel costs. Note that the $1,393 per observer sea day is an estimate. Actual costs vary

[132] Vessels are assigned observers according to the scientific sampling plan described in the Annual Deployment Plan developed by NMFS in consultation with the Council (National Marine Fisheries Service 2019a).

[133] NMFS and the Council established a system of fees for observer coverage on groundfish and halibut vessels in the partial coverage category (see Footnote 134). The fees, which are based on the ex-vessel value of vessel landings, are split between the processor and vessel operator (National Marine Fisheries Service 2020b).

[134] All vessels and processors that participate in federally managed or parallel groundfish and halibut fisheries off Alaska (except catcher vessels delivering unsorted codends to a mothership) are assigned to one of two categories: vessels and processors that are not required to have an observer at all times, and vessels and processors that must have all operations observed. The partial observer coverage category includes catcher vessels, shoreside processors, and stationary floating processors when not participating in a catch share program with a transferrable prohibited species catch limit. The full coverage category includes catcher/processors, motherships, and catcher vessels participating in a catch share program with a transferrable prohibited species catch limit.

[135] The cost of an observer-day published in the observer program annual reports reflects the total amount paid through a contract with the service provider divided by the number of days deployed. The published average cost per day over recent years has varied. Annual variation can be attributed to cost growth, but also has much to do with the annual deployment model and the outcomes of the random trip selection that is inherent to the NPOP.

on a case by case basis, depending on the fishery, duration of observer coverage, and logistics (North Pacific Fishery Management Council 2008). Some of the factors that tend to increase observer coverage costs include:

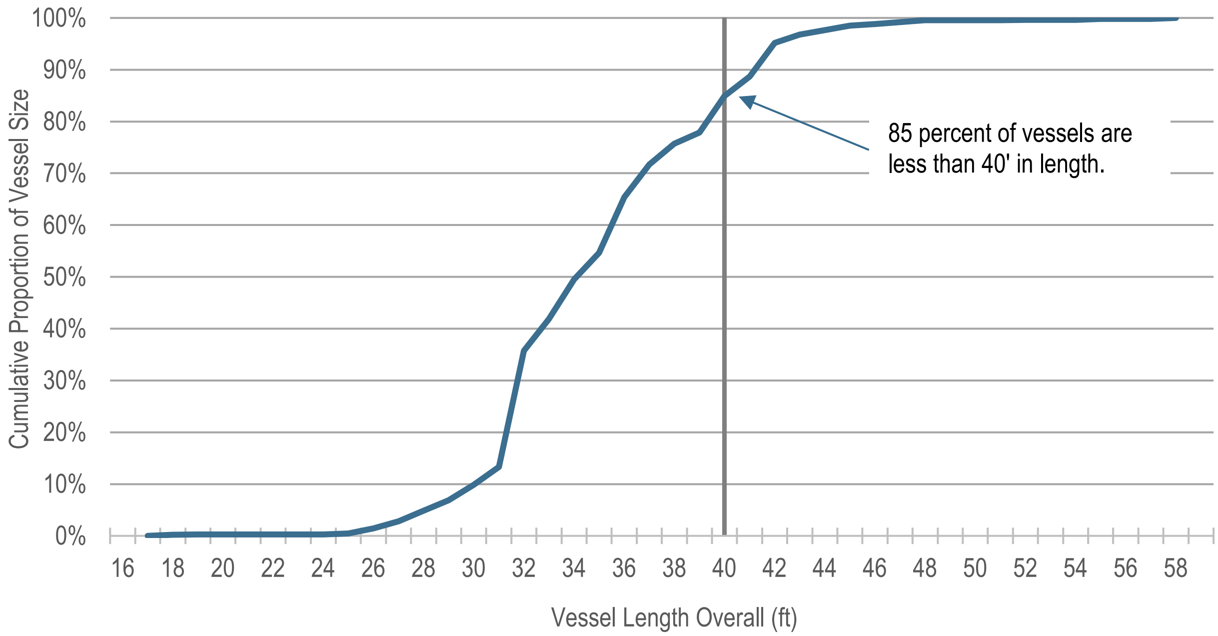
- Fishing trips of short duration.
- Operation out of remote ports with high transportation costs.
- Short-term “pulse” fisheries.
- Small-scale fisheries with few participants.
- Fishery disruptions, changing fishing plans, and lack of advance planning.

Given that the UCI salmon drift gillnet fleet is dispersed across several ports and consists of vessels that make short (day-long), intermittent trips, daily observer costs may be relatively high. Moreover, the fishing schedules of these vessels may frequently change at short notice, which may make it difficult to secure observers as well as increase observer costs. An inability to secure an observer could lead to delayed or missed fishing trips.

In addition, onboard observers would be logistically challenging for smaller boats in the UCI salmon drift gillnet fleet. A small vessel size limits the feasibility of having an additional person onboard in terms of the physical space. In addition, small vessels may find it difficult to comply with existing safety and all other vessel requirements and responsibilities in 50 CFR § 679.51(e)(1). Since the start of randomized coverage in the NPOP in 2013, at-sea observation for partial coverage vessels has not occurred on groundfish and halibut vessels less than 40 ft in length overall due to the logistical considerations of putting observers onto small vessels. The Council and NMFS addressed these concerns for the groundfish and halibut fisheries by developing an electronic monitoring option for vessels 40 ft and greater and not observing vessels less than 40 ft, noting that work is ongoing to provide an electronic monitoring option for vessels less than 40 ft. In addition, many vessels between 40 ft and 50 ft have chosen electronic monitoring over taking a human observer (National Marine Fisheries Service 2022a; National Marine Fisheries Service 2019a).

As shown in Figure 4-64, 85% of the vessels fishing in the UCI salmon drift gillnet fishery from 2014–2021 were less than 40 ft in length, and all were less than 60 ft. Consequently, under the groundfish and halibut observer program length criteria, most of the fleet would have zero coverage.

Figure 4-64 Cumulative proportion of vessel lengths in the UCI salmon drift gillnet fishery, 2014–2021.



Source: ADF&G fish ticket data compiled by AKFIN in the Comprehensive FT database.

Management and Enforcement Considerations

Development of the existing NPOP framework and coverage levels for the groundfish and halibut fisheries occurred over several decades and required extensive collaboration with fishery stakeholders. While this existing framework, program infrastructure, and past experience with the Alaska Marine Mammal Observer Program provide a foundation for the development of an observer program for the UCI salmon drift gillnet fishery, there are many fishery-specific elements that would need to be designed and tested prior to implementation. Among logistical constraints, funding mechanisms, and other program elements, appropriate coverage rates and sampling methodologies for the drift gillnet salmon fisheries would have to be identified with input from the AFSC's Fishery Monitoring and Assessment Division and the Council's Advisory Committees. Given these considerations, it is unlikely that an observer program could be designed and implemented within the available timeframe for this action.

Potential costs to NMFS of administering an observer program in the UCI salmon drift gillnet fishery are summarized in Table 4-50. Some of these cost components can be scaled up proportional to an increase in the number of observer sea days. For example, the additional observer sea days resulting from an observer program in the fishery would increase the number of hours needed to process data, and that need could be met by hiring additional data processing personnel (proportional to the increased need). However, the facilities (particularly office space) needed to accommodate the additional data processing personnel is not proportionally scalable.

Table 4-50 NMFS cost responsibilities for onboard observers.

Training and Data Processing Costs	• The labor and facilities costs associated with training and debriefing of monitors • Data processing
Operational Costs	• Certification of monitoring providers and individual monitors; performance monitoring to maintain certifications • Developing and executing vessel selection • Costs associated with liaison activities between service providers, NMFS, Council, fishing industry, and other partners

Using the groundfish and halibut observer program length criteria, only vessels in the UCI salmon drift gillnet fleet greater than 40 ft would be observed. The bycatch and protected species interaction information collected by observers on these vessels could be extrapolated to the entire fleet using similar procedures to those currently used to estimate catch on unobserved halibut and groundfish vessels (Cahalan et al. 2015). However, as noted above, most of the fleet is less than 40 ft and likely would have zero coverage. Consequently, there could be a high risk for biased estimates on bycatch, and a low probability of detecting a marine mammal or seabird mortality event.

While observers are not law enforcement personnel, they do play a significant compliance role by reporting potential violations they witness. Observers can provide evidence for a specific violation and their data, taken in aggregate, can be useful for targeting enforcement activity or proving elements of a violation.

4.7.2.2.6. Electronic Monitoring (Camera-based)

Compliance monitoring of a groundfish retention requirement could possibly be achieved through a camera-based electronic monitoring system (EM). In addition, the data collected from EM systems deployed on vessels could be used in conjunction with other reporting and recordkeeping tools (e.g., eLandings/eLogbook) to obtain catch and discard information from these vessels. NMFS could develop regulations to allow vessels in observer coverage to opt into EM coverage for the calendar year rather than carrying an observer.

An EM system typically consists of wide-angle digital video cameras, a GPS receiver, gear usage sensors, storage and processing devices, and a display screen. Sensors can collect data about boat locations and when fishing gear is being used. Cameras record imagery that can be analyzed for determining fishing effort (e.g., number of sets) and total catch (species, length, and fate (retained/discarded)), and other noticeable events (e.g., crew behaviors). They are “closed systems” that do not allow for manual input or changes to data that is stored. Sensor data would be sent to shorebased EM reviewers in real-time via satellite. Imagery from cameras would be stored on removable storage devices that are provided to EM reviewers once the vessel returns to port.[136] A feedback report can be sent to the vessel operator to ensure that they keep the systems maintained with cameras and sensors operating effectively. Trip reports can be sent to fishery managers and law enforcement officers to alert them of any issues (Course 2015; National Marine Fisheries Service 2017). As with VMS (Section 4.7.2.2.7), EM can be used to track the spatial dispersion of fishing effort.

[136] Video/imagery would not necessarily have to be transferred, reviewed, and stored if an onboard application completes the processing of both sensor and image data into species enumeration and lengths. This type of system would reduce time lags and costs associated with current EM systems and post processing methods (National Marine Fisheries Service 2019b).

Costs to the Industry of Compliance

The costs to UCI salmon drift gillnet vessels of complying with an EM requirement are uncertain. EM would require further development for use on these vessels. Such a system would not necessarily be more affordable than onboard observers. The initial cost of installing EM equipment on vessels is relatively high, and vessels may incur ongoing monitoring costs (primarily maintenance, licensing, and data review). Further, it is possible that the vessels in the UCI salmon drift gillnet fishery are not ideally suited for making EM economically efficient because they may not carry out enough fishing trips each year to make up for the initial investment costs of EM system installation.[137]

Management and Enforcement Considerations

Much of the recurring annual cost of an EM program is driven by data review and data storage. Review cost are influenced by the review rate (currently equal to coverage rate), the catch handling procedures of the monitored vessels, and the data needing to be captured to meet monitoring objectives. More complex catch events take more time for video review as do increases of data points needed to meet monitoring objectives. The costs associated with EM data review can be especially high for rare events such as protected species interactions (Bonney et al. 2009). Depending on program structure these costs may be borne by industry or by NMFS.

4.7.2.2.7. Vessel Monitoring System (preferred)

VMS is a continuous monitoring equipment, which when installed on a UCI salmon drift gillnet vessel would record and transmit satellite information on the vessel's geographic position, course, and speed. The real-time vessel location information provided by VMS could be used to facilitate enforcement of a commercial salmon fishing closure for the Cook Inlet EEZ. In addition, supplemental to its utility for law enforcement, VMS could potentially be used to validate the area fished reported by eLandings or eLogbook, and to apportion effort in the UCI salmon drift gillnet fishery between State and Federal waters by providing a continuous record of fishing locations.

VMS units integrate global positioning system (GPS) and communications electronics in a single, tamper-resistant package to automatically determine the vessel's position several times per hour. The units can be set to transmit a vessel's location periodically and automatically to an overhead satellite in real time. A communications service provider receives the transmission and relays it to NOAA OLE. The VMS data are monitored and interpreted by NOAA OLE officers. Currently, no officers are directly dedicated to the NMFS Alaska Region VMS Program; however, a program manager, information technology technician, and enforcement technician work on VMS each day for some hours.

The VMS program in Alaska is a relatively simple one involving VMS units set to report a vessel identification and location at fixed 30-minute intervals to the NOAA OLE processing center. Some of these units allow NOAA OLE to communicate with the unit and modify the reporting frequency. The Alaska program is relatively simple, because it doesn't require the range of functions that are required for VMS in some other regions of the United States. Moreover, the Alaska program doesn't require the VMS unit to report on the status of other vessel sensors (in addition to the GPS). VMS units on a vessel have the following components:

- A power source and power cabling;

[137] Sylvia et al. (2016) notes that the costs of onboard observers to a fishing vessel are normally realized as purely "variable" costs – they are paid for on a "per day" basis. EM, however, requires significant initial investment in equipment, installation, and training as a fixed cost. Depending on required video review rates and storage costs, variable costs of EM are potentially much lower than the variable cost of an onboard observer, which makes the scale of fishing effort important. In general, if a vessel does not fish many days, or is required to be observed on only a small percentage of trips, EM is likely to be more expensive than onboard observers; the converse also holds.

- A GPS antenna to pick up satellite signals;
- The VMS itself—a box about the size of a car radio containing a GPS and VHF radio;
- A VHF antenna to transmit the report to a satellite;
- A battery; and
- Cabling between the VMS and both antennas.

Some vessel operators with VMS units add optional equipment by connecting an onboard computer to the VMS unit. This can significantly enhance communications, and the potential for onboard use of information collected by the VMS.

Costs to the Industry of Compliance

The VMS unit is passive and automatic, requiring no reporting effort by the vessel operator. However, there are both fixed and variable costs associated with the installation and operation of a new VMS. Estimating the average costs of installing and operating VMS is difficult as the costs depend on a number of factors, including whether vessel operators pay list price for the VMS unit or a negotiated sale price; the time requirements for installation; the nature of the transmission package they purchase; and the average number of days or months they transmit. Currently, there are four NOAA-approved VMS units available for use in the Alaska region.

The best available average cost estimates for industry are summarized in Table 4-51. Average fixed costs for purchase, installation, and activation are approximately $4,000. Annual variable costs may include transmission costs of approximately $60/month or $180 over a three-month season. NMFS estimates there is a 5% chance that maintenance will be required during the year at an average cost of $512/per call out or $26/year on average.

Table 4-51 Estimated cost of VMS.

Base unit cost with data terminal	$3,100
Installation (6 hrs @ $128/hr.)	$768
Other miscellaneous costs and taxes	$120
Total acquisition and installation w/out reimbursement	**$3,988**
Transmission costs for three months/year for two poll per hour @ $60/month	$180
Maintenance and repairs for one year (5% probability of per year for 4 hrs @ $128/hr)	$$26

Note: Unit costs are based on survey of NOAA-approved VMS units available in the Alaska region (NMFS, 2020c).

The vessel owner and operator would be responsible for all costs associated with the purchase, installation, and maintenance of the VMS unit, and for all charges levied by the mobile communications service provider. However, Federal funds may be available to qualified vessel owners or operators for reimbursement of the cost of purchasing type-approved VMS units. The Vessel Monitoring System Reimbursement Program, which is funded by NOAA and administered by the Pacific States Marine Fisheries Commission, could potentially aid eligible users up to $3,100 of the initial capital/startup cost (Pacific States Marine Fisheries Commission 2012). It is expected that all vessel operators participating in the UCI salmon drift gillnet fishery would qualify for a reimbursement under this program (Gray 2020)

Vessel operators would only be able to use the reimbursement program for the unit cost and installation of their first VMS unit. They would have to replace their VMS units at their own expense as units wore out or became technologically obsolete. Thus, the initial purchase cost underestimates the lifetime costs a VMS requirement would impose on fishermen. One supplier estimates the likely life of their VMS unit as 8 years and the VFH antenna as about 4 years. On the other hand, technological change and competition may reduce the future costs of VMS units (National Marine Fisheries Service 2005).

Fishing operations also face the possibility of lost fishing time if a VMS unit stops working. While NOAA OLE handles breakdowns on a case-by-case basis, it does not normally require a vessel to interrupt a fishing trip and return to port when a breakdown is identified. Nevertheless, a vessel with a damaged VMS unit would have to get it repaired before it begins a new trip. While the number of units that would break down in the UCI salmon drift gillnet fishery each year is uncertain, NOAA OLE experience with the units installed under the Steller sea lion protection program suggests a breakdown rate of about 3% to 5% per year for those units (National Marine Fisheries Service 2008)

Placement of a VMS unit may pose a challenge for small vessels because of the limited space. In addition, breakdown rates for VMS units may be higher for smaller vessels than for larger ones. Smaller vessels may have fewer enclosed and moisture free areas, and VMS units may be exposed to severe operating conditions with resulting higher breakdown rates. As shown in Figure 4-64, 85% of the vessels in the UCI salmon drift gillnet fleet are less than 40 ft in length.

As shown in Table 4-52, some active vessels in the UCI salmon drift gillnet fishery have participated in other Alaska fisheries in which a VMS is required, although the number is relatively small (about 8% of active vessels over the period shown). To the extent that vessel operators have already acquired VMS units under existing VMS programs, the costs of acquisition would not be attributable to the VMS program proposed under Alternatives 2 or 3.

Table 4-52 Number of active vessels in the UCI salmon drift gillnet fishery using VMS, 2009–2021.

Year	Number of Active Vessels	Number of Active Vessels Using VMS During the Year	Percent of Active Vessels Using VMS During the Year
2009	388	39	10%
2010	353	35	10%
2011	420	41	10%
2012	457	43	9%
2013	471	41	9%
2014	478	39	8%
2015	463	37	8%
2016	455	37	8%
2017	404	30	7%
2018	385	29	8%
2019	359	28	8%
2020	317	25	8%
2021	279	18	6%
2009–2021 Average	**402**	**34**	**8%**

Source: Developed by Northern Economics based on data provided by AKFIN (2023).

An alternative tool to VMS is known as the Automated Information System (AIS), a maritime navigation safety communications system that is currently mandatory for commercial vessels 65 ft or more in length. AIS could provide some of the location information that is provided by VMS. However, there are significant issues with this system as the information is not protected. Because anyone can get access to AIS information, many fishermen turn their AIS unit off while they are fishing to protect their fishing locations from their competitors. In addition, AIS is not a satellite-based system, so it is contingent upon line of sight communications and receiving locations. U.S. Coast Guard-approved AIS units range in price from $500 for an AIS Class B transponder to $4,000 for an AIS Class A transponder, not including installation. Costs vary greatly for installation due to differences in vessel configuration and level of integration necessary for other shipboard systems.

Management and Enforcement Considerations

The extension of VMS coverage to the UCI salmon drift gillnet fleet, and the monitoring of VMS reports, would increase administrative costs for NOAA OLE. During the transition period when vessels are taking steps to install VMS units in order to comply with new regulations, NOAA OLE staff would have to answer questions, provide other support services, and record the initialization of new VMS units during the process of adding VMS units to the vessels.

Subsequently, NOAA OLE would have to add VMS technicians to monitor the additional VMS reports. The number and type of persons depends on the type of regulations being monitored, the number of vessels that are being monitored, and the length of the fishing season. Experience from VMS programs suggests that it takes about one VMS technician for every 350 vessels monitored (National Marine Fisheries Service 2007). The actual cost of creating the infrastructure for acquiring and storing the new VMS information has already been incurred for existing VMS coverage. These costs would be expected to change by a small amount. The principal cost to NOAA OLE of extending VMS coverage to the UCI salmon drift gillnet fleet would be the salary and benefits for new VMS technicians, if required.

In order to use VMS to obtain complete, high-resolution fishing effort data for the UCI salmon drift gillnet fishery, it will be necessary to develop a method for differentiating fishing activity from non-fishing activity in VMS data. A VMS algorithm to estimate the time and location of the start and end of gear deployment and retrieval is not yet available for the fishery.

Implementation of VMS in the UCI drift gillnet fishery may require additional consideration of the optimal sampling frequency for vessel positions. Depending on typical net soak times in this area, 30-min intervals may prove insufficient for monitoring compliance and catch apportionment across boundaries so higher frequency transmissions may be necessary, or at least warrant further discussion. Optimal VMS sampling intervals may depend on whether fishing will be allowed in both Federal and State management areas within a single fishing trip. If fishing is only allowed in one area (i.e., State or Federal) per delivery, then VMS would be needed for compliance only (and lower sampling frequencies may be adequate). However, if fishing could occur in both State and Federal areas during the same delivery, VMS may be used to apportion catches based on the proportion of effort that occurred in each area, and thus, higher sampling frequencies may be necessary. Increasing the VMS position transmission rate would increase vessel operating costs. See Section 2.5 for a more detailed discussion of management and enforcement considerations in monitoring Federal and State waters harvests under Alternatives 2 and 3.

An important consideration when evaluating VMS or AIS as a catch accounting or compliance monitoring tool is that drift gillnet gear frequently moves independently of the vessel. Therefore, when fishing is occurring near a regulatory boundary, the vessel could be on one side while some or all of the gear is on the other side. This could be addressed in several ways. A requirement for a vessel to maintain a certain proximity or connection to the net could be added. Alternatively, a VMS or other position indicating beacon requirement could be added to the gillnet gear rather than the vessel. AIS could not be used to indicate the position of fishing gear because it is in violation of 33 CFR §164.46(a).

VMS does not replace at-sea enforcement by aircraft and vessels, but rather complements these traditional surveillance platforms, thereby increasing the level of monitoring possible. Regardless of whether VMS is used in the UCI salmon drift gillnet fishery, catch would need to be reported specific to State or Federal waters through another reporting and recordkeeping tool (e.g., eLandings/eLogbook). A logbook requirement to record set start and end locations would be an important element of enforcing VMS indicated violations as well as developing a VMS algorithm for the fishery.

4.7.2.2.8. ADF&G Fish Tickets and eLandings Electronic Reporting System

ADF&G fish tickets document the offload or delivery of fish that were harvested in State or Federal waters off Alaska. Currently, all State-licensed processors of raw fishery resources must complete and submit this form for each landing from a fishing permit holder. Information such as the vessel ADF&G number, number of crew onboard, fishing trip dates, State statistical areas, Federal areas, State and Federal fishing permits (as applicable), and species weights and dispositions are captured in the form.

Fish tickets are legal documents and serve as the basis of payment on the part of the processors to harvesters.

ADF&G fish tickets could be used to delineate harvest and effort in the UCI salmon drift gillnet fishery relative to the EEZ, although the fish ticket form would need modification to account for the Federal/State waters line. In addition, ADF&G fish tickets could serve as the SBRM for the UCI salmon drift gillnet fishery. There are already accommodations in the fish ticket system for reporting any quantities of fish discarded at sea, and fish tickets are currently serving as the SBRM for the commercial salmon troll fishery in the East Area of the Salmon Management Area.

Processors are required to use an electronic version of an ADF&G fish ticket, called eLandings, if they submitted more than 2,000 salmon fish tickets or bought over 20 million pounds of salmon in any of the previous three calendar years (5 AAC 39.130(b)).[138] The landings and production data of processors using eLandings are transmitted electronically many times a day to the NMFS Alaska Regional Office. This information is made available to fishery managers in near real-time. Extending the eLandings requirement to all processors that take deliveries of salmon from the Cook Inlet EEZ would help ensure timely and accurate reporting of salmon catches in the EEZ.

Costs to the Industry of Compliance

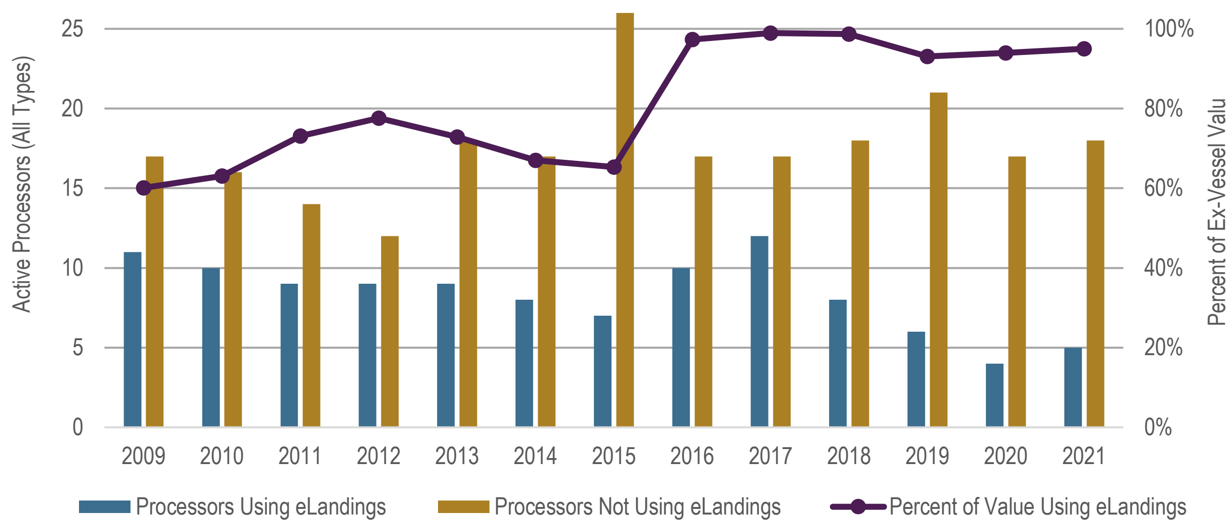
Modification of the ADF&G fish ticket form to account for the Federal/State waters line is not expected to impose any new time burden/cost burden on processors. However, extending the eLandings requirement to all processors that take deliveries of salmon from the Cook Inlet EEZ may be harmful for some small processors and limit the ability of fishery participants to direct market their catch or sell locally off the docks. Equipment cost for using eLandings include a computer, printer, and internet access (approximately $1,000 per facility). On average, approximately 3 hours of training is required for office staff. The time is spent viewing the videos, reviewing resource documents, and completing the training scenarios. Training requirements are unique to each company. While eLandings has been beneficial for large to medium companies, some small operations may view the additional cost they would incur by adopting the eLandings system as outweighing any benefit from increased operational efficiency.[139]

Figure 4-65 summarizes the use of the eLandings system among all processors active in the UCI drift gillnet salmon fishery from 2009–2021, including shorebased processors, direct marketers, catcher-sellers, exporters, etc. All of the shorebased processors used the eLandings system in 2017, but over the next three years, numbers of shorebased processors using eLandings has declined. As reported in Table 4-10, there were a total of 12 shorebased processors active in the fishery in 2017, and 11 in 2018, but only 9 in 2020 and 2021. All of the other types of processors used paper fish tickets rather than eLandings. Table 4-11 shows that there were 15 direct marketers or catcher-sellers active in the fishery in 2017, but only 8 in 2020. The processors continuing to submit paper fish tickets are typically small-scale operations that handle low quantities of fish. Since 2016, the proportion of fishery-wide ex-vessel gross revenue reported via paper fish tickets has averaged around 3.8% of the total revenue.

[138] State regulation requires processors to use eLandings for deliveries of groundfish (5 AAC 39.130(k)), including deliveries of groundfish incidentally caught in the UCI salmon drift gillnet fishery,

[139] The eLandings system has benefited some processors using the system by providing company seafood staff and managers an electronic record of their production and landings that they can access through an online account that has a User ID and is password protected. ADF&G and other agencies have provided business applications and interfaces to help companies access the electronic records. The continuous online access makes reporting and recordkeeping requirements less burdensome by allowing participants to more efficiently monitor their accounts and fishing activities (Northern Economics 2015).

Figure 4-65 Use of eLandings by processors active in the UCI salmon drift gillnet fishery, 2009–2021.



Source: Developed by Northern Economics based on ADF&G fish ticket data compiled by AKFIN (2020) and ADF&G (2023).

Management and Enforcement Considerations

In order for paper or electronic ADF&G fish tickets to accurately account for the catch of UCI salmon drift gillnet vessels in the Cook Inlet EEZ, changes would have to be made to either the ADF&G statistical area boundaries themselves, or how catches within the Federal portion of these areas are reported. The FMP authorizes the State to adjust management area, district, subdistrict, section, and statistical area boundaries to manage the salmon fisheries in the Cook Inlet EEZ for sustained yield and to ensure accurate recordkeeping and reporting. The Cook Inlet EEZ boundary is irregular in shape (Figure 1-2), which stakeholders have indicated could be problematic for compliance. Delineating the boundaries of the EEZ in terms of polygons defined by latitude and longitude coordinates would be easier for industry participants in the UCI salmon drift gillnet fishery to understand and comply with, and for enforcement entities to patrol and enforce. These boundary coordinates would need to be defined in the Salmon FMP or Federal regulations.

Although the eLandings system is a collaborative effort of ADF&G, the International Pacific Halibut Commission, and NMFS, ADF&G is responsible for implementation of the system in Alaska's salmon fisheries. This implementation is coordinated with the local offices of ADF&G. Currently, all harvests from Upper Cook Inlet fisheries reported on paper fish tickets are processed at the Soldotna office of ADF&G. Extending the eLandings requirement to all processors that take deliveries of salmon from the Cook Inlet EEZ would reduce printing and data entry costs for ADF&G as well as improve the agency's ability to track total landings in the UCI salmon drift gillnet fishery in a timely manner. However, the scale of these benefits would be modest because most large-scale processors participating in the fishery are already using eLandings.

Even with processors submitting reports in near-real time, the catch information from eLandings may be insufficiently accurate and up to date for fishery managers to make inseason decisions for a fast-paced fishery such as the UCI salmon drift gillnet fishery. See Section 4.7 for a more detailed discussion of management and enforcement considerations in monitoring Federal and State waters harvests under Alternatives 2 and 3.

While there are currently accommodations in paper or electronic ADF&G fish tickets for reporting at-sea discards, this information is not required to be reported. Moreover, since fish tickets rely on self-reporting of data, it is possible for vessel operators to submit incorrect information either intentionally or unintentionally. Paper or electronic fish ticket data may need to be verified by additional data collection efforts, such as onboard observers, daily fishing logbooks, and VMS.

4.7.2.3. Alternative 4

Under Alternative 4, there would be no commercial salmon fishing in the EEZ. Therefore, no monitoring, recordkeeping, or reporting measures to monitor commercial fisheries would need to be added to the FMP or Federal regulations. With the fishery occurring in State waters, State law enforcement would be primarily responsible for the enforcement of regulations. NOAA OLE would continue their existing enforcement activity in Cook Inlet and respond to any illegal commercial salmon fishing occurring in the EEZ. While at-sea boardings and aerial surveillance could effectively enforce the closed EEZ, these enforcement measures are resource intensive and may detract from other State law enforcement and NOAA OLE priorities.

4.7.3. Administrative Impacts

In accordance with the NS 7 guidelines at 50 CFR 600.340, the following sections evaluate administrative costs under each alternative. Individuals and private or public organizations as well as Federal, State, and local governments could potentially experience changes in administrative costs. The national standard guidelines state that conservation and management measures must, where practicable, minimize costs, including administrative costs, and avoid unnecessary duplication.

4.7.3.1. Alternative 1, No Action

Alternative 1 would not change the State’s management of the UCI salmon drift gillnet fishery in either Federal or State waters. Therefore, the alternative does not substantially change the administrative costs of private and government entities.

4.7.3.2. Alternatives 2 and 3

Under Alternatives 2 and Alternative 3 (preferred), NMFS would incur additional costs for staff to participate in the annual processes to manage this salmon fishery. These include development of harvest specifications and the tasks associated with this process. If the option under Alternative 2 to have ADF&G staff act in lieu of a Salmon Plan Team is selected, there would be a marginal reduction in the amount of NMFS staff time required for the annual process. Under Alternative 3, if no Salmon Plan Team is established, then there would be additional burden to NMFS.

Under Alternatives 2 and Alternative 3 (preferred), when Federal regulatory or FMP amendments are required for the fishery, this will require additional NMFS staff time and lessen availability for other rulemaking activities. Under Alternative 3, it is expected that FMP and federal regulatory amendments would be required more frequently since routine adjustments to management could not be implemented through the State’s delegated authority.

For Alternative 3 (preferred), additional NMFS staff time will also be required to monitor the fishery and prepare and issue any inseason management actions necessary to manage the fishery. This may require the hiring of additional staff.

Under Alternative 2, given the contentious nature of Upper Cook Inlet salmon fishery management, it is likely that there would be a substantial number of public requests for the Council and NMFS to review State management measures governing the UCI salmon drift gillnet fishery in the EEZ for consistency with the FMP, the MSA, and other applicable Federal law. Each review would be anticipated to take a significant amount of time for NMFS and NOAA General Counsel to process. Over time, public petitions for consistency review may decline as users of Upper Cook Inlet salmon resources become more familiar with Federal fisheries management requirements.

NMFS would also incur additional costs for revisions to the catch accounting system, and the development/issuance of FFPs, logbooks, and additionally under Alternative 3 (preferred), registered buyer permits.

Finally, NMFS would incur additional enforcement costs under Alternatives 2 and Alternative 3 (preferred). Under both action alternatives, costs would be expected for investigations into violations of Federal regulations. Cooperative enforcement under Alternative 2 with the State of Alaska would minimize additional burden to NOAA OLE but would likely maintain or slightly increase costs to the State of Alaska. For Alternative 3, there would be additional expenses for OLE to detail agents and operate vessels in support of monitoring and enforcing the fishery. The State of Alaska would have to maintain enforcement for the State waters drift gillnet fishery, but it may realize some cost savings due to not having to patrol or enforce in the EEZ.

In summary, both action alternatives will increase overall cost and burden to State and Federal governments relative to the status quo. It is expected that Alternative 3 (preferred) will result in more cost and burden than Alternative 2 due to the need for separate salmon management and enforcement infrastructure for the State and Federal waters of Cook Inlet.

4.7.3.3. Alternative 4

Under Alternative 4, there would be no commercial salmon fishing in the EEZ. For commercial harvests occurring in State waters, State law enforcement would be primarily responsible for the enforcement of State harvest regulations. NOAA OLE would continue their existing enforcement activity in Cook Inlet and respond to any illegal commercial salmon fishing occurring in the EEZ. While at-sea boardings and aerial surveillance could effectively enforce the closed EEZ, these enforcement measures are resource intensive and may detract from other State law enforcement and NOAA OLE priorities.

4.7.3.3.1. Individuals and Private or Public Organizations

Alternatives 2 and Alternative 3 (preferred) would add administrative burdens to fishery participants, as management measures would be implemented by both Federal and State managers. This change would require fishery participants to attend or follow BOF and Council processes as decisions regarding different aspects of management are made by these different bodies.

Alternatives 1 and 4 would maintain decision making and authority over the UCI salmon drift gillnet fishery with ADF&G and the BOF. With the possible exception of additional meetings to update Cook Inlet salmon management plans in response to an EEZ closure under Alternative 4, existing management and public participation costs would likely be maintained at existing levels under Alternatives 1 and 4.

4.7.3.3.2. Federal, State, and Local Government

Alternative 1 would not change the State's management of the UCI salmon drift gillnet fishery. Therefore, costs and burden to government entities would not change.

Alternatives 2 and Alternative 3 (preferred) would increase costs for both State and Federal management agencies. The administrative impacts to the Federal government are discussed in Section 4.7.3. This section focuses on impacts to the State of Alaska.

Under Alternative 2, the State of Alaska would continue to be responsible for inseason management of the Cook Inlet EEZ drift gillnet fishery, but with additional federal responsibilities. Alternative 3 (preferred) would also impose additional inseason management costs on the State of Alaska due to the increased coordination required for adjacent salmon fisheries under separate jurisdictions. Inseason costs would be higher under Alternative 3 (preferred) than Alternative 2 due to non-synchronous openings of state and federal waters and the need to provide fishery data inseason for EEZ management. Two documents, an Advisory Announcement (AA) and EO, are drafted to open each State fishing period; regular fishing periods defined in regulation do not require an AA or EO. We cannot estimate costs for the additional inseason management coordination under Alternative 3 (preferred) because it is difficult to predict given unknown federal harvest limits, potential federal fishing opportunities/effort, and future status of the managed salmon stocks.

Both Alternatives 2 and Alternative 3 (preferred) would require development of a SAFE or EEZ annual management report and some degree of assistance with the SDC Process. Under Alternative 2, ADF&G would supply substantial personnel as NMFS and the Council do not currently have the required salmon management and stock assessment expertise. Based on current participation levels on the Crab and Scallop Plan Teams, ADF&G would have up to five staff with salmon management, stock assessment, and/or research expertise on the Salmon Plan Team. Time commitment varies based on whether staff are lead stock assessment authors or chair/co-chair of the committee and is estimated at two to four weeks per staff member for the additional work required to support the Plan Team process. This will lessen the availability of staff time for other management or research activities. Most staff with the appropriate expertise who are appointed to Plan Teams are classified at a Range 18 or higher. The approximate salary and benefits for Range 18 is $10,000 per month. Under Alternative 3 (preferred), where NMFS would act in lieu of a salmon plan team, these burdens to the State of Alaska would be minimized or eliminated.

Alternative 2 and Alternative 3 (preferred) would both require coordination and work by the BOF alongside the Council. Up to six ADF&G Coordinators from the Division of Commercial Fisheries and Division of Sport Fish would contribute to or participate in the annual Plan Team, Council, BOF, and/or Joint Protocol Committee processes. Time commitment would vary depending on if there were out-of-cycle proposals being considered or if a stock were declared overfished and a rebuilding plan was required. When UCI finfish is in-cycle at the BOF, more than thirty ADF&G staff contribute to and support the meeting. Annual time commitment for out-of-cycle years is estimated at one to two weeks per staff. Time commitment for in-cycle years would be two to four weeks per staff member. This will lessen the availability of Coordinator staff to work on other assigned tasks. Coordinator-level positions start at a Range 20 or higher. The approximate salary and benefits for Range 20 is $12,500 per month.

The monitoring, recordkeeping, and reporting requirements discussed in Section 4.7.2 would also have impacts on the State of Alaska which are described here.

Under Alternatives 2 and Alternative 3 (preferred), reporting area of harvest and landings would need to be modified in order to differentiate harvests occurring in EEZ and State waters and to ensure timely data for inseason management. The State would likely play a substantial role in this given their historical management of fishery and its catch data, as well as their significant role in the inter-agency administration and implementation of eLandings.

Option 1- Redefine statistical areas to follow EEZ

The Division of Commercial Fisheries implemented a statistical area change process in 2016. This process is designed to update all necessary data and publications, document changes to statistical areas over time, and notify stakeholders of changes. The process is administered by the Headquarters (HQ) GIS Analyst and is overseen by the HQ Research Analyst. A key component to the process is recording start and end dates in the fish ticket application and in master GIS layers. Updating start and end dates in the fish ticket application prevents landings from being recorded in retired statistical areas. Master GIS layers include two fields for tracking changes over time: geometry start date and geometry end date. The addition of these two fields allows the user to determine when a statistical area change occurred and incorporate changes into their end product (e.g., maps, models, analyses, etc.). Geometry Start Dates for the current configuration of statistical areas are not yet available, however according to HQ staff documentation, the current configuration of drift gillnet statistical areas was last updated in 2014.

Redefining statistical areas to follow the EEZ would allow ADF&G and NMFS staff to easily delineate harvest between the EEZ and state waters with a simple query. While this option provides benefits in terms of efficiency, there are other considerations to redefining statistical areas in UCI.

Redefining statistical areas would impact statistical models used for inseason management. These models make inferences based on harvest in the current statistical areas. Updating the statistical areas may hinder the model's ability to make accurate comparisons and predictions until adequate data have been collected in new statistical areas. However, these impacts may be minimal depending on how the boundaries are redefined. Some statistical models can also accommodate area changes over time. If statistical areas are redefined, biometric support would be needed to assess impacts and determine the appropriate model updates. We are unable to estimate the costs of this option at this time.

Redefining statistical areas will also impact the fleet. Fishermen would need to update plotters and maps with the new statistical areas; however, the Department would be able to provide updated static maps and GIS layers.

Option 2- Add a flag for EEZ harvest (Preferred)

There have been various "flags" implemented in the fish ticket and eLandings systems over time. Flags can be applied in the form of a specific code used in a certain field (e.g., Delivery Code 95 indicates the fish was retained for personal use, and not sold), or as a binary (yes/no, 0/1) response in a designated "flag" field.

While the former option has been leveraged more often, it can confound the flags applied in different fields. For example, the Disposition Code field was intended to provide information on the "fate" of a fish- sold, retained, seized, etc. However, similar flags can be found in the Delivery Code field. Disposition and Delivery Codes do not always correspond as expected. For example, a permit holder can record that a fish was retained for personal use in the Disposition Code field, but also record the fish as Delivery Code 01, Whole fish. Data users must account for these inconsistencies in their queries. Incorporating an EEZ flag into a preexisting field (e.g., Disposition Code, Delivery Code, Harvest Code) fields would also have implications for the historical use of that field. For example, if an EEZ flag is incorporated into the Harvest Code field, we would no longer be able to use that field to track state managed fishery harvest, terminal hatchery harvest, etc.

Leveraging a new, dedicated "flag" field, to be filled in as a binary response would simplify this effort. While adding an EEZ flag field to eLandings would require minimal programming effort, adding such a field to conventional paper fish tickets would be more complicated. Paper fish tickets do not currently include an EEZ flag field. While the Department orders new paper fish tickets annually, fish tickets do not expire and have not been changed in the past. New inventory is meant to supplement the supply of fish tickets maintained by regional staff and fishermen and are not intended to replace fish ticket inventories. While adding an EEZ flag field to the fish ticket application would be straight forward, adding this field to the physical fish ticket would be cumbersome. We are unable to estimate the costs of this option at this time.

Adding an EEZ flag to be recorded by permit holders also raises concern for compliance and accurate reporting. As with other fish ticket data, an EEZ flag would be self-reported, with few mechanisms to ensure accurate reporting inseason. Logbook data could be used to adjust EEZ flags accordingly. If this is implemented, NMFS and ADF&G would need to determine which agency would review EEZ flags and determine how data will be updated in fish ticket and eLandings systems. Additionally, the agencies should determine the recommended enforcement actions to ensure accurate reporting if issues arise.

Option 3- Use Logbooks to determine EEZ harvest (preferred)

Federal logbooks would be implemented for the UCI EEZ drift gillnet fishery regardless of how EEZ and state waters harvest is otherwise delineated. Recording the start and end latitudes/longitudes of each set would allow staff to determine the location of harvest at a finer scale than fish tickets provide. These data could later be used to support apportionment of harvest.

If logbook data are the primary means to delineate EEZ and state waters harvest, ADF&G and NMFS would need to establish expectations for collecting, reviewing, and updating data accordingly. Since logbooks would be a federal requirement, NMFS would administer the logbook program and be responsible for all data review and management. It would need to be determined if there is an expectation that ADF&G has access to the data or if data access will lie primarily with NMFS. If ADF&G requires access to logbook data or derived allocation data, programmers would need to create a location to store these data and establish appropriate data access protocols. We are unable to estimate the costs of this option.

Mandatory eLandings Use (Alternative 3) (preferred)

Under current regulations, first purchasers, catcher-exporters, catcher-processors, and catcher-sellers that submit at least 2,000 salmon harvest fish tickets or purchase more than 20 million pounds of salmon in a three-year period are required to use eLandings for all salmon delivered to a tender, floating processor, or shorebased processor (5 AAC 39.130 (b)). First purchasers delivering groundfish to a tender are required to use tLandings (5 AAC 39.130 (b)). Operators submitting fewer than five fish tickets annually can record halibut harvest on paper fish tickets and submit to ADF&G for subsequent data entry into eLandings by agency personnel.

To use eLandings, an operator needs access to:

- A stable internet connection
- A computer with internet access
- A printer
- A USB magnetic stripe reader (recommended but not required)

If an operator does not have access to a magnetic stripe reader, they will need to manually imprint CFEC cards. USB magnetic stripe readers cost approximately $15-$25.

Processors that use tLandings must also ensure each tender has access to:

- A 64-bit laptop or tablet running a Windows operating system
- A printer
- A USB magnetic stripe reader (recommended but not required)

Only two drift gillnet statistical areas overlap with the EEZ in UCI: 244-57 and 244-60. In the past three years (2018-2020), seven shorebased processors have reported UCI drift gillnet landings using eLandings. Twenty-five processing operations have reported drift gillnet landings in UCI using paper fish tickets. Approximately 1,000 paper fish tickets reporting UCI drift gillnet landings have been submitted to

ADF&G in the past three years; approximately 7,680 paper fish tickets reporting UCI drift gillnet landings were submitted by eLandings users during the same time frame.

Mandating the use of eLandings for the UCI drift gillnet fishery in the EEZ would require Federal recordkeeping and reporting regulatory changes and would create a new reporting requirement for operators that submit low numbers of fish tickets.

Mandating the use of eLandings for the UCI drift gillnet fishery in the EEZ would require Federal recordkeeping and reporting requirements. The primary benefit of mandatory eLandings use is data access, efficiency, and quality. As partners in the eLandings project, both NMFS and ADF&G have responsibility for development and maintenance costs of the system. Historically, salmon user support and oversight for eLandings has been addressed by ADF&G eLandings staff. If mandatory eLandings use is implemented for UCI drift gillnet fisheries, costs to ADF&G would be determined by the description and allocation of responsibilities. An implementation schedule, including ADF&G and NMFS responsibilities, would need to be developed to support the new Federal requirements.

Under Alternative 2, without mandatory eLandings use, ADF&G would need to provide data collected via conventional paper fish tickets to NMFS using a new data sharing process, which ADF&G staff would need to develop. ADF&G would need to coordinate with NMFS and the state's Office of Information Technology (OIT) to ensure NMFS can access these data. Once set up, an automated data sharing process can be relatively low maintenance. We are unable to estimate the costs of this option.

Other Considerations for Implementing the UCI FMP Recordkeeping and Monitoring Requirements (Alternatives 2 and Alternative 3 (preferred))

Fish ticket data would need to ensure the accurate enumeration of target species, economic discards, and regulatory discards. While both eLandings and conventional fish tickets can track harvest of both target species and discards, ADF&G and/or NMFS programmers would need to ensure all expected discard codes and business rules are applied appropriately. For example, discard information in groundfish fisheries is often recorded using disposition codes, a required field in eLandings. Disposition code is not a required field in the conventional paper fish ticket system. Furthermore, there is not a disposition code field on paper fish tickets. Some discard information is recorded in the delivery code field, which could be expanded to include the complete list of discard conditions such as, discarded at sea, overage, etc. Leveraging delivery codes to reflect discards would address any issues with field requirements since it is a required field in all systems. However, this may cause confusion in terms of data processing. Staff reviewing discard data would need to review multiple fields to determine discard information depending on if the data source is conventional paper fish tickets or eLandings.

ADF&G and NMFS staff would need to address data access, review, and updates. If UCI drift gillnet fishery harvest is recorded using eLandings only, NMFS could access data using the eLandings data feeds already established. With conventional fish tickets ADF&G staff would either 1) need to enter paper fish ticket information into eLandings, similarly to any paper fish tickets submitted for groundfish fisheries; or 2) provide conventional fish ticket data to NMFS using a new data dump. Providing a new data dump would require coordination between ADF&G, NMFS, and OIT but should be a relatively low maintenance task once established.

NMFS and ADF&G would need to determine data review and "clean up" responsibilities and expectations, particularly with updating fish tickets according to logbook information. For example, if a permit holder records a state waters statistical area on their fish tickets, but records latitudes/longitudes consistent with a different statistical area in their logbooks is there an expectation that the source fish ticket data would be updated accordingly? If so, which agency would perform the updates? The ability to update source data would greatly depend on which system is leveraged (eLandings vs the conventional fish ticket system). Similarly, if EEZ flags are implemented would ADF&G staff need access to that information, or would this be maintained in NMFS' systems only? Lastly, expectations for data availability would need to be discussed. In general, data are available via eLandings virtually in "real time," and there are numerous business rules implemented to ensure data quality. Data entry for conventional fish tickets can be delayed and data may not be available until mid-September under most circumstances.

Alternative 4 would largely maintain Cook Inlet salmon costs near existing levels for the State of Alaska. Modifications to management of state waters in response to an EEZ closure may create initial costs, but ongoing management costs would be expected to remain stable.

4.7.4. Impacts to Vessel Safety

4.7.4.1. Alternative 1, No Action

Alternative 1 would not change the State's management of the UCI salmon drift gillnet fishery or saltwater recreational salmon fishery in either Federal or State waters. Therefore, the alternative does not substantially change management of the fishery in a way that is relevant to fishing vessel safety.

4.7.4.2. Action Alternatives

If no stock or stock complex in the UCI salmon drift gillnet fishery is declared overfished and no overfishing is occurring, Alternative 2 would not result in substantial changes in harvest limits that would be likely to encourage unsafe fishing practices. If a stock or stock complex is declared overfished or if overfishing is occurring, measures designed to protect and rebuild the stock may require a substantial curtailment of catches of healthy salmon stocks. These measures could include a complete closure of the Cook Inlet EEZ to fishing by the drift gillnet fleet. Under Alternative 3 (preferred), all S03H permit holders would be required to forego fishing in the Cook Inlet EEZ when the TAC is attained.

An inseason closure of the Cook Inlet EEZ under Alternative 3 (preferred) or a permanent closure under Alternative 4 would result in the displacement of UCI salmon drift gillnet vessels who normally fish in the area. Limiting areas for fishing could cause vessel congestion in the fishing areas that remain open. Increased crowding on the grounds can create conditions that reduce vessel safety. In addition, closures of traditional, local fishing areas may induce vessel operators to take additional risks, such as fishing in weather and sea conditions that they would normally avoid, in order to remain economically viable in the UCI salmon drift gillnet fishery.

The monitoring, recordkeeping, and reporting measures under Alternatives 2 and Alternative 3 (preferred), as described in Table 4-48, are not expected to have a direct adverse effect on vessel safety in the UCI salmon drift gillnet fishery. The measures would not modify existing safety regulations, authorized gear, the size or type of vessels that may be used in the fishery, or otherwise significantly affect the amount of salmon that could be harvested.

However, the costs of complying with these measures could have an indirect effect on vessel safety in the UCI salmon drift gillnet fishery by reducing the profitability of fishing operations. Lower profits on the part of individual harvesters limit their funds for vessel maintenance and safety equipment, which may lead to increased incidence of injury and losses of life. In addition, if vessel gross revenue declines, vessel owners and captains may find it more difficult to find, hire, and keep skilled and capable crew members. Currently, there are many skilled and capable crew members working on UCI salmon drift gillnet boats. However, it may already be the case that many crewmembers who once would have been attracted to the drift gillnet fishery are now less confident about the fishery's economic future. As discussed in Section 4.5.1.3.2, fishery participants have expressed concern that fewer young people are entering and staying in the fishery because of increasing operating costs, relatively low earnings, and unpredictable openings. The more vessels owners and captains are obliged to hire inexperienced crew for an opening, the more inefficient, less productive, and potentially dangerous their fishing operation may be. In addition, as profitability decreases, some vessels may operate short-handed, which further compromises vessel safety. To the extent that proposed monitoring, recordkeeping, and reporting measures contribute to a further decline in the profitability of fishing operations, these negative effects on fishing vessel safety would likely increase.

Some monitoring, recordkeeping, and reporting measures described in Table 4-48 could enhance vessel safety in the UCI salmon drift gillnet fishery. In particular, VMS provides a valuable tool for search and rescue efforts in the event of a vessel in distress. While nonreporting of a VMS unit is not an indication of distress, should a search and rescue (SAR) coordinator be made aware of a distress situation, whether by activation of a vessel's EPIRB, a May Day call, or other established method of signaling distress, the SAR controllers can use VMS to determine the vessel's last known position and the time of that last position. Oftentimes this will greatly reduce the search area and increase the speed of response as surface and aviation assets can head directly to that last known position without waiting for time-consuming analysis to determine the size of the search area (North Pacific Fishery Management Council 2012).

Under Alternative 4, commercial salmon fishing would be prohibited in the Cook Inlet EEZ. Consequently, no additional monitoring, recordkeeping, and reporting measures that could potentially affect vessel safety would be implemented under this alternative. However, the loss of revenue due to the area closure could have an indirect effect on vessel safety in the UCI salmon drift gillnet fishery by reducing the profitability of fishing operations. As discussed above, lower profits limit funds for vessel maintenance and safety equipment and may make it more difficult to find, hire, and retain skilled and capable crew members, which, in turn, may lead to increased incidence of injury and losses of life. Conversely, the concentration of fishing effort closer to shore may increase the proximity to rescue resources in the event of an emergency.

No monitoring, recordkeeping, or reporting requirements, or other management measures that could directly or indirectly impact vessel safety for the recreational salmon fishery in the Cook Inlet EEZ are proposed under any of the alternatives.

It is also noted that the Board modifies its regulations, as necessary, in order to increase safety and minimize risk of injury or death for all fishery participants. In addition, the Alaska Department of Fish & Game promotes safety whenever possible in its salmon fisheries through management practices, support in the regulation formation process, and through assistance to enforcement agencies. These approaches would continue to in State waters under every alternative. Therefore, overall impacts to public health and safety from Alternatives 2, 3, and 4 are not expected to be significant.

4.8. Management and Enforcement Considerations

This section provides a summary of the management and enforcement consideration applicable to the alternatives. Summary rationale for the proposed monitoring, recordkeeping, and reporting measures are also provided.

Under Alternative 1 there would be no additional Federal management or enforcement considerations or measures as the State would continue to manage the UCI EEZ salmon fishery outside of a Federal FMP. The State of Alaska Department of Public Safety is primarily responsible for enforcing regulations in the fishery under the status quo. NOAA OLE also conducts Federal fishery enforcement patrols and enforcement in Cook Inlet. This includes enforcement of the prohibition on commercial salmon fishing in the EEZ outside of the Cook Inlet EEZ traditional net fishing area.

Under Alternative 2, there would be Federal management of the UCI EEZ salmon fishery with specific management measures delegated to the State, and therefore subject to MSA requirements and other applicable Federal law. The State has an existing management and enforcement infrastructure for the Cook Inlet salmon fishery in place. These existing processes would interface with Federal fisheries management through the associated Council process, which would provide additional review and resources to evaluate Cook Inlet salmon stocks and inform their management. Regarding inseason management, the State would manage to achieve escapement goals that are consistent with the SDC rather than a binding catch limit established preseason. ACLs and the status of the stock would be evaluated post-season, with any accountability measures generally implemented the following season. Recreational fishery removals, likely projections, would be incorporated into this process. In order to fulfill MSA catch accounting requirements, particularly for bycatch, there would be a requirement for commercial salmon fishery participants to record discards in a Federal daily fishing logbook and report them at the time of landing through fish tickets or eLandings. In addition to this, commercial fishermen would report all catch by stat area, with State or EEZ specific identifiers, at the time of landing. The data on harvest proportion would be used for pre- and post-season fishery evaluations and not inseason management against binding pre-season catch limits. As a result, logbook data would be sufficient to inform the SDC process. Using logbooks to report the location of harvest would also provide fishery participants with an objective methodology for compliant reporting and improve the consistency and quality of reported data for the fishery as a whole. For the recreational fishery, information from the State SWHS, Saltwater Guide Logbook, and creel sampling would be used to inform Federal requirements.

State of Alaska law enforcement has established cooperative agreements with NOAA OLE to monitor and enforce Federal fishery requirements. By leveraging existing State management and enforcement infrastructure, duplication of effort at the Federal level would be avoided under Alternative 2. As State law enforcement would be continuing to perform all existing duties under Alternative 2, additional funding through the Joint Enforcement Agreement is not expected. OLE agents would be available to investigate Federal violations as needed.

Alternative 3 (preferred) would result in NMFS managing the UCI EEZ salmon fishery under the Salmon FMP. This would require the creation of a completely new Federal management and enforcement infrastructure for the fishery. NMFS would be responsible for opening the fishery, monitoring catch and landings data, and closing the fishery before EEZ catch limits are exceeded. Recreational fishery removals, likely projections, would also be accounted for in this process. However, management of the recreational fishery would likely be controlled by daily bag limits established preseason. For inseason management of the commercial fishery, eLandings use would need to be required for all landings in the fishery, with suitable reporting timeliness requirements. The time when data are available from eLandings for management decisions is much shorter than with conventional paper fish tickets. Currently, UCI salmon fish ticket data submitted via paper fish tickets may not be available for several weeks after the season ends. Because of the need to avoid exceeding the EEZ TAC established pre-season, self-reporting of State/EEZ salmon harvest proportions from a single trip would not provide suitably accurate data to inseason managers. At a minimum, landings from a single Cook Inlet drift gillnet fishing trip could not include fish harvested from both the EEZ and State waters. A Federal VMS requirement for salmon drift gillnet vessels permitted and fishing in the EEZ would, in conjunction with logbook data, provide data to verify that these vessels were fishing only in the EEZ during a given trip. However, salmon drift gillnet vessels not permitted to fish in the EEZ would not be subject to a Federal VMS requirement. For those vessels, enforcement of a provision prohibiting fish caught in the EEZ and State waters from being onboard during the same trip would be most easily facilitated by State and EEZ salmon drift gillnet fisheries not occurring at the same time. A system of non-concurrent Federal and State openings would require close coordination between State and Federal agencies at the start of each fishing season. If concurrent openings of the EEZ and State waters fishery are implemented, then additional monitoring through enforcement patrols may be required to ensure compliance with the prohibition on mixed EEZ/State water catches.

Under Alternative 3 (preferred), NOAA OLE would be solely responsible for the water monitoring and enforcement of the drift gillnet fishery in the Cook Inlet EEZ. VMS and corresponding logbooks would provide actionable information to ensure that EEZ fishery participants are operating in the appropriate area. The logbook would also improve accounting of catch and effort by statistical area, including EEZ groundfish that must be accounted for under Federal management. In addition to ensuring that participants in the Cook Inlet EEZ salmon drift gillnet fishery are in compliance with open times and areas, monitoring would also need to be in place to verify that no fishing was occurring in Federal waters during closed periods or by vessels not in compliance with all Federal regulations. This would be particularly challenging with the adjacent and concurrent salmon drift gillnet fishery in the State waters of Cook Inlet.

It is also important to note that independent Federal management of the Cook Inlet EEZ salmon drift gillnet fishery would need to be accounted for by all other State fisheries that harvest Cook Inlet salmon stocks, both commercial and non-commercial. Regarding levels of salmon removals, EEZ harvests would have to be reduced for any expected removals in State waters. However, even with an established EEZ/State apportionment, Federal management measures may have other important implications for State managed fisheries. For example, under existing conditions, the State manages the commercial drift gillnet open periods during the week to allow for escapement pulses to occur on weekends in order to provide higher fish densities to in-river fisheries. Federal management measures could be disruptive to the State management plan for salmon without extensive coordination.

Additional regulations would be necessary to facilitate enforcement of the separate commercial and recreational fisheries managed in the EEZ by prohibiting the possession or fishing for recreational, personal use, or subsistence salmon while commercial fishing for salmon in the UCI EEZ. Likewise, by limiting the commercial salmon fishery in the EEZ to only using drift gillnet gear, this streamlines enforcement by clearly defining legally configured gear for the Cook Inlet EEZ commercial salmon fishery. NMFS also recommends prohibiting the use of aircraft or drones to locate salmon consistent with the prohibition that exists for the State water fishery. Implementing similar and consistent regulations for the commercial fishery in the Federally managed EEZ waters will facilitate compliance and enforcement of management provisions in both areas.

For the recreational fishery, it is expected that anglers harvesting salmon in the Cook Inlet EEZ could not land fish in the State of Alaska in excess of State daily bag and possession limits. Similarly, if bag limits were more liberal in State waters, then anglers could not transit or fish in the Cook Inlet EEZ once the Federal limit was exceeded. Creel surveys, Saltwater Guide Logbooks, and enforcement patrols will assist in monitoring and enforcing recreational bag and possession limits.

Existing State management and enforcement infrastructure and processes for the Cook Inlet salmon drift gillnet fishery occurring in State waters would also have to be maintained under Alternative 3 (preferred) in addition to establishing Federal management and enforcement infrastructure to manage the fishery occurring in the EEZ.

For both Alternative 2 and Alternative 3 (preferred), NMFS would need to obtain approval from the Office of Management and Budget (OMB) for the recordkeeping and reporting requirements, which may affect full implementation of all elements associated with this action. Under the Paperwork Reduction Act (PRA), NMFS must obtain OMB approval for any new or revised information collection requirements that occur as a result of a rulemaking. The process to obtain OMB approval is concurrent with the rulemaking process. OMB has 60 days after publication of the final rule to make its determination of approval or disapproval. The timing of implementation of all or some recordkeeping and reporting elements could be affected because NMFS could not implement the information collection requirements until they were approved by OMB. Depending on the exact timing of final rule publication, the potential impacts of this may need to be taken into consideration by NMFS for management in the initial salmon fishing season under federal management.

Under Alternative 4, management and enforcement conditions would be substantially similar to existing conditions. For commercial salmon harvests occurring in State waters, State law enforcement would be primarily responsible for the enforcement of State harvest regulations. NOAA OLE would continue their existing enforcement activity in Cook Inlet and respond to any illegal commercial salmon fishing occurring in the EEZ.

4.9. Affected Small Entities (Regulatory Flexibility Act Considerations)

Section 603 of the Regulatory Flexibility Act (RFA) requires that an initial regulatory flexibility analysis (IRFA) be prepared to identify if a proposed action will result in a disproportionate and/ or significant adverse economic impact on the directly regulated small entities, and to consider any alternatives that would lessen this adverse economic impact to those small entities. NMFS Alaska Region will prepare the IRFA in the classification section of the proposed rule for an action and a separate IRFA is not necessary for Council final actions on the issue. This section will provide information that NMFS will use in preparing the IRFA for this action, namely a description and estimate of the number of small, directly regulated entities to which the proposed action will apply.

The proposed action would amend the *Salmon FMP* to manage the salmon fisheries that occur in Federal waters of Cook Inlet.

Identification of Directly Regulated Entities

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

Under Alternative 1: No Action, no entities would be directly regulated. The alternative would not include the Cook Inlet EEZ in the Salmon FMP and, therefore, would not meet the objectives of this action.

For purposes of the Regulatory Flexibility Act, entities that would be directly regulated under Alternatives 2 and Alternative 3 (preferred) include S03H permit holders with an FFP endorsed for salmon, processors that take deliveries of salmon caught in the Cook Inlet EEZ, and charter-vessel operators and guides fishing for salmon in the Cook Inlet EEZ. S03H permit holders with FFPs would be subject to proposed measures managing target species harvest in the Cook Inlet EEZ. Processors (or other entities) that take deliveries of salmon caught in the Cook Inlet EEZ would be subject to proposed monitoring, recordkeeping, and reporting requirements. Under Alternative 3 (preferred), all S03H permit holders that choose to fish in the Cook Inlet EEZ would be directly regulated.

Count of Small, Directly Regulated Entities

Under the RFA, businesses that are classified as primarily engaged in commercial fishing are considered small entities if they have combined annual gross receipts not in excess of $11.0 million for all affiliated operations worldwide, regardless of the type of fishing operation (81 FR 4469; January 26, 2016). For charter vessels, the threshold is $9 million (87 FR 61998, 12/19/2022). If a vessel has a known affiliation with other vessels—through a business ownership or through a cooperative—these thresholds are measured against the small entity threshold based on the total gross revenue of all affiliated vessels. Reliable information is not available on ownership affiliations of S03H permit holders. In 2021, 567

S03H permits were held by 502 individuals and are considered directly regulated small entities. In 2021, 65 unique charter fishing vessels had at least one trip in the area, all of which are assumed to be small entities. Processors and other entities receiving deliveries of commercially caught Cook Inlet EEZ salmon would be impacted by this action. From 2009 to 2021, this included an annual average of 12 processors, 5 catcher sellers, and 7 direct marketers, all of which are assumed to be small entities. See Table 4-10 and Table 4-11 in Section 4.5.1.4.1 for information on the number of processors and other entities that have been engaged in the fishery.

Impacts to Small, Directly Regulated Entities

The following sections estimate the costs associated with each of the selected alternatives on the small entities that would be subjected to the costs. The relevant costs include lost sales and profits resulting from measures managing target species harvests and the extra costs associated with additional monitoring, recordkeeping, and reporting requirements.

Impacts of Measures Managing Target Species Harvest

Alternative 1 would not change the State's management of the UCI salmon drift gillnet or recreational fisheries in Federal waters. Current trends in the salmon harvest levels of S03H permit holders participating in the UCI salmon drift gillnet fishery in the Cook Inlet EEZ would continue.

Under Alternative 2, harvest level trends of S03H permit holders participating in the UCI salmon drift gillnet fishery in the Cook Inlet EEZ as well as anglers participating in the UCI EEZ recreational saltwater fishery are not expected to be appreciably different than those under Alternative 1.

Under Alternative 3 (preferred), the Council would control harvest through annually setting TACs for the UCI salmon drift gillnet fishery in the Cook Inlet EEZ. Given the uncertain interaction between run size and State/EEZ waters harvest proportion, potential BOF action, and Federal TAC setting considerations, it is not possible to precisely estimate expected harvests in the Cook Inlet EEZ by S03H permit holders under Alternative 3. Over the long term, harvest level trends in the salmon drift gillnet fleet are expected to be appreciably similar to those under Alternative 1. As with existing State management, when the abundance of one or more salmon stocks is low, or uncertainty is high, commercial fishing time and harvests in the EEZ are expected to be limited. Due to the extremely limited estimated harvest by the recreational salmon fishery in the UCI EEZ, it is expected that their recent historical harvests could continue. However, retention of specific weak stocks could be prohibited.

Under Alternative 4, commercial salmon fishing would be prohibited in the Cook Inlet EEZ.

The impact of Alternative 3 and 4 on the harvests of individual S03H permit holders participating in the UCI salmon drift gillnet fishery in the Cook Inlet EEZ would be proportional to the extent that they rely on the EEZ for target fishing. The entire active UCI salmon drift gillnet fleet likely fishes in the EEZ at some time during each fishing season, but over the entire season, vessels differ with respect to their level of economic dependency on fishing grounds in the EEZ. While the difference between vessel groups is small, the EEZ accounted for more of the annual catch of vessels that generally catch the fewest fish during a season. If commercial salmon harvests in the EEZ are reduced and not offset by increases in commercial salmon harvests within State waters, then there may be corresponding adverse impacts to processors and other entities receiving delivers of commercial caught Cook Inlet salmon. No significant reductions in salmon harvest by charter vessels are expected and therefore no adverse impacts to charter vessels are expected.

UCI salmon drift gillnet vessels displaced by an inseason EEZ closure under Alternative 3 or permanent closure under Alternative 4 would have the options of ceasing to fish or relocating their fishing activities to State waters. However, a number of factors, including lower catch rates in State waters than in Federal waters and potential congestion costs, may potentially make it difficult for vessels to offset the loss of access to the EEZ by increasing effort inside State waters. The impact of any Federal closure on the harvest of the UCI salmon drift gillnet fishery would depend on the timing and duration of the closure, together with the ability of the UCI salmon drift gillnet fleet to offset a reduction in EEZ harvests by increasing effort inside State waters.

The adverse effects on the profitability of fishing operations resulting from a permanent closure of the EEZ under Alternative 4 may cause the UCI drift gillnet fleet size to shrink, as some fishermen may choose not to participate in the fishery and either retire or transfer their fishing effort to other fisheries.

Impacts of Monitoring, Recordkeeping, and Reporting Requirements

Alternative 1 would not change the State's management of the UCI salmon drift gillnet fishery in either Federal or State waters. Therefore, no additional monitoring, recordkeeping, and reporting measures would be imposed on small entities participating in the UCI salmon drift gillnet fishery in the Cook Inlet EEZ.

S03H permit holders that would experience the costs of additional monitoring, recordkeeping, and reporting measures under Alternatives 2 and 3 are those permit holders that "opted into" the opportunity to fish in the Cook Inlet EEZ. Some S03H permit holders may choose to avoid the costs associated with these additional monitoring, recordkeeping, and reporting measures by altering their operations to fish only in State waters. However, these changes could increase other types of adverse economic effects on vessel operators. For example, the catch rates of Kenai River late-run and Susitna River sockeye salmon and Susitna River coho salmon in State waters is likely lower than in Federal waters, translating into less harvesting revenue for any given effort level. It is expected that the number of vessels that choose to fish only in State waters would be limited.

The costs of additional monitoring, recordkeeping, and reporting measures incurred by S03H permit holders that choose to fish in Federal waters under Alternative 2, Option 1 are expected to be minimal. As shown in Table 4-48, the costs to S03H permit holders of complying with an FFP and Federal Daily Fishing Logbook requirement are low. As in the BSAI and GOA groundfish fisheries, NMFS is expected to provide an FFP and paper logbook to UCI salmon drift gillnet vessels at no cost to vessel operators.

No additional monitoring, recordkeeping, or reporting requirements are proposed for the recreational fishery under Alternative 2.

Under Alternative 3, Option 1 (preferred), the costs of additional monitoring, recordkeeping, and reporting measures incurred by S03H permit holders that choose to fish in Federal waters would be higher than under Alternative 2, Option 1. S03H permit holders fishing in the Cook Inlet EEZ would have to comply with a VMS requirement as well as an FFP and logbook requirement. Federal funds may be available to qualified vessel owners or operators for reimbursement of the cost of purchasing type-approved VMS units. However, vessel operators would have to replace their VMS units at their own expense as units wore out or became technologically obsolete. In addition, Alternative 3, Option 1 (preferred) would require the use of eLandings by all processors accepting deliveries of salmon caught in the Cook Inlet EEZ. The equipment costs of an eLandings requirement could be a substantial economic burden for small processors, including those that directly market their catch or sell locally off the docks.

Under Option 1 or Option 2 of Alternatives 2 and 3, NMFS could require full retention of all fish caught, thus requiring that all fish remain onboard a vessel until offloaded to a processor, tender, or packer. Given the low level of bycatch in the UCI salmon drift gillnet fishery, the costs of a full retention requirement to fishing operations are expected to be low. NMFS could verify that fish reported in the logbook were landed shoreside rather than discarded at sea. However, compliance monitoring of a full retention requirement would likely be expensive and logistically difficult if onboard observers or an electronic monitoring system were used. Under NMFS's preferred option under Alternative 3, retention of non-salmon bycatch would be optional subject to maximum retainable amounts. The amount and type would be recorded in the logbook.

The economic impacts of the monitoring, recordkeeping, and reporting requirements under Alternatives 2 and Alternative 3 (preferred) would likely be unevenly distributed across participants in the UCI salmon drift gillnet fishery in Federal waters. The costs of the measures would not account for the size or profitability of individual harvesters or processors. Smaller vessel operators and processors that participate in the fishery would face costs that are disproportionately high relative to their gross revenue. Similarly, the additional costs would have a higher marginal impact on harvesting and processing operations that are less profitable or less well capitalized. These distributional effects, in turn, could change the size, composition, and geographic distribution of the UCI salmon drift gillnet fleet. In general, the costs of additional monitoring, recordkeeping, and reporting requirements would be most disruptive to harvesters and processors in years when they are operating nearest their profit margin (e.g., during years when the sockeye salmon run in Cook Inlet is especially low).

No additional monitoring, recordkeeping, or reporting requirements are proposed for the recreational fishery under Alternative 3 (preferred).

Under Alternative 4, commercial salmon fishing would be prohibited in the Cook Inlet EEZ. Consequently, no small entities would incur the costs of additional monitoring, recordkeeping, and reporting measures under this alternative.

4.10. Summation of the Alternatives with Respect to Net Benefit to the Nation

Of the viable management alternatives, Alternative 3 (preferred) would maximize net benefits to the Nation because it would be the only alternative under which commercial fishing could continue in the Cook Inlet EEZ. Had the State accepted delegated management authority, Alternative 2 would have maximized net benefit because it would maintain many existing conditions in both the EEZ drift gillnet and recreational fisheries while minimizing additional Federal management costs to agencies and fishery participants. However, without complete participation by the State, Alternative 2 is not viable. A closure of the EEZ under any alternative could result in a greater use of economic inputs by fishing operations for a particular level of catch due to the closure of historically productive fishing grounds in Cook Inlet. Alternative 3 (preferred) may result in reductions in commercial EEZ salmon harvest in years when there is more uncertainty, and will impose additional costs to commercial salmon fishery participants in the EEZ, as well as State and Federal management agencies. However, generally Alternative 3 is expected to maintain harvest levels and opportunities commensurate with status quo conditions to the extent possible while accounting for uncertainty, and management should improve over time. If there are years when Alternative 3 results in forgone commercial salmon yield in the UCI drift gillnet fishery and the harvests of the drift gillnet fishery or other groups in State waters do not increase, some consumers of salmon products could be adversely affected to the extent the harvests of other salmon user groups do not increase. Alternative 3 could redistribute some benefits of Cook Inlet salmon resource harvests among user groups in some years. However, these distributive impacts are minimal and would not substantially affect the overall net benefits to the nation.

None of the action alternatives are expected to result in a significant change in the conditions of Cook Inlet salmon stocks, other living marine resources, or their habitats. The additional Federal management measures and processes implemented under Alternative 2 are not likely to result in significant changes relative to current State management of Cook Inlet salmon stocks under the status quo. Under

Alternative 3, harvests of Cook Inlet salmon stocks in the EEZ by the UCI drift gillnet fishery may be restricted in some years to account for increased management uncertainty, but salmon surplus to escapement needs are expected to be harvested in State waters salmon fisheries. Therefore, the impacts of these alternatives on salmon stocks are not likely to be significant. With respect to non-salmon marine resources, none of the action alternatives are expected to result in a change to the incidental take level of marine mammals, including beluga whales, Steller sea lions, humpback whales, and fin whales, or have a significant impact on prey availability to these species. In addition, none of the action alternatives are expected to result in a significant change in commercial or recreational salmon fishing interactions with Cook Inlet seabirds.

5. Magnuson-Stevens Act and FMP Considerations

5.1. Magnuson-Stevens Act National Standards

Below are the 10 National Standards as contained in the MSA (16 U.S.C. 1851). In recommending a preferred alternative, NMFS must consider how to balance the National Standards.

National Standard 1 *— Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.*

This action defines optimum yield, maximum sustainable yield, and includes an ongoing management process to apply status determination criteria following the NS 1 guidelines to prevent overfishing and achieve OY.

National Standard 2 *— Conservation and management measures shall be based upon the best scientific information available.*

NMFS used the best scientific information available to develop the proposed conservation and management measures and would continue to evaluate use the best scientific information available to implement the FMP. Harvest specifications would be developed by NMFS stock assessment authors and reviewed by the SSC every management cycle.

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

NMFS and the Council would manage salmon fishing in the Cook Inlet EEZ. NMFS has no authority to manage salmon fishing that occurs in State waters, and thus there would necessarily be two separate Cook Inlet salmon fisheries. The State would not accept delegated management authority for the fishery. Under this action, NMFS would work with the State to the extent practicable in order coordinate adjacent salmon fisheries and share scientific and fishery data collected between agencies to ensure that management actions are appropriately responsive to conditions throughout the range of stocks.

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

This action does not allocate or assign fishing privileges among salmon fishery participants and would not discriminate between residents of different states. The drift gillnet fishery and recreational fisheries in the Cook Inlet EEZ would continue, as has been the case historically. This action would attempt to maintain status quo levels of harvest for the commercial fishery, while accounting for the increased management uncertainty resulting from this action, variability in salmon runs, weak stocks, and potential future changes to other salmon fisheries in Cook Inlet outside of Federal jurisdiction. Status quo levels of recreational harvest are anticipated to continue due to their very limited harvest in and use of the Cook Inlet EEZ Area. Harvest levels by the recreational fishery in the Cook Inlet EEZ Area are not expected to impact harvest available to the drift gillnet fishery.

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

This action is generally expected to maintain existing patterns of harvest in the EEZ which allows for viable commercial and recreational salmon fisheries in the EEZ, as well as allows for viable commercial, recreational, and subsistence fisheries throughout the rest of upper Cook Inlet. This action does not only consider economic allocation as the sole purpose and are intended to bring the management of Cook Inlet EEZ salmon fisheries into compliance with the MSA.

National Standard 6 *— Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.*

This action implements a fishery management process that evaluates salmon stock condition and abundance based on the best scientific information available prior to fishing beginning. ACLs, TACs, and bag limits that account for uncertainty, variations among, and contingencies in, fisheries, fishery resources, and catches are specified for each fishing year.

National Standard 7 *— Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.*

This action aims to minimize costs and avoid unnecessary duplication to the extent practicable. However, some costs are unavoidable when implementing a new management regime. This action creates a new separate Federal management regime that would include costs and create additional duplication with existing State management. However, the conservation and management measures proposed under Alternative 3 do minimize costs and avoid unnecessary duplication while providing the essential information required for federal managers to manage the Cook Inlet EEZ Area and avoid overfishing.

National Standard 8 *— Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of National Standard 2, in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.*

This action provides for the sustained participation of such communities in balance with achieving other national standards. Both recreational and commercial salmon fisheries in the Cook Inlet EEZ would continue to the extent practicable while accounting for uncertainty and preventing overfishing. Over time, it is expected that the fishery management process will improve and may be able to provide additional fishing opportunity to commercial salmon fisheries in the Cook Inlet EEZ. To the extent practicable, management measures minimize adverse economic impacts on fishing communities, including avoiding overfishing and depleting the salmon stocks on which they are dependent.

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

This action would account for bycatch in the commercial and recreational salmon fisheries. This action would provide new information about bycatch occurring in the Cook Inlet EEZ Area drift gillnet fishery. The drift gillnet fishery would have limits on the amount of bycatch that could be retained. The recreational fishery either releases incidental catch alive, or retains and utilizes it.

National Standard 10 *— Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.*

This action could have an indirect impact on commercial salmon fishing vessel safety to the extent that the cost of complying with monitoring, recordkeeping and reporting measures could reduce profit margins and therefore reduce the funds available for vessel maintenance and safety equipment. However, the use of VMS would provide another way to locate fishing vessels in the event of an emergency and may improve response and rescue time.

5.2. Section 303(a)(9) Fisheries Impact Statement

Section 303(a)(9) of the Magnuson-Stevens Act requires that a fishery impact statement be prepared for each FMP or FMP amendment. A fishery impact statement is required to assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts of the conservation and management measures on, and possible mitigation measures for, (a) participants in the fisheries and fishing communities affected by the plan amendment; (b) participants in the fisheries conducted in adjacent areas under the authority of another Council; and (c) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery.

The EA/RIR prepared for this plan amendment will constitute the fishery impact statement. The likely effects of the alternatives are analyzed and described throughout the EA/RIR. The effects on participants in the fisheries and fishing communities are analyzed in the RIR chapter of the analysis (Section 4.7). The effects of the alternatives on safety of human life at sea are evaluated in Section 4.7.4, and above under NS 10, in Section 5.1.

The preferred alternative affects the salmon fisheries in the EEZ off Alaska, which are under the jurisdiction of the North Pacific Fishery Management Council. Impacts on participants in fisheries conducted in adjacent areas under the jurisdiction of other Councils are not anticipated to result from implementation of the preferred alternative.

5.3. Council's Ecosystem Vision Statement

In February 2014, the Council adopted, as Council policy, the following:

Ecosystem Approach for the North Pacific Fishery Management Council

> ***Value Statement***
>
> The Gulf of Alaska, Bering Sea, and Aleutian Islands are some of the most biologically productive and unique marine ecosystems in the world, supporting globally significant populations of marine mammals, seabirds, fish, and shellfish. This region produces over half the nation's seafood and supports robust fishing communities, recreational fisheries, and a subsistence way of life. The Arctic ecosystem is a dynamic environment that is experiencing an unprecedented rate of loss of sea ice and other effects of climate change, resulting in elevated levels of risk and uncertainty. The North Pacific Fishery Management Council has an important stewardship responsibility for these resources, their productivity, and their sustainability for future generations.
>
> ***Vision Statement***
>
> The Council envisions sustainable fisheries that provide benefits for harvesters, processors, recreational and subsistence users, and fishing communities, which (1) are maintained by healthy, productive, biodiverse, resilient marine ecosystems that support a range of services; (2) support robust populations of marine species at all trophic levels, including marine mammals and seabirds; and (3) are managed using a precautionary, transparent, and inclusive process that allows for analyses of tradeoffs, accounts for changing conditions, and mitigates threats.

Implementation Strategy

The Council intends that fishery management explicitly take into account environmental variability and uncertainty, changes and trends in climate and oceanographic conditions, fluctuations in productivity for managed species and associated ecosystem components, such as habitats and non-managed species, and relationships between marine species. Implementation will be responsive to changes in the ecosystem and our understanding of those dynamics, incorporate the best available science (including local and traditional knowledge), and engage scientists, managers, and the public.

The vision statement shall be given effect through all of the Council's work, including long-term planning initiatives, fishery management actions, and science planning to support ecosystem-based fishery management.

6. Preparers and Persons Consulted

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8. Appendix: Consideration and Comparison of Monitoring, Recordkeeping, and Reporting measures

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Approaches to Assessing the Amount and Type of Catch and Bycatch

In the Cook Inlet salmon fishery, all species of salmon that are captured are retained and sold. The only times that a salmon may be discarded is if it has been damaged by a predator, such as a seal, or has previously entered freshwater to spawn and would not be accepted by a processor. These are thought to be infrequent occurrences. There are no other PSC considerations or other known rationale that incentivize discarding of salmon in the fishery. Therefore, it is expected that a sufficiently complete accounting of salmon catches occurs at the time of landing.

However, bycatch in the fishery has never been fully accounted for. Previously, participants with a miscellaneous finfish CFEC permit could choose to retain and sell groundfish caught as bycatch. According to fish ticket data, drift gillnet vessels land very little groundfish. Between 2002 and 2015, only seven vessels made landings of groundfish and landings ranged from three pounds to 962 pounds. The amount of discard occurring at-sea is not reported. According to fishery participants there is limited bycatch and discarding in the Cook Inlet EEZ, but data does not exist to confirm this. Currently, this information does not satisfy NS 9 guidelines.

NMFS currently has no method to assess at-sea discards in the salmon fisheries in the Federal waters of Cook Inlet. In the groundfish, crab, or scallop fisheries, there generally is some observer information from which to extrapolate to unobserved vessels and estimate at-sea discards. In the case of salmon fisheries, this information is not available and an estimation methodology could not be used until additional bycatch data are collected.

Regulations relating to the disposition of bycatch may impact the monitoring, recordkeeping, and reporting tools selected for the fishery. Several approaches could be used to assess fish discard in the Cook Inlet drift gillnet fishery. One approach would be to require full retention of all fish caught, thus requiring that all fish remain onboard a vessel until offloaded to a processor, tender, or packer. Another approach would be to allow the vessel to discard at-sea (which occurs now), with at-sea monitoring to assess discard amounts. Finally, there could be optional retention for participants that obtain a Federal Fisheries Permit (FFP) and comply with the associated requirements. These broad approaches could be implemented under either Alternative 2 or 3. In order to simplify regulations and compliance, the Council may wish to coordinate Federal groundfish retention regulations with State groundfish regulations.

Option 1- Full retention of groundfish: Require a groundfish FFP and require vessels to retain all groundfish. Processors receiving deliveries of GOA groundfish harvested in the EEZ would be required to have a Federal Processor Permit (FPP).[140] In addition to potential logistical constraints of vessels, this may have interactions with GOA groundfish regulations, including situations where one or more

[140]§ 679.4 (f) Federal processor permit (FPP)—(1) Requirement. No shoreside processor of the United States, SFP, or CQE floating processor defined at §679.2 may receive, process, purchase, or arrange to purchase unprocessed groundfish harvested in the GOA or BSAI, unless the owner or authorized representative first obtains an FPP issued under this part. A processor may not be operated in a category other than as specified on the FPP. An FPP is issued without charge.

groundfish species, such as Pacific cod, may be on non-retention status. The costs of a full retention requirement are discussed in Section 4.7.2.2.3 of the RIR.

Option 2- Discard of groundfish at-sea: Prohibit groundfish retention, may not require an FFP. However, in order to implement Federal monitoring or recordkeeping measures, a Federal fisheries permit specific to the fishery is still necessary. This option likely requires additional monitoring or reporting measures to improve the quality of self-reported discard information.

NMFS requires FFP for U.S. vessels that are used to fish for groundfish in the Gulf of Alaska or Bering Sea and Aleutian Islands at 50 CFR 679.4(b).[141] NMFS also requires an FFP for vessels used to fish for any non-groundfish species and that retain any bycatch of groundfish. Non-groundfish species includes but are not limited to halibut, crab, salmon, scallops, and herring. “Fishing” is a broad term and includes, for example: harvesting, processing, tendering, support, etc. FFPs are non-transferable, three-year permits issued on request and without charge to vessel owners. Under the FMP, vessels that fish for salmon with troll gear and that retain groundfish must have an FFP endorsed for troll gear.

Option 3- Optional retention of groundfish: Allow retention of groundfish for participants with an FFP.

This option would allow participants that obtain of an FFP to retain groundfish. If a fishery participant did not obtain an FFP, they would be required to discard all groundfish at sea. Requiring full groundfish retention for participants with an FFP could potentially provide enough data to allow for an extrapolated estimate of fishery bycatch. However, having participants operating under multiple sets of regulations would increase the enforcement and administrative complexity of the fishery. Any processors receiving groundfish harvested in the EEZ would be required to have an FPP.

Monitoring, Recordkeeping, and Reporting Tools

An array of potential monitoring, recordkeeping, and reporting tools are available to assess the amount and type of bycatch in the Cook Inlet drift gillnet fishery. In some cases, these tools may also be applicable to the monitoring of other fishery-dependent activities, including measuring retained salmon in State and Federal waters, assessing effort and catch that occurred in the EEZ, determining the number of marine mammal and seabird interactions in the fishery, and monitoring compliance with fishery regulations, including open/closed areas.

A description of potential monitoring, recordkeeping, and reporting tools is provided in in the subsequent section, noting that tools could be combined under Alternative 2 or 3. Alternative 3 would require the greatest amount of fishery monitoring, recordkeeping, and reporting due to the inseason data requirements of Federal managers to control catch below a TAC and to allow for the effective enforcement of distinct but adjacent Federal and State Cook Inlet salmon fisheries. A comprehensive discussion of the costs of each of these tools and their impacts is provided in Section 4.7.2 of the RIR.

Logbooks (paper and electronic)

Logbooks are in important enforcement and monitoring tool in the groundfish fisheries. Enforcement uses these logbooks to verify catch information, including amounts of fish retained or discarded (and for verification of Maximum Retainable Amounts), locations fished by a vessel, fishing effort, and other vessel activity information. In addition, onboard observers use information in the logbook to obtain information on total effort, location fished, total hail weights, and other trip-specific types of information.

[141] § 679.4 (b) Federal Fisheries permit (FFP) (1) Requirements. (i) No vessel of the United States may be used to retain groundfish in the GOA or BSAI or engage in any fishery in the GOA or BSAI that requires retention of groundfish, unless the owner or authorized representative first obtains an FFP for the vessel, issued under this part. An FFP is issued without charge. Only persons who are U.S. citizens are authorized to receive or hold an FFP.

For example, all groundfish catcher vessels that are 60 feet (ft.) or greater in length overall (LOA), and fishing longline, trawl, or pot gear, and vessels fishing longline pot gear and less than 60 ft. LOA, are required to have a Federal Daily Fishing Logbook. An example of this logbook is at https://alaskafisheries.noaa.gov/sites/default/ files/CVLGLDFL.pdf. Vessel operators request logbooks from the NMFS Alaska Regional Office (AKRO) using an online form, or calling the office, and the AKRO mails the logbooks to the operator.

Logbooks provide on-the-water information about the types and amount of fish caught, and where the fish were caught. For example, set location (deployment and retrieval) and species caught could be used to determine whether fishing occurred in the EEZ and whether fish were retained as required in regulation. This provides an important source of information to verify fishing activity on-the-water using both logbook and shoreside accounting, including enforcement of closure areas and species retention. Electronic logbooks (called eLogbooks) provide the same effort information in a timely and easily accessible format and allows the agency to broadly compare logbook information with landings off the water and also to check fishing location information.

Paper logbooks account for most of the logbook use for catcher vessels in the groundfish fisheries. Fisheries data contained in the paper logbooks are generally not electronically available for unobserved vessels. Entering information from the paper logbook is expensive for the agency and with the exception of the sablefish fishery most paper logbook data are not entered into a database unless there is a specific reason to do so (e.g., enforcement case). Some groundfish catcher vessels have switched to electronic logbooks and these data are available in an AKRO database. Electronic logbooks provide detailed information on fishing effort that is not easily accessible from paper logbooks and not available on landing reports in eLandings.

There currently is not a logbook requirement in the Salmon FMP. A logbook for the salmon fisheries would need to be developed since there currently is not a State or Federal logbook for these fisheries. The use of an eLogbook in salmon fisheries would require developing a salmon fishery logbook application (likely a modification of the groundfish logbook and backend functionality). Based on experience in the groundfish fishery, the minimum requirements for an eLogbook would require vessel operators to purchase a laptop (or tablet), suitable operating system, and a printer. The printer is needed to maintain hard copy records onboard the vessel for enforcement purposes, and also to provide a processor with information on at-sea discards. NMFS currently provides the logbook application, user support, and training that is offered either in person or through the internet. Finally, information would be transmitted from the vessel to the agency server via the internet or email when the vessel is in Wi-Fi range (e.g., at the processing plant) or the operator had access to email. A comprehensive discussion of potential logbook costs and their impacts is provided in Section 4.7.2.2.2 of the RIR.

Under either option (full retention or discard at-sea), verification of logbook information would be reliant on periodic checks by enforcement. Logbooks could be applied under Option 1, Option 2, or Option 3 in the following ways:

Option 1 - Full Retention of groundfish

Full retention would require NMFS to verify fish reported in the logbook were also landed shoreside, and fish were not discarded at sea. Fish landed shoreside would be reported to NMFS through eLandings. All catch that was not going to be retained could be verified and counted at the dock and compared against the logbook and any information related to on-the-water enforcement.

The salmon fisheries are not likely to need inseason action on groundfish discard, and thus near real time electronic reporting would not necessarily be needed for inseason management of discards. However, fishery participants would still need to be notified if a groundfish species was placed on prohibited retention status in the GOA. A paper logbook would be available for on-site enforcement and verification purposes and to assist with eLandings reporting. However, no information on effort would be electronically available from paper logbooks without additional monitoring tools (e.g., EM or VMS) or resources to enter logbook data. The eLogbook could provide spatially explicit effort information for both retained and discarded fish. This type of spatial information could be used to delineate harvest and effort relative to the EEZ, which could be used by NMFS if inseason action was needed due to salmon management.

Option 2 - Discard of groundfish at-sea

Similar to Option 1, the logbook could be used to assess discard in the salmon fisheries. Vessels with electronic logbooks would also provide both the accounting and effort information for managers. For vessels with a paper logbook, species-specific discard information can be reported via eLandings. In this situation, the vessel would submit a copy of the logbook page (i.e., the “blue sheet”) to the processor, and the at-sea discard would be entered into eLandings by the processor using the blue sheet information. The eLandings disposition code for at-sea discard would be used.

Without the logbook (i.e., just eLandings), there would be no at-sea record of the amounts of groundfish discarded. While both eLandings and the logbook are industry reported information, keeping a logbook would likely improve the accuracy of information given the vessel operator would be required to track catch on a set-by-set basis, rather than just reporting species-specific trip totals upon landing the salmon. Further, if accounting specific to the EEZ was needed, eLandings could be modified to accommodate this information (see eLandings section) and the logbook would provide a record of locations fished. *However, given logbooks consist of industry reported information, discard amounts would be unverified unless on-the water observation occurred.*

Option 3 - Optional retention of groundfish

A logbook could also be required for participants that choose to obtain an FFP and are required to retain groundfish to verify retention and/or participants that discard all groundfish to document discards. The discussion of Option 1 and Option 2 in the proceeding paragraphs review the considerations that would be applicable to each class of participant.

Observers

Under Section 303(b)(8) of the MSA, the FMP may require that one or more observers be carried on board a vessel engaged in fishing for species that are subject to the plan, for the purpose of collecting data necessary for the conservation and management of the fishery; except that such a vessel shall not be required to carry an observer on board if the facilities of the vessel for the quartering of an observer, or for carrying out observer functions, are so inadequate or unsafe that the health or safety of the observer or the safe operation of the vessel would be jeopardized. Of the monitoring tools identified in Table 2-8, an observer program would provide the most comprehensive information at the level of an individual vessel, including data on marine mammal and seabird interactions. Appropriate program design, coverage levels, and funding mechanisms would have to be developed for this fishery. A comprehensive discussion of potential observer costs and their impacts are provided in Section 4.7.2.2.4 of the RIR.

Electronic monitoring - Camera technology

A number of electronic monitoring technologies have been applied to fisheries monitoring. Video based technologies are being used in several applications in the North Pacific and elsewhere. Within the North Pacific, video technology has been proposed or implemented as a way to supplement existing observer coverage; enhance the value of the data NMFS receives; and/or fill data gaps that have proven difficult to fill with human observers. A recent final rule (82 FR 36991, August 8, 2017) described the requirements for integrating EM into the North Pacific Observer Program.

Electronic monitoring is a reliable tool for compliance monitoring or a combination of compliance and catch accounting. A compliance monitoring approach would be to require industry self-reported data and to use the EM to audit, or verify, compliance with the record keeping and reporting requirement. For example, cameras could be used to verify that all catch is retained. This is a common approach used for quota share programs in the Federal groundfish fisheries. A catch accounting approach would use EM and video reviewers to enumerate fish caught. Catch accounting approaches are currently being implemented for some longline and pot vessels subject to observer coverage in the groundfish fleet. Currently, EM is not being deployed on any vessels fishing with gillnets in waters off Alaska.

On the U.S. east coast, EM for both compliance monitoring and catch accounting is being used on gillnet vessels operating in the Greater Atlantic Region. Specifically, the Nature Conservancy was issued an Exempted Fishing Permit that exempts 15 vessels (40-50 ft. in length) from at-sea monitors if they take EM cameras; hence most of that fleet is human observed outside of the EFP. Discarded regulated groundfish species are placed on a measuring strip in view of the camera, and species other than regulated groundfish (e.g., dogfish and skates) are discarded at designed discard points that are in view of the camera. Prohibited species (e.g., marine mammals, seabirds, etc.) are also discarded in view of the camera, and mammal catches are recorded in a log. Each participating vessel is required to have a vessel monitoring plan (VMP) that is reviewed and approved by NMFS. Similar to the VMP in the Alaska groundfish fisheries, the VMP describes how fishing operations on the vessel are conducted, including how gear is set, how catch is brought on board, and where catch is retained and discarded. The VMP also describes how the EM system and associated equipment is configured to meet the data collection objectives, including camera locations, and any special catch handling requirements to ensure the data collection objectives can be met. Funding for this experimental program is provided through Federal grants, as well as NGO participation. Additional information about the potential costs of EM and their impacts is provided in Section 4.7.2.2.5 of the RIR.

Option 1 - Full Retention of groundfish

The use of EM to track regulatory compliance is a common practice for fisheries off Alaska and elsewhere in the US. Federal regulations at 50 CFR 679.28 describe in detail video monitoring system and vessel requirements for certain groundfish fisheries off Alaska where video is used to monitor how catch is sorted and weighed on a flow scale. Under the full retention option, a gillnet vessel’s compliance with a prohibition on discards would be verified using video monitoring. Application of this technology would need adjustment to fit the requirements of the gillnet fishery but would likely have some components similar to those in regulation for the Alaska groundfish fisheries.

Fisheries outside of Alaska use video monitoring for compliance on small vessels (less than 60 ft. LOA). This includes testing a compliance camera system in the Gulf of Maine groundfish fishery that is designed to detect compliance of full retention requirements. NMFS is also testing EM system in the Atlantic herring and Atlantic Mackerel mid-water trawl fisheries in an effort to address concerns about the incidental catch of river herring, shad, and haddock, as well as the amount of discarding at-sea.

The use of camera monitoring systems under option 1 would be for compliance monitoring and thus catch enumeration would not be necessary. This is a simpler and potentially less expensive monitoring program than a program designed to enumerate catch.

Option 2 - Discard of groundfish at-sea

Under option 2, a full catch accounting EM program similar to the groundfish program could be implemented to enumerate at-sea discard.

Option 3 - Optional retention of groundfish

Under option 3, EM could be applied to those vessels retaining groundfish to ensure compliance and/or to those vessels discarding groundfish for catch accounting.

In summary, the use of cameras for monitoring discard under either Option 1, 2, or 3 is likely feasible from a technology standpoint. However, prior to implementation either retention option would require additional research and testing to develop an appropriate and effective EM system for the gillnet fishery, including consideration of costs for the equipment and video review. As with placing observers on vessels, funding sources would be needed, and further analysis needed as to how an EM program would be structured and implemented.

Vessel Monitoring System

Another option could be the use of vessel monitoring system (VMS) to track vessel activity using location information that is transmitted to NOAA. The VMS is useful for enforcing area closures and inferring where fishing occurred. In the case of salmon management, it would provide spatial information describing where a vessel traveled that can be compared to State and Federal waters and includes a time stamp that can be compared with other reporting tools (e.g., logbook). In the groundfish fisheries, VMS is used intensively by inseason managers to assist in determining management actions. VMS provides inseason managers with useful information about the levels of effort in both space and time. This has become very useful for gauging fishery season length given TAC limits and therefore how much longer a given fishery may be kept open without either exceeding the TAC, or leaving fish unharvested. A comprehensive discussion of potential costs of VMS and their impacts is provided in Section 4.7.2.2.6 of the RIR.

One of the challenges associated with Alternative 3 is partitioning catches between respective jurisdictions. In Cook Inlet, individual State salmon management areas (districts / sub-districts) currently span both Federal and State waters. One option would be for ADF&G to redistrict this area for catches to be monitored and allocated to the State and EEZ waters, individually. Or, a new EEZ only sub-area could be added that would be reported in addition to the State statistical area. Another option would be for processors (through eLandings) or fishers (through an eLogbook) to report the proportion of catch inside versus outside of the EEZ, without changing district lines.

In order to ensure accurate reporting and compliance based on jurisdictional boundaries, the ability to monitor vessel fishing locations would likely be necessary. Such monitoring may be achieved through EM systems that record fishing locations or through VMS (Jennings et al. 2010). VMS have been used in groundfish and crab fisheries in the GOA and Bering Sea / Aleutian Islands since the early to mid-2000s (depending on the fishery) to enforce spatial regulations by transmitting vessel locations at fixed, typically 30-min, intervals (NPFMC 2012). VMS have been typically required less among smaller vessels (less than 60 feet), like those that comprise the drift gillnet fleet, but the information provided by VMS may be a critical component for fishery management, especially during times when the two management bodies have different restrictions in place.

eLandings

The eLandings Electronic Reporting System is the electronic and Internet based reporting system maintained by ADF&G, the NMFS Alaska Region, and the International Pacific Halibut Commission to obtain non-redundant, near real- time information on catch and production.

The eLandings system includes—

eLandings – A web application for shore side and Internet capable vessels.

seaLandings – A desktop application for at-sea vessels without Internet capability.

tLandings – A portable data storage application for tender and other operations.

Landings of salmon are reported to ADF&G using a combination of paper fish tickets and eLandings/tLandings. Paper fish tickets must be manually entered, whereas eLandings information is electronically reported and available in near real time. Most salmon landings are reported through eLandings, and all harvest from the UCI reported on paper fish tickets are processed at the Soldotna office of ADF&G. For example, a tender acting as an agent for a processor located in Lower Cook Inlet or beyond may buy fish in UCI and land that product outside of UCI. Then the fish tickets are sent to the Soldotna office as the harvest occurred within their management area. These data processing procedures assure that local area management biologists have a full understanding of harvest from their area of responsibility.

ADF&G began migration of all fish ticket reporting to electronic submission in 2010. Starting January 1, 2016, the department began to require all operations, by processor code, to use eLandings if they submitted more than 2,000 salmon fish tickets or bought over 20 million pounds of salmon in any of the previous three calendar years. This includes tender vessels, floating processors, and shore based processors.[142] Many facilities in the Cook Inlet area were required to use the eLandings System for the first time in 2016.

Under all Alternatives, the use of eLandings could be required for processors with salmon landings; however, consideration should be given to whether all processors are required to use eLandings, or whether the current 2,000 fish ticket threshold should be maintained under Alternatives 2 or 3 (for processors receiving landings from vessels fishing in the EEZ). This threshold provides flexibility for a few small processors that are sensitive to costs associated with eLandings (e.g., equipment, training, and access to robust internet service). A comprehensive discussion of potential costs of eLandings and their impacts is provided in Section 4.7.2.2.7 of the RIR.

An important advantage with the eLandings/tLandings system is the ease at which managers can access near real time information, and also the flexibility of the platform to accommodate modifications in reporting (e.g., proportion of fish from the EEZ). Paper fish tickets can take up to a year to be electronically available to managers. In addition, eLandings information is available to company seafood staff and managers through an online account that has a User ID and is password protected. Agencies have provided business applications and interfaces to help these companies access the electronic records. This feature of eLandings has been very beneficial for large to medium companies; however, the burden of additional reporting has not been viewed as a large efficiency gain for small operations.

Combination of monitoring, recordkeeping, and reporting measures

Any combination of monitoring, recordkeeping, and reporting measures reviewed in this section could be required. For example, VMS, logbook, and electronic monitoring could be combined for a comprehensive monitoring approach. Estimates of effort for inseason monitoring could be obtained using VMS and the eLogbook and providing EEZ specific eLandings reporting of catch.

[142] 5 AAC 39.130 (b)

9. Appendix: Examples of Tier 3 status determination criteria methodology applied to Tier 1 and Tier 2 stocks

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This appendix contains examples of Tier 3 status determination criteria methodology applied to Tier 1 and Tier 2 stocks. This may be required if suitable salmon forecasts are not available in time to inform the harvest specifications using the Tier 1 and Tier 2 approach. In this example, the 80th percentile of EEZ catch over the 1999-2021 timeseries multiplied by *T* years is used to calculate OFL. This is more conservative than the 1999-2021 maximum EEZ catch multiplied by *T* years proposed as a starting point to calculate OFLs for pink and chum salmon stocks. A 10% buffer is then applied to the OFL to determine Max ABC. If this approach was required, the salmon plan team or agency could recommend an alternate catch reference or buffer on the basis of the best scientific information available. Comparisons to the Max ABC calculated using the Tier 1 or Tier 2 approach are also provided for reference.

All data and Tier 1 or 2 calculations from Table 3-5 through Table 3-9 in Section 3.1.2.

Kenai river sockeye salmon							OFL to Max ABC Buffer		10%
Year	**Total Kenai R. Catch**	**Kenai R. EEZ Catch**	**Tier 3 OFL**	**Tier 3 Max ABC**	**Cumulative Catch (∑CEEZ)**	**Tier 3 Max ABC Exceeded?**	**Tier 3 ABC less conservative than Tier 1 ABC?**	**Tier 1 ABC**	**Tier 1 ABC exceeded?**
1999	2035	341							
2000	1118	181							
2001	1451	221							
2002	2340	360							
2003	3037	431	3514	3163	1534	No	Yes	2947	No
2004	4015	716	3514	3163	1909	No	No	4064	No
2005	4455	857	3514	3163	2585	No	No	5697	No
2006	957	107	3514	3163	2471	No	No	6737	No
2007	2638	774	3514	3163	2886	No	No	6989	No
2008	1374	220	3514	3163	2674	No	No	6084	No
2009	1582	328	3514	3163	2285	No	No	4852	No
2010	2558	672	3514	3163	2100	No	No	4052	No
2011	4982	1140	3514	3163	3134	No	No	4474	No
2012	3557	1214	3514	3163	3573	Yes	No	5162	No
2013	2648	683	3514	3163	4036	Yes	No	5897	No
2014	2186	504	3514	3163	4212	Yes	No	6443	No
2015	2419	238	3514	3163	3778	Yes	No	6371	No
2016	2592	400	3514	3163	3038	No	No	5469	No
2017	1525	202	3514	3163	2025	No	No	4315	No
2018	679	97	3514	3163	1440	No	No	3637	No
2019	2085	252	3514	3163	1189	No	No	3624	No
2020	888	50	3514	3163	1001	No	No	3492	No
2021	1751	256	3514	3163	857	No	No	4420	No

Kasilof river sockeye salmon							OFL to Max ABC Buffer		10%
Year	**Total Kasilof R. Catch**	**Kasilof R. EEZ Catch**	**Tier 3 OFL**	**Tier 3 Max ABC**	**Cumulative Catch (∑CEEZ)**	**Tier 3 Max ABC Exceeded?**	**Tier 3 ABC less conservative than Tier 1 ABC?**	**Tier 1 ABC**	**Tier 1 ABC exceeded?**
1999	514	110							
2000	267	60							
2001	432	81							
2002	432	76							
2003	509	78	422	380	404	Yes	No	1088	No
2004	897	160	422	380	454	Yes	No	1349	No
2005	867	71	422	380	466	Yes	No	1457	No
2006	1490	61	422	380	446	Yes	No	1509	No
2007	792	193	422	380	563	Yes	No	1755	No
2008	1248	160	422	380	646	Yes	No	1811	No
2009	779	87	422	380	572	Yes	No	1541	No
2010	523	73	422	380	574	Yes	No	1477	No
2011	564	75	422	380	588	Yes	No	1347	No
2012	258	65	422	380	460	Yes	No	1229	No
2013	513	51	422	380	351	No	No	1282	No
2014	663	74	422	380	338	No	No	1383	No
2015	704	18	422	380	283	No	No	1504	No
2016	241	1	422	380	209	No	No	1424	No
2017	443	39	422	380	183	No	No	1382	No
2018	329	30	422	380	162	No	No	1260	No
2019	240	10	422	380	98	No	No	1128	No
2020	303	6	422	380	86	No	No	1208	No
2021	409	21	422	380	107	No	No	1525	No

Kenai river late-run Chinook salmon							OFL to Max ABC Buffer		10%
Year	Total Kenai late-run Catch	Kenai late-run EEZ Catch	Tier 3 OFL	Tier 3 Max ABC	Cumulative Catch (∑CEEZ)	Tier 3 Max ABC Exceeded?	Tier 3 ABC less conservative than Tier 1 ABC?	Tier 1 ABC	Tier 1 ABC exceeded?
1999	16557	62							
2000	16217	49							
2001	16223	58							
2002	15396	39							
2003	19523	109							
2004	26200	121	644	580	438	No	No	157658	No
2005	28501	194	644	580	570	No	No	184378	No
2006	17817	109	644	580	630	Yes	No	198241	No
2007	14757	114	644	580	686	Yes	No	198430	No
2008	14586	49	644	580	696	Yes	No	186020	No
2009	9793	105	644	580	692	Yes	No	155806	No
2010	9143	65	644	580	636	Yes	No	104073	No
2011	10650	72	644	580	514	No	No	63994	No
2012	753	38	644	580	443	No	No	47071	No
2013	2077	32	644	580	361	No	No	30793	No
2014	1423	32	644	580	344	No	No	16150	No
2015	5971	40	644	580	279	No	No	14659	No
2016	10453	102	644	580	316	No	No	15937	No
2017	10647	41	644	580	285	No	No	20790	No
2018	1222	103	644	580	350	No	No	15691	No
2019	1633	29	644	580	347	No	No	15691	No
2020	310	29	644	580	344	No	No	15691	No
2021	518	25	644	580	329	No	No	12326	No

Upper Cook Inlet coho salmon							OFL to Max ABC Buffer		10%
Year	**Total Catch**	**EEZ Catch**	**Tier 3 OFL**	**Tier 3 Max ABC**	**Cumulative Catch (∑CEEZ)**	**Tier 3 Max ABC Exceeded?**	**Tier 3 ABC less conservative than Tier 1 ABC?**	**Tier 1 ABC**	**Tier 1 ABC exceeded?**
1999	257704	29177							
2000	443988	68810							
2001	320985	19384							
2002	465327	66185	264110	237699	183556	No	No	284826	No
2003	261952	26096	264110	237699	180475	No	No	302344	No
2004	509533	92888	264110	237699	204553	No	No	387738	No
2005	391817	64728	264110	237699	249897	Yes	No	437294	No
2006	359893	44646	264110	237699	228358	No	No	411410	No
2007	316900	65791	264110	237699	268053	Yes	No	451071	No
2008	357443	38407	264110	237699	213572	No	No	324660	No
2009	315690	37456	264110	237699	186300	No	No	269533	No
2010	353653	59497	264110	237699	201151	No	Yes	235786	No
2011	203893	18580	264110	237699	153940	No	Yes	172579	No
2012	197966	36416	264110	237699	151949	No	Yes	152983	No
2013	382699	109846	264110	237699	224339	No	Yes	224226	Yes
2014	280218	33163	264110	237699	198005	No	Yes	214074	No
2015	377887	54489	264110	237699	233914	No	No	261362	No
2016	231482	34640	264110	237699	232138	No	No	262851	No
2017	416258	76492	264110	237699	198784	No	No	248423	No
2018	362708	60426	264110	237699	226047	No	No	260552	No
2019	273194	39361	264110	237699	210919	No	Yes	236567	No
2020	226730	1621	264110	237699	177900	No	Yes	205358	No
2021	277020	33047	264110	237699	134455	No	Yes	118186	Yes

Upper Cook Inlet other sockeye salmon							OFL to Max ABC Buffer		10%
Year	**Total Catch**	**EEZ Catch**	**Tier 3 OFL**	**Tier 3 Max ABC**	**Cumulative Catch (∑CEEZ)**	**Tier 3 Max ABC Exceeded?**	**Tier 3 ABC less conservative than Tier 1 ABC?**	**Tier 1 ABC**	**Tier 1 ABC exceeded?**
1999	648575	156824							
2000	434858	119113							
2001	456081	109011							
2002	634198	143699							
2003	620332	233954	937420	843678	762601	No	No	940189	No
2004	759438	217801	937420	843678	823578	No	No	1008829	No
2005	676378	61373	937420	843678	765838	No	No	889598	No
2006	255954.6	38546	937420	843678	695373	No	No	856745	No
2007	650879.3	229734	937420	843678	781408	No	No	881555	No
2008	424069.2	85106	937420	843678	632560	No	Yes	569081	Yes
2009	539839.6	135999	937420	843678	550758	No	Yes	610588	No
2010	636905.5	201708	937420	843678	691093	No	No	933147	No
2011	834647.6	254210	937420	843678	906757	Yes	No	1243363	No
2012	472767	166148	937420	843678	843171	No	No	1192749	No
2013	506729	143884	937420	843678	901949	Yes	No	1297418	No
2014	469175.4	136438	937420	843678	902388	Yes	No	1216058	No
2015	504962.2	70489	937420	843678	771169	No	No	1124803	No
2016	308201.5	48990	937420	843678	565949	No	No	851745	No
2017	656080	131865	937420	843678	531666	No	No	897693	No
2018	361858	79263	937420	843678	467045	No	No	868786	No
2019	448705	73049	937420	843678	403656	No	No	871007	No
2020	230842	13142	937420	843678	346309	No	Yes	692863	No
2021	367315	54303	937420	843678	351622	No	Yes	762606	No

10. Appendix: United Cook Inlet Drift Association v. NMFS, 837 F.3d 1055 (9th Cir. 2016)

FOR PUBLICATION

UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

UNITED COOK INLET DRIFT ASSOCIATION; COOK INLET FISHERMEN'S FUND, *Plaintiffs-Appellants*, v. NATIONAL MARINE FISHERIES SERVICE; PENNY PRITZKER, in her official capacity as Acting United States Secretary of Commerce; KATHRYN SULLIVAN, Acting Under Secretary of Commerce and Administrator for the National Oceanic and Atmospheric Administration; JAMES W. BALSIGER, in his official capacity as NMFS Alaska Region Administrator, *Defendants-Appellees*, STATE OF ALASKA, *Intervenor-Defendant-Appellee.*	No. 14-35928 D.C. No. 3:13-cv-00104-TMB OPINION

Appeal from the United States District Court
for the District of Alaska
Timothy M. Burgess, Chief Judge, Presiding

Argued and Submitted August 2, 2016
Anchorage, Alaska

Filed September 21, 2016

Before: Raymond C. Fisher, Richard A. Paez,
and Andrew D. Hurwitz, Circuit Judges.

Opinion by Judge Hurwitz

SUMMARY*

Magnuson-Stevens Fishery Conservation and Management Act

The panel reversed the district court's summary judgment in favor of the government in an action under the Magnuson-Stevens Fishery Conservation and Management Act brought by two groups of commercial fishermen urging the rejection of Amendment 12, which removed the historic net-fishing area of Cook Inlet from the Salmon Fishery Management Plan ("FMP"); and remanded with instructions that judgment be entered in favor of plaintiffs.

The panel held that the National Marine Fisheries Service cannot exempt a fishery under its authority that required conservation and management from an FMP because the agency is content with State management. The panel held that the Magnuson-Stevens Act unambiguously

* This summary constitutes no part of the opinion of the court. It has been prepared by court staff for the convenience of the reader.

requires a Regional Fishery Management Council to create an FMP for each fishery under its authority that requires conservation and management. The panel further held that the Magnuson-Stevens Act allowed delegation to a state under the FMP, but did not excuse the obligation to adopt an FMP when a Regional Fishery Management Council opted for state management. The panel concluded that Amendment 12 was therefore contrary to law to the extent that it removed Cook Inlet from the FMP.

COUNSEL

Jason T. Morgan (argued) and Beth S. Ginsberg, Stoel Rives LLP, Seattle, Washington, for Plaintiffs-Appellants.

Ellen J. Durkee (argued) and Coby Howell, Attorneys, Appellate Section; John C. Cruden, Assistant Attorney General; Environment and Natural Resources Division, United States Department of Justice, Washington, D.C.; Caroline Park, NOAA Office of the General Counsel, Silver Spring, Maryland; Lauren Smoker, NOAA Office of the General Counsel, Department of Commerce, Juneau, Alaska; for Defendants-Appellees.

Seth M. Beausang (argued), Assistant Attorney General, Anchorage, Alaska, for Intervenor-Defendant-Appellee.

OPINION

HURWITZ, Circuit Judge:

The Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801–91 ("Magnuson-Stevens Act," or "the Act"), creates a "national program for the conservation and management of the fishery resources of the United States." *Id.* § 1801(a)(6). The Act establishes eight Regional Fishery Management Councils, each of which "shall" prepare a fishery management plan ("FMP") "for each fishery under its authority that requires conservation and management." *Id.* § 1852(a), (h)(1). The Secretary of Commerce, acting through the National Marine Fisheries Service ("NMFS"), then reviews each FMP or amendment of a plan "to determine whether it is consistent with the [Act's] national standards, the other provisions of this chapter, and any other applicable law," 16 U.S.C. § 1854(a)(1). *See Or. Trollers Ass'n v. Gutierrez*, 452 F.3d 1104, 1108 (9th Cir. 2006).

The issue for decision is whether NMFS can exempt a fishery under its authority that requires conservation and management from an FMP because the agency is content with State management. The district court held that it could. We disagree, and reverse.

BACKGROUND

I. Factual and Legislative Background

Cook Inlet is one of the nation's most productive salmon fisheries. Its salmon are anadromous, beginning their lives in Alaskan freshwater, migrating to the ocean, and returning to freshwater to spawn.

In 1953, the United States entered into the International Convention for the High Seas Fisheries of the North Pacific Ocean. In response, Congress enacted the North Pacific Fisheries Act of 1954 (the "1954 Act"), authorizing the Secretary of the Interior to promulgate regulations governing fisheries contiguous to Alaskan waters. *See* Pub. L. No. 83-579, §§ 10 & 12, 68 Stat. 698, 699–700 (previously codified at 16 U.S.C. §§ 1021–35). The Secretary then issued a regulation prohibiting salmon net fishing in the western waters of Alaska, but excepting Cook Inlet and two other areas where net fishing had historically been permitted under Alaska law; in those areas, federal regulation was to mirror existing Alaskan regulation. 50 C.F.R. § 210.10 (repealed).

Before 1976, the United States asserted authority only over waters up to twelve nautical miles from the coastline, and there was substantial concern that foreign fishers were depleting American fisheries. *See* Mark H. Zilberberg, *A Legislative History of the Fishery Conservation & Management Act of 1976* ("Legislative History") 237–41, 352, 448–49, 455–56, 472–73, 476–81, 519 (1976). In 1976, Congress enacted the Fishery Conservation and Management Act (the "1976 Act"), Pub. L. No. 94-265, 90 Stat 331 (codified as amended at 16 U.S.C. §§ 1801–1891), later renamed the Magnuson-Stevens Act. The 1976 Act extended federal jurisdiction to 200 miles from the coastline, *id.* § 101 (codified as amended at 16 U.S.C. § 1811), and regulated foreign fishing in that area, *id.* §§ 201, 204 (codified as amended at 16 U.S.C. §§ 1821, 1824). States retained jurisdiction over the first three miles from the coast, *id.* § 306(a) (codified as amended at 16 U.S.C. § 1856), and the federal government had jurisdiction over the next 197 miles, originally called the fishery conservation zone ("FCZ") and later named the exclusive economic zone ("EEZ"), *id.* § 101 (codified as amended at 16 U.S.C.

§ 1811). *See also* 16 U.S.C. § 1801(b)(1); *Exclusive Economic Zone of the United States of America*, 48 Fed. Reg. 10,605 (Mar. 10, 1983).

The federal government manages its waters through eight regional Councils. 16 U.S.C. § 1852. During the debate on the 1976 Act, Senator Gravel of Alaska criticized the concept of federal management on one side of the three-mile line and state management on the other, because fish freely travel across the three-mile boundary. Legislative History 412–13, 460–67. Senator Gravel suggested that a state should manage its federal waters under a plan approved by the federal government. *Id.* at 467, 471. Senator Stevens of Alaska, one of the bill's managers, offered an even broader proposal, which provided for exclusive state management of "[t]hose fisheries capable of being managed as a unit, which reside principally within the waters of a single State." *Id.* at 422. But, Congress instead approved a more modest substitute offered by the bill's other manager, Senator Magnuson, directing Councils, if possible, to incorporate state management measures in FMPs. *Id.*; 1976 Act § 305(c) (codified at 16 U.S.C. § 1855).

In 1979, NMFS promulgated an FMP for salmon fisheries near Alaska. *See* Fishery Management Plan for the High Seas Salmon, 44 Fed. Reg. 33,250 (June 8, 1979) (the "Salmon FMP"). The Salmon FMP divided Alaskan federal waters into East and West Areas; Cook Inlet is in the West Area. *Id.* at 33,267. With respect to the West Area, the FMP tracked the regulations promulgated under the 1954 Act prohibiting commercial salmon fishing except in the three historic net-fishing areas, including Cook Inlet, which the State would continue to manage. *Id.* ("These fisheries are technically in the FCZ, but are conducted and managed by the State of Alaska as inside fisheries."). The decision to leave these fisheries in the hands of the State was not based on a finding that they were in good health; to the contrary, the Salmon FMP found that "[a]ll salmon species are at historic low levels in the Cook Inlet management area, with chinook stocks seriously depleted." *Id.* at 33,309.

In 1983, Congress amended the Act to specify that a Council need only prepare an FMP with respect to a fishery "that requires conservation and management." Pub. L. No. 97-453, § 5(4), 96 Stat. 2481, 2486 (codified as amended at 16 U.S.C. § 1852(h)(1)). The conference report explained this amendment was intended "to clarify that the function of the Councils is not to prepare a fishery management plan (FMP) for each and every fishery within their geographical areas of authority. Rather, such plans are to be developed for those fisheries which require conservation and management." H.R. Conf. Rep. No. 97-982, 97th Cong., 2d Sess., at *18.

Alaska had proposed to amend the Act "to direct the Secretary of Commerce to delegate authority of a domestic fishery in the FCZ to the adjacent state . . . if . . . 1) the fishery does not cross interstate boundaries; and 2) the State is capable and willing to provide conservation and management consistent with the National Standards." *Omnibus Authorization Bill for the National Oceanic and Atmospheric Administration: Hearings Before the S. Comm. on Commerce, Sci. & Transp.*, Serial No. 97-118, 97 Cong. 310 (1982) [hereinafter *Hearings*] (statement of Ronald O. Skoog, Commissioner, Alaska Department of Fish and Game). But, this proposal was not enacted. *See* Pub. L. No. 97-453, § 5(4), 96 Stat. 2481, 2486 (1982).

The Salmon FMP was revised in 1990. The revised FMP stated that, under the regulation implementing the 1954 Act, 50 C.F.R. § 210, salmon net fishing in the West Area was prohibited, with the exception of the three historic net-fishing areas, which "technically extend into the EEZ, but . . . are conducted and managed by the State of Alaska as nearshore fisheries."

In 1992, a new international convention prohibited all fishing for anadromous fish beyond the EEZ. Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, art. I, III. Congress promptly implemented that convention and repealed the 1954 Act. North Pacific Anadromous Stocks Act of 1992, Pub. L. No. 102-567, §§ 801–14, 106 Stat. 4309 (codified at 16 U.S.C. §§ 5001–5012). The Secretary of Commerce then concluded that regulations promulgated under the 1954 Act, including 50 C.F.R. § 210, no longer had statutory support, and repealed them. Removal of Regulations, 60 Fed. Reg. 39,271, 39,272 (Aug. 2, 1995). But, the Salmon FMP was not revised, and Alaska continued to manage the three historic net fisheries.

In 1995, a fishing vessel, "Mister Big," engaged in a massive unregulated harvest of scallops in the federal waters of Prince William Sound. *See Trawler Diane Marie, Inc. v. Brown*, 918 F. Supp. 921 (E.D.N.C. 1995). That scallop fishery was not covered by an FMP, but the Magnuson-Stevens Act provided that a State could regulate fishing vessels in federal waters that were registered in that state. *Id.* at 924, 926; *see* Pub. L. No. 98-623, § 404(4), 98 Stat. 3394, 3408 (1984) ("[A] State may not directly or indirectly regulate any fishing vessel outside its boundaries, unless the vessel is registered under the law of that State."). The Mister Big set sail from Seattle, renounced its Alaska registration, and began fishing for scallops in the Sound. *Trawler Diane Marie*, 918 F. Supp. at 924. By January 26, 1995, the quota that Alaska set for the area, 50,000 pounds of scallops, had been harvested, so Alaska closed the scallop season and Alaska-registered boats returned home. *Id.* But, the Mister Big continued to dredge, eventually harvesting 52,000 pounds of scallops before the Secretary of Commerce approved an emergency closure of the fishery. *Id.* at 925, 927. The North Pacific Council had drafted an FMP which addressed the possibility that an unregulated vessel might fish for scallops in the federal waters off Alaska, but had not adopted it "because of the belief that all vessels fishing in the EEZ would be registered in Alaska and thus bound by the state's regulations." *Id.* at 926.

The following year, Congress revised the provision regarding state authority to regulate fishing vessels in federal waters. *See* Sustainable Fisheries Act, Pub. L. No. 104-297, § 112, 110 Stat. 3559, 3595–97 (1996). After that amendment, the Magnuson-Stevens Act now provides, in relevant part:

> A State may regulate a fishing vessel outside the boundaries of the State in the following circumstances:
>
> (A) The fishing vessel is registered under the law of that State, and (i) there is no fishery management plan or other applicable Federal fishing regulations for the fishery in which the vessel is operating; or (ii) the State's laws and regulations are consistent with the fishery management plan and applicable Federal fishing regulations for the fishery in which the vessel is operating.
>
> (B) The fishery management plan for the fishery in which the fishing vessel is operating delegates management of the

> fishery to a State and the State's laws and regulations are consistent with such fishery management plan.

16 U.S.C. § 1856(a)(3). The version of the bill reported out of the House Committee on Resources would have authorized Alaska to enforce its regulations in federal waters even absent an FMP. H.R. Rep. No. 104-171, at *11–12 (1995). But, that version was not enacted. Pub. L. No. 104-297, § 112.

II. Amendment 12

The North Pacific Council has jurisdiction over the federal waters of Cook Inlet. Six of its 11 voting members are from Alaska and the remainder are from Washington and Oregon. 16 U.S.C. § 1852(a)(1)(G), (b)(1), (b)(2)(C).

In 2010, the North Pacific Council began a comprehensive review of the Salmon FMP. As a result, NMFS "realized" that Cook Inlet was "not exempt from the FMP as previously assumed." Council staff prepared a discussion paper, which summarized the situation as follows:

> The FMP is vague on the function of the FMP in these areas. Though the FMP broadly includes these three areas and the salmon and fisheries that occur there within the fishery management unit and states that management of these areas is left to the State under other Federal law, the FMP does not explicitly defer management of these salmon fisheries to the State. The FMP does not contain any management goals or objectives for these three areas or any provisions with which to

> manage salmon fishing. The FMP only refrains from extending the general fishing prohibition to those areas, where, as the FMP notes, fishing was authorized by other Federal law, [which has since been repealed]. Therefore, the FMP's reference to "other Federal laws" may no longer be fully effective.

The North Pacific Council circulated a draft Environmental Assessment, held five public meetings, and took testimony. In 2011, the North Pacific Council unanimously voted to remove the three historic net fishing areas from the Salmon FMP. In April 2012, NMFS solicited comments on this change, "Amendment 12," and proposed implementing regulations. 77 Fed. Reg. 19,605 (Apr. 2, 2012); 77 Fed. Reg. 21,716 (Apr. 11, 2012).

Two groups of commercial fishermen, the United Cook Inlet Drift Association and the Cook Inlet Fishermen's Fund (collectively, "United Cook"), submitted comments urging the rejection of Amendment 12. The comments cited a 51% decline since 1981 in the commercial catch of sockeye salmon. United Cook attributed this decline to two management failures by Alaska. First, United Cook argued that the State had failed to address the introduction of carnivorous northern pike into nearby lakes and streams. Second, United Cook argued that Alaska was not properly managing the escapement of salmon in Cook Inlet. The Magnuson-Stevens Act requires limits on the number of fish caught. 16 U.S.C. § 1853(a)(15). In contrast, Alaska manages commercial salmon fishing through escapement goals, *i.e.*, the number of salmon allowed to "escape" past a fishery to spawn. According to United Cook, "the State misses the high end of its escapement goal targets as much as 35% of the time," leading to a massive unharvested supply of fish, and "has no escapement goals at all for many runs in Cook Inlet."

In June 2012, NMFS issued a final Environmental Assessment, finding that "the State is the appropriate authority for managing Alaska salmon fisheries given the State's existing infrastructure and expertise," and that "the State's escapement based management system is a more effective management system for preventing overfishing than a system [like the federal one] that places rigid numeric limits on the number of fish that may be caught." NMFS also issued a finding that Amendment 12 would have no significant impact on the environment because it would not change the management of the fisheries. NMFS approved Amendment 12, and, in December 2012, promulgated implementing regulations. *See* Fisheries of the Exclusive Economic Zone Off Alaska; Pacific Salmon, 77 Fed. Reg. 75,570 (Dec. 21, 2012); 50 C.F.R. § 679.2 (definition of West Area).

III. Procedural Background

United Cook filed this action in 2013, challenging Amendment 12 and its implementing regulations as contrary to the Magnuson-Stevens Act's requirement that a Council prepare an FMP "for each fishery under its authority that requires conservation and management," 16 U.S.C. § 1852(h)(1). United Cook also alleged that Amendment 12 was arbitrary and capricious and contrary to the National Environmental Policy Act, 42 U.S.C. § 4332(2)(C). The district court granted Alaska's motion to intervene as a defendant, and entered summary judgment for the government. United Cook timely appealed.

DISCUSSION

The Magnuson-Stevens Act requires that "[e]ach Council shall, in accordance with the provisions of this chapter—(1) for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary (A) a fishery management plan . . . ." 16 U.S.C. § 1852(h)(1). Thus, the usual initial question is whether the fishery at issue even needs conservation and management. *See Anglers Conservation Network v. Pritzker*, 139 F. Supp. 3d 102, 114–15 (D.D.C. 2015). We review that administrative decision under the traditional arbitrary and capricious standard. *Id.* But we need not tarry over that issue here; the government concedes that the Cook Inlet fishery requires conservation and management.

But, the government argues that the Act only requires an FMP for fisheries that need *federal* conservation and management, and that Cook Inlet is in good hands with Alaska. The district court found the Act ambiguous, gave *Chevron* deference to the government's interpretation, and found not arbitrary and capricious the agency's decision that federal involvement was not necessary.

We determine whether to afford *Chevron* deference to an agency interpretation of a statute under a two-step analysis. First, we consider "whether Congress has directly spoken to the precise question at issue." *Chevron, U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 842 (1984). "If the intent of Congress is clear, that is the end of the matter." *Id.* Only "if the statute is silent or ambiguous with respect to the specific issue," do we go to step two, which considers "whether the agency's answer is based on a permissible construction of the statute." *Id.* at 843.

"We start, as always, with the language of the statute." *Williams v. Taylor*, 529 U.S. 420, 431 (2000). Section 1852(h)(1) of the Act provides that a Council "shall" prepare an FMP for a fishery (1) "under its authority" that (2) requires "conservation and management." The government concedes that Cook Inlet is a fishery under its authority that requires conservation and management. But it argues that an FMP is only mandated by the Act when "federal" conservation and management is required. Thus, the government asks us to insert the word "federal" into § 1852(h)(1) before the phrase "conservation and management."

"[W]e ordinarily resist reading words or elements into a statute that do not appear on its face," *Bates v. United States*, 522 U.S. 23, 29 (1997), and the government never persuasively explains why we should deviate from that rule here. *See Pac. Coast Fed'n of Fishermen's Ass'ns v. Blank*, 693 F.3d 1084, 1095 (9th Cir. 2012) (rejecting a reading of the Magnuson-Stevens Act which "requires inserting the word 'only' or 'solely' into subsection [1853a](c)(5)"); *see also Stanton Rd. Assocs. v. Lohrey Enters.*, 984 F.2d 1015, 1020 (9th Cir. 1993) (stating that courts "lack . . . power" to "read into the statute words not explicitly inserted by Congress"). In arguing that we should insert the word "federal" into § 1852(h)(1), the government relies heavily on what it calls the "deferral" provision of the Act, § 1856(a)(3)(A)(i), which allows a state to regulate state-licensed vessels in federal waters when no FMP exists. The government argues that this provision assumes that NMFS can cede regulatory authority to a state over federal waters that require conservation and management simply by declining to issue an FMP. But, § 1856(a)(3)(A)(i) does not create an exception to the general obligation to issue an FMP when a fishery requires conservation and management;

rather, the provision only restates the longstanding principle that a State can regulate vessels registered under its laws in federal waters absent federal law to the contrary. This principle dates at least to 1976. *See* 1976 Act § 306(a) ("No State may directly or indirectly regulate any fishing which is engaged in by any fishing vessel outside its boundaries, unless such vessel is registered under the laws of such State.").

The 1996 amendment to the Magnuson-Stevens Act did not expand that traditional state authority, but rather *limited* state jurisdiction over state-registered vessels to when (i) there is no FMP, or (ii) state law is consistent with the FMP. *See* Sustainable Fisheries Act, § 112 (codified at 16 U.S.C. § 1856(a)(3)(A)). This "deferral provision" would be a strange form of delegation of federal regulatory authority, as it does not allow states to regulate vessels registered in other states. In contrast, the next paragraph of the 1996 amendments, the so-called "delegation" provision, expressly authorizes NMFS to "delegate[ ] management of the fishery to a State" through an FMP, at which point the state can regulate any fishing vessel in the federal waters at issue, regardless of registration. *Id.* (codified at 16 U.S.C. § 1856(a)(3)(B)).

The Act is clear: to delegate authority over a federal fishery to a state, NMFS must do so expressly in an FMP. 16 U.S.C. § 1856(a)(3)(B). If NMFS concludes that state regulations embody sound principles of conservation and management and are consistent with federal law, it can incorporate them into the FMP. *Id.* § 1853(b)(5). Indeed, Amendment 12 expressly delegates management of the East Area – certain federal waters off Alaska not including Cook Inlet – to Alaska. Fisheries of the Exclusive Economic Zone Off Alaska; Pacific Salmon, 77 Fed. Reg. at 75,570–71;

50 C.F.R. §§ 679.1(i)(2) ("State of Alaska laws and regulations that are consistent with the Salmon FMP and with the regulations in this part apply to vessels of the United States that are commercial and sport fishing for salmon in the East Area of the Salmon Management Area."), 679.3(f). Amendment 12 could have expressly delegated management of Cook Inlet to Alaska as well, but it did not. The government argues removing Cook Inlet from the FMP amounts to delegation. But, the federal government cannot delegate management of the fishery to a State without a plan, because a Council is required to develop FMPs for fisheries within its jurisdiction requiring management and then to manage those fisheries "through" those plans. 16 U.S.C. §§ 1801(b)(4)–(5), 1852(h)(1). The "deferral" provision covers those waters where for some reason a plan is not in effect; it is not an invitation to a Council to shirk the statutory command that it "shall" issue an FMP for each fishery within its jurisdiction requiring conservation and management.

Although we find the statutory language clear, we also note that the legislative history of the Act belies the government's argument.[1] The Act makes plain that federal fisheries are to be governed by federal rules in the national interest, not managed by a state based on parochial concerns. *Compare* 16 U.S.C. §§ 1801(a)(6) ("A national program for the conservation and management of the fishery resources of the United States is necessary to prevent overfishing . . . and to realize the full potential of the Nation's fishery

[1] "[W]e 'cautiously adhere' to the practice of consulting legislative history" at step one of a *Chevron* analysis, *Irvine Med. Ctr. v. Thompson*, 275 F.3d 823, 829 n.3 (9th Cir. 2002) (quoting *Am. Rivers v. Fed. Energy Reg. Comm'n*, 201 F.3d 1186, 1196 n.16 (9th Cir. 2000)), recognizing that "courts have no authority to enforce a principle gleaned solely from legislative history that has no statutory reference point," *Shannon v. United States*, 512 U.S. 573, 584 (1994) (alterations omitted).

resources.") and 1802(33)(A) ("The term 'optimum', with respect to the yield from a fishery, means the amount of fish which—(A) will provide the greatest overall benefit to the Nation.") and 1811(a) ("[T]he United States claims, and will exercise in the manner provided for in this chapter, sovereign rights and exclusive fishery management authority over all fish, and all Continental Shelf fishery resources, within the exclusive economic zone.") *with* Alaska Br. 13 ("The Alaska Constitution requires the State to manage natural resources for the maximum benefit and use for all Alaskans." (citing Alaska Const. art. VIII, §§ 1–2)). Congress therefore repeatedly rejected proposals to provide for state management of federal fisheries without an FMP. *Compare* Legislative History 422, 467, 471, *with* 1976 Act § 305(c); *compare Hearings*, *supra*, at 310, *with* Pub. L. No. 97-453, § 5(4) (1982); *compare* H. Rep. No. 104-171 at *11–12, *with* Pub. L. No. 104-297, § 112 (1996). We decline the government's invitation to vest in Alaska the very authority that Congress abjured.

Alaska argues that NMFS has discretion not to adopt an FMP for federal waters requiring management and conservation, because "shall" sometimes means "may." *See Sierra Club v. Whitman*, 268 F.3d 898, 904 (9th Cir. 2001). But, that is not the general rule; we recognized in *Sierra Club* that "'shall' in a statute generally denotes a mandatory duty." *Id.*; *see also United States v. Monsanto*, 491 U.S. 600, 607 (1989) (stating that by using "shall," "Congress could not have chosen stronger words to express its intent that forfeiture be mandatory"); *Brower v. Evans*, 257 F.3d 1058, 1067 n.10 (9th Cir. 2001) ("'Shall' means shall." (quoting *Ctr. for Biological Diversity v. Norton*, 254 F.3d 833, 837–38 (9th Cir. 2001))). Our holding in *Sierra Club* that the Environmental Protection Agency did not have a mandatory duty to bring enforcement actions under the Clean Water Act was driven by "the traditional presumption that an agency's refusal to investigate or enforce is within the agency's discretion," and based on an "[a]nalysis of the structure and the legislative history of the Clean Water Act." 268 F.3d at 902, 904. No similar factors here support reading "shall" as "may."[2]

The government argues that § 1852(h)(1) does not expressly require an FMP to cover an entire fishery, noting that "the provision says nothing about the geographic scope of plans at all." But, the statute requires an FMP for a fishery, a defined term. *See* 16 U.S.C. § 1802(13). No one disputes that the exempted area of Cook Inlet is a salmon fishery. But, under the government's interpretation, it could fulfill its statutory obligation by issuing an FMP applying to only a single ounce of water in that fishery. We disagree. When Congress directed each Council to create an FMP "for each fishery under its authority that requires conservation and management," *id.* § 1852(h)(1), it did not suggest that a Council could wriggle out of this requirement by creating

[2] Alaska also argues that, if we fail to add the word "federal" before "conservation and management" in § 1852(h)(1), NMFS will be forced to issue an FMP for every fishery, because all fisheries require some conservation and management. However, the legislative history of the Act directly refutes this argument. A previous version of the statute required an FMP for every fishery under a Council's authority. In 1983, Congress amended the statute to specify that an FMP is necessary only where a fishery "requires conservation and management." Pub. L. No. 97-453 § 5(4), 96 Stat. 2481, 2486 (codified as amended at 16 U.S.C. § 1852(h)(1)). If every fishery required some type of conservation and management, this amendment would amount to a nullity. But, "[w]hen Congress acts to amend a statute, we presume it intends its amendment to have real and substantial effect." *Stone v. I.N.S.*, 514 U.S. 386, 397–98 (1995)). The amendment thus indicates Congress understood that some fisheries might not require conservation or management.

FMPs only for selected parts of those fisheries, excluding other areas that required conservation and management. *See id.* § 1853(a) (setting out the required contents of FMPs).[3]

Finally, the government argues that its interpretation is supported by National Standards 3 and 7 in the Magnuson-Stevens Act, 16 U.S.C. § 1851(a)(3), (7), and the implementing guidelines for those standards, 50 C.F.R. §§ 600.305–355. But, the National Standards only govern the *contents* of an FMP, not the decision whether to issue one. *See* 16 U.S.C. § 1851(a) (requiring that FMPs "be consistent with the following national standards for fishery conservation and management"). The government's advisory guidelines fare no better, as they do not have the force of law. *Id.* § 1851(b).

CONCLUSION

The Magnuson-Stevens Act unambiguously requires a Council to create an FMP for each fishery under its authority that requires conservation and management. The Act allows delegation to a state under an FMP, but does not excuse the

[3] The government also appears to argue that it fully discharged its statutory obligation when the Salmon FMP was adopted in 1990, because the FMP included Cook Inlet (albeit by placing it under Alaska's authority), and that it was thereafter free under the Act to remove any parts of the West Area from the FMP. But, removing a fishery from an FMP is no different than excluding that fishery from the start. An amendment to an FMP, like the FMP itself, must conform to the statutory scheme. *See* 16 U.S.C. §§ 1852(h)(1) ("Each Council shall . . . prepare and submit to the Secretary . . . (B) amendments to each such plan that are necessary."); 1854(a)(1) (requiring the Secretary to review an FMP amendment "to determine whether it is consistent with the national standards, the other provisions of this chapter, and any other applicable law").

obligation to adopt an FMP when a Council opts for state management. Amendment 12 is therefore contrary to law to the extent it removes Cook Inlet from the FMP.[4] We reverse the judgment of the district court and remand with instructions that judgment be entered in favor of United Cook.

REVERSED and REMANDED.

[4] Because Congress has spoken clearly, we need not reach *Chevron* step two. And, because we conclude that Amendment 12 is contrary to law with respect to its removal of Cook Inlet from the FMP, we need not address United Cook's other challenges to the Amendment.

11. Appendix: NOAA Office of General Counsel legal memorandum regarding "Scope of the "fishery" to be conserved and managed under the Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska"

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of General Counsel
P.O. Box 21109
Juneau, Alaska 99802-1109

March 29, 2018

MEMORANDUM FOR: North Pacific Fishery Management Council

THROUGH: Maura A.B. Sullivan Maura A B Sullivan
Chief, Alaska Section
NOAA Office of General Counsel

FROM: Lauren Smoker Lauren Smoker
Attorney-Advisor, Alaska Section
NOAA Office of General Counsel

SUBJECT: Scope of the "fishery" to be conserved and managed under the Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska

BRIEF BACKGROUND

The North Pacific Fishery Management Council ("Council") is currently in the process of amending the Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska (FMP) to add to the FMP the commercial salmon fishery in the exclusive economic zone (EEZ) waters adjacent to Cook Inlet ("Cook Inlet EEZ Area"). The Council is taking this action pursuant to section 302(h)(1) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA) and the Ninth Circuit's decision in *United Cook Inlet Drift Association v. National Marine Fisheries Service* (*UCIDA v. NMFS*), which interprets section 302(h)(1).[1] At this time, the Council has received two discussion papers on the amendment, one at its April 2017 meeting and another at its October 2017 meeting. At both meetings, the public was invited to submit comments and provide testimony to the Council on the amendment generally and on the discussion papers specifically.

At its April 2017 meeting, the Council adopted a suite of preliminary alternatives, and then refined those alternatives at its October 2017 meeting to focus the FMP amendment on adding the commercial

[1] *United Cook Inlet Drift Association. v. National Marine Fisheries Service*, 837 F.3d 1055 (9th Cir. 2016).

salmon fishery in the Cook Inlet EEZ Area.[2] This FMP amendment will be referred to as the "Cook Inlet EEZ Area amendment" for the remainder of this memorandum. The preliminary alternatives include a no action alternative and two action alternatives. One action alternative provides that NMFS and the State of Alaska (State) would cooperatively manage the fishery in the EEZ. Consistent with MSA section 306(a)(3)(B), this alternative would delegate to the State management of certain measures in the Cook Inlet EEZ Area. The second action alternative would establish Federal management of the fishery in the EEZ. Under both action alternatives, the Federal government will be the entity ultimately responsible for managing the commercial salmon fishery within the Cook Inlet EEZ Area consistent with the FMP, the MSA, and other applicable law.

At both the April and October 2017 Council meetings, representatives for the United Cook Inlet Drift Association (UCIDA) and Cook Inlet Fishermen's Fund (CIFF) submitted comments and provided testimony to the Council on a number of points concerning the Cook Inlet EEZ Area amendment, some of which challenged the scope of the action alternatives.[3] Shortly after the Council's October 2017 meeting, legal counsel for UCIDA and CIFF filed a letter with the Alaska district court objecting to the scope of the Council's action alternatives.[4] In these letters, UCIDA and CIFF state that the action alternatives are not consistent with the Ninth Circuit's decision in *UCIDA v. NMFS* or the requirements of the MSA because they fail to include the entire Cook Inlet salmon fishery occurring in both the EEZ and State waters of Cook Inlet.

At its December 2017 meeting, the Council asked NOAA General Counsel to provide legal guidance on UCIDA and CIFF's objections to the scope of the action alternatives. NOAA General Counsel provides the following legal guidance in response to the Council's request.

QUESTIONS PRESENTED

1. Did the Ninth Circuit in *UCIDA v. NMFS* hold that the Council and NMFS must prepare an FMP amendment that includes salmon fisheries conducted within State waters of Cook Inlet?

2. Does the Magnuson-Stevens Act authorize and require the Council to prepare an FMP amendment that includes salmon fisheries occurring within State waters of Cook Inlet?

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[2] The Cook Inlet EEZ Area, with coordinates, is depicted in Figure 1 of the FMP and in Figure 23 of 50 CFR part 679, and is described in regulations at 50 CFR § 679.2 under the definition of "Salmon Management Area" as "the EEZ waters north of a line at 59° 46.15′ N."

[3] See Attachment 1 (Letter dated March 28, 2017, from UCIDA to Dan Hull, Chairman, North Pacific Fishery Management Council) and Attachment 2 (Letter dated September 28, 2017, from UCIDA to Dan Hull, Chairman, North Pacific Fishery Management Council). Attachment 2 includes UCIDA's letter and the first attachment to the letter. The full letter can be obtained at www.npfmc.org.

[4] See Attachment 3 (Letter dated November 21, 2017, from Jason Morgan to the Honorable Timothy M. Burgess, U.S. District Judge, District of Alaska).

SHORT ANSWERS

1. No. At no point did the Ninth Circuit address Federal authority to manage fisheries within State waters. The Ninth Circuit held that under section 302(h)(1) of the MSA,[5] the Council must prepare an FMP for a fishery that (1) is under its authority and (2) requires conservation and management.[6] The portion of the Cook Inlet commercial salmon fishery that occurs in the Cook Inlet EEZ Area was "the fishery" at issue in the litigation. The question before the Ninth Circuit was whether the FMP under Amendment 12, which applies to most of the commercial salmon fishery occurring within the EEZ, but not to the commercial salmon fishery occurring within the Cook Inlet EEZ Area, was consistent with section 302(h)(1). Because the commercial salmon fishery occurring within the Cook Inlet EEZ Area is a fishery, under the Council's authority, and requires conservation and management, the Ninth Circuit concluded that its removal violated the MSA.[7]

2. No. Unless preemption occurs in accordance with section 306(b), the Magnuson-Stevens Act does not provide the Council or NMFS with the authority to conserve and manage salmon fisheries that occur within State waters in Cook Inlet.

DISCUSSION OF QUESTION 1

The Ninth Circuit's decision in *UCIDA v. NMFS* does not support UCIDA and CIFF's position that the Council must include salmon fisheries in State waters in the Federal FMP. The FMP has never managed state water fisheries, and the Ninth Circuit did not address this issue.

Prior to Amendment 12, the FMP's fishery management unit was all of the EEZ off the coast of Alaska and the salmon and fisheries that occur there.[8] At no point in its history did the FMP's fishery management unit include State waters or the salmon fisheries occurring within State waters. Amendment 12 made a number of modifications to the FMP, but these involved changes to Federal fishery management in the EEZ. Specific to Cook Inlet, Amendment 12 removed the Cook Inlet EEZ Area and the commercial salmon fishery that occurs within this area from the fishery management unit and therefore Federal management under the FMP. UCIDA and CIFF sued NMFS over its approval and implementation of Amendment 12, primarily arguing that the exemption of the Cook Inlet EEZ Area from the FMP violated section 302(h)(1) of the MSA.[9]

Although NMFS and the State (as an Intervenor-Defendant) prevailed at the district court, UCIDA and CIFF prevailed on appeal to the Ninth Circuit. The Ninth Circuit considered the language of section 302(h)(1), which states, "Each council shall … for each fishery under its authority that requires

[5] 16 U.S.C. § 1852(h)(1).
[6] *UCIDA v. NMFS*, 837 F.3d, at 1062.
[7] *Id.*, at 1065.
[8] *See* FMP, Chapter 1, at 1-7 (describing history of the FMP through Amendment 12).
[9] 16 U.S.C. § 1852(h)(1).

conservation and management, prepare and submit to the Secretary" an FMP and any necessary amendments to the FMP.[10] Given this language, the Ninth Circuit concluded that section 302(h)(1) "provides that a Council [must] prepare an FMP for a fishery (1) 'under its authority' that (2) requires 'conservation and management.'"[11] During litigation, NMFS agreed that the commercial salmon fishery occurring within the Cook Inlet EEZ Area requires conservation and management by some entity[12] and none of the parties disputed "that the *exempted area* of Cook Inlet is a salmon fishery (emphasis added)."[13] The Ninth Circuit found that, "When Congress directed each Council to create an FMP 'for each fishery *under its authority* that requires conservation and management,' . . . it did not suggest that a Council could wriggle out of this requirement by creating FMPs only for selected parts of those fisheries, excluding other areas that required conservation and management (emphasis added)."[14] Therefore, the Ninth Circuit held Amendment 12's removal of the Cook Inlet EEZ Area and the commercial salmon fishery that occurs within it contrary to the requirement of section 302(h)(1) and in violation of the MSA.

UCIDA and CIFF state that the action alternatives are out of compliance with the Ninth Circuit's decision because they only address part of the "fishery" -- the part of the Cook Inlet fishery that occurs in the EEZ. UCIDA and CIFF point out that the Ninth Circuit rejected the government's argument that section 302(h)(1) "does not expressly require an FMP to cover an entire fishery, noting that 'the provision says nothing about the geographic scope of plans at all.'"[15] They highlight that the Ninth Circuit found that the MSA requires an FMP for a fishery, a term defined at section 3(13), and that "no one disputes that the exempted area of Cook Inlet is a salmon fishery."[16] They also note that the Ninth Circuit said NMFS cannot "wriggle out" of the requirement at 302(h)(1) by preparing an FMP "only for selected parts of those fisheries, excluding other areas that required conservation and management."[17] Because "[t]here are not two separate fisheries in Cook Inlet (a state and a federal fishery) – there is only one fishery,"[18] and because the Cook Inlet fishery as a whole requires conservation and management,[19] UCIDA and CIFF state that the Ninth Circuit's decision mandates the

[10] 16 U.S.C. § 1852(h)(1).
[11] *UCIDA v. NMFS*, 837 F.3d, at 1062.
[12] *Id.*, at 1061.
[13] *Id.*, at 1064. The Court's reference to "exempted area of Cook Inlet" correctly describes what no one disputed – that the "fishery" being litigated was the commercial salmon fishery within the EEZ adjacent to Cook Inlet and that was exempted from the FMP by Amendment 12.
[14] *UCIDA v. NMFS*, 837 F.3d, at 1064.
[15] Attachment 1, at pages 6-7 (quoting *UCIDA v. NMFS*, 837 F.3d, at 1064).
[16] *Id.*
[17] *Id.*
[18] Attachment 1, at page 6.
[19] *See* Attachment 1, at pages 2-5 (stating that the commercial salmon fishery in Cook Inlet is declining and that the State's management decisions are a major reason for the decline); Attachment 3, at page 2 (stating that "the fishery did not have the complete benefit of management under the Magnuson-Stevens Act" and "the longer that the Council and NMFS attempt to 'wriggle out' of their statutory obligations, the greater the continued economic harm upon the fishing industry, fishing communities, and the Nation.")

Council prepare an FMP for the entire Cook Inlet fishery which occurs in both Federal and State waters.[20]

The Ninth Circuit's decision in *UCIDA v. NMFS* does not support UCIDA and CIFF's position, as it did not address Federal management of fisheries in State waters. The Ninth Circuit focused on Amendment 12's removal of a fishery (the commercial salmon fishery) that occurs in an area under the authority of the Council (the Cook Inlet EEZ Area) and extension of State management authority into the EEZ.[21] The decision correctly characterizes the history and scope of the FMP as applying to the entire EEZ prior to Amendment 12, and then applying to something less than the entire EEZ under Amendment 12.[22] The decision also correctly characterizes the "fishery" in question as the salmon fishery within *the exempted area* of Cook Inlet.[23] Amendment 12 exempted the Cook Inlet EEZ Area, which is comprised entirely of Federal waters, from the FMP.

At no point in the decision does the Ninth Circuit suggest that the FMP did, or should, include State waters and State water salmon fisheries. The decision does not describe the "fishery" in question as including State water salmon fisheries managed by the State, or conclude that State water salmon fisheries are under the authority of the Council and NMFS. The decision expressly acknowledged several times that section 302(h)(1) applies to fisheries "under a Council's authority."[24]

All of the action alternatives currently under consideration by the Council would add to the FMP the Cook Inlet EEZ Area and the commercial salmon fisheries that occur within it. Therefore, the action alternatives currently under consideration by the Council are consistent with the holding in *UCIDA v. NMFS*.

DISCUSSION OF QUESTION 2

Separate from the holding in *UCIDA v. NMFS*, UCIDA and CIFF assert that several MSA provisions support their view that the action alternatives for the Cook Inlet EEZ Area amendment must include

[20] See Attachment 1, at 6 (stating that "the Council has a mandatory duty to develop an FMP for [the entire Cook Inlet] fishery"

[21] *See UCIDA v. NMFS*, 873 F.3d, at 1063 (discussing the authority in the Magnuson-Stevens Act to delegate management of a Federal fishery to a State and correctly describing the FMP's delegation of management authority to the State for the salmon fisheries occurring within the East Area EEZ).

[22] See *id.*, at 1058 (explaining "States retained jurisdiction over the first three miles from the coast . . . and the federal government had jurisdiction over the next 197 miles"); *id.* (stating FMP "divided Alaskan federal waters into East and West Areas" and "three historic net fishing areas, including Cook Inlet, . . . are technically in the FCZ, but are conducted and managed by the State of Alaska as inside fisheries."); and *id.*, at 1060 (correctly describing Amendment 12's removal of the three historic net fishing EEZ areas from the Salmon FMP).

[23] *Id.*, at 1064.

[24] *Id.*, at 1061, 1062, 1063, 1064, and 1065.

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salmon fisheries within State waters. UCIDA and CIFF cite to broad terms in the MSA, which do not override the state jurisdiction provisions of the Act.

As discussed above, the action alternatives currently under consideration would add into the FMP the Cook Inlet EEZ Area and the commercial salmon fishery that occurs within the Cook Inlet EEZ Area. Neither of the action alternatives would add into the FMP the State waters of Cook Inlet or the salmon fisheries that occur within State waters. Citing to the MSA's definitions of "fishery" and "migratory range" and section 101 (which addresses U.S. sovereign rights),[25] UCIDA and CIFF argue, "There are not two separate fisheries in Cook Inlet (a state and a federal fishery) – there is only one fishery, and the Council has a mandatory duty to develop an FMP for that fishery."[26] UCIDA and CIFF state that the alternatives for the FMP amendment must include the salmon fisheries that occur within the State waters of Cook Inlet to "ensure that the entire fishery is managed to meet the requirements of the MSA."[27] UCIDA and CIFF also state that, "If NMFS and the Council continue to try and force the artificial distinctions on the fishery, the resultant plan will not meet the requirements of the Act."[28]

As discussed earlier, section 302(h)(1) of the MSA states that each council must prepare an FMP for (1) a fishery (2) under its authority that (3) requires conservation and management. "Fishery" is defined at section 3(13) of the MSA as "(A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and (B) any fishing for such stocks."[29] While "fishery" is defined broadly under the MSA, this definition does not dictate the scope of Federal fishery management authority. Several provisions of the MSA provide specific limits on such authority.

First, section 101(a) establishes the Nation's sovereign rights and exclusive fishery management authority over all fish and all Continental Shelf fishery resources within the EEZ.[30] Section 3(11) defines the EEZ as the zone established by Presidential Proclamation 5030 (March 10, 1983), in which President Reagan claimed for the United States a 200-mile zone within which the United States would assert sovereign rights over natural resources.[31] Section 3(11) also states that the inner boundary of the EEZ "is a line coterminous with the seaward boundary of each of the coastal States."[32]

Second, section 302(a)(1)(G) states that the North Pacific Council has "authority over the fisheries in the Arctic Ocean, Bering Sea, and Pacific Ocean seaward of Alaska."[33] Because Alaska's seaward boundary is 3 nautical miles from its coast (3-nm boundary line),[34] the inner boundary of the EEZ, and

[25] Attachment 1, at 6-7; Attachment 2, at 2 and 5; and Attachment 3, at 1.
[26] Attachment 1, at 6.
[27] Attachment 3, at 2.
[28] *Id.*
[29] 16 U.S.C. § 1802(13)
[30] 16 U.S.C. § 1811(a).
[31] 16 U.S.C. § 1802(11).
[32] *Id.*
[33] 16 U.S.C. § 1852(a)(1)(G).
[34] 43 U.S.C. § 1301(b).

therefore the Council's authority, starts at the 3-nm boundary line and extends 197 miles seaward to the outer boundary of the EEZ at 200 nautical miles seaward of the coast of Alaska.[35]

Third, section 306(a)(1) explicitly recognizes State jurisdiction: "Except as provided in subsection (b), nothing in this Act shall be construed as extending or diminishing the jurisdiction or authority of any State within its boundaries."[36] Under section 306(b), NMFS may preempt a State's authority and regulate a fishery within the boundaries of a State other than its internal waters.[37] However, this may only happen if NMFS finds, after notice and opportunity for a hearing in accordance with 5 U.S.C. § 554, that (a) the fishing in a fishery, which is covered by a fishery management plan, is engaged in predominately within the EEZ and beyond such zone and (b) the State has taken an action, or omitted to take an action, "the results of which will substantially and adversely affect the carrying out of such fishery management plan."[38]

Finally, and importantly given that the salmon stocks managed under the FMP are anadromous stocks, section 101(b)(1) states that the United States also has exclusive fishery management authority over "all anadromous species throughout the migratory range of each such species beyond the exclusive economic zone; except that that management authority does not extend to any such species during the time they are found within any waters of a foreign nation."[39] The term "migratory range" is defined by the MSA as "the maximum area at a given time of the year within which fish of an anadromous species or stock thereof can be expected to be found, as determined on the basis of scale pattern analysis, tagging studies, or other reliable scientific information, except that the term does not include any part of such area which is in the waters of a foreign nation."[40] The phrase "beyond the exclusive economic zone" is not defined by the MSA, but has been interpreted to mean seaward of the outer boundary of the EEZ (*i.e.*, more than 200 nautical miles from the coast) and to not include State waters that are landward of the inner boundary of the EEZ (*i.e.*, 0-3 nautical miles from the coast).[41]

All of the provisions of a statute such as the Magnuson-Stevens Act must be considered as a harmonious whole and one provision cannot be interpreted or applied without regard to other provisions.[42] While "fishery" and "migratory range" are broad definitions with no limits on geographic scope, sections 101(a) and (b)(1), 306(a), and 302(a)(1)(G) provide geographic boundaries on the Council's and NMFS' authority to conserve and manage fisheries. Although the terms "fishery" and "migratory range," when considered alone and without regard to any other provisions of the Magnuson-Stevens Act, appear to give the Council and NMFS broad authority to manage anadromous species and stocks found within the State's internal waters (freshwater rivers, streams and lakes) and

[35] Some exceptions, not relevant to the Cook Inlet EEZ Area, are provided at section 306(a)(2) of the MSA (16 U.S.C. § 1856(a)(2)).
[36] 16 U.S.C. § 1856(a)(1).
[37] 16 U.S.C. §1856(b). For Alaska, this would include the State's marine waters from 0-3 nm but would exclude internal freshwater rivers, streams, and lakes.
[38] *Id.*
[39] 16 U.S.C. § 1811(b)(1).
[40] 16 U.S.C. § 1802(29).
[41] *Jensen v. Locke*, No. 3:08-cv-00286-TMB, 2009 WL10674466, at *4-6 (D. Alaska Nov. 5, 2009).
[42] 2A Norman J. Singer & Shambie Singer, Sutherland Statutory Construction § 46:5 (7th ed. 2014).

marine waters (0 to 3 nautical miles from Alaska's coast), sections 101(a) and (b)(1), 306(a), and 302(a)(1)(G) place geographic limits on the Council's and NMFS' fishery management authority and do not provide authority for the Council and NMFS to manage anadromous species and stocks within the boundaries of the State. Nothing in the Magnuson-Stevens Act indicates that the definitions of "fishery" and "migratory authority" are to take precedence over these other provisions of the MSA. Section 306 explicitly limits Federal management of fisheries within a State's boundaries except under very specific circumstances.

Consistent with the authority provided by the MSA, the Council and NMFS would amend the FMP by adding back to the FMP the Cook Inlet EEZ Area that was removed under Amendment 12. With this amendment, the Cook Inlet EEZ Area will be under Federal management. Under both action alternatives, the Federal government will be the entity ultimately responsible for managing the commercial salmon fishery within the Cook Inlet EEZ Area consistent with the FMP, the MSA, and other applicable law. Absent preemption in accordance with the requirements in section 306(b), any alternative that would add into the FMP the State waters of Cook Inlet and the salmon fisheries that occur within State waters would exceed the statutory authority provided to the Council and violate the MSA.

However, the action alternatives encompass the decision point as to whether the Federal government, through the Council and NMFS, will directly manage the commercial salmon fishery within the Cook Inlet EEZ Area or whether the Council and NMFS will delegate certain aspects of managing the commercial salmon fishery within the Cook Inlet EEZ Area to the State. The action alternative delegating authority to the State to manage the commercial salmon fishery occurring within the Cook Inlet EEZ Area is consistent with MSA section 306(a)(3)(B),[43] which explicitly provides for such a delegation on the condition that the State's management measures and actions *that apply to the commercial salmon fishery within the Cook Inlet EEZ Area* are consistent with the relevant FMP. Under this delegation alternative, the State's management of the commercial salmon fishery within the Cook Inlet EEZ Area would be subject to Federal review and possible modification under Chapter 9 of the FMP. Under either action alternative, State management of salmon fisheries occurring within State waters would not be governed by the FMP and MSA requirements, absent preemption under section 306(b).

As explained in the April 2017 discussion paper, adding the commercial salmon fishery that occurs in Cook Inlet EEZ Area to the FMP will require the Council and NMFS to specify, among other things, maximum sustainable yield, optimum yield, acceptable biological catch, status determination criteria so that overfishing and overfished determinations can be made, and annual catch limits for the stocks of salmon managed by the FMP. In establishing these reference points, NMFS and the Council will consider the best scientific information available on the stocks of salmon without regard to Federal and

[43] 16 U.S.C. § 1856(a)(3)(B).

State boundaries.[44] Once established, these reference points will guide the Council and NMFS in their management (either direct or delegated) of the commercial salmon fishery occurring within the Cook Inlet EEZ Area. Factors that affect the salmon stocks, whether occurring within or outside of the EEZ, will be taken into account and may require additional limitations or restrictions on the commercial salmon fishery occurring within the Cook Inlet EEZ Area in order for the Council and NMFS to prevent overfishing of the stocks or exceeding annual catch limits.[45]

cc: Kristen Gustafson
Adam Issenberg
Caroline Park
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[44] For example, section 2.7.2 of the October 2017 Discussion Paper presents a preliminary approach as to how optimum yield (OY) and maximum sustainable yield (MSY) could be described for the commercial salmon fishery in the Cook Inlet EEZ Area under Alternative 2 -- Cooperative Management with the State:

> For the salmon fisheries in the three traditional net fishing areas, several economic, social, and ecological factors are involved in the definition of OY. Of particular importance are the annual variations in the abundance, distribution, migration patterns, and timing of the salmon stocks; allocations by the Board [of Fisheries]; traditional times, methods, and areas of salmon fishing; and inseason indices of stock strength. Further, because the fisheries take place in the EEZ and State waters without formal recognition of the boundary between these two areas, the OY should not and cannot be subdivided into separate parts for the EEZ and State waters.
>
> MSY is established for salmon stocks with escapement goals based on the MSY control rules in section 2.5. For these stocks, MSY is defined in terms of escapement. MSY escapement goals account for biological productivity and ecological factors, including the consumption of salmon by a variety of marine predators.
>
> The OY for the salmon fishery is that fishery's annual catch which, when combined with the catch from all other salmon fisheries, results in a post-harvest run size equal to the MSY escapement goal for each indicator stock. The portion of the annual catch harvested by the salmon fishery reflects the biological, economic, and social factors considered by the Board and ADF&G in determining when to open and close the salmon harvest by the salmon fishery.
>
> The Magnuson-Stevens Act requires Regional Councils to "review on a continuing basis, and revise as appropriate, the assessments and specifications made ... with respect to the optimum yield." In particular, OY may need to be respecified in the future if major changes occur in the estimate of MSY. Likewise, OY may need to be respecified if major changes occur in the ecological, social, or economic factors governing the relationship between OY and MSY.

[45] For State-Federal fisheries, the National Standard 1 Guidelines address annual catch limits (ACLs) to prevent overfishing and accountability measures (AM) as follows:

"***ACLs for State-Federal Fisheries.*** For stocks or stock complexes that have harvest in state or territorial waters, FMPs and FMP amendments should include an ACL for the overall stock that may be further divided. For example, the overall ACL could be divided into a Federal-ACL and state-ACL. However, NMFS recognizes that Federal management is limited to the portion of the fishery under Federal authority. *See* 16 U.S.C. 1856. When stocks are co-managed by Federal, state, tribal, and/or territorial fishery managers, the goal should be to develop collaborative conservation and management strategies, and scientific capacity to support such strategies (including AMs for state or territorial and Federal waters), to prevent overfishing of shared stocks and ensure their sustainability." 50 C.F.R. 600.310(f)(4)(iii).

"***AMs for State-Federal Fisheries.*** For stocks or stock complexes that have harvest in state or territorial waters, FMPs and FMP amendments must, at a minimum, have AMs for the portion of the fishery under Federal authority. Such AMs could include closing the EEZ when the Federal portion of the ACL is reached, or the overall stock's ACL is reached, or other measures." 50 C.F.R. 600.310(g)(6).

Attachment 1

March 28, 2017

VIA EMAIL TO NPFMC.COMMENTS@NOAA.GOV

Dan Hull
Chairman
North Pacific Fishery Management Council
605 W. 4th Avenue, Suite 306
Anchorage, AK 99501-2252

Re: Comments by United Cook Inlet Drift Association on Agenda Item C2

Dear Chairman Hull:

I am writing on behalf of the United Cook Inlet Drift Association ("UCIDA") to provide comments and offer UCIDA's assistance with respect to agenda item C2, the Salmon FMP Amendment – Discussion Paper. As you know, UCIDA's members are strongly committed to establishing a Salmon FMP for the Cook Inlet salmon fisheries that protects and develops this important fishery in a manner consistent with the Magnuson-Stevens Fishery Conservation and Management Act ("MSA").

The purpose of this letter is two-fold. *First*, UCIDA below provides specific comments on the Discussion Paper. As detailed below, the Discussion Paper misses some of the context and background essential to properly evaluate the problems facing Cook Inlet salmon fisheries and the solutions needed to address those problems. Due to the short time available for public comment, it is not possible for UCIDA to fully address all of its concerns in this letter. UCIDA will supplement this response in the coming weeks and months, and looks forward to working with you and the other Council members to ensure a successful and effective process.

Second, and relatedly, UCIDA requests that the Council form a committee, in accordance with the North Pacific Council's Statement of Organization, Practices, and Procedures Section 2.3.4 (Council Committees), to help develop the options for a salmon FMP for Cook Inlet. UCIDA's members have decades of invaluable first-hand experience with the Cook Inlet salmon fishery and its particular challenges and opportunities. This critical perspective is currently lacking in the Discussion Paper, and UCIDA respectfully submits that inclusion of its members in the development of alternatives for the Council's consideration is both necessary and essential to producing a workable and effective FMP for Cook Inlet.

I. BACKGROUND

A. The Commercial Salmon Fishery in Cook Inlet Is Declining

Everyone agrees that "Cook Inlet is one of the nation's most productive salmon fisheries."[1] Upper Cook Inlet is home to five species of anadromous salmon – chinook, sockeye, coho, pink, and chum – as well as steelhead. Some of these wild runs are among the largest in the world. But the salmon resources in the Upper Cook Inlet watershed are facing growing threats to their survival, and some stocks are in decline from the effects of climate change, warm water, invasive species, urbanization, and ineffective management schemes.

The harvest numbers demonstrate this decline. By one estimate, there has been "a 51% decline since 1981 in the commercial catch of sockeye salmon" in Cook Inlet.[2] The numbers from the Alaska Department of Fish and Game ("ADF&G") also show major declines: the 2013 salmon harvest was 21% less than the 1966-2012 average; the 2014 harvest was 23% less than the 1966-2013 average; the 2015 harvest was 23% less than the 1966-2014 average; and the 2016 harvest was 23% less than the 1966-2015 average.[3] Even worse, *the forecast for the 2017 harvest is the lowest in the past 15 years.*

B. The State's Management Decisions Are a Major Reason the Commercial Fishery Is Declining

The State of Alaska's management decisions have played a significant role in the decline of these fisheries in Cook Inlet. One major problem is over-escapement. As demonstrated in Fig. 1 below, the State has exceeded the in-river goal in the Kenai River for sockeye (the most important sockeye run in Cook Inlet) ***six years in a row***. And the State is not doing much better with the Kasilof River (the second most important sockeye run in Cook Inlet), exceeding the biological escapement goal for that system ***four of the last six years***. Furthermore, for both of these rivers these goals have been exceeded in eight of the last 10 years.

[1] *United Cook Inlet Drift Ass'n v. Nat'l Marine Fisheries Serv.*, 837 F.3d 1055, 1057 (9th Cir. 2016).

[2] *Id.* at 1060-61.

[3] Pat Shields & Aaron Dupuis, Alaska Dep't of Fish & Game, Fishery Management Report No. 16-14, Upper Cook Inlet Commercial Fisheries Annual Management Report, 2015, App. B2, at 126 (Apr. 2016), http://www.adfg.alaska.gov/FedAidPDFs/FMR16-14.pdf (Upper Cook Inlet commercial sockeye harvest by gear type and area, 1966-2015).

Fig. 1 Sockeye Escapements and Surplus 2011-2016

	Kenai River				Kasilof River		
Year	Inriver Goal* (Thousands of Sockeye)	Sonar Count (Thousands of Sockeye)	Est. Pounds Over Midpoint of Goal		Escapement Goal (Thousands of Sockeye)	Sonar Count (Thousands of Sockeye)	Est. Pounds Over Midpoint of Goal
2011	1,100-1,350	1,599	2,431,000		160-340	245	-
2012	1,100-1,350	1,582	2,428,000		160-340	375	705,000
2013	1,000-1,200	1,360	1,638,000		160-340	490	1,520,000
2014	1,000-1,200	1,525	2,635,000		160-340	440	1,093,000
2015	1,000-1,200	1,703	3,317,000		160-340	470	1,119,000
2016	1,000-1,200	1,384	1,647,000		160-340	240	-

There are two distinct impacts from this over-escapement. *First*, it is well established that the over-escapement of sockeye in these systems leads to decreased future sockeye returns. The State has over-escaped the Kenai River six years in a row, and the Kasilof River four of the last six years. Unsurprisingly, the worst returns in 15 years are forecast for 2017.

Second, this over-escapement causes immediate financial loss from foregone harvest. As demonstrated in Fig. 2, the foregone harvest from the Kenai and Kasilof Rivers over the last six years amounts to nearly $33 million in ex-vessel value alone.

Fig. 2 Ex-vessel Value of Surplus/Unharvested Kenai & Kasilof Sockeye 2011-2016

Year	Est. Lbs. Over Midpoint of Goal	Avg. Commercial Price/lb. for Sockeye	Est. Ex-Vessel Value of Surplus - Unharvested Sockeye	Surplus/Unharvested as Percentage of Actual Harvest
2011	2,431,000	$1.50	$3,646,500	10.10%
2012	3,133,000	$1.50	$4,699,500	21.00%
2013	3,158,000	$2.25	$7,105,500	26.90%
2014	3,728,000	$2.25	$8,388,000	36.50%
2015	4,436,000	$1.60	$7,097,600	44.30%
2016	1,647,000	$1.50	$2,470,500	11.9%
Total	**18,533,000 lbs**		**$32,964,000**	
Estimated First Wholesale Value Loss				**- $66,000,000**

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These reduced returns and foregone harvest have devastated the commercial fishing industry and the communities of Cook Inlet. For example, in 2015, the State's management decisions left nearly a million sockeye unharvested. Not coincidentally, that was the same year the Great Pacific Seafoods Company went bankrupt, taking with it 300 jobs and a payroll of over $2 million. Many other processors in Cook Inlet have suffered similar fates, unwilling or unable to operate in this unstable regulatory environment.

These economic problems are exacerbated by the fact that the escapement goals for these systems are already set well above levels that can be scientifically justified. Since 2001 the ADF&G has been using a method known as the Percentile Approach (Bue and Hasbrouck) to set nearly half the escapement goals across the State, including several goals in Cook Inlet. This methodology was based on incomplete data and was never peer reviewed. Not until 2014 did the ADF&G reveal that the Percentile Approach upper level escapement goals were "unsustainable" and likely exceeded the "carrying capacity" for many stocks.[4]

There are numerous other documented management problems in Cook Inlet. The State's repeated failures to properly count salmon returns to the Susitna River is another prime example. For many years, ADF&G thought that the Susitna River had chronic *under-escapements* of sockeye salmon because, according to the State's counting method, not enough sockeye were getting back to the Susitna River. To address those "problems," ADF&G and the Alaska Board of Fish ("BOF") imposed severe restrictions on driftnet harvests, including strict limitations on fishing in the EEZ portions of Cook Inlet. These unnecessary restrictions arising from the State's counting errors resulted in great financial hardship to the commercial fishing industry.

Indeed, as confirmed by study, these same restrictions proved unnecessary and counter-productive because ADF&G was badly *miscounting fish*. A study conducted by ADF&G from 2006 through 2009 revealed that methods used for counting sockeye salmon in the Susitna River were grossly inaccurate and, in fact, *had been undercounting the fish returns for the prior 27 years*.[5] The ADF&G study revealed the Susitna River sockeye *escapement goal had been exceeded 96% of the time* during that period. In some of those years the goal was exceeded by as

[4] Robert A. Clark et al., Alaska Dep't of Fish & Game, Fishery Manuscript No. 14-06, An Evaluation of the Percentile Approach for Establishing Sustainable Escapement Goals in Lieu of Stock Productivity Information, at 9 (Dec. 2014), http://www.adfg.alaska.gov/FedAidPDFs/FMS14-06.pdf.

[5] Lowell F. Fair et al., Alaska Dep't of Fish & Game, Fishery Manuscript Series No. 09-01, Escapement Goal Review For Susitna River Sockeye Salmon, 2009 (Jan. 2009), http://www.adfg.alaska.gov/FedAidpdfs/FMS09-01.pdf.

much as 300% to 400%.[6] After 2009, ADF&G switched to the Percentile Approach to set escapement goals for the Susitna River system. Recently it determined that those goals were also unsustainable, were set too high, and likely exceeded the carrying capacity for many stocks. Furthermore, genetic studies conducted by ADF&G in 2013 to 2015 also indicated that Susitna-bound salmon were not concentrated in any particular area in Cook Inlet so restrictions on fishing in the EEZ made no difference.[7]

When this data was presented to the BOF, they took no action to walk back the inappropriate fishing restrictions that had been developed for the non-existent problem. These restrictions – based on flawed science and faulty data – are *still being used in the current management plans*.

In short, the entire commercial fishing industry has suffered *and continues to suffer* immense economic loss by not being allowed to harvest these surplus salmon stocks. The BOF and ADF&G have, based on faulty information, systematically reduced commercial salmon harvests in Upper Cook Inlet to a current crisis point where commercial fishing produces such marginal economic returns that fishermen and salmon buyers/processors are being forced out of business here.

C. UCIDA Is Seeking Help from the Council to Help Address These Difficult Problems

UCIDA originally turned to the Council during the Amendment 12 process precisely because of these failures by ADF&G and the BOF. Since the Council passed Amendment 12, things have continued to get worse for Cook Inlet. For example, in 2012, the Secretary of Commerce issued a fishery disaster declaration in Cook Inlet due to the unexpected and unexplained crash in returns of Chinook salmon. This caused widespread fishery closures and severe economic hardship for the commercial fishing industry and communities. As detailed above, this was followed by poor harvests in 2013, 2014, 2015, and 2016, and a projected 15-year low for 2017. Things are getting worse, not better.

[6] Catherine Cassidy & Erik Huebsch, United Cook Inlet Drift Ass'n, Fishery Related Aspects of Faulty Sonar Data, Over-Escapement and Impaired Habitat for Susitna Sockeye (Jan. 2014), http://www.ucida.org/wp-content/uploads/2014/11/Fishery-Related-Aspects-of-Faulty-Sonar-Data-Over-Escapement-and-Impaired-Habitat-for-Susitna-Sockeye1.pdf.

[7] Andrew W. Barclay et al., Alaska Dep't of Fish & Game, Regional Information Report 5J17-03, Genetic Stock Identification of Upper Cook Inlet Coho Salmon Harvest, 2013-2015 (Feb. 2017), http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/uci/AR06.pdf.

UCIDA's motivations for turning to the Council for help have been consistently misrepresented. UCIDA is not looking to reallocate the fishery. UCIDA simply wants management of the fishery to be transparent, based on sound science and rational decision-making, and consistent with the principles of maximum sustained yield established by the MSA. Properly managed, there are enough fish in Cook Inlet for all user groups. As currently managed, the fishery is poised for continued decline and crisis.

The State's process is not working in Cook Inlet. The Council has a more deliberative, transparent, and science-driven management process that can help develop sound management objectives and accountability measures for the Cook Inlet salmon fishery. The problems facing the fishery are difficult. So are the problems associated with coordinating management of the fishery between the State and the Council. But these problems are solvable, and UCIDA is willing to put the time and effort to work with the Council and the State to make that happen.

II. SPECIFIC COMMENTS

A. The Fishery Should Be Managed as a Unit Throughout Its Range

The Discussion Paper states that the Council previously "recognized that salmon are best managed as a unit throughout their range . . . ."[8] UCIDA agrees with that sentiment. The Cook Inlet salmon fishery should be managed as a unit throughout the species' range.

However, the Discussion Paper takes the position that the Salmon FMP must focus solely on management goals and objectives for the portion of the fishery occurring in the EEZ, and that the fishery in the EEZ "would have to be responsive to harvests in state waters" and that the "EEZ portion of the fishery would only occur if there was a harvestable surplus after accounting for removals in state waters."[9]

This position misapprehends the responsibility of the Council. There are not two separate fisheries in Cook Inlet (a state and a federal fishery) – there is one fishery, and the Council has a mandatory duty to develop an FMP for that fishery. As the Ninth Circuit explained in the Amendment 12 case:

> The government argues that § 1852(h)(1) does not expressly require an FMP to cover an entire fishery, noting that "the provision says nothing about the geographic scope of plans at all." But, the statute requires an FMP for a fishery, a defined term.

[8] Discussion Paper at 28.

[9] *Id.* at 33-34.

6

> *See* 16 U.S.C. § 1802(13). No one disputes that the exempted area of Cook Inlet is a salmon fishery. But, under the government's interpretation, it could fulfill its statutory obligation by issuing an FMP applying to only a single ounce of water in that fishery. We disagree. When Congress directed each Council to create an FMP "for each fishery under its authority that requires conservation and management," *id.* § 1852(h)(1), it did not suggest that a Council could wriggle out of this requirement by creating FMPs only for selected parts of those fisberies, excluding other areas that required conservation and management. *See id.* § 1853(a) (setting out the required contents of FMPs).[10]

Thus, the Council's obligation is over the entire "fishery" – not merely one area of that fishery.

This is confirmed by the definition of fishery. The MSA defines fishery as:

> (A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and (B) any fishing for such stocks.[11]

The five salmon stocks in Cook Inlet "*can be* treated as a unit for purposes of conservation and management" and are currently heing treated as such by the State and the Council. The Council must therefore produce an FMP for the entire fishery, not "only for selected parts of those fisheries."[12]

To be clear, this does not mean that the Council is required to take over the State's job or preempt state fishery management. Rather, it means that the Council, through the FMP, ***has to set the standards*** for this fishery based on the requirements of the MSA and its 10 national standards. Whether the State is ultimately willing to voluntarily meet those standards is a separate question, as is the potential need for preemption if the State does not meet those standards. The State previously entered into a memorandum of understanding to manage the entire Cook Inlet salmon fishery in a manner consistent with the MSA, putting aside artificial

[10] *United Cook Inlet Drift Ass'n*, 837 F.3d at 1064.

[11] 16 U.S.C. § 1802(13).

[12] *United Cook Inlet Drift Ass'n*, 837 F.3d at 1064.

boundaries that bear no relationship to the geographic range of the fish. There is no reason why it could not do so again.

Nor is there any legitimate reason why the State should not want to do so. The MSA and the FMP process is the gold standard for sustainable fishery management. Although the State does an excellent job with many fisheries, it is plainly struggling with the Cook Inlet salmon fishery. The State's process is not working, and it should embrace this opportunity to develop a science-based approach to sustainable fishery management.

In any event, regardless of the scope of the FMP, the Council at the very least may not delegate management of the EEZ portion of the Cook Inlet salmon fishery to the State unless "the State's laws and regulations are consistent with" the FMP.[13] The Council cannot adopt and rely on the State's regulatory framework, including escapement goals or time and area restrictions, unless those regulations are "consistent with the national standards, the other provisions of [the MSA], and any other applicable law."[14] While this may require the State to change the way it does business in Cook Inlet, such changes imposing additional scientific rigor and greater accountability are plainly needed.

B. Escapement Goals May Serve as an Appropriate Proxy for Annual Catch Limits, but Only if Those Goals Are Based on Sound Science, Subject to Independent Peer Review

UCIDA agrees, in principle, that escapement-based management is an appropriate way to manage salmon fisheries. However, the escapement goals themselves must be based on sound scientific data and be scientifically defensible.

The Discussion Paper states that:

> The State's salmon management program is based on scientifically defensible escapement goals and inseason management measures to prevent overfishing. Accountability measures include the State's inseason management measures and the escapement goal setting process that incorporates the best available information of stock abundance.[15]

[13] 16 U.S.C. § 1856(a)(3)(A), (B).

[14] 16 U.S.C. § 1853(b)(5).

[15] Discussion Paper at 41.

With respect to Cook Inlet, these statements are not accurate. As detailed above, ADF&G has conceded that it's Percentile Approach (Bue and Hasbrouck) used to set escapement goals sets upper levels that are "unsustainable" and likely exceeded the "carrying capacity" for many stocks.[16] Likewise as detailed above, the BOF has imposed "inseason management measures" based on supposed impacts to Susitna River sockeye that were based on faulty escapement data, and are currently doing more harm than good. The BOF has repeatedly refused (including earlier this year) to make corrections or withdraw these in-season management measures in light of the best available information on escapement data and genetic testing showing the lack of efficacy of these restrictions. Again, these are just examples of the many problems inherent in the State's escapement goals.

The Discussion Paper also suggests that the State has a "peer review" process for setting escapement goals. According to the National Standard Guidelines, "Peer review is a process used to ensure that the quality and credibility of scientific information and scientific methods meet the standards of the scientific and technical community."[17] The "participants in a peer review should be based on expertise, independence, and a balance of viewpoints, and be free of conflicts of interest."[18] The peer review process must also be open and transparent, and the public must have "full and open access to peer review panel meetings."[19]

The State has no such peer review process. As the State's latest escapement goal report plainly demonstrates, the escapement goals for Cook Inlet are reviewed and set entirely by ADF&G staff.[20] ADF&G staff (sitting in committee) recommend escapement goals, and those "recommendations are reviewed by ADF&G regional and headquarters staff prior to adoption as escapement goals."[21] ADF&G may consider this internal review as "peer review," but it plainly

[16] Clark et al., *supra* note 4.

[17] 50 C.F.R. § 600.315(a)(6)(vii).

[18] 50 C.F.R. § 600.315(b)(2).

[19] 50 C.F.R. § 600.315(b)(3).

[20] Jack W. Erickson et al., Alaska Dep't of Fish & Game, Fishery Manuscript Series No. 17-03, Review of Salmon Escapement Goals in Upper Cook Inlet, Alaska, 2016, at 20 (Feb. 2017), http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/uci/FMS17-03.pdf (listing participants).

[21] *Id.* at 2-3.

lacks all the attributes of "peer review" required by the MSA. ADF&G's review process has no independence, has no balance of viewpoints, is plainly hampered by conflicts of interest (it is reviewing its own work), and has zero transparency because the review by "regional and headquarters staff" is entirely internal to ADF&G. What the State calls a peer review process is in reality just ADF&G agreeing with itself.

C. The State of Alaska Cannot Serve as a Proxy for the Scientific and Statistical Committee

Relatedly, the Discussion Paper suggests that the State's peer review process "could serve as a functional substitute for SSC recommendations on acceptable biological catch under the Magnuson-Stevens Act § 302(h)(6)."[22] This is not legally permissible. The Council is required to set annual catch limits ("ACLs") at or below the expert recommendations generated by the scientific and statistical committee ("SSC"); no other body may produce and provide these recommendations. In passing the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, Pub. L. No. 109-479, 120 Stat. 3575 ("Reauthorization Act"), Congress intended "to increase the role of science in fishery management."[23] To help accomplish this, the Reauthorization Act added provisions requiring members of the SSC to "have strong scientific or technical credentials and experience."[24] Additionally, Congress "requir[ed] regional fishing councils to set <u>hard, science-based caps</u> on how many fish could be caught each year."[25]

Particularly relevant, the Reauthorization Act amendments provide that, among other things, "[e]ach scientific and statistical committee <u>shall provide</u> its Council ongoing scientific advice for fishery management decisions, including <u>recommendations for acceptable biological catch</u> . . . ."[26] After receiving the SSC's recommendation, "[e]ach Council <u>shall</u> . . . develop annual catch limits for each of its managed fisheries that <u>may not exceed</u> the fishing level

[22] Discussion Paper at 39.

[23] *Lovgren v. Locke*, 701 F.3d 5, 17 (1st Cir. 2012).

[24] 16 U.S.C. § 1852(g)(1)(C).

[25] *Conservation Law Found. v. Pritzker*, 37 F. Supp. 3d 254, 266 (D.D.C. 2014) (emphasis added).

[26] 16 U.S.C. § 1852(g)(1)(B) (emphases added).

10

recommendations of its scientific and statistical committee . . . ."[27] A plain reading of these provisions unequivocally requires that the SSC produce "hard, science-based" ACLs, and that the Council subsequently adopt ACLs at or below the SSC's recommendations.[28]

Case law confirms that a Council's failure to set ACLs at or below recommendations based on the expertise of, and coming from, the SSC is unlawful. *Lovgren v. Locke*, 701 F.3d 5, 17 (1st Cir. 2012) ("[P]roposed ACLs c[an] 'not exceed the fishing level recommendations of [a council's] scientific and statistical committee.'" (third brackets in original) (quoting 16 U.S.C. § 1852(h)(6))); *Flaherty v. Bryson*, 850 F. Supp. 2d 38, 60 (D.D.C. 2012) ("[I]n the process of setting the final ACL, the council must solicit scientific advice from the SSC and, based on that advice, establish a rule for acceptable biological catch to account for scientific uncertainty, and then set an ACL that permits no greater fishing levels than the SSC recommends." (emphases added)). Any attempt by the Council to circumvent these statutory mandates will be heavily scrutinized and invalidated by a court. *See, e.g.*, *Conservation Law Found. v. Pritzker*, 37 F. Supp. 3d 254, 266-67 (D.D.C. 2014) (rejecting Council's "simply nonsensical" attempt to circumvent requirement to set ACLs at or below SSC recommendations because it "contravenes the plain language of the Act").

Accordingly, while it may be appropriate for the Council to use escapement goals as an alternative approach for ACLs, that alternative approach must still be carefully vetted through the SSC.

D. The Discussion Paper's Treatment of Over-Escapement Is Based on Outdated Information

The Discussion Paper marginalizes the problems associated with over-escapement, citing a 2007 ADF&G study and stating that for the last 15 years "foregone harvest was small" and that "the stock which exhibited the largest foregone harvests were not heavily exploited, lacked fishing power and were unable to fully exploit large runs when they occurred."[29] This discussion presents an inaccurate, incomplete, and outdated picture of the escapement problem in Cook Inlet.

[27] 16 U.S.C. § 1852(h)(6) (emphasis added).

[28] *Engine Mfrs. Ass'n v. S. Coast Air Quality Mgmt. Dist.*, 541 U.S. 246, 252 (2004) ("'Statutory construction must begin with the language employed by Congress and the assumption that the ordinary meaning of that language accurately expresses the legislative purpose.'" (citation omitted)).

[29] Discussion Paper at 72.

Critically, the study cited by the Discussion Paper is *10 years old*. During the last 10 years, the Kenai River exceeded the in-river goal eight times, 12 times since the year 2000, including major over-escapements the last six years in a row.[30] Likewise, the Kasilof River also exceeded the biological escapement goal eight times during the last 10 years and 14 times since the year 2000.[31] These were not situations where the "foregone harvest was small." In 2015, the foregone harvest to the Kenai River alone (approximately 500,000 sockeye) was equal to about 50% of the entire catch by the drift fleet for that year. Nor was this a situation where the drift fleet "lacked fishing power" to exploit these runs.[32] The State just over-escaped the fishery through mismanagement – a practice that has unfortunately become the norm, rather than the exception, in Cook Inlet.

In addition, the Discussion Paper incorrectly assumes that the problems of over escapement are limited to situations where ADF&G exceeds its stated escapement goals. But the problems are actually much more pervasive because, as discussed above, ADF&G and/or the BOF have in many cases set their escapement goals at levels that are "unsustainable" or based on data that undercounts actual returns. Over-escapement is a pervasive problem in Cook Inlet.

E. The Discussion Paper Presents an Incomplete Picture of the Cook Inlet Salmon Fishery and the Current and Historical Regulatory Environment

In addition, the Discussion Paper's commentary on the Cook Inlet fishery includes errors and faulty assumptions that miss the larger historical regulatory context of the fishery.

The Discussion Paper uses the State's regulation of Susitna River sockeye beginning in 2008 as an example of how the State manages the Cook Inlet sockeye fishery.[33] As written, the discussion details a seemingly rational process of responding to yield concerns by imposing fishery restrictions. But this superficial discussion misses the context (detailed above) showing

[30] Pat Shields & Aaron Dupuis, Alaska Dep't of Fish & Game, Fishery Management Report No. 17-05, Upper Cook Inlet Commercial Fisheries Annual Management Report, 2016, at 1 (Feb. 2017), http://www.adfg.alaska.gov/FedAidPDFs/FMR17-05.pdf.

[31] *Id.*

[32] It is also estimated that appropriately 200,000 sockeye entered the Kenai River after the ADF&G suspended the sonar counter and the management plans had closed the commercial fisheries in all but the west side of Cook Inlet.

[33] Discussion Paper at 58.

that these same actions were based both on faulty data (namely, grossly erroneous return numbers) and that the area restrictions were based on no data at all (and on assumptions that were later disproven by genetic testing). This example, selected by the Discussion Paper as typical state management in Cook Inlet, is an example of *gross mismanagement*, and the fact that these same baseless restrictions remain in place today only demonstrates the need for the Council to be involved in this fishery.

This Discussion Paper also states that "[c]oho salmon are fully utilized" and that "an increase in commercial opportunity for pink, chum, or coho salmon could result in unsustainable harvest rates on coho salmon" in Upper Cook Inlet.[34] This statement is not correct. The commercial exploitation rate on the total coho return to Northern Cook Inlet is about 10% to 15%,[35] and the sport exploitation rate on the total coho return to Northern Cook Inlet is about 8% to 12%.[36] Combining these rates is far, far below the 60% overall exploitation rate that ADF&G claims is acceptahle. The hest science actually points to a 77% optimum exploitation rate for MSY management for coho salmon.[37]

The coho salmon return data from 2014 demonstrates this. As shown in the chart below, of the estimated 2.75 million coho salmon returning in 2014, there were 1.5 million coho salmon that went unutilized. Any claim that "[c]oho salmon are fully utilized" in Cook Inlet is not supportable.

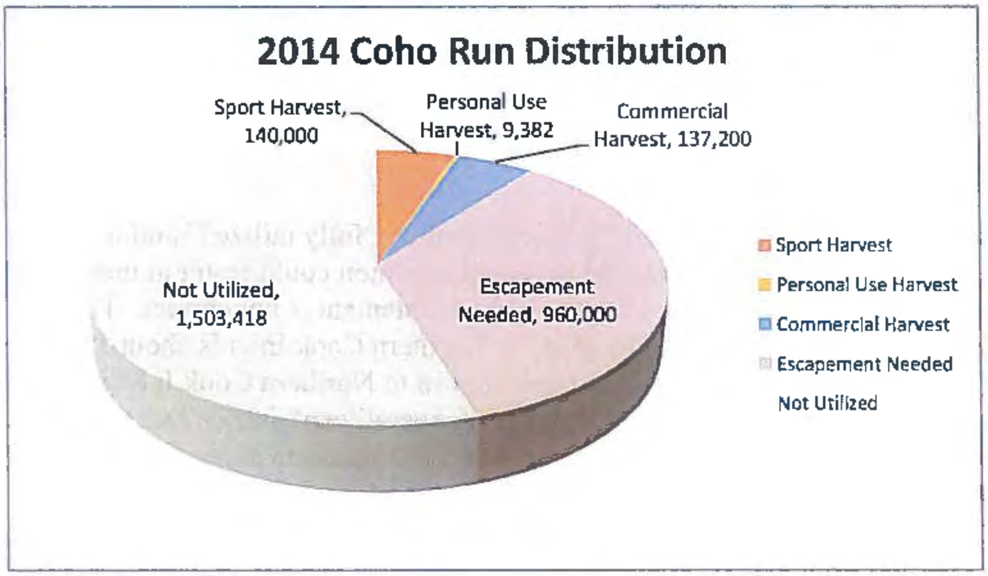
[34] *Id.*

[35] T. Mark Willette, Robert DeCino & Nancy Gove, Alaska Department of Fish & Game, Report No. 2A03-20, Mark-Recapture Population Estimates Of Coho, Pink And Chum Salmon Runs To Upper Cook Inlet In 2002 (June 2003), http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.2003.20.pdf

[36] Samantha Oslud, Sam Ivey & Daryl Lescanec, Alaska Department of Fish & Game, Report No. 17-07 (February 2017), http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/uci/AR03.pdf.

[37] Barclay et al, *supra* note 7.

Figure 5. Distribution of the 2,750,000 Coho Run in Upper Cook Inlet, 2014



The Discussion Paper's confusion on this point is understandable. For a long time, ADF&G used coho salmon as an excuse not to allow fishing on underutilized stocks like pinks and chums. This position is not scientifically sustainable as coho salmon are plainly not fully utilized. As the charts below illustrate, there are significant, underutilized stocks in the Inlet, and the State's failure to authorize harvest on these stocks based on misinformation has imposed significant and unnecessary hardship on the Cook Inlet commercial fishing industry.

Figure 6. Distribution of the 20,000,000 Pink Run in Upper Cook Inlet, 2014

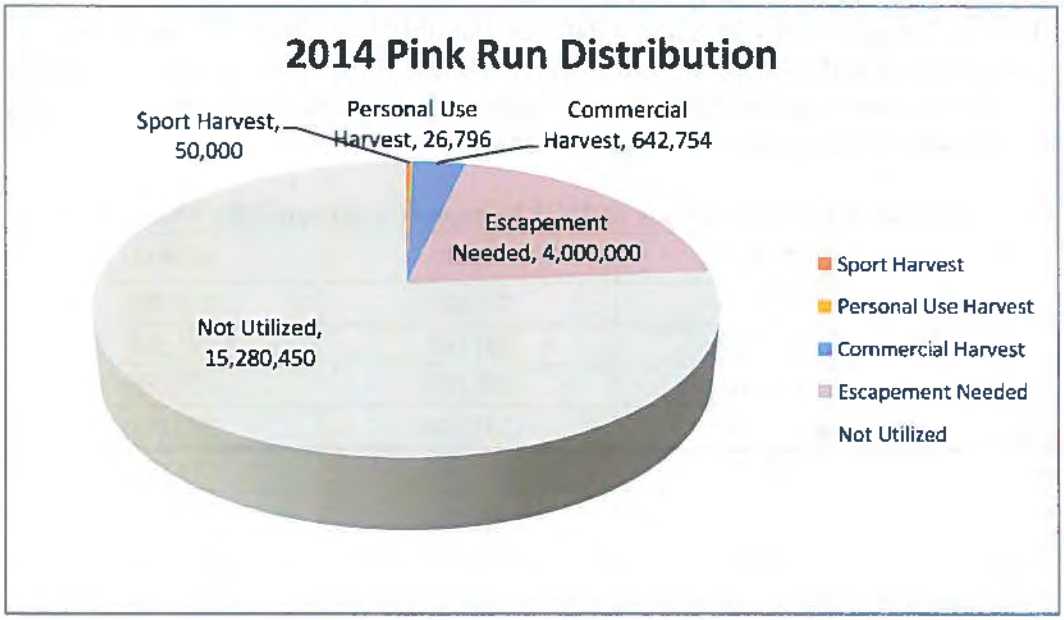
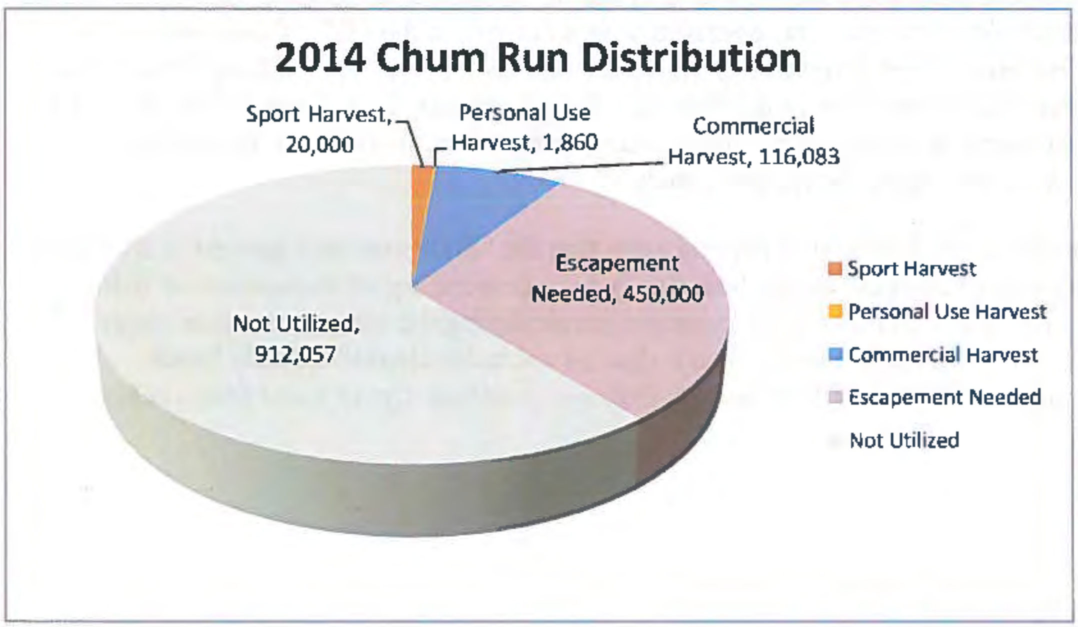


Figure 7. Distribution of the 1,500,000 Chum Run in Upper Cook Inlet, 2014



The Discussion Paper also provides an incomplete picture of the history of state regulation of the commercial fishing fleet in Cook Inlet. For example, the Discussion Paper provides historical catch data that goes back only to 1991, and states that "ADF&G managers estimate that in recent years approximately half of the drift fleet's salmon harvest comes from waters of the EEZ."[38] The problem with using a data set that only goes back to 1991 is that a lot of the State's restrictions on drift fishing started in the 1990s and then got progressively worse over the years. As demonstrated in the figure below, looking at a broader set of data shows how the average harvests have declined under the State's management.

Fig. 4 Average and Annual Number of UCI Salmon Commercially Harvested

	Coho	Pink	Chum
1975 - 1984	363,000	730,000	833,000
1985 - 1994	506,000	397,000	441,000
1995 - 2004	222,000	209,000	178,000
2005 - 2014	171,000	247,000	123,000
2014 Harvest	137,376	642,879	116,093
2015 Harvest	216,032	48,004	275,960
2016 Harvest	147,469	382,436	123,711

As for the fact that half of the drift fleet harvest currently occurs in the EEZ, that too is a product of historical state regulations. The best fishing locations in Upper Cook Inlet are in the EEZ. Historically, the drift fleet has operated predominately in the EEZ. Given their choice, commercial fishermen would continue to spend the vast majority of their fishing effort in the EEZ today. But beginning in the mid-1990s, the State progressively limited fishing in the EEZ, restricting operations based on erroneous or unsupported assumptions about the fishery and unfounded and unsustainable escapement goals.

Furthermore, the Discussion Paper asserts that the "State monitors harvest in all of the salmon fisheries and manages salmon holistically by incorporating all the sources of fishing mortality on a particular stock or stock complex in calculating the escapement goal range."[39] This gives the State much more credit than is due. A recently released Genetic Stock Composition report (FMS 16-10) documents that *over a million Upper Cook Inlet sockeye*

[38] Discussion Paper at 57.

[39] *Id.* at 69.

salmon were targeted and harvested in just a portion of the Kodiak Management Area in the years 2014 to 2016.[40]

ADF&G did not account for those removals when setting or reviewing its escapement goals for the Upper Cook Inlet fishery, even though it was aware of the problem over a year ago. In 1989 the BOF took action and developed the North Shelikof Straits Sockeye Salmon Management Plan to reduce the interception of Cook Inlet sockeye in the Kodiak Management Area. The express purpose of this plan is stated in the preamble: *"The purpose of the North Shelikof Strait Sockeye Salmon Management Plan is to allow traditional fisheries in the area to be conducted on Kodiak Area salmon stocks, while minimizing the directed harvest of Cook Inlet sockeye salmon stocks. The board recognizes that some incidental harvest of other stocks has and will occur in this area while the seine fishery is managed for Kodiak Area salmon stocks. The board intends, however, to prevent a repetition of the nontraditional harvest pattern which occurred during 1988."*[41]

That action by the BOF in 1988 was the result of a harvest of Cook Inlet sockeye estimated at less than half a million. The new genetics study (FMS 16-10) and numerous other ADF&G reports from the Kodiak Management Area reveal the magnitude of the interception far exceeds the previous quantity measured in 1988. In spite of this being the best available science and in spite of the directive from the BOF in 1988, the ADF&G has not taken action to alter current management in the Kodiak Management Area or incorporate the new data. As this example demonstrates, the State does not account for all removals from the fishery or utilize the best available science.

Lastly, the Discussion Paper overlooks the significant role that other federal entities currently have (or may have in the future). Much of the core spawning and rearing habitat for Cook Inlet salmon stocks occur on federally managed lands, including, parks, refuges, reserves, and national forests. The agencies that administer these federal areas can control access to the Cook Inlet fishery stocks above and beyond the NPFMC, NMFS, and the State. All of these entities have a say in the management of fish habitat, and some, such as the Federal Subsistence Board and U.S. Fish and Wildlife Service, can authorize or manage harvests without state approval. The State is not the only regulatory entity involved here, and the role of these other federal agencies and entities needs to be carefully considered and discussed.

[40] Kyle R. Shedd et al., Alaska Dep't of Fish & Game, Fishery Manuscript Series No. 16-10, Genetic Stock Composition of the Commercial Harvest of Sockeye Salmon in Kodiak Management Area, 2014–2016 (Dec. 2016), http://www.adfg.alaska.gov/FedAidPDFs/FMS16-10.pdf.

[41] 5 AAC 18.363(a)

Dan Hull
March 28, 2017
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We sincerely appreciate your consideration of these comments and concerns and look forward to working with you to develop a robust, science-based FMP for the Cook Inlet salmon fisheries.

Very truly yours,

Jason T. Morgan

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Attachment 2

United Cook Inlet Drift Association

43961 K-Beach Road, Suite E • Soldotna, Alaska 99669 • (907) 260-9436 • fax (907) 260-9438
• info@ucida.org •

Date: September 28, 2017

Addressee: Dan Hull
Chairman
North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, AK 99501-2252

RE: Salmon Fisheries Management Plan, Alaska Agenda Item C-8

Dear Mr. Hull,

Once again, United Cook Inlet Drift Association (UCIDA) and Cook Inlet Fishermen's Fund (CIFF) express our willingness to work cooperatively with NOAA/NMFS. NPFMC, State of Alaska and other stakeholders in the construction and development of a new salmon Fishery Management Plan (FMP) for Alaska. We first raised this issue of a legal and adequate salmon FMP a decade ago. Now, after several Federal court cases and rulings, we again ask for a legal and adequate salmon FMP for Alaska.

Concerning the latest Discussion Paper For Revisions to the Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska, October 2017, UCIDA offers the following:

Review of Decisions, Orders and MSA Excerpts

1. We would ask that all Council members read the United States Court of Appeals for the Ninth Circuit Decision in Case No. 14-35928, Opinion, Filed September 21, 2016. This case is attached and incorporated into our comments by reference.
2. Additionally, we ask all Council members to read the case settlement Order signed by District Court Judge Timothy M. Burgess on August 3, 2017. This case settlement agreement is attached and incorporated into our comments by reference.

3. Lastly, we would ask that all Council members read "Magnuson-Stevens Act Excerpts," which is also attached and incorporated into our comments by reference.

In referencing these three documents, there are several issues:

A. There is no reference to anadromous species as explained or described by MSA;

B. The anadromous term "migratory range" does not appear anywhere in Discussion Paper;

"101-627
(29) The term "migratory range" means the maximum area at a given time of the year within which fish of an anadromous species or stock thereof can be expected to be found, as determined on the basis of scale pattern analysis, tagging studies, or other reliable scientific information, except that the term does not include any part of such area which is in the waters of a foreign nation."

C. The October 2017 Discussion Paper avoids or tries to reinterpret this definition.

D. The term "fishery" is a defined term in MSA and is not adequately addressed or incorporated into the Discussion Paper.

Factual Information Errors

In the March 2017 and October 2017 draft Discussion Papers, there are as many as 35 factual errors in the Tables, Figures and general discussions. There are conclusion statements in these documents that are not supportable or supported. We are resubmitting our written comments from March 28, 2017. These comments are attached and incorporated into this paper by reference. In the March 28 comments, we have described certain factual errors and omissions that were found in the March 2017 version of the Discussion Paper. The October 2017 version of the Discussion Paper has not corrected those errors. If the Council's Discussion Paper does not incorporate comments from the stakeholders, then this really isn't an "open and transparent" or meaningful process at all.

Peer Review

Both the March 2017 and the October 2017 Discussion Papers describe a "peer review process" that is nothing more than the State of Alaska agreeing with itself. The described peer review process bypasses all of the stakeholders along with the Science and Statistical Committee (SSC), which was established and mandated by MSA. In our view, there is nothing in MSA that allows a wholesale delegation of the peer review process.

Escapement Goal Management as an Alternative to MSA/OY

Escapement goal management, as a means of achieving the MSA, mandates providing food to the nation and national food security. Following the National Standards 1-10 for this mandate is awkward, incomplete and not well-described. The escapement goal discussion makes no sense in regard to tiers and the use of the percentile approach for setting escapement goals. Structurally and practically, MSY/OY will not be achieved. Just the opposite occurs as millions of salmon are preplanned and pre-prescribed for waste and underutilization; both of which are not in accordance with the stated purposes of MSA.

In the UCIDA comments on the March 2017 Discussion Paper, we raised the issue of the Kodiak Seine Fleet harvests of over a million salmon natal to Cook Inlet. Please read our letter to Mr. John Jensen, AK BOF Chairman, which is attached and incorporated into our comments by reference. Also, see Adjustments for Cook Inlet Reporting Groups to the Addendum to FMS 16-10: Redefinition of Reporting Groups to Separate Cook Inlet into Four Groups for Genetic Stock Composition of the Commercial Harvest of Sockeye Salmon in the Kodiak Management Area, 2014-2016, this document is referenced and incorporated into our comments by reference.

There is no discussion at all regarding the harvesting of salmon natal to Cook Inlet. There is no discussion of how these harvests relate to the National Standards. Lastly, the Discussion Paper is silent on how to approach achieving the National Standards throughout the migratory range of these salmon. We are willing to discuss and work on achieving solutions to these issues related to escapement goal management as an alternative approach to MSA/OY and other MSA mandates.

Stakeholder Working Group

UCIDA has repeatedly asked for a stakeholder salmon committee. Again, we support the formation of such a group. MSA and the August 3, 2017 settlement agreement mandate the formation of a stakeholder group to be established at the very early stages of developing the new FMP. The letter from UCIDA to NPFMC, dated April 6, 2017, is incorporated by reference into our comments. In the Settlement Agreement dated August 3, 2017, the plaintiffs are referenced as being members of the stakeholder committee. UCIDA and CIFF are prepared to provide the names to the NPFMC as appropriate.

In some respects, this letter has been cathartic in the sense that some of the legal issues have been resolved. In other aspects, this letter and the incorporated referenced documents expand the scope of depth of the issues we have regarding the development of a new salmon FMP. We, again, offer our time, energy, thoughtful considerations and suggestions. We believe that if all parties put forward a good faith effort, a draft of the new FMP for Cook Inlet could be ready for review in six to nine months.

Sincerely,

Original Signed Document

David R. Martin, President
United Cook Inlet Drift Association

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Magnuson – Stevens Act excerpts

TITLE I—UNITED STATES RIGHTS AND AUTHORITY REGARDING FISH AND FISHERY RESOURCES

SEC. 101. UNITED STATES SOVEREIGN RIGHTS TO FISH 16 U.S.C. 1811 AND FISHERY MANAGEMENT AUTHORITY

99-659, 102-251
(a) IN THE EXCLUSIVE ECONOMIC ZONE.—Except as provided in section 102, the United States claims, and will exercise in the manner provided for in this Act, sovereign rights and exclusive fishery management authority over all fish, and all Continental Shelf fishery resources, within the exclusive economic zone.

99-659, 101-627, 102-251
(b) BEYOND THE EXCLUSIVE ECONOMIC ZONE.—The United States claims, and will exercise in the manner provided for in this Act, exclusive fishery management authority over the following:
(1) All anadromous species throughout the migratory range of each such species beyond the exclusive economic zone; except that that management authority does not extend to any such species during the time they are found within any waters of a foreign nation.
(2) All Continental Shelf fishery resources beyond the exclusive economic zone.

101-627
(29) The term "migratory range" means the maximum area at a given time of the year within which fish of an anadromous species or stock thereof can be expected to be found, as determined on the basis of scale pattern analysis, tagging studies, or other reliable scientific information, except that the term does not include any part of such area which is in the waters of a foreign nation.

(13) The term "fishery" means—
(A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and
(B) any fishing for such stocks.

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November 21, 2017

Hon. Timothy M. Burgess
United States District Judge
U.S. District Court
District of Alaska
222 W. 7th Avenue, Room 229
Anchorage, AK 99513

Re: Response to Status Report in *United Cook Inlet Drift Assn., et al. v. National Marine Fisheries Service et al.* - USDC No. 3:13-cv-00104 TMB

Dear Judge Burgess:

Plaintiffs United Cook Inlet Drift Association and Cook Inlet Fishermen's Fund hereby file this response to the Status Report filed by Defendant National Marine Fisheries Service ("NMFS"), ECF No. 105-1. Plaintiffs appreciate the fact that NMFS and the North Pacific Fishery Management Council (the "Council") have taken the initial steps towards revising the Salmon Fishery Management Plan (Salmon FMP) as required by the Ninth Circuit's decision in *United Cook Inlet Drift Association v. NMFS*, 837 F.3d 1095 (9th Cir. 2016). Plaintiffs further appreciate the initial discussions by the Council regarding the possible formation of a "salmon workgroup committee" to help guide the development of the Salmon FMP.

However, Plaintiffs have serious reservations as to whether NMFS or the Council are taking to heart the instructions from the Ninth Circuit. The Ninth Circuit instructed NMFS that the "Magnuson-Stevens Act unambiguously requires a Council to create an FMP for each fishery under its authority that requires conservation and management." *Id.* at 1065. The Ninth Circuit expressly rejected NMFS's arguments that the Magnuson-Stevens Act "does not require an FMP to cover an entire fishery" explaining that "fishery" is "a defined term." *Id.* at 1064; *see* 16 U.S.C. § 1802(11) (defining fishery as "(A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and (B) any fishing for such stocks"). The court clearly explained that Congress "did not suggest that a Council could wriggle out of this requirement by creating FMPs only for selected parts of those fisheries." *United Cook*, 837 F.3d at 1064.

Despite this clear instruction, the Council and NMFS appear intent on trying to "wriggle out" once again. There is no dispute that the salmon stocks of Cook Inlet are a "fishery." Yet the alternatives identified by the Council and NMFS to date address only "selected parts" of the

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Hon. Timothy M. Burgess
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fishery occurring in the exclusive economic zone of Cook Inlet instead of the fishery as a whole. The Expanded Discussion Paper cited in NMFS's status report claim that NMFS and the Council have no authority in State waters, and thus (apparently) no ability to provide a plan that sets goals or objectives for the fishery, and instead must simply be "responsive to harvests in state waters." *See* Expanded Discussion Paper at 39.

Plaintiffs are very concerned that if NMFS and the Council continue to focus only on the selected parts of the fishery occurring in the EEZ rather than the entire fishery (as instructed by the Ninth Circuit and as required by statute), the entire remand process is likely to be a wasted exercise. Staff for NMFS at the Council's October meeting described the process of trying to manage the salmon fishery only in the EEZ while complying with the requirements of the Act as a "square-peg, round-hole" exercise. *See* Council Audio Files, 10/7/2017.[1] We agree. But the solution is not to keep forcing the peg into the wrong whole, but to do what the Act requires; ensure that the entire fishery is managed to meet the requirements of the MSA. If NMFS and the Council continue to try and force the artificial distinctions on the fishery, the resultant plan will not meet the requirements of the Act.

Furthermore, Plaintiffs are concerned that NMFS and the Council are not sufficiently availing themselves of the opportunity to work with affected fishermen to develop a workable and effective FMP. The initial Discussion Paper was apparently developed without the cooperation of stakeholders (or at least, without Plaintiffs) and Plaintiffs' comments to the Council on the appropriate scope and nature of the FMP do not appear to be reflected in either the Discussion Paper or the Expanded Discussion Paper. Moreover, while Plaintiffs appreciate the initial discussions by the Council regarding the possible formation of a salmon workgroup committee, nonetheless Plaintiffs were told by one Council member that they should not expect any funding for that committee. Moreover, the Council does not appear to be moving with any sense of expediency or urgency as the Council is not even going to reach the issue of whether to have a salmon committee until April of 2018, more than seven months after the entry of judgment in this case.

All of this points to a process that may be heading in the wrong direction. Six years ago, Council refused to produce an FMP for the Cook Inlet Salmon and Plaintiffs were told by member of the Council, on the record, that they were naïve and misguided in seeking an FMP. Plaintiffs had to spend years litigating with NMFS to force the Council to comply with their statutory duties. All the while, the fishery did not have the complete benefit of management under the Magnuson-Stevens Act, and still will not until the Council produces a proper plan. The longer that the Council and NMFS attempt to "wriggle out" of their statutory obligations, the greater the continued economic harm upon the fishing industry, fishing communities, and the Nation.

[1] https://app.box.com/s/5cm1pxn8nn/folder/40339404138

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Plaintiffs sincerely expect that the Council and NMFS get this process moving in the right direction, and towards development of a Salmon FMP in full compliance with the Act. Until that happens, Plaintiffs reserve their rights to seek interim relief with this Court.

Very truly yours,

Jason T. Morgan

JTM:sdl

cc: All Counsel of Record

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CERTIFICATE OF SERVICE

I hereby certify that on November 21, 2017, I filed a copy of the foregoing document with the Clerk of the Court for the United States District Court – District of Alaska by using the CM/ECF system. All participants in this Case No. 3:13-cv-00104-TMB are registered CM/ECF users and will be served by the CM/ECF system.

/s/ Jason T. Morgan
Jason T. Morgan

12. Appendix: Incorporation of Uncertainty into Escapement Goal Development and Management of Pacific Salmon in Alaska

Fisheries Scientists
Alaska Department of Fish and Game
Anchorage AK

Since Statehood Alaska has utilized a fixed escapement goal policy for managing Pacific salmon (Woodby et al. 2005) based on the work of Thompson (1951). Alaska formally adopted this policy into regulation in 2000 as the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) and the Policy for Statewide Salmon Escapement Goals (5 AAC 39.223). These two policies dictate that Pacific salmon be managed to achieve escapements that provide for sustained yields per the Alaska constitutional mandate to utilize, develop, and maintain fish based on the sustained yield principle (Alaska Constitution, Article VIII, Section 4). Moreover, these policies define escapement goals that maximize or sustain yields and are expressed as ranges or lower bounds that take into account salmon productivity and data uncertainty.

The biological escapement goal (BEG) is the escapement that provides the greatest potential for maximum sustained yield (MSY). The BEG is the primary fishery management objective in the absence of any allocative factors and is developed from and scientifically defensible based on the best available biological information. The BEG is always specified as a range. The sustainable escapement goal (SEG) is the escapement known to provide for sustained yield over a 5 to 10-year period and is used in situations where a BEG cannot be estimated or managed for. The SEG is the primary fishery management objective in the absence of any allocative factors and is developed from and scientifically defensible based on the best available biological information. The SEG can be a range or a lower bound.

Methods of developing escapement goals that account for salmon productivity and data uncertainty have evolved since Statehood but remain based on principles of Pacific salmon population biology, simple production models, and the stock concept. Improved data collection and methods of statistical modeling have greatly facilitated the direct incorporation of uncertainty into an escapement goal analysis. As a result, management of Pacific salmon in Alaska explicitly accounts for uncertainty by managing for a scientifically defensible escapement goal.

Production Models for Pacific Salmon

Due to the semelparous life history of salmon and harvest of largely mature fish in Alaska fisheries, production from a stock of Pacific salmon can be modeled as a simple relationship between escapement of adults and the expectation of subsequent return of offspring as adults,

$$E[R|S] = S \times \alpha \times f\left(S|S_{EQ}\right),$$

where R = production of adults in subsequent generation, S = spawning abundance (escapement) of adults, α = intrinsic rate of increase, and S_{EQ} = carrying capacity (Figure 1).

In this simple model, there is an intrinsic rate of increase (α) due to the average per-adult generation of ova and the survival of these ova to adult in the absence of competition. Counteracting this rate of increase is a discount due to competition, $f\left(S|S_{EQ}\right)$, that increases as escapements tend towards a theoretical carrying capacity (i.e., average escapements in the absence of fishing mortality or S_{EQ}).

The intrinsic rate of increase, also known as the density independent parameter, is thought to be species and regionally specific. Factors influencing the intrinsic rate of increase are variability in life history characteristics such as fecundity, maturation rate, growth rate as well as environmental influences on survival in fresh and salt water.

Carrying capacity is thought to be watershed specific and can be effectuated via rearing or spawning ground limitation. Rearing limitation in Pacific salmon is thought to occur as competition among juveniles for food or space in the freshwater rearing environments of some species. Evidence of these limitations can be seen in variation in time spent residing in freshwater or in size of juveniles at the time of smoltification. Spawning ground limitation is thought to occur as adults compete for suitable spawning areas. Evidence of these limitations can be seen in variation in the location and density of redds and in the amount of egg retention in adults due to competitive interactions.

Several specific production models have been postulated for Pacific salmon. The main difference in these models is the mathematical formulation of compensation in survival rates (*R/S*) as competition increases. Two common models for compensation in survival rates are: 1) asymptotic (*S/R* increases linearly) or 2) exponential (ln(*R/S*) decreases linearly) as spawning abundance increases. In relation to the generic production model above, the differing forms for discounting due to competition are:

$$f(S|S_{EQ}) = \frac{1}{1 + \frac{(\alpha-1)}{S_{EQ}}S} \text{ or } f(S|S_{EQ}) = \exp\left[-\frac{\ln(\alpha)}{S_{EQ}}S\right].$$

These two mathematical forms result in the two most common production models for Pacific salmon: 1) Beverton-Holt (Beverton and Holt 1954) and 2) Ricker (1975; Figure 2). The Beverton-Holt model can be used to model competition due to rearing or spawning limitation, whereas the Ricker model can only be used to model spawning limitation (see Quinn and Deriso 1999). The Beverton-Holt model can only exhibit simple or pure compensation, where the expectation of maximum production occurs at carrying capacity. Over-compensation can occur in the Ricker model, where the expectation of maximum production can occur at intermediate levels of escapement depending on the intrinsic rate of increase.

Although choice of production model represents one form of scientific uncertainty that could be accounted for in escapement goal development, Alaska has largely chosen to use the Ricker model. Reasons for extensive use of the Ricker production model in Alaska are both biological and practical. Production in most Pacific salmon stocks in Alaska is arguably driven by competition among adults on the spawning grounds. Biological evidence for competition among adults can be seen in egg retention from overcrowding on spawning grounds, dominance of age-1 smolts when harvest rate (and competition) is low, size of juveniles is not inversely related to parent escapements when harvest rate is low, and little or no rearing of juveniles in freshwater (i.e., for chum and pink salmon).

Empirical evidence for a Ricker production model comes from dome-shaped production plots, superior statistical fits to Ricker versus Beverton-Holt production models, and poor production from exceptionally large escapements for various stocks in Alaska, indicating that maximum production occurs when escapements are held at an intermediate level in relation to carrying capacity (see Clark et al. 2007 for examples). Moreover, many stocks of Pacific salmon in Alaska consistently provide surplus production (i.e., meet and exceed lower bound escapement goals) under moderate to high harvest rates, arguable evidence of a dome-shaped production relationship.

From a practical standpoint, use of the Ricker production model will consistently provide for precautionary management under a fixed escapement goal management paradigm. Assuming fixed intrinsic rate of increase and carrying capacity, the Ricker model will provide a lower average harvest rate and higher average escapement than the equivalent Beverton-Holt model (Figure 3).

Incorporation of Uncertainty into Production Models

Two general forms of uncertainty are accounted for in production models used to develop escapement goals in Alaska. Process error is the uncertainty in production introduced by variation in survival rates from ova to adult. Biological mechanisms for process error in Pacific salmon include variation in sex ratio, fecundity, growth (size composition), and maturation (age composition). Environmental mechanisms for process error include variation in freshwater habitat (e.g., stream flows, stream temperature) as well as marine habitat (e.g., ocean temperature and circulation patterns). Ecosystem linkages can also create process error in survival rates in the form of predation, inter-specific competition, disease, and starvation for example.

Process error can be easily introduced into a production model as density-independent and stochastic. For example, the Ricker production model has the stochastic version:

$$E[R|S] = \exp\left(\ln(\alpha) - \frac{\ln(\alpha)}{S_{EQ}}S\right)\exp\left(\frac{\sigma_\varepsilon^2}{2}\right),$$

where σ_ε^2 is a log-normally distributed random variable (Peterman 1981) that represents variation from the expectation due to process error. Serially correlated patterns of lag-1 are often seen in process error in Pacific salmon, so that an alternative process error model is used:

$$E[R|S] = \exp\left(\ln(\alpha) - \frac{\ln(\alpha)}{S_{EQ}}S\right)\exp\left(\frac{\sigma_\varepsilon^2}{2(1-\phi_1^2)}\right),$$

where ϕ_1 is the lag-1 correlation coefficient. Random walk Kalman filtering has also been used to assess serially correlated process error in salmon production (Peterman et al. 2003).

Another form of uncertainty in production models comes from measurement errors introduced into the annual stock assessment process. Escapements are routinely estimated rather than counted using weirs, sonar, mark-recapture, aerial survey, or a combination of methods to reconstruct runs. In many cases measurement error in escapements are small (e.g., complete counts at weirs) and can be ignored in development of an escapement goal. However, high measurement error in escapements can create bias in estimates of the intrinsic rate of increase that is high or low depending on the magnitude of harvest rates (Kehler et al. 2002). This bias can directly affect development of an escapement goal. Age composition of annual runs are routinely estimated from a sample of catches and escapements. Catches are also estimated with error, especially when sport or subsistence harvests are substantial and/or commercial harvests in mixed-stock fisheries are estimated from stock identification techniques such as genetic stock identification.

Time series bias can also enter the escapement goal development process (Walters 1985). Data used to develop production models usually come from annual stock assessments where the escapements in one year are not independent of escapements in proceeding years. This can confound the estimation of the relationship between escapements and production and bias estimates of intrinsic rate of increase and carrying capacity.

When necessary, uncertainty in the form of measurement errors in escapements, catches, age compositions, and other types of run reconstructions can be incorporated into the production model. Time series bias can also be accounted for in these same models. As described below, Alaska currently utilizes methods of escapement goal analysis that bring all of these sources of uncertainty into “full probability” State-space models.

Escapement Goal Analysis

Management parameters can be estimated directly from the production models described above. For example, the Ricker production model leads to the following estimates of interest to escapement goal development for Pacific salmon (from Hilborn 1985):

$$S_{MSY} \cong S_{EQ}\left(0.5 - 0.07\ln(\alpha')\right),$$

where, S_{MSY} is the escapement that maximizes sustained yield (MSY) on average and $\ln(\alpha') = \ln(\alpha) + \frac{\sigma_\varepsilon^2}{2}$ for the log-normal random process error model. Harvest rate at MSY (U_{MSY}) can also be estimated in this way:

$$U_{MSY} \cong \ln(\alpha')\left(0.5 - 0.07\ln(\alpha')\right).$$

MSY is then calculated by plugging S_{MSY} back into the Ricker equation:

$$MSY = S_{MSY}\left(\exp\left(\ln(\alpha') - \frac{\ln(\alpha')}{S_{EQ}}S_{MSY}\right) - 1\right).$$

The limiting rate of exploitation (that drives the stock to extinction) can also be calculated directly from α':

$$U_{lim} = 1 - \frac{1}{\alpha'}.$$

Escapement goals in Alaska are developed directly from these management parameters or their proxies. Moreover, these goals are commonly specified as ranges (see Munro 2019). Although no specific standard has been set in policy, Alaska has generally developed these ranges based on the premise that when fisheries are managed to keep escapements within the goal range, the targeted stock would on average produce yields at or above a high (e.g., 90) percent of MSY. Use of ranges takes advantage of the fact that the Ricker production model provides relatively similar yields across a wide range of escapements close to S_{MSY}. Use of ranges also addresses uncertainty in implementing fixed escapement goal management of Pacific salmon fisheries, where preseason forecasts of run strength are often imprecise and knowledge of realized run strength improves as the fishery proceeds and escapements are assessed.

Proxies for S_{MSY}

Empirical development of production models requires time series of data on escapements and resultant production. In many cases in Alaska available fishing power is insufficient to cause overfishing (i.e., resultant escapements below the lower bound of the escapement goal), average harvest rates are generally lower than U_{MSY}, and management is largely predicated on a schedule of fixed duration fishery openings. In other cases in Alaska, there are mixed-stock and mixed-species fisheries where catches cannot be resolved by stock during the fishing season. In these fisheries, stock-specific production data are usually lacking, but a time series of post-season escapement data are available to develop an escapement goal.

Based on these realities, Alaska has developed several proxies that are based on production theory, knowledge of fishing power and relative harvest rates, and the ability (or inability) to manage fisheries in-season. Most lower bound SEG and SEG ranges are based on these proxies (Munro 2019).

Percentile Approach

The most used proxy in Alaska is the percentile approach as described in Clark et al. (2014, 2017). This proxy approach is largely based on production theory and Hilborn's (1985) approximation for S_{MSY}. In general sustained yields (i.e., surplus production) can be produced from a wide range of escapements (Figure 4). Specifically for the Ricker model, Hilborn (1985) showed that S_{MSY} lies in the range of 29 to 43 percent of carrying capacity (S_{EQ}) over the range of likely productivities of Pacific salmon ($\ln(\alpha')$ ranging from 1 to 3), with U_{MSY} ranging from 43 to 87 percent. Given that harvest rates in situations of low fishing power are generally less than U_{MSY}, a trimmed range or lower bound of observed escapements for stocks in the fishery will be a conservative estimate of (i.e., escapements generally larger than) S_{MSY}. Clark et al. (2014, 2017) used theoretical, simulation, and empirical meta analyses to evaluate the percentile approach as a proxy for S_{MSY}. For the theoretical and simulation analyses, they used log-productivity values from 1 to 2 and various levels of average harvest rates up to 40 percent. For all three approaches, they calculated percentiles representing specific levels of spawning abundance corresponding to a desired range around S_{MSY}. The range around S_{MSY} was the smallest escapement that produced 90% of MSY at the lower bound and the largest escapement that produced 70% of MSY at the upper bound. This range represents a conservative approach to development of an SEG, where low escapements that might cause overfishing are avoided at the lower bound and larger escapements that might be informative to better understanding future production are encouraged at the upper bound. A range based on the strict 90% of MSY boundaries was considered but rejected as too narrow for development of an SEG when information on productivity of the stock is lacking. Based on overall results of the three different analyses, they recommended 3 tiers of percentiles of the observed time series of escapements based on the amount of contrast (highest observed escapement divided by lowest observed escapement) and measurement error for stocks with low to moderate average harvest rates of $\leq$ 40 percent (Table 1).

Examples using the percentile approach in Alaska are numerous. A series of SEG ranges were established for pink salmon stocks in lower Cook Inlet using the percentile approach. As is typical for this approach, these stocks are assessed with foot and aerial surveys that do not enumerate the entire escapement, commercial catches cannot be resolved to stock of origin, and harvest rates are low to moderate (Otis et al. 2016). The percentile algorithm in Table 1 was applied to 17 of these stocks, with SEG ranges specified using the 20th and 60th percentiles of the observed time series of escapements for each of these pink salmon stocks in lower Cook Inlet.

In a very different situation, five chum salmon stocks in Prince William Sound are managed using lower bound SEGs developed using the percentile approach. These five stocks (Eastern, Northern, Coghill, Northwestern and Southeastern districts) are occasionally targeted in commercial fisheries, but in many years experience low to moderate harvest rates from the targeted Prince William Sound pink salmon fishery (Haught et al. 2017). Assessments of escapement consist of multiple in-season aerial surveys and application of area-under-the-curve methods adjusted for an estimate of stream life. Lower bound SEGs were developed using the 20th percentile of observed escapements. These stocks are managed to maintain the long-term average escapements with these lower bound SEGs serving as precautionary escapement goals that warn managers of a decrease in productivity and/or an increase in harvest rates.

Risk-based Approach

Another approach for developing precautionary lower bound SEGs for non-targeted stocks is the risk-based approach of Bernard et al. (2009). While not as common as SEG ranges in Alaska, there are a number of non-targeted stocks for which a precautionary escapement goal is necessary (see Munro 2019). This approach models the observed time series of escapements to determine the lowest observed escapement that balances the risk of observing three to five consecutive years below the lower bound SEG (i.e., precipitating a management concern per 5 AAC 23.222(f)(21)) due to random chance with the risk of not observing a real drop in the average observed escapements due to either an increase in harvest rate or drop in production. Risk is estimated via simulation of the time series of observed escapements as either a log-normal process or a lag-1 autoregressive process and calculation of tail probabilities (see example output in Figure 5). Drops in average observed escapement are arbitrary, but the range of possible drops are usually determined from the drop from the average observed to the minimum observed escapement. This approach generally results in lower bound SEGs that are similar to the 15th percentile of the observed escapements.

Fair et al. (2012) used this approach to develop a lower bound SEG for the Nushagak chum stock in Bristol Bay. They reasoned that this chum salmon stock was coincidentally harvested in the targeted sockeye salmon fishery in the Nushagak District and was not managed for in-season. The estimated risk used to develop this lower bound SEG was a 2 percent (a 1-in-50 chance) for unwarranted concern over three consecutive years balanced against a 16 percent risk (a 1-in-6 chance) of ignoring actual reductions in average escapement of 85%.

Habitat Models

Although less commonly used than the percentile or risk-based approaches in Alaska, habitat models are usually appended to an escapement goal analysis as corroboration of other proxies or in combination with a formal stock-recruit analysis. This approach can be used to develop a BEG or SEG. The most fully developed habitat model is for Chinook salmon and is based on the premise that carrying capacity of a stock is related to the size of the watershed in which the stock resides (Liermann et al. 2010). A Bayesian hierarchical model is used to relate estimated management parameters (S_{MSY} and S_{EQ}) from 25 Chinook salmon populations from Oregon north to Alaska to watershed area. Predictions of management parameters and their posterior distributions can be made using only watershed area or with watershed area and available production data for the stock in question. Nelson et al. (2006) first used this method for comparison with an estimate of S_{MSY} from stock-recruit analysis in the Nelson River on the Alaska Peninsula. More recently, Fleischman et al. (2011) developed a Bayesian model of Chinook salmon in the Blossom and Keta rivers in southeast Alaska, with the habitat model of Liermann et al. (2010) providing priors into the stock-recruit analysis.

Similar habitat-based approaches are used for corroborating escapement goals for lake-rearing sockeye salmon in Alaska. Spawning area, euphotic volume, and zooplankton biomass measurements in lakes have all been used as predictors of management parameters for sockeye salmon. For examples, see Nelson et al. (2006) for Ilnik River, Bear River, Mortensen Lagoon, and Thin Point Lake analyses; and Witteveen et al. (2005) for Chignik River analyses.

Theoretical Approaches

There are two proxy methods of escapement goal analysis that are used infrequently in Alaska to develop or evaluate SEGs. Both methods are based on production theory and depend on the history of harvest rates on the stock (Clark et al. 2009). For lightly harvested stocks (harvest rates below 5 percent), one can assume that the average observed escapements are a reasonable proxy for carrying capacity (Figure 6A). Using Hilborn's (1985) approximation, S_{MSY} can be estimated by substituting the average observed escapement for S_{EQ} and supplying an estimate or range of the likely species-specific $\ln(\alpha')$ for the stock. Ericksen and McPherson (2004) used this method to develop an escapement goal for Chilkat Chinook salmon during a period of low harvest rates discerned from code-wire tag recoveries.

For heavily harvested stocks in Alaska (harvest rates near U_{MSY}) there is generally production data available for conducting a stock-recruit analysis (see next section). However, when harvest rates are high, often there is not enough information in the data to determine the carrying capacity of the stock (Figure 6B), but there is enough information to determine $\ln(\alpha')$. A preponderance of stocks that experience high harvest rates also have an existing escapement goal that can be evaluated using this approach. Using Hilborn's (1985) approximation one can estimate U_{MSY} from $\ln(\alpha')$ alone. The estimate of U_{MSY} can be compared to the average harvest rate on the stock to determine if the existing escapement goal is too high or low relative to S_{MSY}. If average harvest rate is higher than U_{MSY} the existing escapement goal is too low, and conversely if average harvest rate is lower than U_{MSY} the existing escapement goal is too high. Baker et al. (2009) used this method to compare estimates of ln(α') during peak and off-cycle years of production of sockeye salmon in the Kvichak River drainage and to corroborate an approach that uses an escapement goal and a maximum harvest rate of 50 percent to manage the fishery.

Stock-Recruit Analysis

When sufficient data and information content are available, stock-recruit analysis is used to develop stock-specific production models to estimate management parameters and develop escapement goals. In Alaska and elsewhere, methods of stock-recruit analysis are evolving from simple regression models that provide point estimates of the management parameters to Bayesian State-space models that incorporate uncertainty in process and measurement error to adjust for known biases and provide marginal posterior distributions of the management parameters (Fleischman et al. 2013).

Classical methods of stock-recruit analysis usually involve linear transformation of the production model and following the linear regression recipe to estimate the parameters of interest (Ricker 1975). Recasting the stochastic Ricker production model in the following way:

$$R = S\exp(\ln(\alpha) - \beta S)\exp(\varepsilon), \text{where } \beta = \frac{\ln(\alpha)}{S_{EQ}},$$

and then dividing by S and log-transforming so that

$$\ln\left(\frac{R}{S}\right) = \ln(\alpha) - \beta S + \varepsilon,$$

allows for the simple linear regression of $\ln\left(\frac{R}{S}\right)$ on S to estimate ln(α) as the y-intercept and β as the slope. The residual error of the regression provides the estimate of ε. Management parameters can then be estimated in the usual way with $E[\varepsilon] = \frac{\sigma_\varepsilon^2}{2}, \ln(\alpha') = \ln(\alpha) + \frac{\sigma_\varepsilon^2}{2}$, and $S_{EQ} = \frac{\ln(\alpha')}{\beta}$.

Escapement goals (BEGs and SEGs) for many stocks in Alaska were developed using this method (see Fried 1994, Clark 2001, Geiger 2003, and Nelson et al. 2005 for examples). Ranges around the point estimate of S_{MSY} were calculated in a variety of ways, but most commonly using the range of escapement that produces 90% or more of the point estimate of *MSY* or by applying the results of simulation work by Eggers (1993). Eggers (1993) simulated yields from a Ricker production model along with implementation error in management and found that an escapement goal range that was 0.8 to 1.6 times the point estimate of S_{MSY} provided for average yields that were 90% or more of the point estimate of MSY.

More recently, salmon biologists in Alaska have used probabilistic approaches to the classical method of stock-recruit analysis and extended the analysis to provide information on sustained yield, yield in relation to MSY, and overfishing. These methods include bootstrapping of the linear regression recipe (see Clark and Clark 1994, Bernard et al. 2000, Clark and Etherton 2000, and McPherson and Clark 2001 for examples) and maximum likelihood estimation of the management parameters (e.g., Fair et al. 2004 for Kvichak River sockeye salmon). In addition to point estimates of the management parameters, these methods provide estimates of uncertainty distributions of these parameters. In particular, Alaska has developed probability profiles for attainment of 70%, 80% and 90% or more of MSY (Szarzi et al. 2007, Fleischman and McKinley 2013, Fleischman and Reimer 2017) and for overfishing (probability of low escapements producing less than 90% of MSY (Bernard and Jones 2010, Fleischman and McKinley

2013). These profiles are useful for determining escapement goal ranges that are robust to uncertainty in the management parameters and describing the potential outcomes from managing to these escapement goals (Figure 7). These methods continue to be used in Alaska in situations where escapement is measured with little to no error, harvest rates are low to moderate, and there is no serial correlation in residuals (e.g., Fair et al. 2008 for Eshamy Lake sockeye salmon).

Although probabilistic approaches to classical methods are an improvement in escapement goal analysis, potential for bias in the management parameters due to measurement error in estimates of escapement, non-independent estimates of escapement through time, and serially correlated residual errors remain. To address these potential biases, Alaska has developed Bayesian State-space models of production for Pacific salmon (Meyer and Millar 2001, Fleischman et al. 2013), especially for situations where escapements are estimated with error (e.g., mark-recapture) and stock assessments are the result of a wide range of sampling programs each with sampling error (e.g., contributions from coded wire tag recoveries to estimate stock-specific harvest or run reconstruction to estimate escapement of a large stock complex). These models mimic the stock assessment processes used to estimate the inputs to the production model. The State-space model allows for non-independence of the time series of escapements as the process to estimate catches and, therefore, estimate subsequent escapements is accounted for. In the Bayesian framework, marginal posterior distributions of the management parameters are estimated using Markov Chain-Monte Carlo methods such as implemented in WinBUGS (Lunn et al. 2000) or RJAGS (Plummer 2013).

The observation equations of the State-space model are of the general form:

$$\hat{S} = S^{true}\exp(v^S) \text{ and } \hat{C} = C^{true}\exp(v^C),$$

where, both escapement (*S*) and catch (*C*) are estimated with iid log-normal errors $\left(\text{e.g.}, v^S \sim N(0, \tau_S^2)\right)$.

The link between successive years is accomplished by fishing (*C*) on the annual run (*N*) to produce escapement (*S*) for the next brood in year *t*:

$$\hat{S}_t = \hat{N}_t - \hat{C}_t.$$

Subsequent production (*R*) from escapement in year *t* is estimated from annual runs and the age compositions for ages *x* to *y*, depending on the maturation schedule of the stock (e.g., *x*=4 and *y*=6 for typical Chinook salmon stocks):

$$\hat{R}_t = \sum_{a=x}^{y} \hat{p}_{t+a,a}\hat{N}_{t+a},$$

where the estimated age compositions $\left(p_x, p_{x+1}, \dots, p_y\right)$ that represent the maturity schedule of a particular brood year are drawn from a $Dirichlet\left(\gamma_x, \gamma_{x+1}, \dots, \gamma_y\right)$ distribution.

The State equation for the Ricker model is then:

$$\hat{R} = \hat{S}\exp\left(\ln(\alpha) - \beta\hat{S}\right)\exp\left(\frac{\hat{\sigma}_\varepsilon^2}{2}\right).$$

In the Bayesian framework, initial states of the model are specified as priors. It is most common for uninformative priors to be used in these models, although habitat models (Fleischman et al. 2011) and regional summaries of key parameters (ln(α') for example, as in Bernard and Jones 2010) have been used as priors where stock-specific information is lacking information content. Beyond the posterior density of the management parameters, outputs of these models are the same probability profiles previously discussed (Figure 7), with the additional uncertainties directly accounted for. As an extension to this framework, complex run reconstructions have been directly integrated into the stock-recruitment analysis and escapement goal development process (see Fleischman and Borba 2009, Fleischman and Evenson 2010, Bernard and Jones 2010, Eggers and Bernard 2011, Hamazaki et al. 2012, Hamazaki and Conitz 2015 for examples).

Escapement Goal Management

Sustainable Salmon Fisheries Policy and Escapement Goal Policy

The framework for fishery management in the State of Alaska is guided by the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222). The policy was born from joint recognition by the BOF and ADF&G that: 1) there is need for a comprehensive policy to manage and regulate fisheries; 2) fishery management plans must consider a variety of factors including data uncertainty, environmental change, and existing harvest patterns; and 3) management plans require guiding principles and criteria. In the policy, State salmon management should be based on several principles and criteria, including:

1. Maintaining wild salmon stocks and habitats at levels of productivity that assure sustained yields,
2. Management of salmon fisheries to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem function,
3. Establish effective management systems to regulate human activities that affect salmon,
4. Encourage public support and involvement for sustained use and protection of salmon resources,
5. In the face of uncertainty, salmon stocks, fisheries, artificial propagation, and essential habitats shall be managed conservatively.

Criteria for establishing escapement goals are outlined in the Policy for Statewide Salmon Escapement Goals (5 AAC 39.223). These fixed goals provide managers specific targets for their actions. Previous discussion has documented how various uncertainties are accounted for in establishing those goals.

Management Plans

Management of salmon fisheries in Alaska is guided by management plans developed by the department in consultation with the BOF. Salmon management plans typically provide an overview of expected run sizes, regulations, management issues and harvest strategies for a particular fishery. These plans provide commercial fishermen and processors with a generalized picture of how the fishery will be prosecuted, management options, and conditions that may trigger management actions in-season. Recent changes to fishing time, area, gear, or allocations determined by the BOF are noted in annual updates to management plans. Plans often identify scheduled fishing periods, subject to change by EO. Management plans for Alaska fisheries can be accessed from the ADF&G commercial fisheries web page, http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main.

Pre-season forecasts

In advance of each fishing season, ADF&G prepares pre-season forecasts for salmon runs that affect major fisheries around the State (see Brenner et al. 2020). Selection of species for which to develop regional or area forecasts is based upon management need, economic importance, and data availability. A variety of methods may be employed to develop these forecasts including escapement levels of parent stocks, returns to date from sibling age classes, and outmigrating fry or smolt abundance. While forecasts provide some insight to run strength and possible management strategies, there is substantial uncertainty surrounding these estimates and ADF&G pursues a conservative approach based upon a flexible management plan until more information is available on actual strength of runs. Hatchery operators typically provide forecasts for hatchery runs of pink, chum and sockeye salmon.

In-season management

Most fishery management decision-making in ADF&G is delegated to area biologists who live and work in the fisheries areas. This approach has worked effectively to help area staff acquire significant expertise about the resources, people, and fisheries within the areas they live and work. A primary management tool is “emergency order authority,” delegated by the Commissioner to State area fishery managers. This authority allows the local manager to quickly respond to changing conditions within a fishery to implement conservation measures (restriction of harvest) or to allow harvest opportunity when data supports the in-season action. Regional and area research and monitoring staff support management by collecting and analyzing an assortment of data on run abundance, run timing, harvest, escapement and population structure.

A key to in-season management designed around meeting fixed escapement goals is in-season estimates of run strength and escapement levels to local rivers. A variety of methods are employed to provide insight to managers on the strength of salmon runs and escapements including test fishing, sonars, counting towers, weirs, aerial and foot surveys, and fish wheels. Genetic analyses often play an important role in delineating stock composition of salmon runs and harvests. Historical knowledge of salmon run timing allows managers to assess the date-specific strength of escapement against the likelihood of achieving any particular goal. Timely availability of run, catch and escapement information coupled with EO authority to restrict fisheries provides a robust mechanism for responding to uncertainties in annual salmon runs.

Performance metrics (accountability measures)

An important measure of management performance, implicit in ADF&G’s management regime is success in meeting escapement goals. There are currently 282 escapement goals for all species and management regions in Alaska (Munro 2019). During the fishing season, managers can follow escapement trends against historical data to determine the likelihood of meeting an escapement goal. Where escapement information is not yet available during the fishery, due to lengthy fish travel time from commercial fishing districts to escapement projects, manager’s gain useful information from in-river counting projects and commercial, subsistence or test fish catch indexes. Because run assessment, catch and escapement data are available in-season, EO authority over fishing time and area provides a mechanism for responding quickly to uncertainties in expected run sizes. The system of daily catch reporting on fish tickets provides real time information on commercial catch and EO authority provides the tool for mangers to quickly constrain catch, if necessary.

After the fishing season is complete, performance of fisheries and success at meeting escapement goals can be evaluated. An annual review of escapement goals and performance provides a Statewide perspective (Munro 2019). The sustainable salmon policy outlines a process for regular review of salmon stock status and identification of specific stocks of concern. Three categories of concern exist: yield concern - stocks that fail to produce expected yields; management concern – stocks that fail to meet established escapement goals; or conservation concern – stocks in danger of not being able to rebuild themselves. Stocks are designated as concerns if the stock fails to meet expected yields or the escapement goal over a period of 4 to 5 years despite appropriate management taken to address the concern. When stocks of concern are identified, department staff members work with the Board of Fisheries and public to develop action plans, management plans, and research plans to help return the stock to health.

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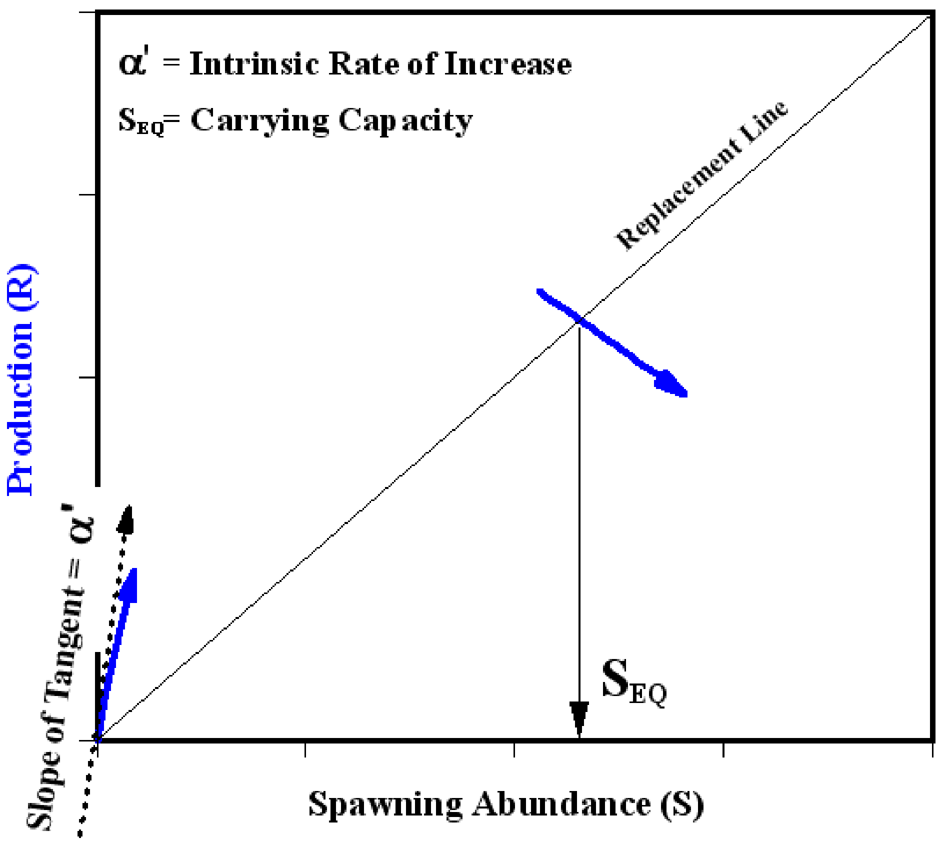

Figure 1. A generic production model for Pacific salmon with the counteracting processes (blue arrows) of reproduction and competition.

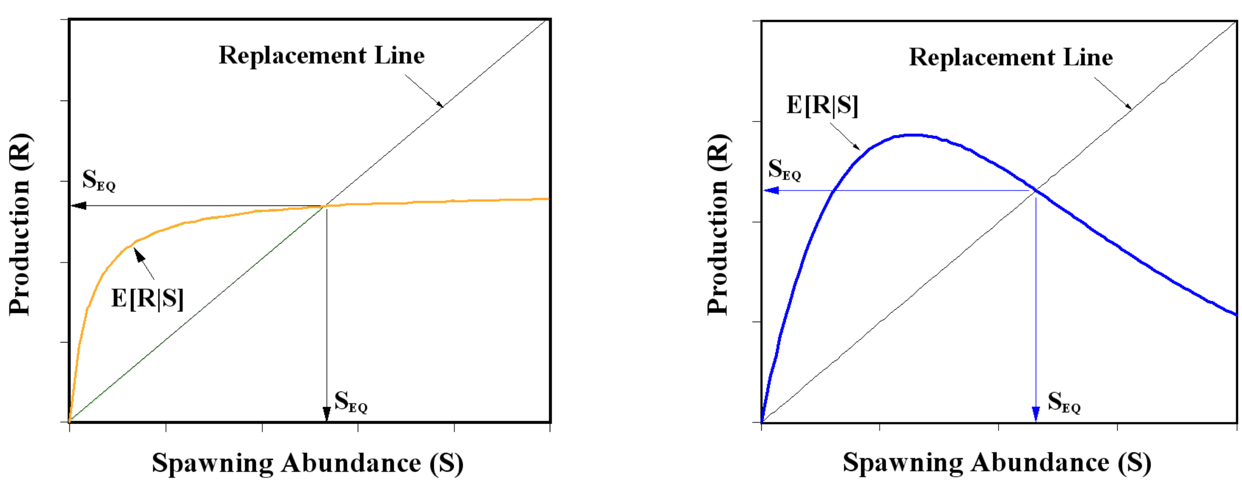

Figure 2. Beverton-Holt (left panel) and Ricker (right panel) production models.

Incorrect Choice →	Ricker	Beverton-Holt
True Model →	Beverton-Holt	Ricker
Esc. Goal Mgt. →	**$S_{MSY} < \hat{S}_{MSY}$ "Under" fishing**	$S_{MSY} > \hat{S}_{MSY}$ "Over" fishing
Harvest Rate Mgt. →	$U_{MSY} < \hat{U}_{MSY}$ "Over" fishing	$U_{MSY} > \hat{U}_{MSY}$ "Under" fishing

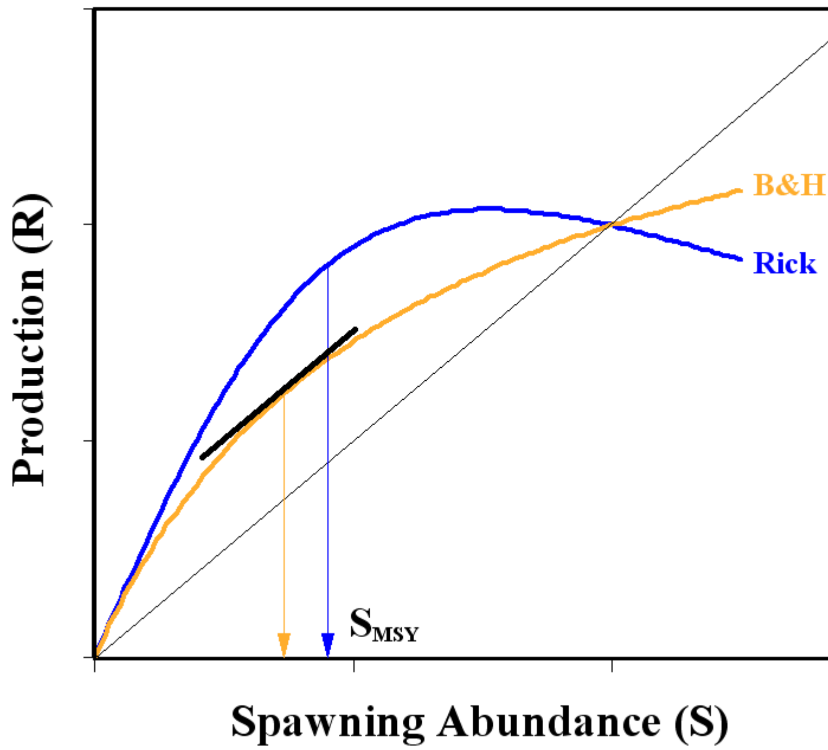

Figure 3. Decision table and graph for precautionary management under differing production models for Pacific salmon. S_{MSY} is the spawning escapement that maximizes sustainable yields and U_{MSY} is the harvest rate that maximizes sustainable yields. Quantities with hat symbols above are estimates, while those without are the true quantities.

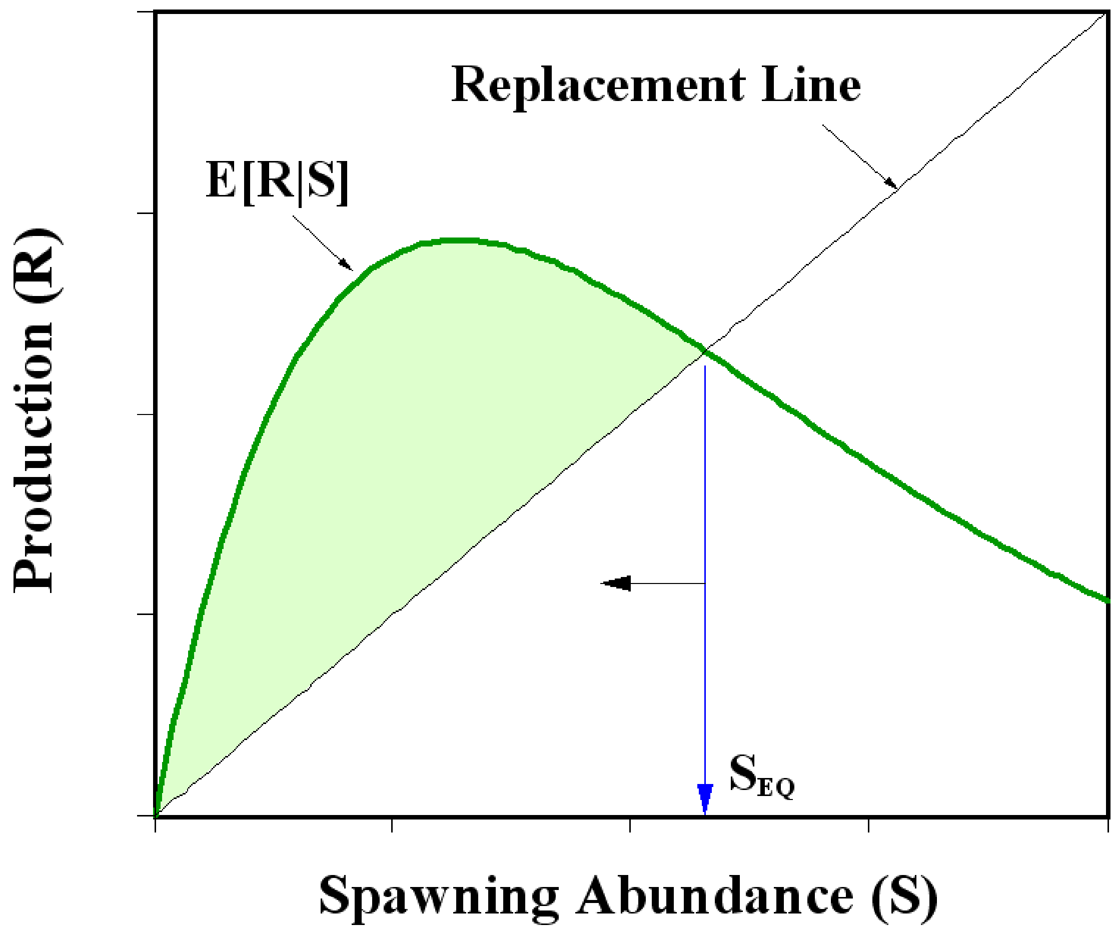

Figure 4. Schematic of the Ricker production model with potential sustained yields in the shaded area between $E[R|S]$ and the replacement line ($R = S$) and escapements less than carrying capacity (S_{EQ}). S_{MSY} generally occurs between 29 and 43 percent of S_{EQ} for Pacific salmon.

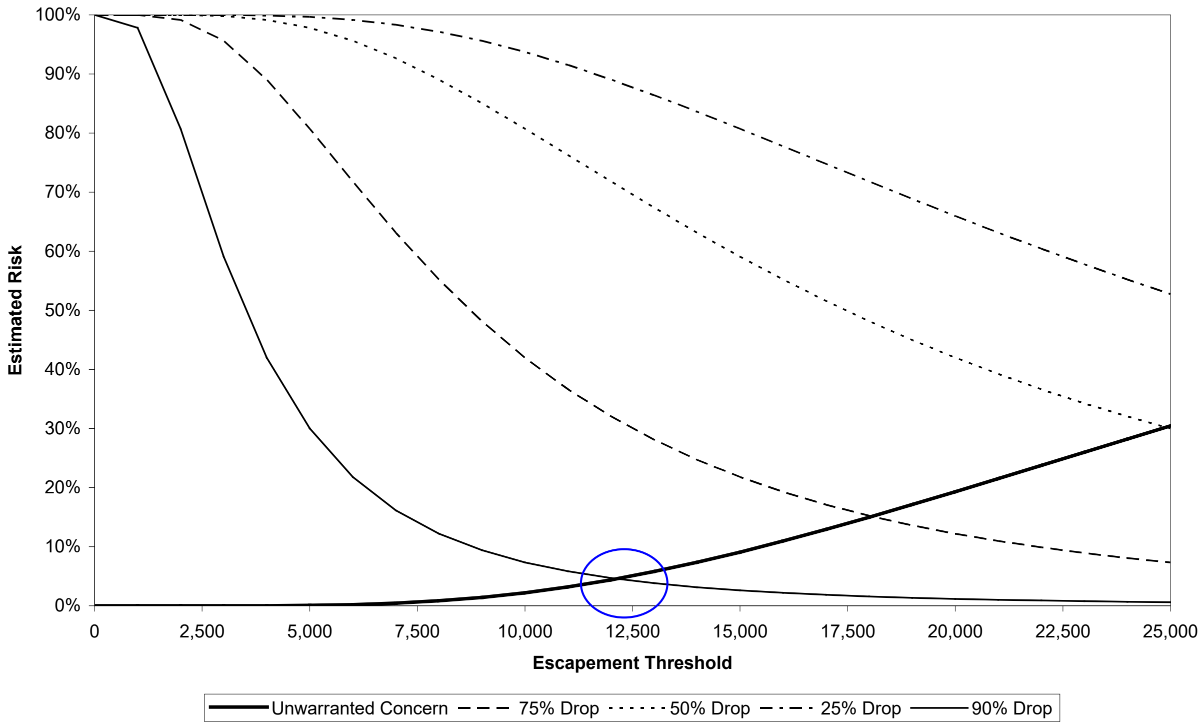

Figure 5. Estimated risk of three or more consecutive years of observed escapements below the lower bound SEG due to random chance (unwarranted concern) and risk of missing a real drop of 75-90% in the average observed escapement for Kulukak River sockeye salmon. A lower bound SEG of approximately 12,000 fish (circled) balances these two risks at a low level (< 10% risk).

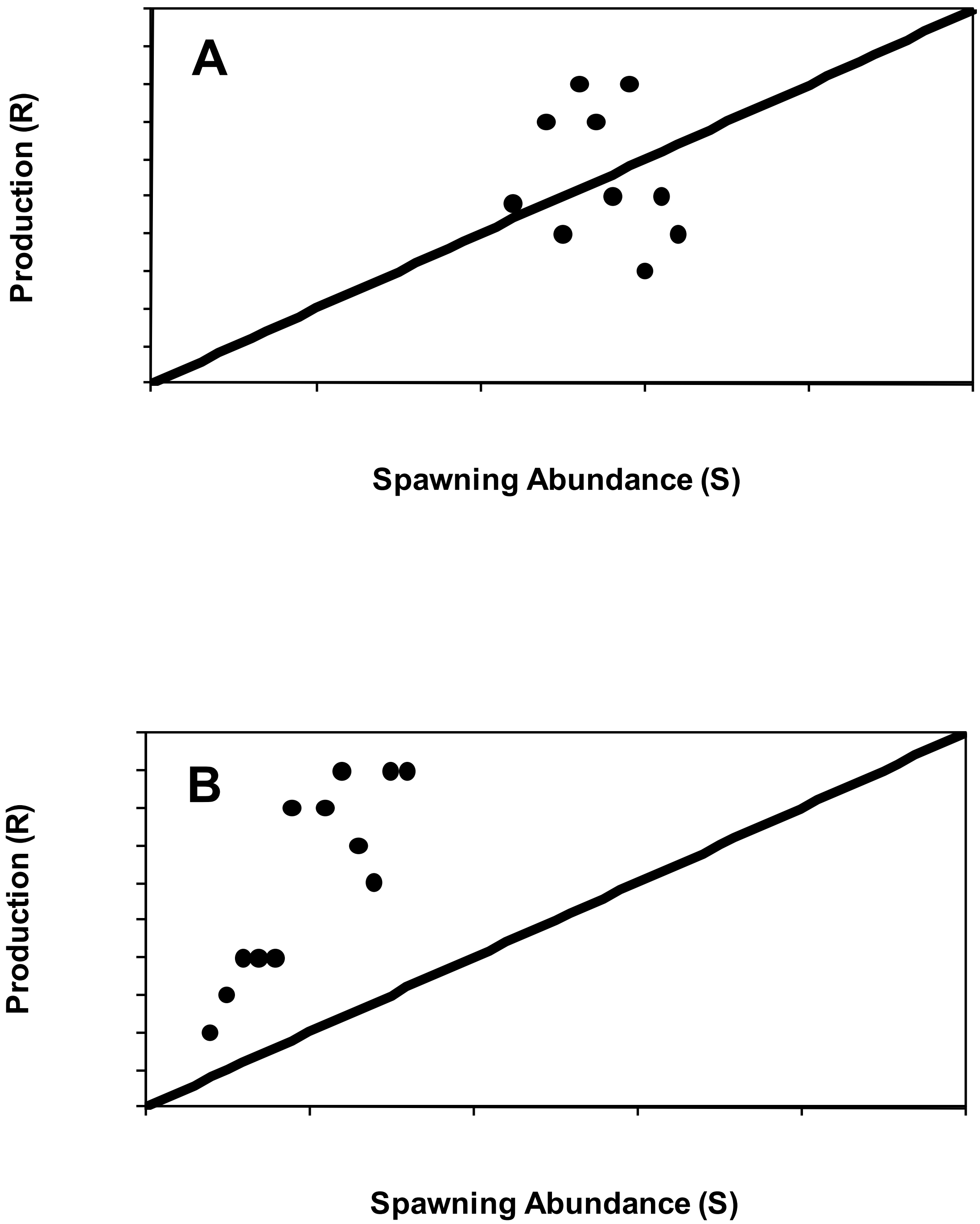

Figure 6. Schematic of observed production data (points) in relation to the replacement line (dark diagonal line) in the situation of low (A) or high (B) harvest rates.

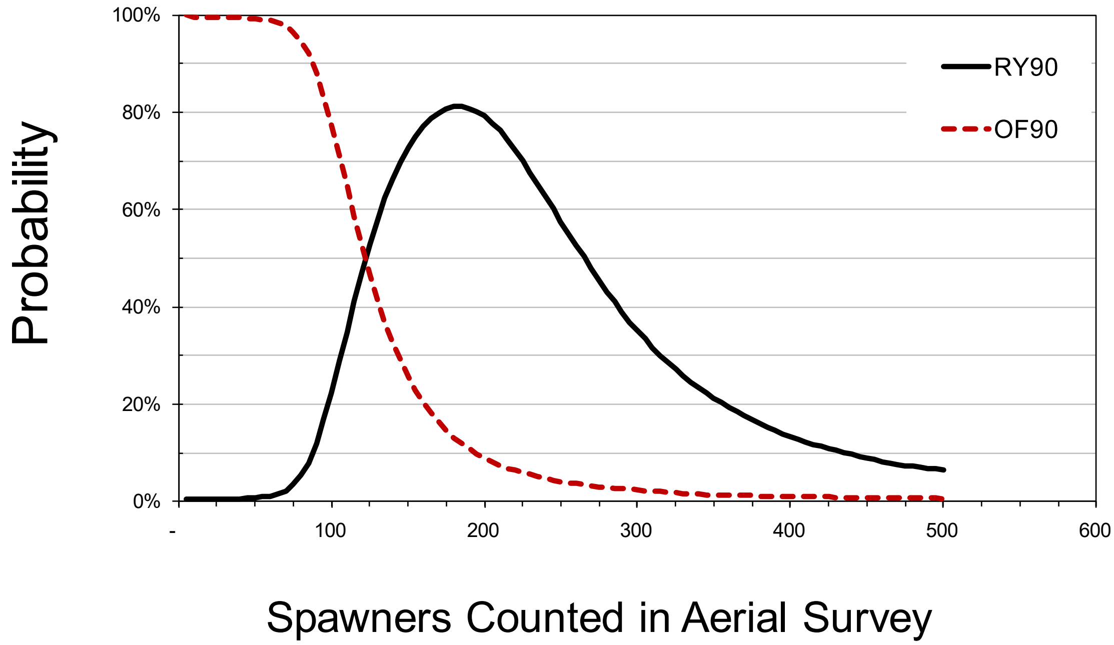

Figure 7. Schematic of probability profiles for yields of 90% or more of MSY (RY90 – solid line) or for yields less than 90% of MSY (OF90 – dotted line) over a range of escapements considered for development of an escapement goal.

Table 1. Percentile approach to estimate Sustainable Escapement Goals (SEGs) from observed escapements (adapted from Clark et al. 2014, 2017).

Tier	Contrast[a]	Measurement Error	Exploitation	SEG Range
1	High (> 8)	High (aerial and foot surveys)	Low to moderate (< 0.40)	20th to 60th Percentile
2	High (> 8)	Low (weirs, towers)	Low to moderate (< 0.40)	15th to 65th Percentile
3	Low (≤ 8)		Low to moderate (< 0.40)	5th to 65th Percentile

[a] Maximum observed escapement divided by minimum observed escapement.

13. Appendix: Responses to Questions from the Salmon FMP Analytical Team on the Impacts of Alternative 4

Alaska Department of Fish and Game
October 28, 2020
Juneau, Alaska

Q: How might fishing behavior change if the drift gillnet fleet can't fish in federal waters?

The EEZ area within Cook Inlet is a relatively small area that engulfs a huge mixed stock fishery where thousands of distinct/discrete salmon stocks migrate through these federal waters on their final destination to their spawning grounds. Some of these stocks are robust while some are weak and others such as Chinook stocks are in a serious state of decline. Timing of the fishery along with daily/weekly openers and amount of hours allotted; amount and length and make up of fishing gear; weather; and finally timing of migration—particularly of those weaker stocks through the EEZ waters—all play a significant role in whether or not some of those weaker stocks will be over harvested or the more robust stocks will be under harvested. With that many different stocks migrating through a relatively small area in such a short time frame, these waters that comprise the Cook Inlet EEZ are extremely difficult and complicated to manage to say the least without overharvesting some stocks or underutilizing others. That is why there are numerous complicated management plans that guide the harvest of CI salmon stocks and though these plans are continually a work in progress they have successfully been implemented to provide a sustainable harvest of Cook Inlet salmon over the past several decades for a variety of commercial, sport, personal use, and subsistence users.

The only commercial salmon fishery that occurs in federal waters of Cook Inlet is the drift gillnet fishery. This fishery has exclusive commercial salmon fishery use of this area. If federal waters were closed to commercial salmon fishing, fishing with drift gillnet gear would occur only in state waters. On the east side of Cook Inlet fishing with drift gillnet gear would occur in a band of water between two and three miles offshore until the set gillnet fishery begins. After the set gillnet fishery season opens, fishing with drift gillnet gear would be only open south of the Kenai River in a band of water between one and one half and three miles offshore and north of the Kenai River to between one and three miles offshore. This may result in development of a "line fishery" where the bulk of the fleet is positioned near the EEZ boundary to harvest fish as they enter state waters. However, waters of the EEZ are closed for the last two weeks in July to protect northern bound stocks and a line fishery has not developed. Drift gillnet fleet size may shrink because some drift gillnet fishermen may choose not to participate in the fishery and either retire or transfer to other areas if the EEZ is closed.

After August 15, openings for the drift gillnet fleet would only occur in Drift Gillnet Area 3 and Chinitna Bay, as most of Drift Gillnet Area 4 is in EEZ waters. In some years this would happen after August 1 if state regulations related to the total yearly harvest of sockeye salmon (e.g. 1% rules) are triggered.

Q: Can we anticipate that the drift gillnet harvest will decrease? Would additional fish be available to other users? Could all fish previously harvested in the Cook Inlet EEZ be harvested in state waters?

Drift gillnet fishery harvest may decrease in some years by variable amounts depending upon how the Cook Inlet drift gillnet fishery is managed in terms of weak stocks and allocation. For example, under current management direction from the Alaska Board of Fisheries to address weak stocks in NCI, the waters of the EEZ are closed from July 16–July 31. Also, the waters of the EEZ are currently restricted to minimize catch of NCI and Kenai-bound coho salmon to address allocation direction from the Board of Fisheries. Thus, it is not possible to estimate how much harvest may be reduced in any given year if the EEZ is closed to drift net fishing.

Fish not harvested in the EEZ would become available to commercial set gillnet, sport, personal use, and subsistence fishermen throughout upper Cook Inlet, primarily Northern District and Upper Subdistrict set gillnet, Susitna and Matanuska river sport and personal use, and Kenai and Kasilof commercial set gillnet and sport and personal use fishermen. While it is likely harvest by these user groups would increase in response to decreased drift gillnet harvest of sockeye and coho salmon in the EEZ, it is not possible to estimate the magnitude of this increase because of the complexities of UCI mixed stock fisheries and intertwined management/allocation plans. For example, the Upper Subdistrict and Northern District set gillnet fisheries may see increased harvests of sockeye salmon if the EEZ were closed to fishing with drift gillnet gear, but may not be able to fully utilize this benefit in years when set gillnet fisheries are restricted to conserve Chinook or coho salmon.

Current management plans do not provide for drift gillnet fishery openings in Drift Gillnet Area 2 only. The Alaska Board of Fisheries could direct ADF&G to provide drift gillnet fishing opportunity in Drift Gillnet Area 2 to compensate for lost opportunity in the EEZ, but this would likely result in increased harvest of Susitna River, Knik Arm, and Matanuska River stocks. Catch rate of Kasilof and Kenai river sockeye salmon stocks would be lower in Drift Gillnet Area 2 than the EEZ.

Sport and personal use fishermen may experience fewer inseason fishery restrictions and would likely experience higher fish abundances in river. This could translate to increased annual harvest dependent on overall fishery participation, open season length, and bag limits.

Fishing patterns will change but whether fish unharvested in the EEZ go unharvested elsewhere is hard to quantitatively predict.

Q: Would the catch composition by stock change due to fishing only in state waters?

EEZ drift gillnet catch rate of Kenai River late-run and Susitna River sockeye salmon and Susitna River coho salmon is likely greater than in state waters. It is likely harvest of stocks bound for the Susitna, Matanuska, and northern Cook Inlet drainages would decrease and proportional contribution of Kenai and Kasilof sockeye salmon to drift gillnet catch would increase, but if Drift Gillnet Area 2 were utilized as a tool to compensate for loss of opportunity in the EEZ, harvest of stocks bound for the Susitna, Matanuska, and northern Cook Inlet drainages may increase, possibly to a level that would require fishery restrictions to ensure escapement objectives are met. For additional details see: https://www.adfg.alaska.gov/static-f/regulations/regprocess/fisheriesboard/pdfs/2016-2017/uci/AR16.pdf.

Q: What is the average of fishing days in the Central District? Are there times under the current management plan when only the EEZ is open?

No, but Drift Gillnet Area 1 openings are a close approximation of an EEZ-only opening.

Year	Area 1 only	Area 4 only	District-Wide	Total
2010	3	8	12	23
2011	4	6	12	22
2012	4	4	12	20
2013	5	4	10	19
2014	5	9	8	22
2015	4	6	11	21
2016	3	9	11	23
2017	5	7	8	20
2018	3	6	9	18
2019	4	7	9	20
Total	40	66	102	208
Average 2010–2019	4	7	10	21

Q: Please describe potential benefits from closing the EEZ?

Potential effects of closing the EEZ would include increased escapements of sockeye and coho salmon to northern Cook Inlet, including the Susitna River where sockeye salmon were classified a Stock of Yield Concern from 2008–2020. If improved escapement were realized, it is likely sport and personal use fisheries for sockeye and coho salmon in northern Cook Inlet would experience fewer restrictions.

It is likely the Northern District set gillnet fishery would realize improved catches of sockeye, coho, pink, and chum salmon as would the Upper Subdistrict set gillnet fishery, provided they were not otherwise restricted.

Potential increased inriver fish abundance available to sport, personal use and subsistence fisheries in UCI would also likely occur, especially in years of low chinook abundance when set gill net fishing is restricted to ensure chinook escapement goals are achieved.

Potential growth of sport fishing sector and guide/charter businesses if inriver salmon abundance increases and potential benefits to associated support businesses may also occur.

Closing federal waters would avoid complex, intertwined state-federal joint management of salmon fisheries in Cook Inlet EEZ waters and associated costs.

Q: Is it likely that harvests would occur closer to natal streams? Would this result in less interception?

The drift gillnet fishery would remain a mixed stock fishery, but drift gillnet fishing closer to the Kenai and Kasilof rivers would likely decrease harvest of stocks bound for the Susitna, Matanuska, and northern Cook Inlet drainages and increase proportional contribution of Kenai and Kasilof river sockeye salmon to drift gillnet catch.

Q: Is it likely that there would be more opportunities for other user groups?

Described in responses to other questions.

Q: Is management uncertainty likely to be reduced?

Area-wide drift gillnet fishing periods provide an early indicator of run strength that managers use in developing a fishing strategy. If the EEZ is closed to drift gillnet fishing, fishery-dependent indicators of run strength would not be available until salmon are closer to terminal areas where there is less opportunity to harvest surplus fish and less time to make fishery management decisions. This would be mitigated by the use of the offshore test fishery in UCI that is used assess run strength.

In years when late-run Kenai River and Kasilof River sockeye salmon returns are early and weak, closing the EEZ may reduce the probability of excessively large drift gillnet harvests early in the season followed by lengthy closure periods needed to achieve escapement objectives; and, therefore, may allow for more consistent fishing opportunities. In years of above average-size or late runs sufficient harvest power may be not available in state waters alone to ensure escapement remains within the established escapement goal range unless management plans are altered.

Q: What are some of the expected downsides from closing of the EEZ?

Foregone harvest that may not be recovered in state waters and associated lost revenue to the drift gillnet sector and support businesses and communities.

Increased complexity in managing for Kenai River late-run and Kasilof River sockeye salmon escapement goals, particularly in years of above-average run size and in years when the set gillnet fisheries are restricted to conserve Kenai River late-run king salmon.

Potential for more extreme interannual variation in run size and/or uncertainty in yields in future years due to density dependence effects in river if fish are not harvested by another user group and escapement goal ranges are exceeded on a consistent basis.

Less timely fishery-dependent indicators of run strength and timing.

Q: Are increased gear conflicts or crowding within the drift gillnet fleet or with other users more likely?

Gear conflicts may increase if a “line fishery” develops. Gear conflicts between set gillnet and drift gillnet gear could be mitigated by minimum gear spacing regulations like those in place for Prince William Sound.

Q: Are increased drift gillnet harvests of king salmon likely?

Probably not a noticeable increase. King salmon generally migrate at depths greater than can be reached with drift gillnet gear in the UCI. The drift gillnet fleet is considered a negligible harvester of king salmon in UCI.

Q: Are foregone harvests likely?

Covered elsewhere in document.

14. Appendix: Exploration of Overcompensation and the Spawning Abundance Producing Maximum Sustainable Yield for Upper Cook Inlet Sockeye Salmon Stocks

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Background

Critical to the development of escapement-based management targets for Pacific salmon is quantifying the shape or form of the relationship between spawning abundance and recruitment, and the extent to which that stock-recruitment relationship exhibits compensation and overcompensation. Compensation is the tendency for population productivity (recruits-per-spawner) to decline as spawning abundance increases, resulting in a decrease in potential yield for each additional spawner beyond Smsy. Compensation may be contrasted with overcompensation, or the tendency for recruitment to decrease at high levels of spawning abundance, causing a stock-recruitment relationship to “bend over.”

From a management perspective the implication of surplus escapement, escapement in excess of the spawning abundance predicted to produce maximum sustainable yield (Smsy), depends heavily on whether the stock-recruitment relationship exhibits evidence for overcompensation. For a population exhibiting simple compensation, surplus escapement is expected to result in foregone yield in the current year, but no reduction in future recruitment. However, for a population exhibiting overcompensation, surplus escapement may be expected to result in a reduction in future recruitment. As a result, the extent of overcompensation exhibited by a salmon population has very real implications for the expected impact from, and level of risk imposed by, surplus escapement.

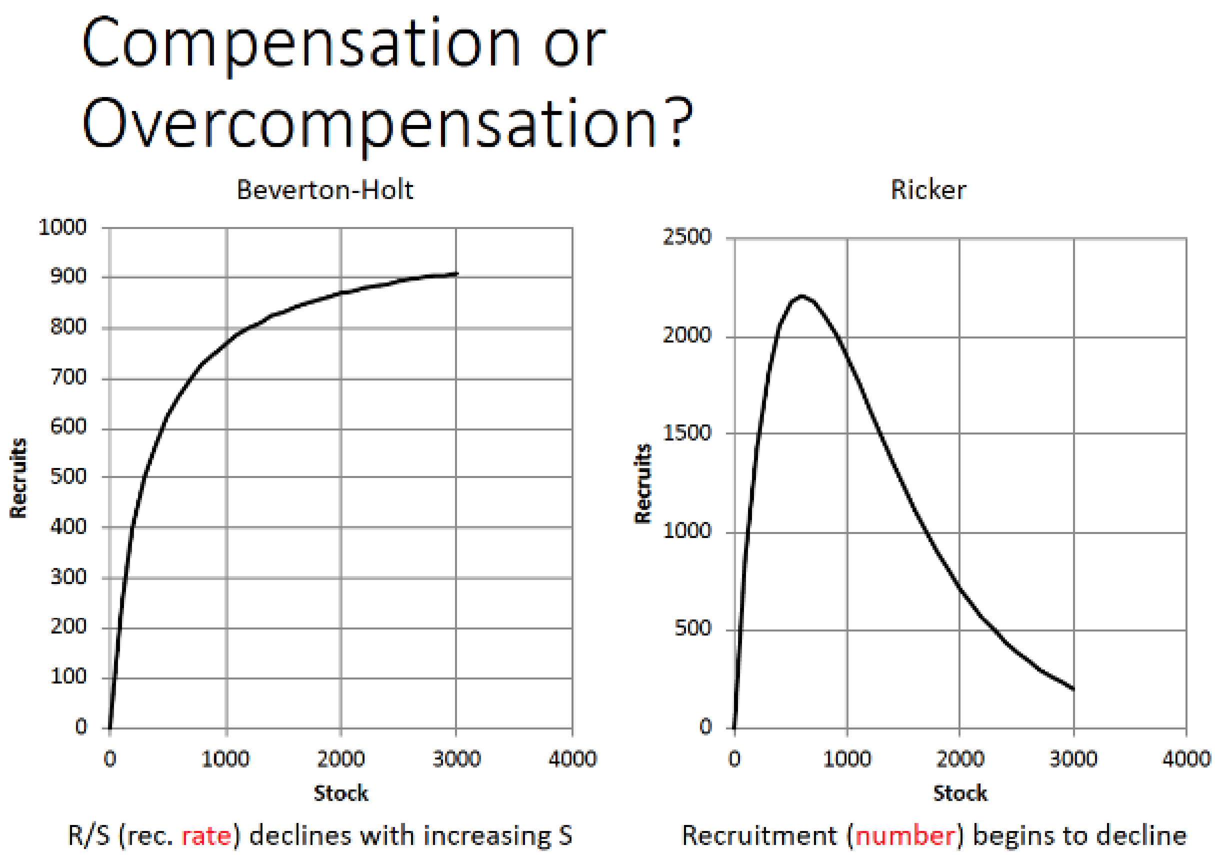

Figure 1. Graphical explanation of the difference between simple compensation and overcompensation in the context of stock-recruitment relationships.

The purpose of this analysis is to explore alternative methods for determining the spawning abundance of sockeye salmon (*Oncorhynchus nerka*) that is expected to produce maximum sustainable yield for the Kenai late-run and Kasilof river sockeye salmon stocks, and from this to quantify the extent to which the stock-recruitment data for these stocks exhibit evidence for overcompensation within the range of past observations. A broad range of mathematical forms for stock-recruitment relationships have been developed, each with specific properties and meanings for their respective parameters (Hilborn and Walters 1992, Walters and Martell 2004). We explore five alternative stock-recruitment models that are applicable to the Kenai and Kasilof river stocks, compare the statistical evidence supporting each along with differences in their estimated parameters and predictions for maximum sustainable yield (MSY) and the spawning abundance expected to produce MSY (Smsy). In addition, we use two stock-recruitment models that may take either Ricker or Beverton-Holt forms as proxy for assessing the extent to which overcompensation is evident in these data.

The table below contains definitions for common terms and references used throughout this document.

Table 1. Description of symbols, terms, and references.

Name	Definition
MSY	Maximum sustainable yield.
Smsy	The spawning abundance expected to produce MSY.
Recruitment	The number of salmon produced by the spawning stock size in a given (brood) year, returning in subsequent years, and measured as either catch or escapement.
Stock-recruitment Relationship or Spawner-recruit Relationship	The average relationship between spawning abundance and expected recruitment.
Process Error	Random variation in a stock-recruitment relationship.
Productivity	Recruits-per-spawner: The number of recruits (catch + escapement) per unit spawning abundance. Referenced by brood year.
Yield	Surplus production or recruitment of salmon in excess of the amount necessary for escapement, that may be taken as harvest.

Methods

Five alternative stock-recruitment models were fit to data from the Kenai and Kasilof river sockeye salmon stocks. Three of these models, the standard, brood year interaction, and autoregressive Ricker models are typical forms routinely evaluated by the Alaska Department of Fish and Game and included in the 2017 escapement goal review by Erickson et al. (2017) for these stocks. Two alternative stock-recruitment models were used to describe the probability that either a Beverton-Holt relationship, which does not permit overcompensation, or a Ricker-type relationship that may allow for overcompensation, have more support from the available data.

Standard Ricker

The Ricker (1954) model is a standard and flexible function often used in the approximation of salmon stock-recruitment relationships. The Hilborn (1985) version of the Ricker model was used because of the easier interpretation of the β parameter and the ability to approximate MSY and Smsy given the model parameters. Under this Ricker formulation:

$$R_t = S_t e^{\alpha(1-S_t/\beta)+\varepsilon_t}$$

R_t is the expected number of recruits arising from a spawning abundance S_t, from a brood year t. The α parameter describes the maximum productivity (recruits-per-spawner) of the population at low spawning abundance and the β parameter describes the equilibrium abundance of the unfished stock. It should be noted that maximum productivity in this form is the natural log of α, or $ln(\alpha)$. Residual process error in brood year t is described by ε_t which is assumed to be normally distributed with mean zero standard deviation σ: $\varepsilon_t \sim Normal(0, \sigma^2)$.

Brood Year Interaction Ricker

This model is a modified version of the Hilborn (1985) Ricker model above, that includes two terms (β_1, β_2) describing density-dependence, or the tendency for expected productivity (recruits-per-spawner) to decline with increasing spawning abundance (Ward and Larkin 1964, Larkin 1971, Collie and Walters 1987). In the brood year interaction Ricker model:

$$R_t = S_t e^{\alpha - \beta_1 S_t - \beta_2 S_{t-1} + \varepsilon_t}$$

β_1 describes the effect of spawning abundance in brood year t on population productivity and β_2 describes the lagged effect of spawning abundance in the prior $(t-1)$ brood year.

Autoregressive Ricker

The third type of model explored accounts for serial autocorrelation in process error at a lag of one year, under the assumption that these errors may not be fully independent across time. In this autoregressive form of the Ricker model described by Fleischman and Reimer (2017),

$$R_t = \alpha S_t e^{-\beta S_t + \phi v_{t-1} + \varepsilon_t}$$

ϕ describes the effect of the residual in the prior brood year:

$$v_{t-1} = ln(R_{t-1}) - ln(\alpha) + \beta S_{t-1}$$

It should be noted that under this form of the Ricker model the α is not in the exponentiated portion of the equation, and therefore maximum productivity is equal to α and not $ln(\alpha)$.

The three model alternatives described above are consistent with the standard models the Alaska Department of Fish and Game has previously used to estimate potential yield for the Kenai and Kasilof sockeye salmon stocks in the most recent escapement goal review (Erickson et al. 2017). The two models described below were used to quantify the likelihood that overcompensation (decreasing recruitment for escapements in excess of Smsy) or simple compensation is supported by these two datasets. We used the relative support from the data for a Ricker-type model that permits overcompensation, relative to the level of support for a Beverton-Holt model (no overcompensation possible) as a proxy for extent to which overcompensation is reflected in the data.

Ricker Beverton-Holt Mixture

The first model used to quantify support for the overcompensation hypothesis is a mixture of both Beverton-Holt and Ricker models. A State (δ) parameter is sampled from a Bernoulli distribution with a prior probability of 0.5, taking a value of 0 or 1 in each posterior sample. If $\delta = 1$, the stock-recruitment relationship has a Ricker form (potential overcompensation), while if $\delta = 0$ the relationship has a Beverton-Holt form (no possible overcompensation).

$$R_t = \left[\delta\left(S_t e^{\alpha_R(1 - S_t/\beta_R)}\right) + (1-\delta)\left(\frac{\alpha_B S_t}{1 + \frac{\alpha_B S_t}{\beta_B}}\right)\right] e^{\varepsilon_t}$$

Separate productivity parameters (α_R, α_B) and density-dependence (β_R, β_B) are estimated for each model type, given their different values and meanings. After estimation, the proportion of time the model spends as a Ricker function as opposed to Beverton-Holt function can be calculated as the proportion of posterior samples where δ has a value of 1 or 0 respectively. In general terms, the more time the model spends as Beverton-Holt may be interpreted as less evidence for the overcompensation hypothesis.

Deriso-Schnute

The second model used to quantify support for the overcompensation hypothesis is the Deriso-Schnute model. The Deriso-Schnute is a generalized stock-recruitment model that can take the shape of either a Beverton-Holt or Ricker model depending on the value of a shape parameter c.

$$R_t = \alpha S_t(1 - c\beta S_t)^{\frac{1}{c}} e^{\varepsilon_t}$$

If $c = -1$, the model has the Beverton-Holt form, while if the $c = 0$ it takes the shape of a Ricker model. This generalized stock-recruitment model was originally introduced by Deriso (1980) and further developed by Schnute (1985). The estimated value of the shape parameter may be interpreted as evidence for a Ricker or Beverton-Holt function describing the stock-recruitment data and by extension may be a way to quantify evidence regarding the overcompensation hypothesis.

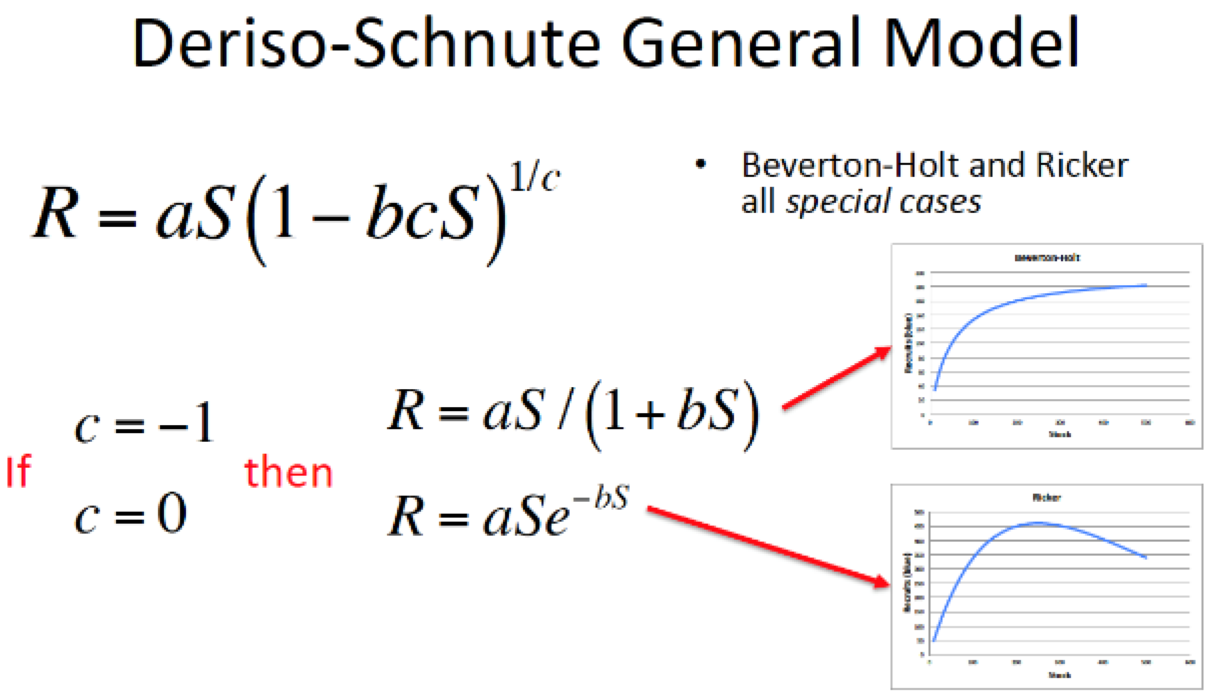

Figure 2. **Visual description of the Deriso-Schnute stock-recruitment model.**

Estimation Methods

All models were fit to available stock-recruitment data for the Kenai River late-run and Kasilof River sockeye salmon stocks using Bayesian methods, by minimizing the difference between the natural log of observed and predicted recruitment for a given brood year's spawning abundance and estimating the σ parameter describing the residual error. Bayesian posterior samples were generated with JAGS software (Plummer 2013) implemented using the R2jags package in R (Su and Yajima 2015). Three chains with random starting values were run for 2 million iterations, saving 1 in every 500 samples to reduce posterior correlation. The first 50% of the chain was discarded as a burn-in period leaving a total of 6,000 posterior samples.

Standard diagnostics were used to assess model convergence, including potential scale reduction factors ($\hat{R}$) and effective sample sizes for model parameters. Traceplots and the extent of autocorrelation at lags up to 20 were also evaluated. No significant convergence difficulties were observed, although under the Ricker Beverton-Holt mixture model posteriors for the Ricker parameters were less well defined because the model on average spent less time exploring this State for both stocks.

Priors for estimated model parameters were either uninformative or mildly informative (Table 2). Mildly informative priors included those for the process error standard deviation of each model (σ), which were normally distributed with mean zero and variance equal to one, and was constrained between 0 and 2. In reality all estimates of process error standard deviations were far below two and sensitivity tests indicated this choice of prior did little aside from constrain extremely unrealistic jumps in model parameters. The shape parameter in the Deriso-Schnute model (c) was constrained between -1 and 0 as per our goal of quantifying evidence for Beverton-Holt and Ricker forms of this model. Finally, the prior probability for the different states in the mixture model was fixed at $p = 0.5$, for the Bernoulli draw in each posterior sample.

Table 2. Full model equations and priors for each model parameter. Normal distributions are presented with the with the mean and variance $Normal(mean, variance)$. [min,max] indicates truncation of the full prior distribution across a range (min-max).

Name	Equation	Priors
Ricker	$R_t = S_t e^{\alpha(1-S_t/\beta)+\varepsilon_t}$	$\alpha \sim ln(Uniform(1e-3,20))$ $\beta \sim Uniform(1,1e7)$ $\sigma \sim Normal(0,1)[1e-3,2]$
Brood Year Interaction Ricker	$R_t = S_t e^{\alpha-\beta_1 S_t-\beta_2 S_{t-1}+\varepsilon_t}$	$\alpha \sim ln(Uniform(1e-3,20))$ $\beta_{1,2} \sim Uniform(0,1e-3)$ $\sigma \sim Normal(0,1)[1e-3,2]$
Autoregressive Ricker	$R_t = \alpha S_t e^{-\beta S_t+\phi v_{t-1}+\varepsilon_t}$ $v_{t-1} = ln(R_{t-1}) - ln(\alpha) + \beta S_{t-1}$	$\alpha \sim Uniform(1e-3,20)$ $\beta \sim Unform(0,1)$ $\phi \sim Normal(0,\sqrt{10})$ $v_0 \sim Normal\left(0,\frac{\sigma^2}{1-\phi^2}\right)$ $\sigma \sim Normal(0,1)[1e-3,2]$
Ricker Beverton-Holt Mixture	$R_t = \left[\delta\left(S_t e^{\alpha_R(1-S_t/\beta_R)}\right) + (1-\delta)\left(\frac{\alpha_B S_t}{1+\frac{\alpha_B S_t}{\beta_B}}\right)\right] e^{\varepsilon_t}$	$\alpha_R \sim ln(Uniform(1e-3,20))$ $\alpha_B \sim Uniform(1e-3,20)$ $\beta_R \sim Normal(0,(1e8)^2)[0,]$ $\beta_B \sim Normal(0,(1e8)^2)[0,]$ $\sigma \sim Normal(0,1)[1e-3,2]$
Deriso-Schnute	$R_t = \alpha S_t(1-c\beta S_t)^{\frac{1}{c}} e^{\varepsilon_t}$	$\alpha \sim Uniform(1e-3,20)$ $\beta \sim Uniform(0,1)$ $c \sim Uniform(-1,0)$ $\sigma \sim Normal(0,1)[1e-3,2]$

Simulation of Potential Yield

Potential yield was simulated across a range of trial spawning abundances for each stock, under each of the alternative stock-recruitment models. Spawning abundance was increased iteratively in steps of 1,000 spawners across a suitable range, and at each level of spawning abundance potential yield was calculated for each of the 6,000 samples from the joint posterior distribution of model parameters. Correction for the lognormal process error distribution was achieved by using the appropriate bias correction for model parameters in the case of the standard and autoregressive Ricker models (Hilborn 1985, Fleischman and Reimer 2017), or multiplying expected recruitment by $e^{\sigma^2/2}$.

Table 3. Datasets used for analysis.

Stock	Brood Years
Kenai River late-run sockeye salmon	1968-2010
Kasilof River sockeye salmon	1968-2010

General Results

Model Selection

The range of models evaluated in this analysis provided very similar fits to the stock-recruitment data for the Kenai and Kasilof river sockeye salmon stocks (Figure 3). The exception is the Kasilof River stock for which the predictions from the autoregressive Ricker model better matched low recruitments at the beginning of the time series and higher recruitments observed in the late 1970s and early 1980s.

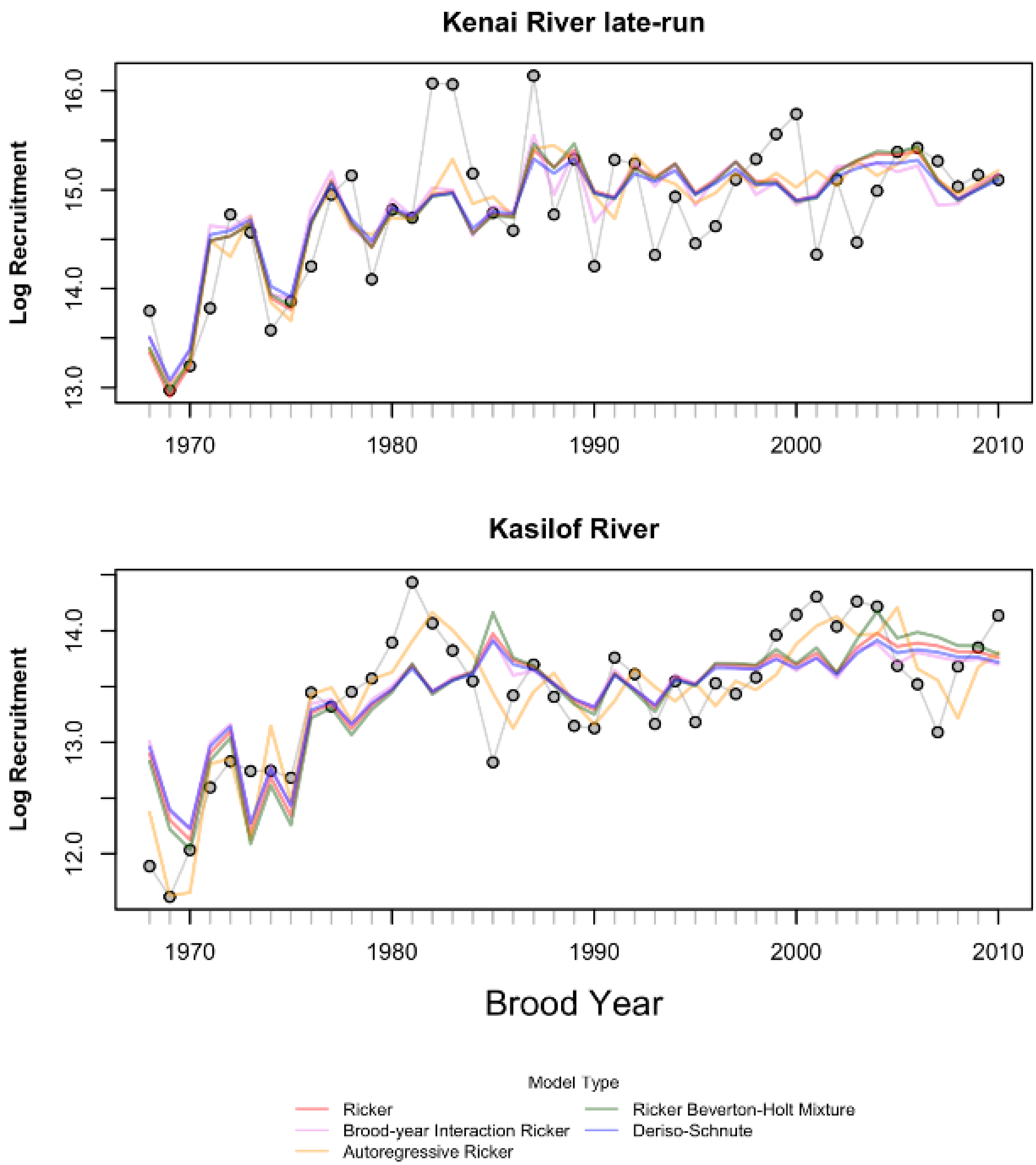

Figure 3. Predicted recruitment from the five model alternatives for the Kenai and Kasilof river sockeye salmon stocks. Lines are posterior median values for predicted recruitment in log space and points are the observed recruitments in log space, by brood year.

To evaluate support for alternative models in a Bayesian context, estimates of out-of-sample prediction error through cross-validation have been recommended (Gelman et al. 2014). The Watanabe-Akaike information criterion (WAIC) is an approximation to cross-validation and serves as a metric for model selection in a Bayesian context. In general terms lower WAIC values indicate a better fit by the model to the data.

Table 4. WAIC values for each model fitted to each stock. Green colors indicate lower WAIC values and therefore preferred models.

Model	Kenai River	Kasilof River
Basic Ricker	61.96	53.73
Brood Year Interaction	61.46	53.72
Autoregressive Ricker	62.54	32.45
Ricker Beverton-Holt Mixture	62.45	57.26
Deriso-Schnute	61.68	52.56

Comparison of WAIC values for the range of models evaluated indicates that for the Kenai River stock there is relatively equal support for all model types, however a slight preference for the brood year interaction Ricker. Conversely, for the Kasilof River stock a substantially lower WAIC value was found for the autoregressive Ricker model. These preferred models are consistent with findings in the most recent ADF&G escapement goal review for these stocks (Erickson et al. 2017).

Overcompensation

The strength of evidence for the overcompensation hypothesis, that escapements in excess of Smsy are predicted to result in reduced future recruitment, was evaluated using two models that attempt to quantify the probability of a Ricker or Beverton-Holt model better representing the observed stock-recruitment relationship. While a model-based preference for the Ricker model does not necessarily indicate that overcompensation is present, given the flexibility of this model to describe relationships with and without overcompensation, a preference for the a Beverton-Holt like model indicates there is limited evidence for overcompensation, as this model allows for recruitment to asymptote but not decline at high spawning abundances (i.e. overcompensation). In this way one can consider the potential for overcompensation under Ricker the null hypothesis and a model-based preference for a Beverton-Holt stock-recruitment relationship to be evidence for rejecting this null hypothesis.

Results from the Ricker Beverton-Holt mixture model indicate that the majority of posterior samples were generated under the Beverton-Holt model (Figure 4). For the Kasilof River sockeye salmon stock, 13.0% of posterior samples were generated from the Ricker model while 87.0% of samples were generated from the Beverton-Holt model. For the Kenai River late-run stock, 4.5% of posterior samples were generated from the Ricker model while 95.5% of samples were generated from the Beverton-Holt model. The relative proportions of posterior samples generated from each model suggest that a Beverton-Holt model may better represent the underlying stock-recruitment relationships, and as such limited evidence for overcompensation for either stock.

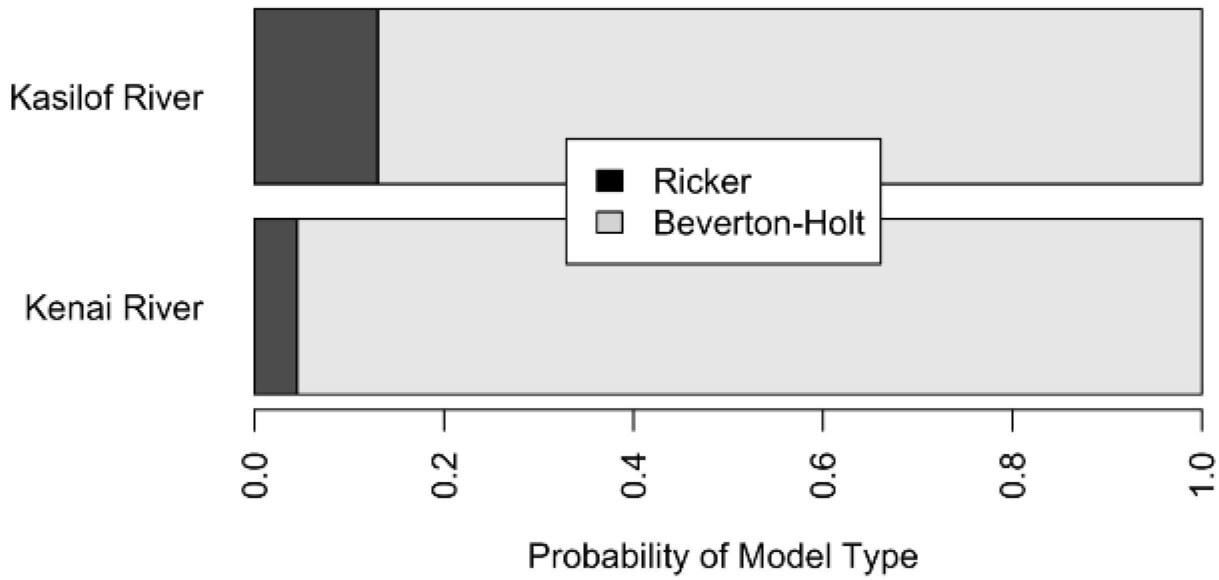

Figure 4. Probability of the Ricker or Beverton-Holt model representing stock-recruitment relationships for each sockeye salmon stock, from the mixture Ricker model. Each bar describes the proportion of time the model spent sampling as Ricker or Beverton-Holt, as defined by the proportion of posterior samples in which the State was $\delta = 1$ or $\delta = 0$, respectively.

Results from the Deriso-Schnute model with respect to overcompensation are more mixed. For the Kenai River stock the posterior distribution for the shape parameter indicates substantially higher probability for a value of -1, indicating more evidence for a Beverton-Holt type relationship (Figure 5). Given that a Beverton-Holt function does not provide for overcompensation, this indicates limited evidence for the overcompensation hypothesis with respect to the Kenai River late-run sockeye salmon stock. Conversely, when the Deriso-Schnute model was fit to stock-recruitment data from the Kasilof River the posterior distribution for the shape parameter was more uniform with a marginally higher probability for a value of -1 (Figure 5). This results suggests nearly equal evidence for Ricker and Beverton-Holt relationships representing the data for this stock. However, this result does not indicate overcompensation is present, merely that we cannot reject the overcompensation hypothesis for the Kasilof River stock under this model.

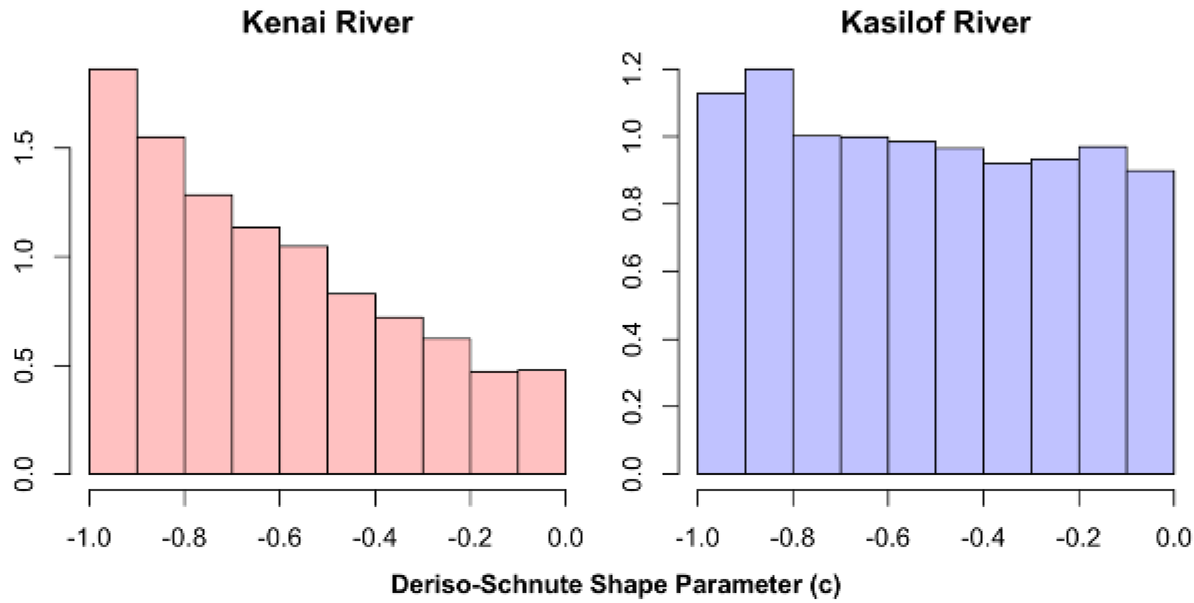

Figure 5. Evidence for a Ricker or Beverton-Holt like model better representing the data for each stock based from the Deriso-Schnute model. The Deriso-Schnute shape parameter controls whether the underlying relationship is more consistent with one of the two model types. A shape parameter value of -1 is similar to Beverton-Holt, while a shape parameter value of 0 indicates a Ricker-like form where overcompensation is possible. Histograms are the marginal posterior distributions for the shape parameters for each stock.

Specific Results

In the following section model-specific parameter estimates and projections for potential yield as a function of spawning abundance are presented. Potential yield was simulated based on the posterior distribution for model parameters, which after appropriate log-normal correction represent the expected potential yield and uncertainty in potential yield resulting from estimation uncertainty.

Model parameter estimates were consistent with those identified by Erickson et al. (2017) where specific model comparison was possible.

With respect to simulation results, the spawning abundances expected to produce maximum potential yield and estimated maximum potential yield generally agreed with findings in the most recent ADF&G escapement goal review for Upper Cook Inlet sockeye (Erickson et al. 2017). In the case of the Kenai River late-run sockeye stock the brood year interaction model was preferred based on WAIC. The estimate of the spawning abundance (escapement) producing maximum potential yield from this model was 1.201 million sockeye, with a potential yield of 3.071 million sockeye. For the Kasilof River sockeye stock the autocorrelated Ricker was the WAIC-preferred model, and predicted maximum potential yield could be obtained by an escapement of 237,000 sockeye and produce a potential yield of 706,000 sockeye.

Standard Ricker

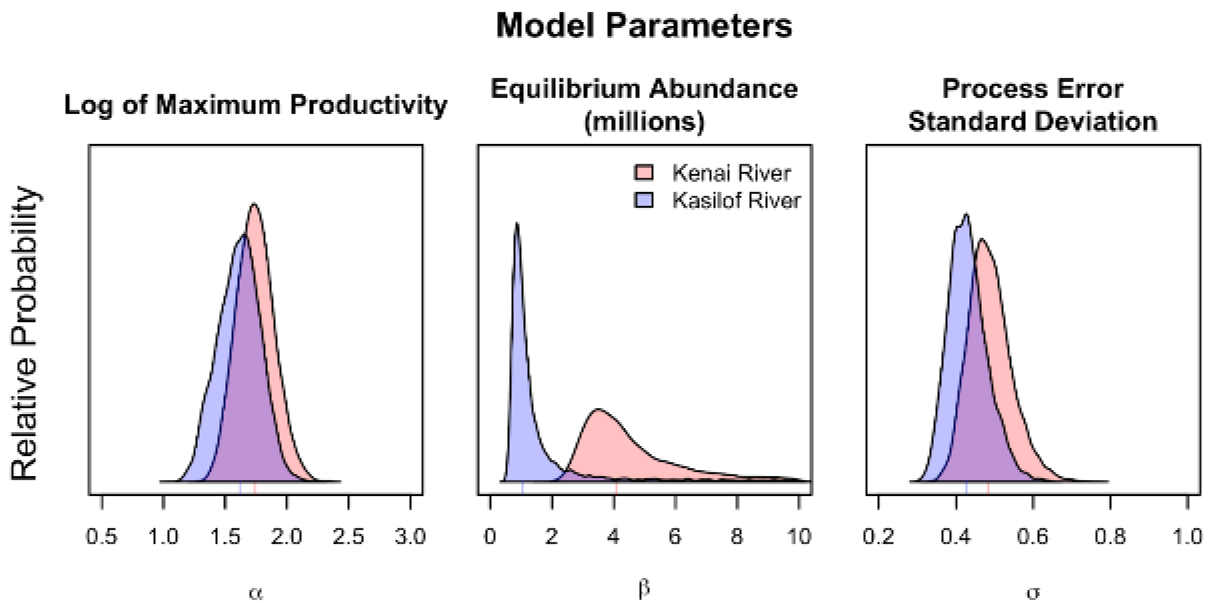

Figure 6. Posterior distributions for Ricker model parameters. The highest point on each distribution indicates the parameter value with the highest posterior probability density given the data. Vertical lines on the x-axis highlight the posterior median parameter value for each population.

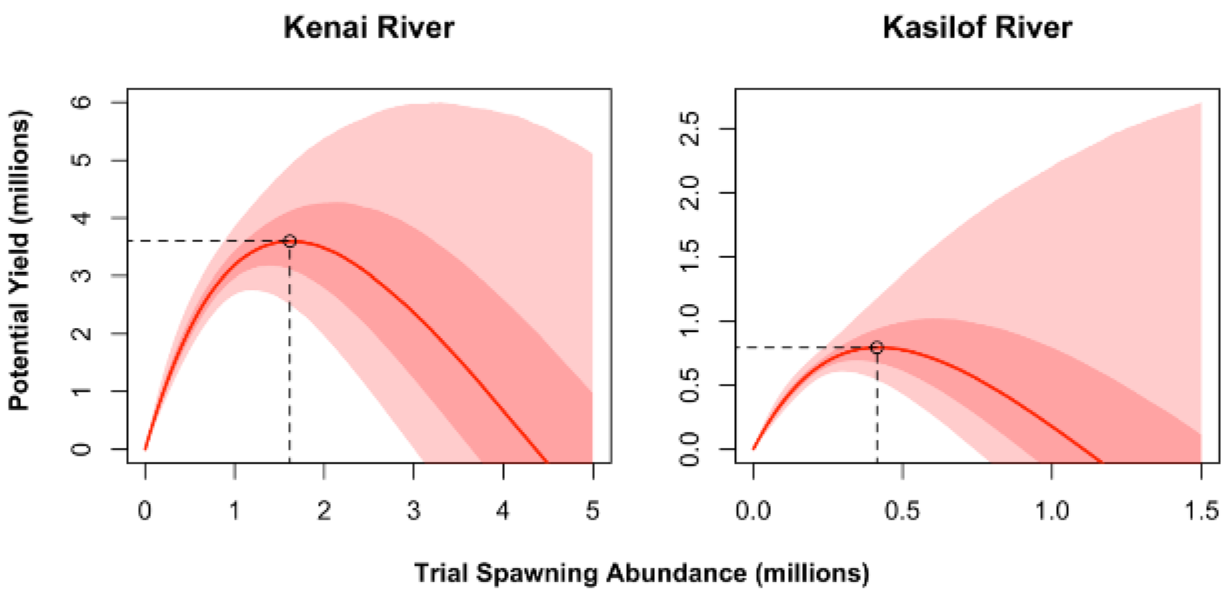

Figure 7. Simulated potential yield for the standard Ricker model across a range of trial spawning abundances. The red line indicates the median expectation, while the dark and light shaded regions indicate the 50% and 95% credible intervals for predictions. Dashed lines describe predicted Smsy and MSY for each stock.

Brood Year Interaction Ricker

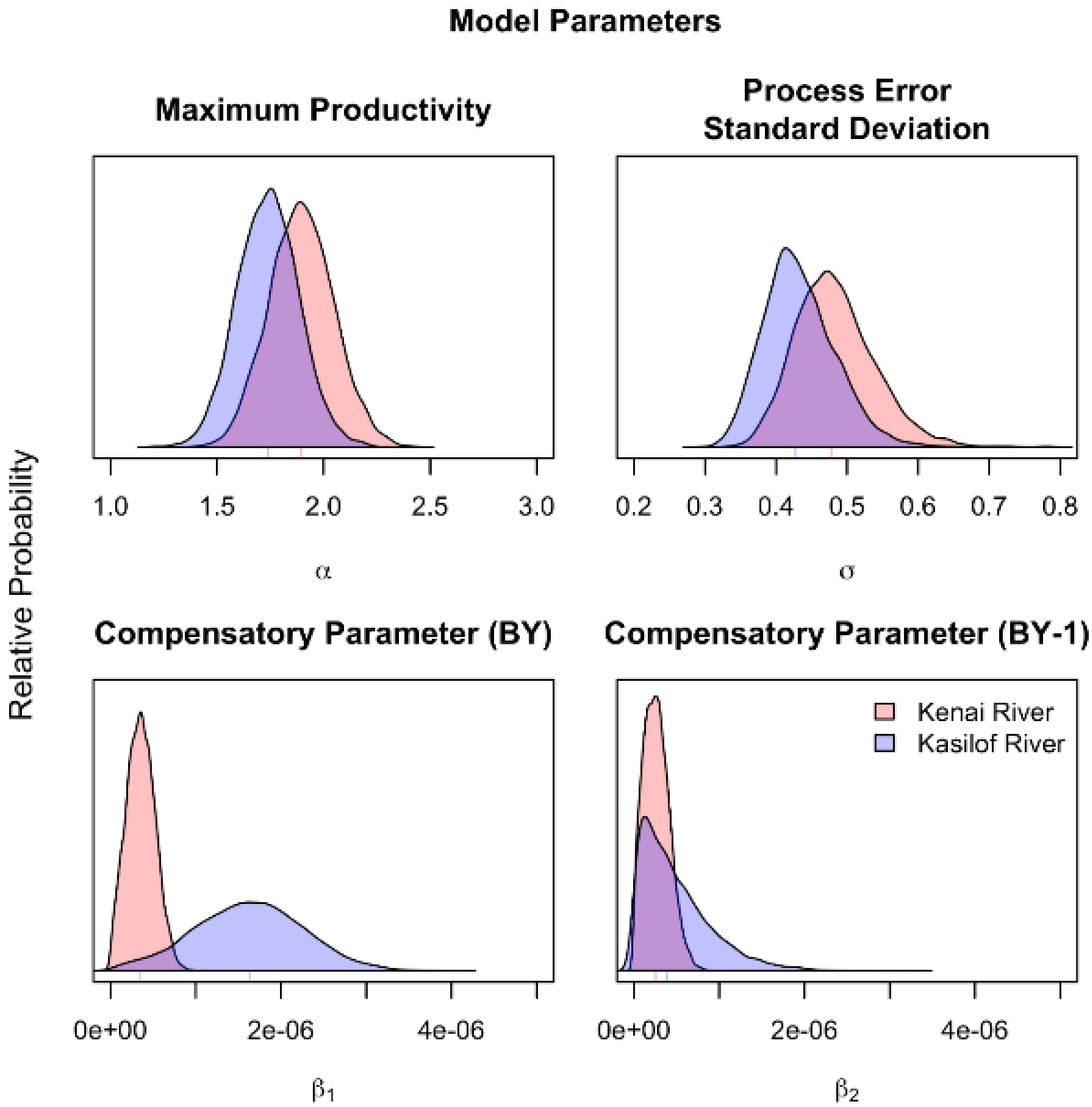

Figure 8. Posterior distributions for brood year interaction Ricker model parameters. The highest point on each distribution indicates the parameter value with the highest posterior probability density given the data. Vertical lines on the x-axis highlight the posterior median parameter value for each population.

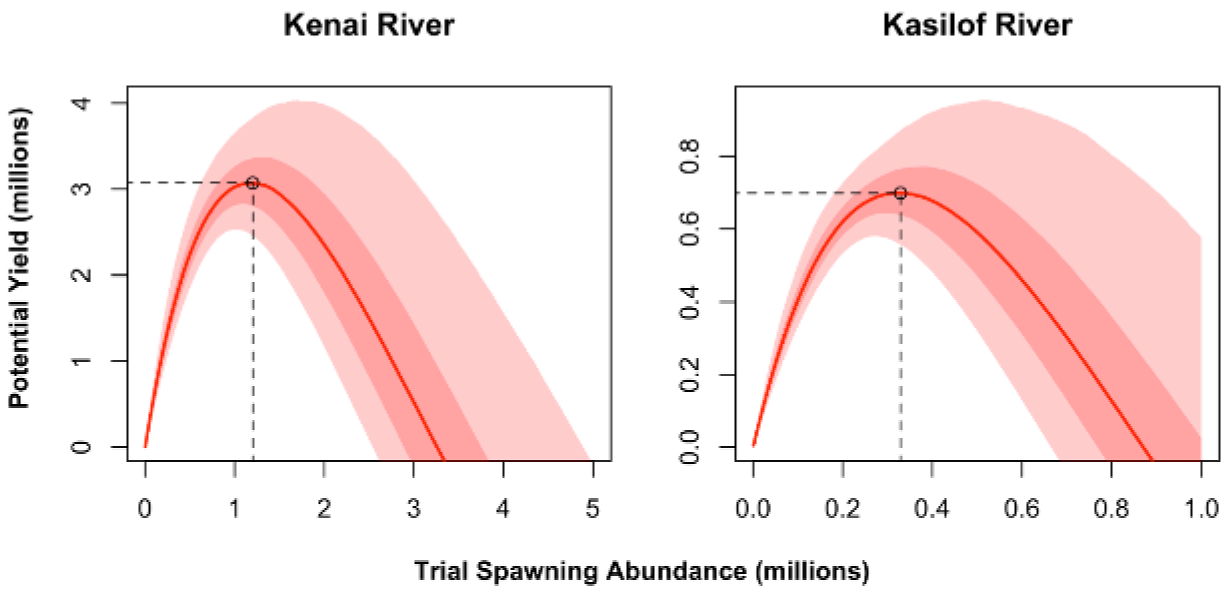

Figure 9. Simulated potential yield for the brood year interaction Ricker model across a range of trial spawning abundances. The red line indicates the median expectation, while the dark and light shaded regions indicate the 50% and 95% credible intervals for predictions. Dashed lines describe predicted Smsy and MSY for each stock.

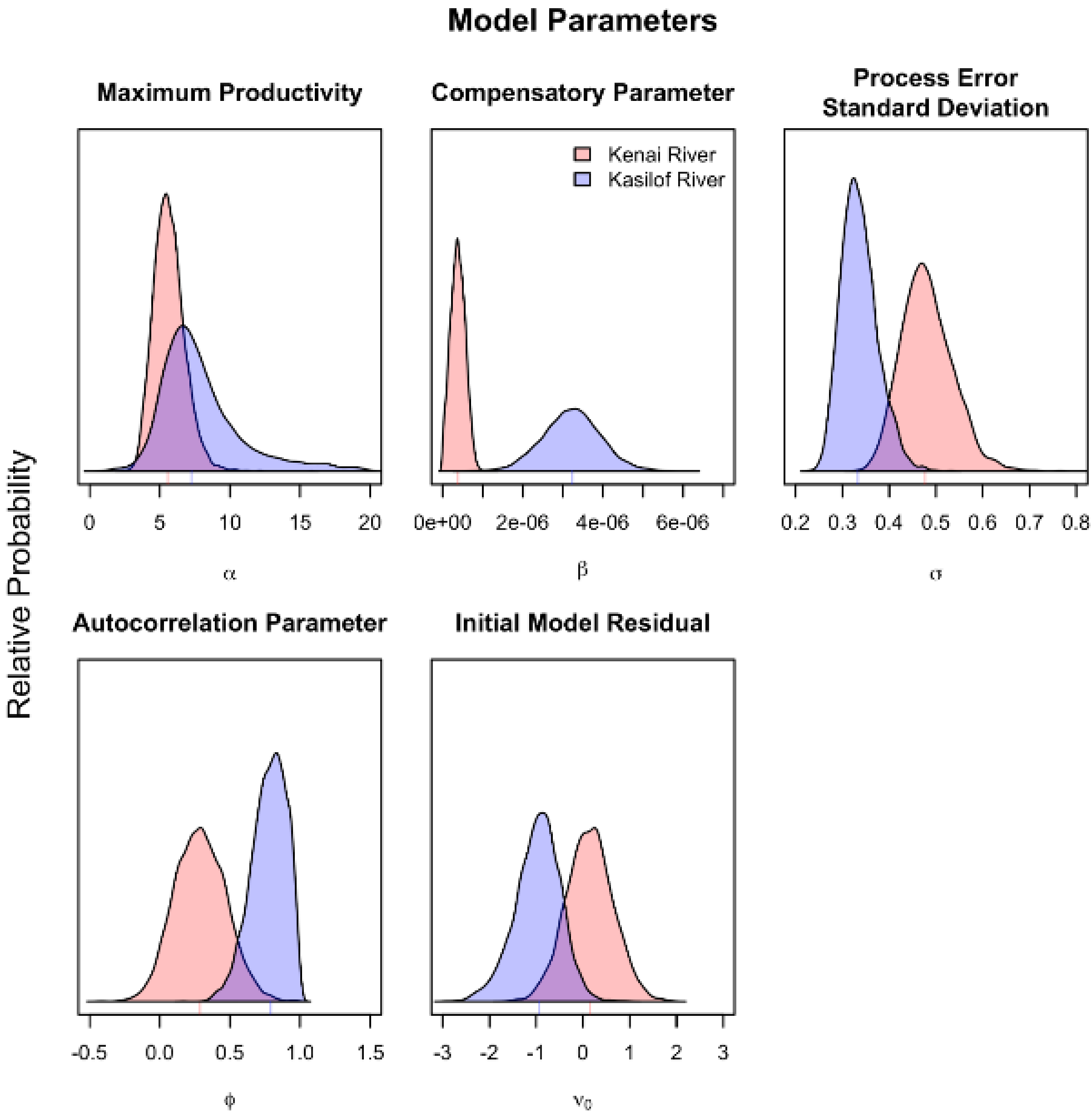

Figure 10. Posterior distributions for autoregressive Ricker model parameters. The highest point on each distribution indicates the parameter value with the highest posterior probability density given the data. Vertical lines on the x-axis highlight the posterior median parameter value for each population.

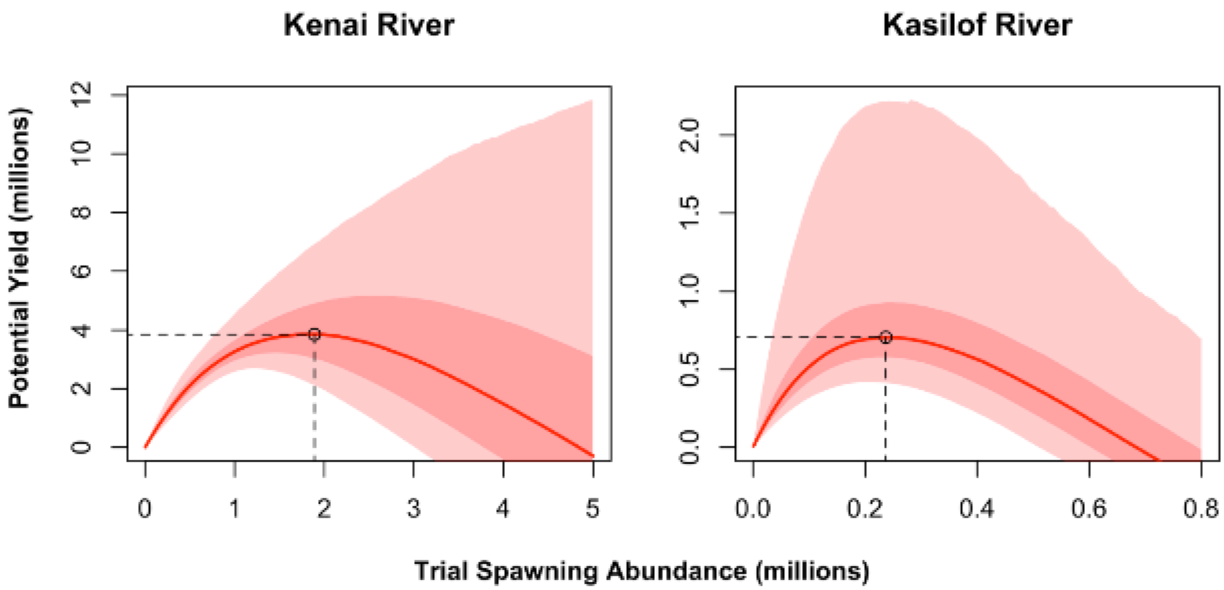

Figure 11. **Simulated potential yield for the autoregressive Ricker model across a range of trial spawning abundances. The red line indicates the median expectation, while the dark and light shaded regions indicate the 50% and 95% credible intervals for predictions. Dashed lines describe predicted Smsy and MSY for each stock.**

Ricker Beverton-Holt Mixture

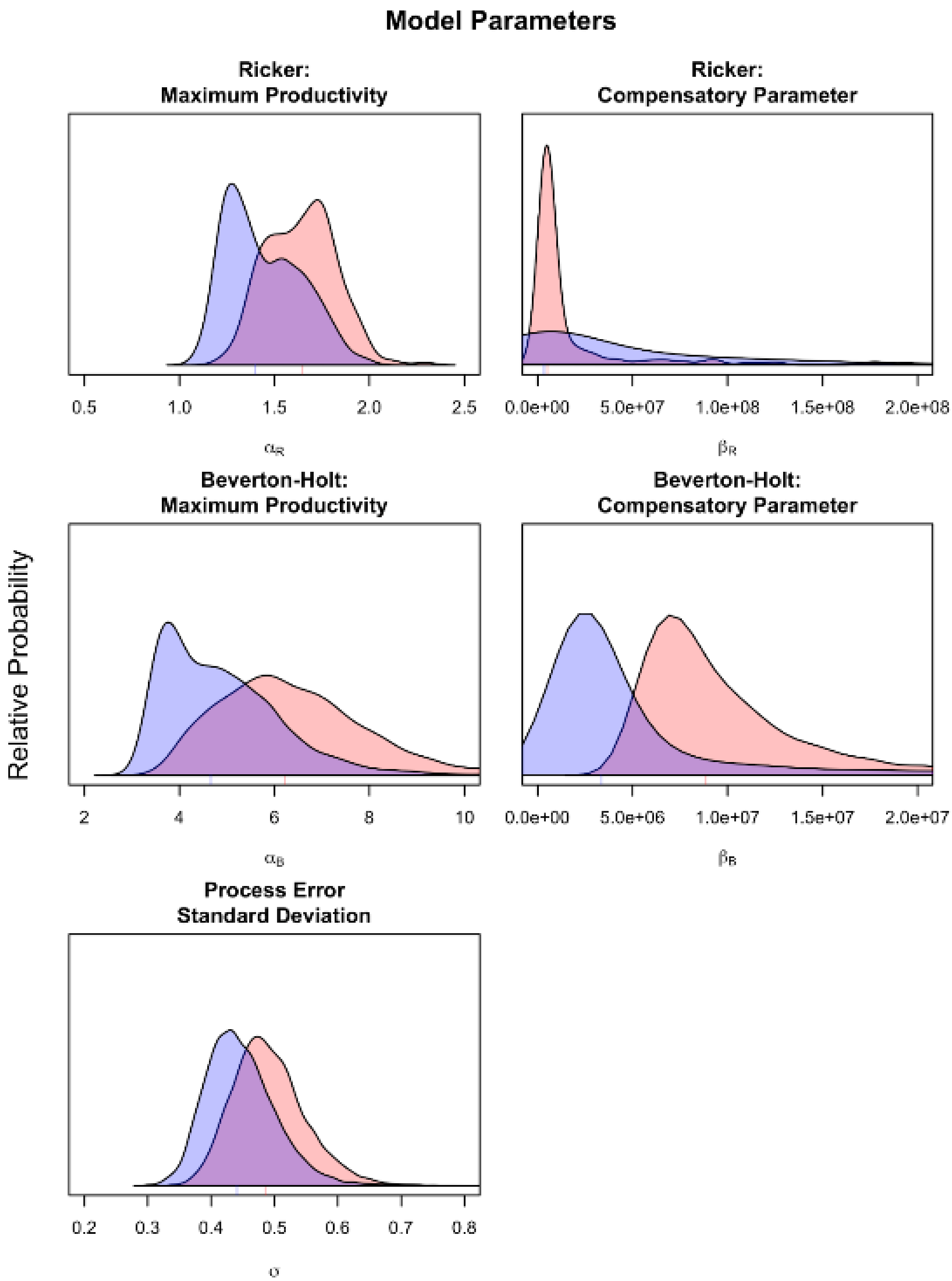

Figure 12. Posterior distributions for Ricker Beverton-Holt mixture model parameters. The highest point on each distribution indicates the parameter value with the highest posterior probability density given the data. Vertical lines on the x-axis highlight the posterior median parameter value for each population.

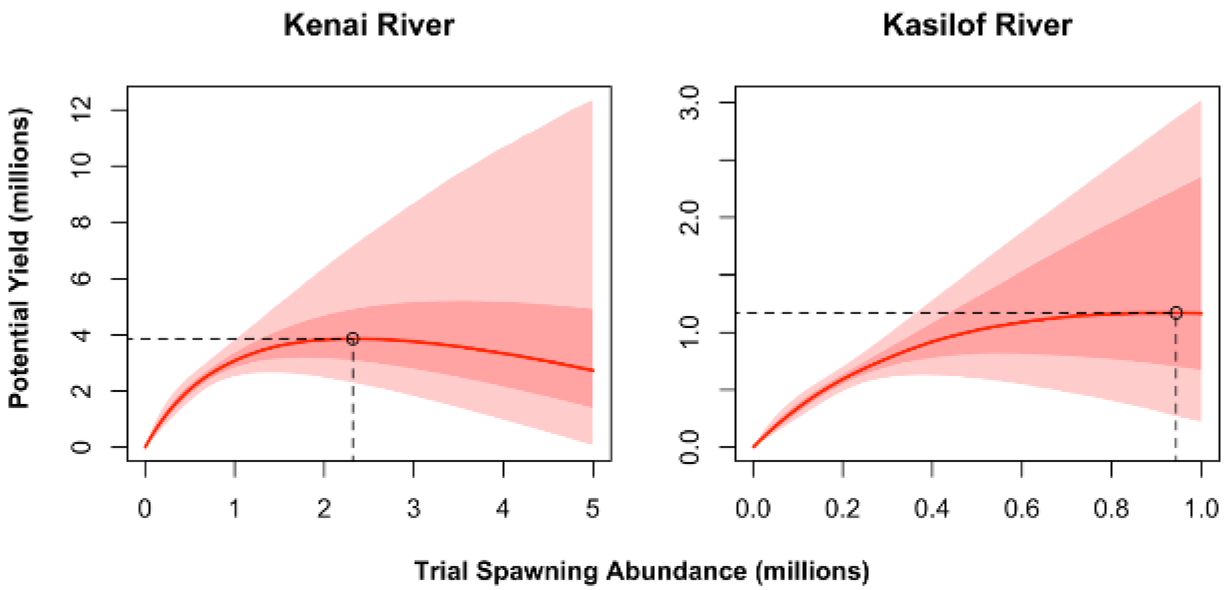

Figure 13. Simulated potential yield for the Ricker Beverton-Holt mixture model across a range of trial spawning abundances. The red line indicates the median expectation, while the dark and light shaded regions indicate the 50% and 95% credible intervals for predictions. Dashed lines describe predicted Smsy and MSY for each stock.

Deriso-Schnute

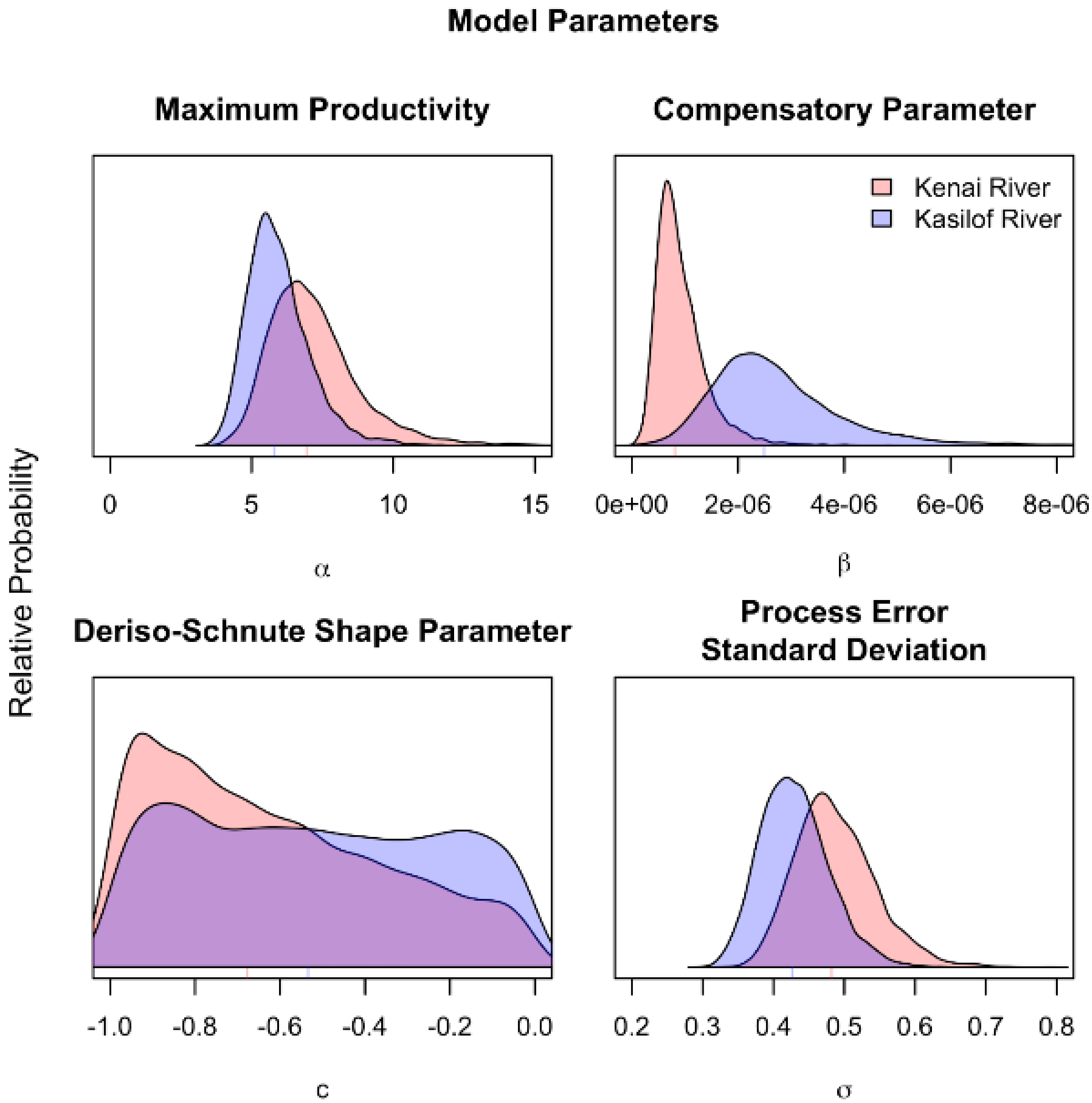

Figure 14. **Posterior distributions for Deriso-Schnute model parameters. The highest point on each distribution indicates the parameter value with the highest posterior probability density given the data. Vertical lines on the x-axis highlight the posterior median parameter value for each population.**

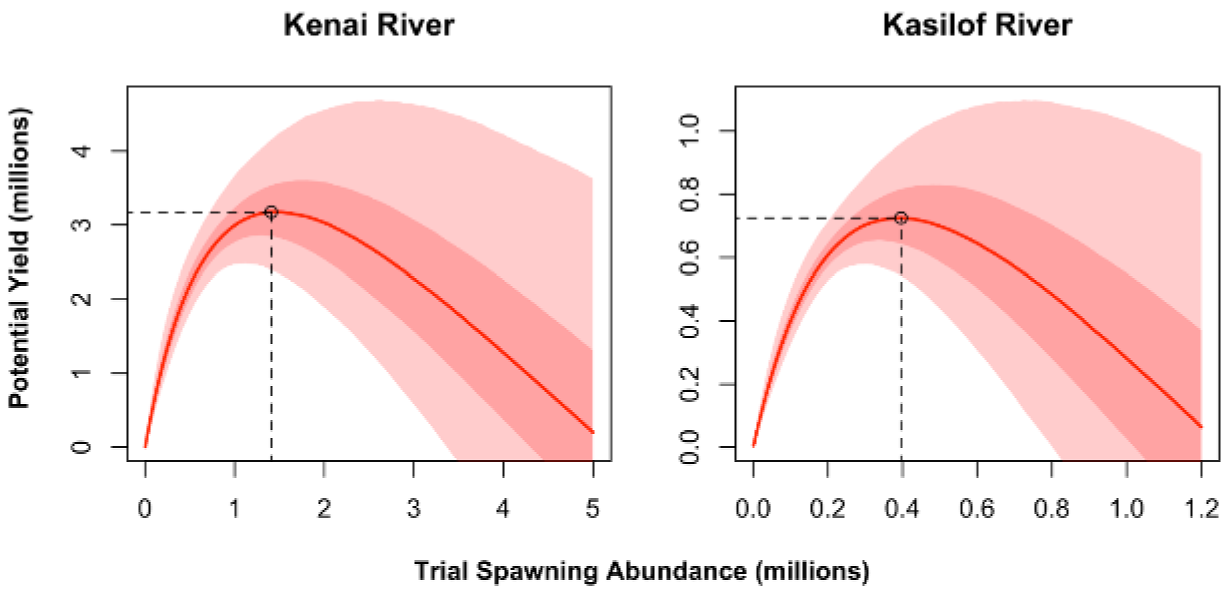

Figure 15. **Simulated potential yield for the Deriso-Schnute model across a range of trial spawning abundances. The red line indicates the median expectation, while the dark and light shaded regions indicate the 50% and 95% credible intervals for predictions. Dashed lines describe predicted Smsy and MSY for each stock.**

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15. Appendix: Community Fisheries Engagement Indices of the Cook Inlet Salmon Drift Gillnet Fishery 1991-2021

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This analysis adapts a framework developed by the National Marine Fisheries Service (NMFS) to create quantitative indices of fisheries engagement to help understand community participation in marine fisheries.[143, 144] In the North Pacific, NMFS publishes the Annual Community Engagement and Participation Overview (ACEPO) that utilizes these techniques to explore community participation in the Federal FMP groundfish and FMP crab fisheries. In contrast to that analysis that includes all commercial fisheries, here we examine community participation for a single fishery, the Cook Inlet salmon drift gillnet fishery. These performance metrics can be used to track fisheries participation over time using pre-existing data for all communities participating in commercial fisheries by examining the degree to which communities in Alaska, the Pacific coast, and the rest of the U.S. participate in different aspects of commercial fisheries.[145] This analysis focuses specifically on those communities engaged in Cook Inlet salmon drift gillnet harvesting and processing activities. The purpose of this analysis is to explore the degree to which communities are engaged in Cook Inlet salmon drift gillnet harvesting and processing and how their participation has changed over time. These indices can be used to provide information about the degree to which communities have sustained participation in this fishery over time to support NMFS and NPMFC decision making processes as they relate to National Standard 8.[146]

Methods

Commercial Fisheries Engagement Indices

Communities were included in the analysis based on the activity of vessels that prosecuted the Cook Inlet salmon drift gillnet fishery over the period 1991-2021. This analysis considers two somewhat distinct aspects of community engagement in commercial fisheries in Alaska: **a) commercial processing engagement** reflects activities associated with vessel landings and fish deliveries in the community and associated processing employment, municipal tax revenues, demand for supplies, and profits; **b) commercial harvesting engagement** reflects activities associated with the community of residence of the vessel owners engaged in this fishery, as that community also derives benefits from the fisheries activity and associated income. Some proportion of crew and other supplies will be procured in the vessel owner's community and reflects a different aspect of community participation in commercial fisheries in the North Pacific than the location of landings. The communities that are highly engaged in processing seafood in

143 Jepson, M., & Colburn, L. L. (2013). *Development of social indicators of fishing community vulnerability and resilience in the US southeast and northeast regions*. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

144 A map of the most recent social indicators for coastal communities in the U.S. is available at: https://www.st.nmfs.noaa.gov/data-and-tools/social-indicators/

145 Himes-Cornell, A., & Kasperski, S. (2016). Using socioeconomic and fisheries involvement indices to understand Alaska fishing community well-being. *Coastal Management*, *44*(1), 36-70.

146 National Standard 8 states "*Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirement of paragraph (2) [i.e., National Standard 2], in order to (a) provide for the sustained participation of such communities, and (b) to the extent practicable, minimize adverse economic impacts on such communities.*"

Alaska are not always the same as those engaged in the harvesting of those fish and shellfish, and this analysis will consider these two aspects of engagement and their impacts separately.

All communities in Alaska with activities in these fisheries are included in the analysis,[147] and non-Alaska communities are grouped into 5 groupings: the Seattle metropolitan statistical area (MSA), Other Washington, Oregon, California, and All Other States. Communities were included in the processing engagement analysis if any vessels using Cook Inlet Salmon drift gillnet (S 03H) permit made Cook Inlet salmon drift gillnet landings in the community from 1991-2021. Communities were included in the harvesting engagement analysis if the owner of a vessel which used a Cook Inlet salmon drift gillnet (S 03H) permit and landed Cook Inlet salmon using drift gillnet gear (regardless of the community) resided in the community for any year from 1991 through 2021.[148] Processing engagement is represented by the amount of landings (pounds) and associated revenues from landings in the community, the number of vessels delivering Cook Inlet salmon using drift gillnet gear in the community, and the number of processors in the community processing Cook Inlet salmon using drift gillnet gear. Harvesting engagement is represented by the Cook Inlet salmon drift gillnet landings and revenues associated with vessels owned by community residents (regardless of the location of landing), the number of vessels with Cook Inlet salmon drift gillnet landings owned by residents in the community, and the number of distinct resident vessel owners whose vessels made Cook Inlet salmon drift gillnet landings in any community. By separating commercial processing from commercial harvesting, the engagement indices highlight the importance of fisheries in communities that may not have a large amount of landings or processing in their community, but have a large number of fishermen and/or vessel owners that participate in commercial fisheries based in the community.

To examine the relative harvesting and processing engagement of each community, a separate principal components factor analysis (PCFA) was conducted each year for each category to determine a community's engagement relative to all other communities. There are 31 years in the study and two PCFAs are conducted each year (processing engagement and harvesting engagement) for a total of 62 different PCFAs summarized below.

PCFA is a variable reduction strategy that separates a large number of correlated variables into a set of fewer, linearly independent components. The first component from each PCFA, which by definition explains the most variation in the data, is used to create quantitative indices of engagement for each community by using the regression method of summing the standardized coefficient scores multiplied by the included variable values. A unique processing engagement index and harvesting engagement index value for each community in each year is created using the first un-rotated extracted factor from the PCFA, each of which resulted in single factor solutions with second factor eigenvalues below 1.00 for all 62 PCFAs. Each index is normalized to have a mean of zero and a standard deviation of one for each year across communities. These indices are relative scores in that they represent each community's engagement in commercial fisheries within a single year relative to all other communities in that year. Indices are then appended across all years to create a continuous series of relative engagement in these two aspects of commercial fisheries over time.

Communities that scored above one (above one standard deviation from the mean of zero) for any year are classified as highly engaged for that particular year. These communities are used in additional analyses to explore the changes in their participation in Cook Inlet salmon drift gillnet processing engagement or harvesting engagement. It is important to note that since these are relative indices, a large change in the fishing activity over time will only cause a change in an index if one community loses a larger share of their vessels (or other commercial fisheries activities) than another

[147] Eagle River and Girdwood are included as part of Anchorage.

[148] The vessel owner's community is determined from the CFEC vessel registration each year.

community. If the change in number of active vessels (or other commercial fishing activities) are directly proportional to the existing number of vessels across communities, there will be only minimal change in the indices over time.

Regional Quotient

The regional quotient is a measure of the importance of a community Cook Inlet salmon drift gillnet activities in terms of pounds landed or revenue generated relative to the rest of the Cook Inlet salmon drift gillnet fishery. It is calculated as the landings or revenue attributable to a community divided by the total landings or revenue from all communities and community groupings. The regional quotient is reported for revenue from landings in a community (similar to processing engagement) and displays the distribution of Cook Inlet salmon drift gillnet processing revenues across communities. The regional quotient uses the same criteria for inclusion as the processing and harvesting engagement indices and is presented for all communities that were highly engaged for at least one year from 1991-2021.

Data

Data were collected for 68 communities or community groupings throughout the U.S. that had either some commercial Cook Inlet salmon drift gillnet fisheries landings or residents who owned vessels that were used in commercial Cook Inlet salmon drift gillnet fishing during the period 1991-2021. Of those, only 15 communities had some Cook Inlet salmon drift gillnet landings occurring in their community and were included in the commercial processing engagement analysis. In contrast, 66 of the 68 communities had a resident who owned a vessel that participated in commercial Cook Inlet salmon drift gillnet fishing and therefore were included in the commercial harvesting engagement analysis.

Results

As was noted above, the harvesting engagement and processing engagement indices are relative indicators of community participation in this fishery over time in which communities are ranked against one another. This characteristic of the methods can obscure the absolute changes in fishing activities across communities or over time. To assist the reader in interpreting these changes over time, Figure 1 displays the aggregate annual values of the five variables that make up the processing and harvesting engagement indices.[149,150] Landings in the fishery reached a peak of 45 million pounds in 1992 resulting in over $117 million in revenues with 643 harvesting vessels delivering to 33 different processors. Fishing activity was less in the years that followed, increased again from 2010-2015, and has been generally declining from 2016-2021. The composition of the communities engaged in the fishery also changes substantially over these periods.

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[149] Revenues were adjusted for inflation to 2021 dollar values using the GDP implicit price deflator available from BEA Table 1.1.9. Accessed on 11/1/22, via:
https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&categories=survey

[150] Note the harvesting engagement index includes vessel owners while the processing engagement index includes processors, but the other variables are the same in aggregate for all communities annually. However, the value of the variables for each community will vary based on whether the aggregation is done over communities with landings (processing engagement) or aggregated over communities with vessel owners (harvesting engagement).

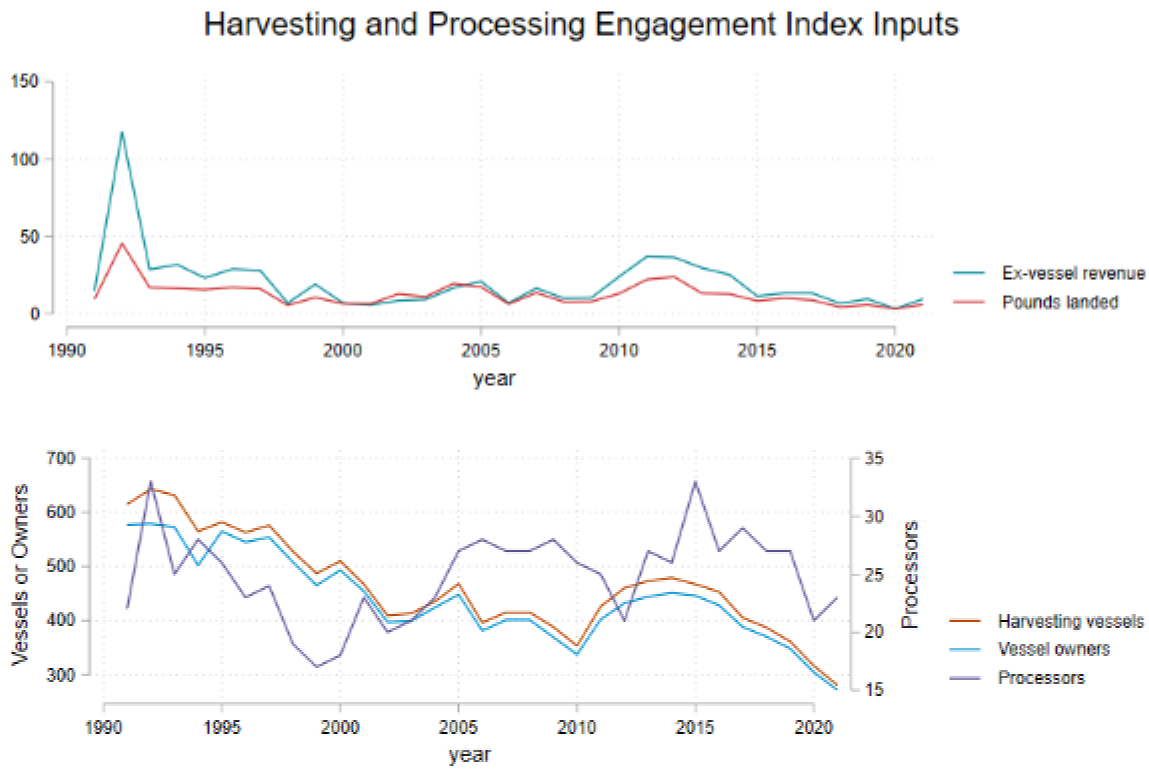

Figure 1. Aggregate annual Cook Inlet drift gillnet salmon processing engagement index inputs

Cook Inlet salmon drift gillnet Commercial Processing Engagement

The results of the commercial processing engagement PCFA analyses are shown in Table 1 which presents the eigenvalues, factor loadings, total variance explained, and Armor's theta reliability coefficient (Armor, 1973)[151] for all of the variables included in each PCFA. The results suggest very strong relationships among all variables, and that a single index based on the first extracted factor explains between 84% and 100% of the variation in each of the variables in each year. While it is uncommon to explain 100% of the variation in the variables, only Kenai was accepting deliveries of Cook Inlet salmon from S03H permits (using drift gillnet gear) during 2003 and from 2005-2007, thus the variance is all explained by the included variables and only Kenai has a positive index score for those periods.

151 Armor, D.J., 1973. Theta reliability and factor scaling. Sociological methodology, 5, pp.17-50.

Table 1. Commercial Cook Inlet Salmon Drift Gillnet Processing Engagement PCFA Results.

Year	Eigenvalues				Factor Loadings				1st Eigenvalue Percent variance explained	Armor's Theta
	1	2	3	4	Ex-vessel value	Pounds landed in community	Number of vessels delivering	Number of processors		
1991	3.77	0.22	0.01	0.00	0.986	0.911	0.991	0.992	0.942	0.980
1992	3.85	0.13	0.02	0.00	0.990	0.950	0.992	0.992	0.963	0.987
1993	3.88	0.11	0.01	0.00	0.993	0.957	0.995	0.995	0.970	0.990
1994	3.78	0.20	0.02	0.00	0.990	0.919	0.989	0.989	0.945	0.981
1995	3.85	0.15	0.00	0.00	0.997	0.942	0.992	0.992	0.963	0.987
1996	3.88	0.11	0.01	0.00	0.993	0.957	0.995	0.995	0.970	0.990
1997	3.91	0.08	0.00	0.00	0.999	0.970	0.993	0.993	0.978	0.993
1998	3.90	0.10	0.00	0.00	0.998	0.962	0.995	0.995	0.975	0.992
1999	3.86	0.13	0.01	0.00	0.996	0.949	0.992	0.993	0.966	0.988
2000	3.92	0.08	0.00	0.00	0.997	0.969	0.996	0.997	0.980	0.993
2001	3.93	0.06	0.00	0.00	0.998	0.976	0.996	0.996	0.983	0.994
2002	3.76	0.24	0.01	0.00	0.990	0.903	0.989	0.990	0.939	0.978
2003	4.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
2004	3.97	0.02	0.01	0.00	0.993	0.995	0.998	0.998	0.992	0.997
2005	4.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
2006	4.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
2007	4.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000
2008	3.99	0.01	0.00	0.00	0.997	0.998	1.000	0.999	0.997	0.999
2009	3.86	0.13	0.01	0.00	0.991	0.949	0.992	0.996	0.965	0.988
2010	3.81	0.17	0.02	0.00	0.944	0.966	0.998	0.997	0.954	0.984
2011	3.55	0.38	0.07	0.00	0.963	0.832	0.982	0.982	0.887	0.957
2012	3.82	0.18	0.00	0.00	0.988	0.929	0.994	0.994	0.954	0.984
2013	3.81	0.12	0.07	0.00	0.965	0.954	0.991	0.992	0.952	0.983
2014	3.82	0.15	0.03	0.00	0.986	0.939	0.990	0.993	0.955	0.984
2015	3.53	0.45	0.02	0.00	0.993	0.804	0.973	0.978	0.884	0.956
2016	3.54	0.46	0.00	0.00	0.989	0.791	0.983	0.984	0.885	0.957
2017	3.48	0.52	0.00	0.00	0.978	0.754	0.988	0.989	0.870	0.950
2018	3.59	0.41	0.00	0.00	0.987	0.817	0.986	0.988	0.898	0.962
2019	3.54	0.46	0.00	0.00	0.986	0.787	0.986	0.986	0.884	0.956
2020	3.64	0.35	0.01	0.00	0.987	0.846	0.982	0.991	0.909	0.967
2021	3.36	0.64	0.00	0.00	0.985	0.667	0.985	0.986	0.840	0.936

In addition to the goodness of fit statistics of the analyses provided in Table 1, each PCFA provides an index score for each of the 15 communities included in the analyses. These index scores are presented in Table 2 for the 6 communities that were highly engaged (index score above one, which is one standard deviation above the mean of zero) for at least one year from 1991-2021. These cells are shaded in Table 4. The index is an indicator of the degree of participation in a community relative to the participation of other communities. It is a measure of the presence of commercial fishing activity including pounds landed, revenue, processors and the number of delivering vessels in the Cook Inlet salmon drift gillnet fishery.

Table 2. Communities Highly Engaged in Cook Inlet Salmon Drift Gillnet Commercial Processing for One or More Years From 1991-2021*.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Homer	0.7	0.4	0.5	0.6	0.9	0.6	0.4	0.5	-0.1	-0.3	0.3	0.6	-0.3	-0.2	-0.3	-0.3	-0.3	-0.2	0.7	0.9	1.0	1.3	1.2	1.1	0.8	1.4	2.0	2.0	1.8	1.8	1.8
Kasilof	0.5	0.1	0.3	0.4	0.3	0.4	0.6	0.4	0.7	0.0	0.1	0.1	-0.3	-0.2	-0.3	-0.3	-0.3	0.1	0.7	0.1	0.5	0.1	0.6	1.5	2.3	1.6	1.4	1.0	1.2	0.6	-0.4
Kenai	3.3	3.4	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.5	3.4	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.1	2.5	3.2	3.2	2.9	2.8	2.3	2.6	2.3	2.6	2.5	2.8	3.0
Nikiski	-0.5	-0.5	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	0.4	0.2	-0.2	-0.1	-0.3	-0.3	-0.3	-0.3	0.8	1.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.4

*Shaded cells are index scores above one (highly engaged) for at least one year from 1991-2021.

Of the four communities found in Table 2 and displayed in Figure 2, only Kenai was highly engaged in commercial processing all 31 years from 1991-2021. Kenai has the highest engagement scores over time, but declining engagement since 2009 with an increase from other processing communities. Homer had moderate but declining engagement throughout the 1990s until leaving the fishery from 2003-2007, but has seen increases in its processing engagement in this fishery since 2009. Kasilof experienced similar trends in processing engagement as Homer, but experienced a very different trend since 2015 and did not receive any deliveries in 2021. Nikiski has had more variable engagement over time, but was only highly engaged in processing engagement in 2010.

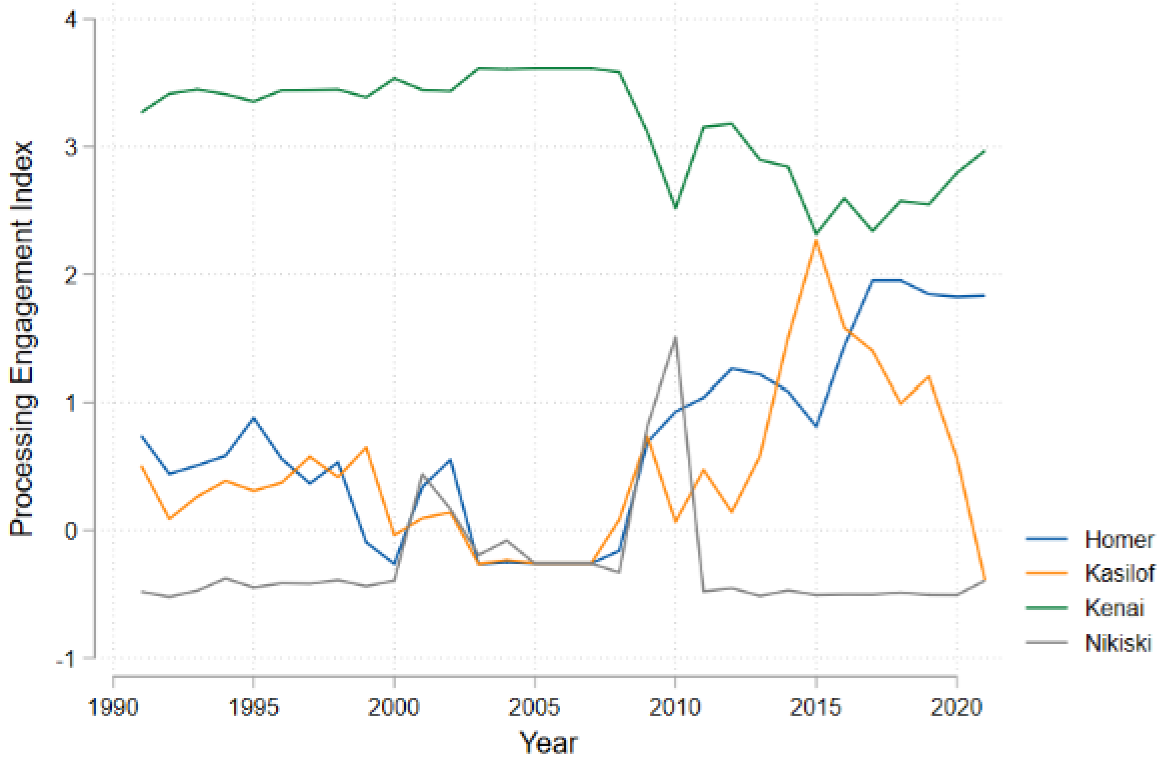

Figure 2. Index scores of communities highly engaged in commercial Cook Inlet salmon drift gillnet processing for at least 1 year from 1991-2021.

Processing Regional Quotient

Another measure of a community's participation in commercial Cook Inlet salmon drift gillnet fisheries is its processing regional quotient of revenues, defined as the share of commercial revenues within a community compared with the total Cook Inlet salmon drift gillnet fishery revenues.[152] It is an indicator of the percentage contribution in revenue landed in that community relative the total revenue from all communities throughout the U.S. Figure 3 shows the processing regional quotient for revenue from 1991-2021. Due to confidentiality restrictions, communities are grouped into Kenai, the three "Other Highly Engaged Communities" for at least one year of Homer, Kasilof, and Nikiski, and all other communities.

[152] The regional quotient for pounds is not calculated as pounds and revenues across communities are very highly correlated for a single species and does not show meaningful differences across communities, but is available upon request.

The most prominent communities for processing Cook Inlet salmon drift gillnet in terms of ex-vessel revenue over this period has been Kenai and accounts for approximately 67% of the value of Cook Inlet salmon drift gillnet retained in the North Pacific on average for this period. This is followed by Homer and Kasilof at 13.2% and 11.8%, respectively. Nikiski only averages 2.3% of revenues over the entire period, but represented the second largest share of revenues when the community was highly engaged in 2010.

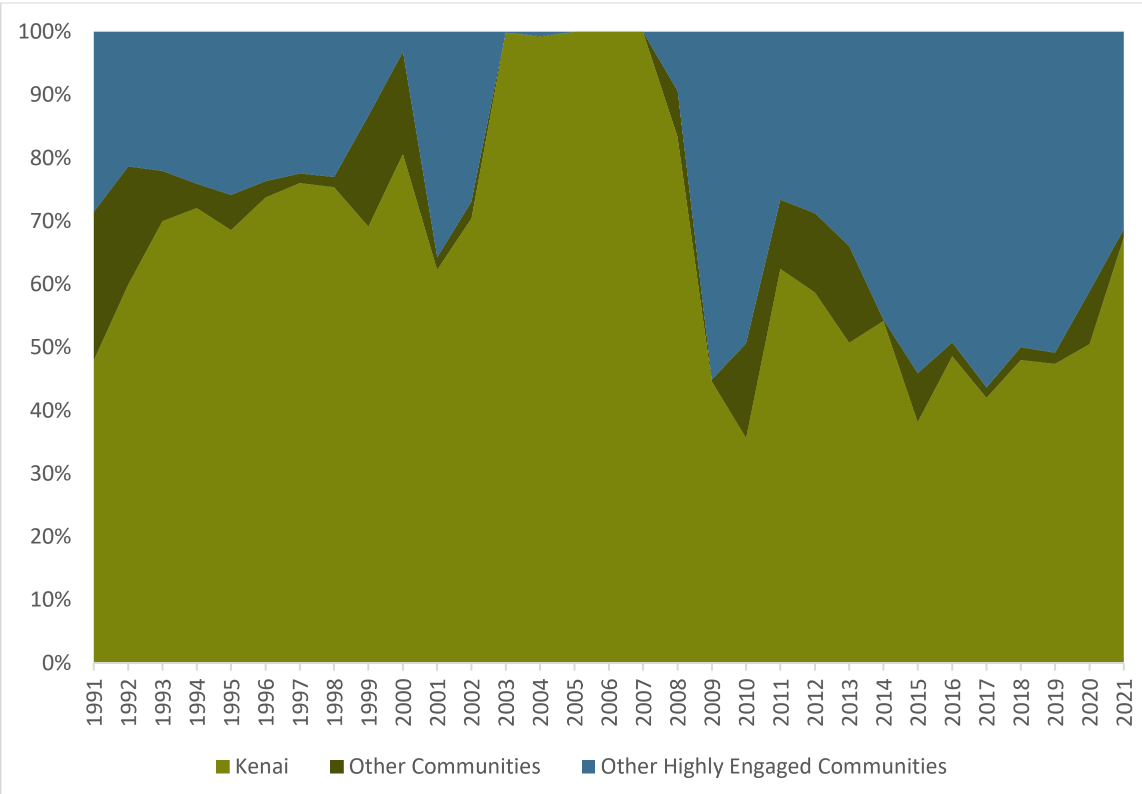

Figure 3. Processing regional quotient of revenue for communities highly engaged in commercial Cook Inlet salmon drift gillnet processing for at least one year from 1991-2021.

Commercial Cook Inlet Salmon Drift Gillnet Harvesting Engagement

The results of the commercial Cook Inlet salmon drift gillnet harvesting engagement PCFA analyses are shown in Table 3 which presents the eigenvalues, factor loadings, total variance explained, and Armor's theta reliability coefficient (Armor, 1973)[153] for all of the variables included in each PCFA. The results suggest very strong relationships among variables and that a single index based on the first extracted factor explains over 98% of the variation in each of the variables in each year.

[153] Armor, D.J., 1973. Theta reliability and factor scaling. Sociological methodology, 5, pp.17-50.

Table 3. Commercial Cook Inlet Salmon Drift Gillnet Harvesting Engagement PCFA Results.

	Eigenvalues				Factor Loadings					
Year	1	2	3	4	Ex-vessel value by resident owned vessels	Pounds landed by resident owned vessels	Number of vessels owned by residents	Number of vessel owners	1st Eigenvalue Percent variance explained	Armor's Theta
1991	3.97	0.03	0.01	0.00	0.993	0.997	0.998	0.996	0.992	0.997
1992	3.92	0.07	0.01	0.00	0.972	0.996	0.996	0.996	0.981	0.993
1993	3.96	0.04	0.00	0.00	0.985	0.997	0.998	0.998	0.989	0.996
1994	3.97	0.02	0.01	0.00	0.995	0.996	0.998	0.997	0.993	0.998
1995	3.99	0.01	0.00	0.00	0.999	0.998	0.999	0.998	0.997	0.999
1996	3.99	0.01	0.00	0.00	0.999	0.999	0.999	0.999	0.998	0.999
1997	3.99	0.01	0.00	0.00	0.998	0.998	0.998	0.998	0.997	0.999
1998	3.99	0.01	0.00	0.00	0.999	0.999	0.999	0.998	0.998	0.999
1999	3.99	0.01	0.00	0.00	0.999	0.999	0.999	0.999	0.998	0.999
2000	3.99	0.00	0.00	0.00	0.999	0.999	0.999	0.999	0.999	1.000
2001	3.98	0.02	0.00	0.00	0.997	0.997	0.997	0.998	0.994	0.998
2002	3.98	0.02	0.00	0.00	0.998	0.997	0.997	0.997	0.995	0.998
2003	3.99	0.00	0.00	0.00	0.999	0.999	0.999	0.999	0.999	1.000
2004	3.99	0.01	0.00	0.00	0.999	0.999	0.999	0.999	0.998	0.999
2005	3.98	0.02	0.00	0.00	0.998	0.997	0.998	0.998	0.995	0.998
2006	3.91	0.09	0.00	0.00	0.991	0.986	0.988	0.989	0.977	0.992
2007	3.98	0.01	0.00	0.00	0.999	0.997	0.998	0.998	0.996	0.999
2008	3.97	0.03	0.00	0.00	0.998	0.995	0.997	0.996	0.993	0.998
2009	3.98	0.02	0.00	0.00	0.999	0.995	0.998	0.997	0.994	0.998
2010	3.98	0.02	0.00	0.00	0.999	0.996	0.998	0.998	0.996	0.999
2011	3.98	0.02	0.00	0.00	0.999	0.997	0.998	0.998	0.996	0.999
2012	3.98	0.01	0.00	0.00	0.999	0.997	0.998	0.998	0.996	0.999
2013	3.97	0.03	0.00	0.00	0.998	0.994	0.997	0.996	0.992	0.997
2014	3.98	0.02	0.00	0.00	0.999	0.996	0.998	0.997	0.995	0.998
2015	3.96	0.04	0.00	0.00	0.996	0.992	0.995	0.995	0.989	0.996
2016	3.97	0.03	0.00	0.00	0.998	0.996	0.997	0.997	0.994	0.998
2017	3.94	0.06	0.00	0.00	0.993	0.991	0.993	0.992	0.985	0.995
2018	3.98	0.02	0.00	0.00	0.998	0.996	0.998	0.997	0.995	0.998
2019	3.96	0.04	0.00	0.00	0.995	0.995	0.995	0.995	0.990	0.997
2020	3.92	0.08	0.00	0.00	0.990	0.991	0.993	0.987	0.981	0.994
2021	3.94	0.06	0.00	0.00	0.992	0.993	0.993	0.992	0.985	0.995

Index scores derived from the PCFA results are presented in Table 4 for the 9 communities that were highly engaged (index score above one, which is one standard deviation above the mean of zero) for any year from 1991-2021. These cells are shaded in Table 4. The harvesting engagement index is an indicator of the degree of participation in a community relative to the participation of all other communities in the U.S. It is a measure of the presence of commercial Cook Inlet salmon drift gillnet fishing activities through residents who own commercial fishing vessels and includes Cook Inlet salmon drift gillnet pounds landed, revenue, the number of vessels harvesting Cook Inlet salmon with drift gillnet gear, and the total number of vessel owners harvesting Cook Inlet salmon using drift gillnet gear in a community.

Table 4. Communities Highly Engaged in Cook Inlet Salmon Drift Gillnet Commercial Harvesting for One or More Years From 1991-2021*.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Anchorage	1.9	1.7	1.8	1.9	1.8	1.7	1.5	1.5	1.4	1.6	1.8	1.3	0.9	1.2	0.8	0.7	1.0	1.1	1.0	1.1	1.1	1.1	0.8	0.9	1.0	1.1	1.2	1.1	0.8	0.7	0.2
Homer	4.6	4.3	4.4	4.4	4.8	4.7	4.8	5.0	5.1	4.9	4.5	4.6	5.1	5.4	6.0	6.4	5.7	5.9	6.2	6.1	6.3	6.5	6.7	6.6	6.7	6.6	6.7	6.4	6.3	6.6	6.4
Kasilof	1.6	1.6	1.6	1.6	1.7	1.7	1.6	1.6	1.6	1.5	1.6	1.9	1.8	1.7	1.4	1.5	1.4	1.4	1.4	1.2	1.2	0.9	0.8	0.9	0.9	1.0	1.2	1.1	1.1	0.9	1.0
Kenai	3.7	3.5	3.5	3.5	3.4	3.6	3.3	3.1	3.2	2.9	3.3	3.2	3.1	3.1	2.5	2.7	2.6	2.6	2.7	2.8	2.4	2.4	2.4	2.3	2.3	2.3	1.9	2.1	2.3	2.3	2.6
Oregon	2.3	2.7	2.7	2.6	2.3	2.7	2.5	2.4	2.6	2.9	2.7	2.7	2.3	2.1	2.2	1.5	1.9	1.8	1.9	1.9	1.9	2.0	1.7	1.7	1.3	1.2	1.3	1.5	1.7	1.2	1.2
Other US	0.9	1.3	1.2	0.8	0.8	1.0	1.2	0.8	0.8	0.9	1.1	1.1	1.1	0.9	0.9	0.8	1.4	1.4	1.4	1.1	1.3	1.2	1.2	1.4	1.4	1.5	1.2	1.7	1.7	1.0	1.4
Other Washington	1.6	1.9	1.7	1.7	1.5	1.7	2.0	2.2	2.1	2.1	2.2	2.0	2.0	1.9	1.7	1.4	1.9	2.0	1.4	1.8	1.7	1.4	1.2	1.4	1.1	1.2	1.0	1.1	1.2	1.0	1.1
Seattle MSA	0.9	1.0	1.3	1.0	0.9	0.6	0.6	0.4	0.3	0.3	0.4	0.4	0.3	0.0	0.0	-0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.1	0.5	0.1	0.0	0.1
Soldotna	2.0	2.3	2.2	2.4	2.3	2.0	2.3	2.3	2.1	2.3	2.3	2.6	2.4	2.2	1.9	1.7	2.3	1.8	1.5	1.6	1.4	1.1	1.1	1.3	1.4	1.6	1.6	1.7	1.8	1.9	1.9

*Shaded cells are index scores above one (which is one standard deviation above the mean of zero) for at least one year from 1991-2021.

Figure 4 displays the commercial Cook Inlet salmon drift gillnet harvesting engagement index for the 9 communities listed in Table 4. These trends will be explored in more detail below, but the most apparent trend from Figure 4 is that the Homer has a substantially higher level of harvesting engagement than many of the other community groupings, averaging 5.63 over the entire period while the next two highest average index scores are for Kenai and the Oregon grouping at 2.82 and 2.03, respectively.

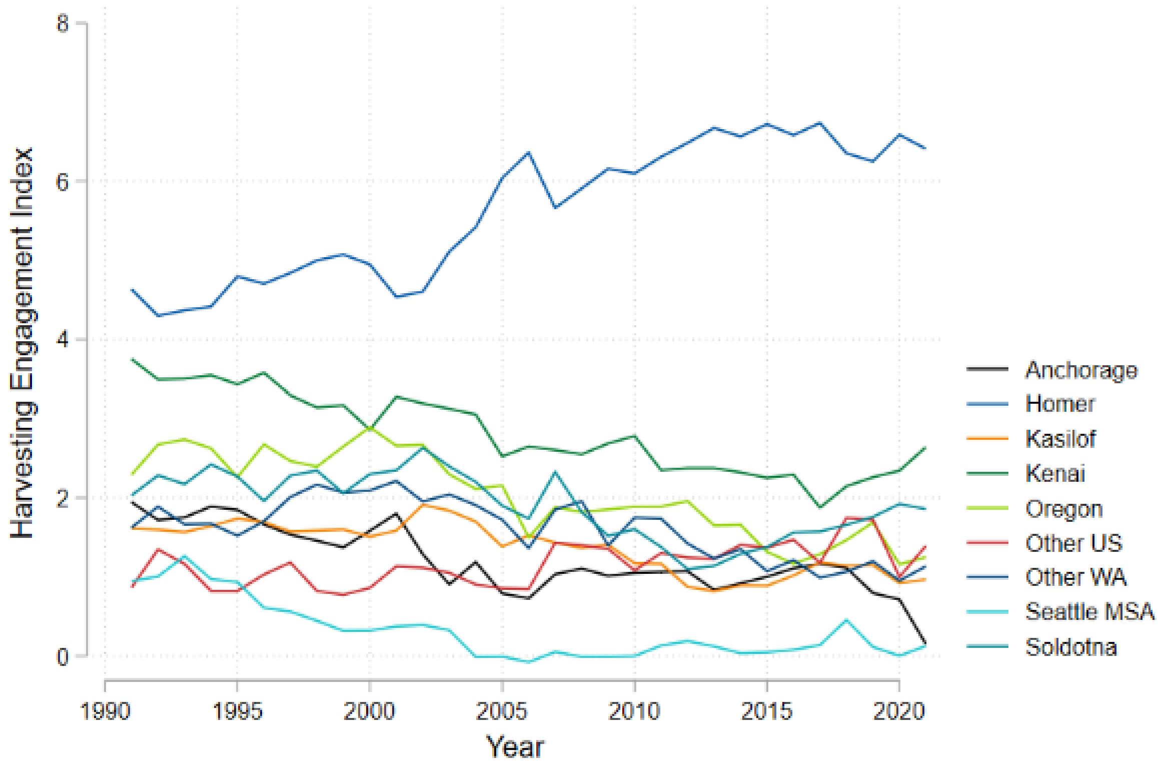

Figure 4. Index scores of communities highly engaged in commercial Cook Inlet salmon drift gillnet harvest for at least 1 year from 1991-2021.

Of the 9 communities listed in Table 4 and shown in Figure 4, four communities (Homer, Kenai, Oregon, and Soldotna) were highly engaged in commercial harvesting for all years from 1991-2021 (Figure 4). Interestingly, the communities outside of Alaska experienced a larger decline in harvesting engagement in 2020, which likely is a result of their distance from Cook Inlet and COVID travel restrictions but while Oregon remained highly engaged in the harvesting aspect of this fishery in 2020, Other US and Other WA did not. Homer has the highest commercial Cook Inlet drift gillnet salmon harvesting engagement scores over time, with an increasing index score, accelerating after 2003. Kenai, Soldotna, and Oregon have each had periods of higher and lower engagement with this fishery but have seen overall declining trends in the engagement indices over time but all three are generally increasing since 2015.

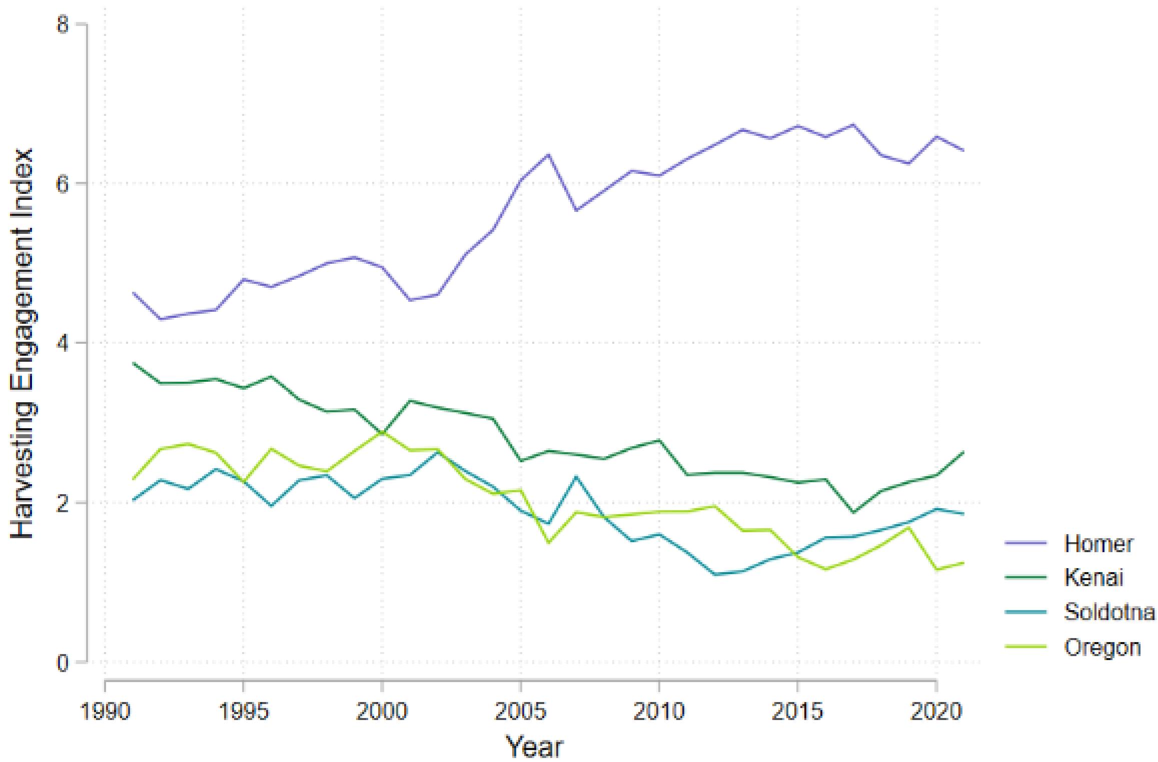

Figure 4. Index scores of communities highly engaged in commercial Cook Inlet salmon drift gillnet harvest for all years from 1991-2021.

Participation Summary

Based on the community engagement index scores for both commercial Cook Inlet salmon drift gillnet processing and commercial Cook Inlet salmon drift gillnet harvesting engagement, communities were categorized into low (index scores below the mean of 0), medium (index scores between 0 and 0.5), medium-high (index scores between 0.50001 and 1), and high engagement (index scores above 1.00001) for each year. The number of years a community is in each category for the processing and harvesting engagement indices is presented in Table 5. There are 19 communities or community groupings in Table 5 that had medium, medium-high, or high engagement in either commercial Cook Inlet salmon drift gillnet harvesting or commercial Cook Inlet salmon drift gillnet processing engagement and 10 communities were highly engaged in one aspect of Cook Inlet salmon drift gillnet commercial fisheries in any year from 1991-2021. There were four communities that were highly engaged in commercial Cook Inlet salmon drift gillnet processing engagement and nine that were highly engaged in commercial Cook Inlet salmon drift gillnet harvesting engagement for at least one year from 1991-2021.

Table 5. Number of years by commercial Cook Inlet salmon drift gillnet processing and commercial Cook Inlet salmon drift gillnet harvesting engagement level. Alaska communities not listed had low commercial Cook Inlet salmon drift gillnet processing and commercial Cook Inlet salmon drift gillnet harvesting engagement in all years.

Community	Harvesting Engagement				Processing Engagement			
	Low	Medium	Medium-High	High	Low	Medium	Medium-High	High
Anchor Point	6	15	10	0	0	0	0	0
Anchorage	0	1	7	23	29	1	1	0
California	5	26	0	0	0	0	0	0
Delta Junction	30	1	0	0	0	0	0	0
Homer	0	0	0	31	8	3	10	10
Kasilof	0	0	6	25	7	12	7	5
Kenai	0	0	0	31	0	0	0	31
Kodiak	26	5	0	0	31	0	0	0
Nikiski	0	26	5	0	27	2	1	1
Nikolaevsk	19	12	0	0	0	0	0	0
Ninilchik	8	23	0	0	26	3	2	0
Oregon	0	0	0	31	0	0	0	0
Other US	0	0	10	21	0	0	0	0
Other Washington	0	0	2	29	0	0	0	0
Seattle MSA	6	18	5	2	0	0	0	0
Seward	30	1	0	0	28	2	1	0
Soldotna	0	0	0	31	30	1	0	0
Sterling	11	17	3	0	0	0	0	0
Wasilla	13	18	0	0	0	0	0	0

16. Appendix: Upper Cook Inlet Exclusive Economic Zone Harvest

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Upper Cook Inlet Exclusive Economic Zone (UCI EEZ) Harvest Estimates

Available Data

The Division of Sport Fish conducts a Saltwater Charter Logbook program which requires all saltwater sport fishing guide operators to maintain an ADF&G-issued logbook and report effort, harvest, and catch for guided anglers. Charter captains record the statistical area where the majority of their sport effort, catch and harvest occurred. Separate areas are recorded for groundfish fishing and for salmon fishing. Prior to 2015 groundfish statistical areas were used to document geographic area for both salmon and groundfish fishing, while salmon statistical areas were used for salmon fishing beginning in 2015. Groundfish areas delineate state and federal waters well with respect to distance form shore, but there is no statistical area which uses the EEZ defined boundary for the southern extent of Upper Cook Inlet. Salmon statistical areas delineate the EEZ defined boundary for the southern extent of Upper Cook Inlet well but span both federal and state waters with respect to distance from shore. Therefore, while logbook data can be used to provide a rough estimate of guided harvest that occurred in the UCI EEZ for each species and year, correction factors are needed and any bias introduced by the correction factors will differ before and after 2014. In this analysis we use reported harvest prior to 2015 to estimate the proportion of fish harvested within 3 miles of shore and use reported harvest in 2015 and later to estimate the magnitude of harvest within the UCI EEZ.

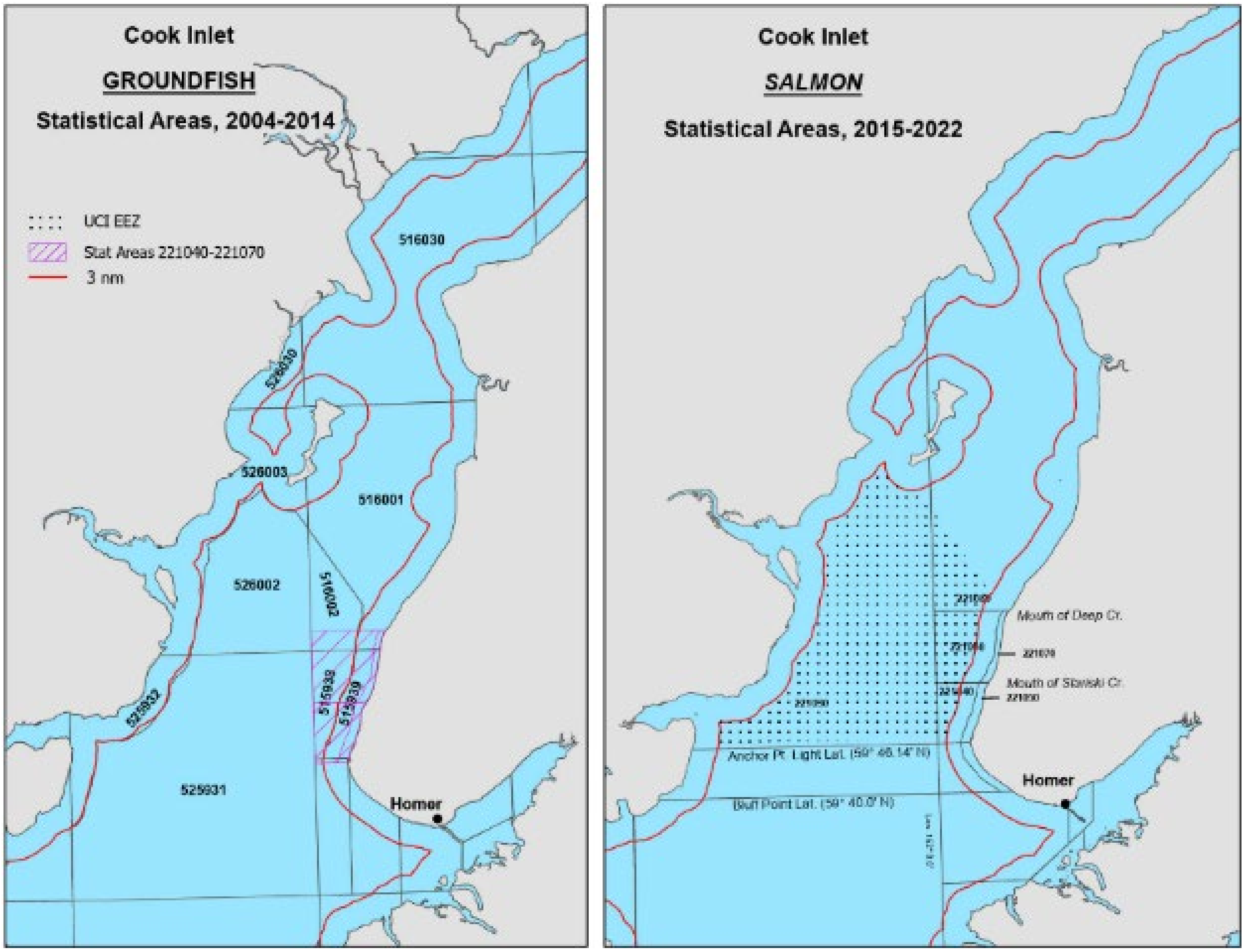

Figure 1. Charter Logbook statistical areas used for reporting salmon effort, 2004-2021.

In addition, the Division of Sport Fish conducts the mail-based Statewide Harvest Survey (SWHS) to estimate sport fishing annual effort (angler-days), harvest (fish kept), and total catch (fish kept plus fish released). Harvest and catch estimates are available for species commonly targeted by sport anglers and are available stratified into geographic areas and categories such as boat/shore and charter/non-charter. Unfortunately, none of the geographic areas used in the SWHS match the boundaries of the EEZ. The closest available geographic area is marine waters in Cook Inlet North of a line between Bluff Point and Chinitna Point, which is South of the southern boundary with the UCI EEZ. Significant harvest occurs in marine waters between Bluff Point and Anchor Point. SWHS estimates also include both State and Federal waters with respect to distance from shore. In addition, the SWHS has issues estimating catch, harvest and effort from fisheries with poorly defined geographic boundaries. Area biologists feel these issues affect SWHS from Upper Cook Inlet, particularity for coho and sockeye salmon. In this analysis, SWHS estimates were only used to derive the fraction of the total harvest taken by Charter anglers.

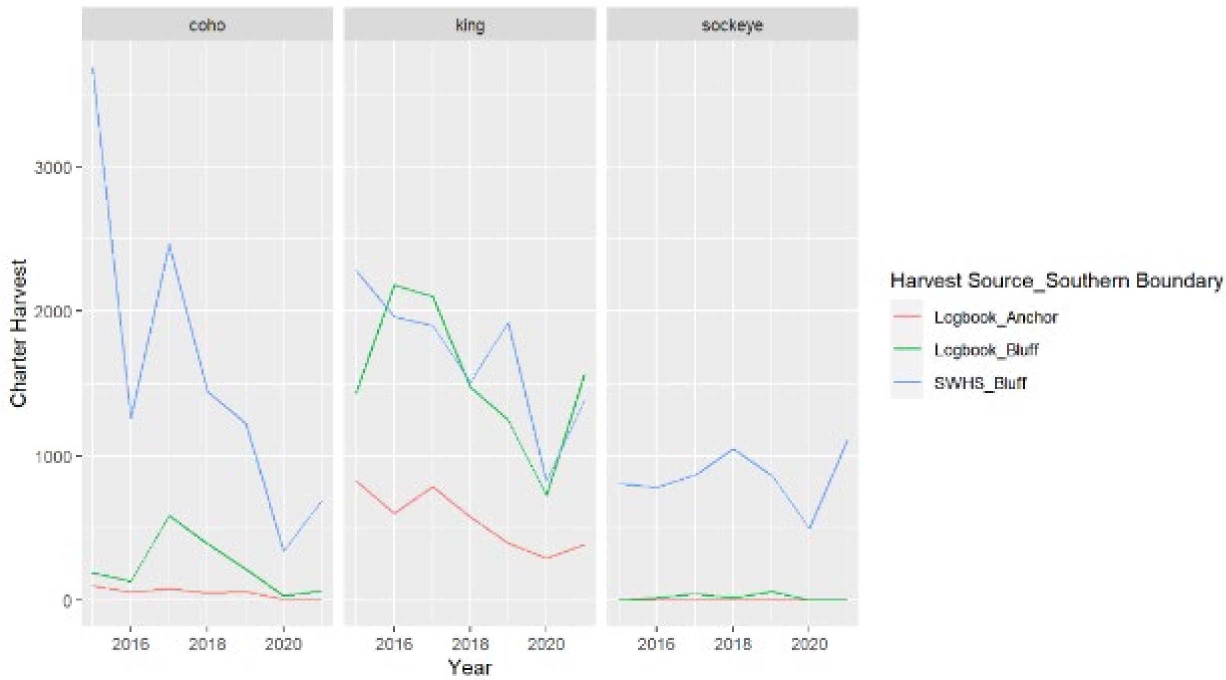

Figure 2. Reported charter harvest from Guide Logbooks and estimated charter harvest from the SWHS, Upper Cook Inlet, 2015-2021.

Methods

Salmon statistical areas 221030, 221040, 221050, 221060, 221070, and 221080 are part of the UCI EEZ. For this analysis area 221030 was considered 100% Federal waters. While areas 221050 and 221070 were 100% within state waters and areas 221040, 221060 and 221080 overlapped the boundary between state and federal waters we combined harvest from all 5 statistical areas when apportioning harvest. Annual charter harvest in in the UCI EEZ for species *s* during years *y* (H_{Csy}) was estimated as:

$$H_{Csy} = L_{221030sy} + \theta_s(L_{221040sy} + L_{221050sy} + L_{221060sy} + L_{221070sy} + L_{221080sy})$$

here L_{asy} is the reported harvest by charter operators in statistical areas *a* for species *s* and year *y*, and θ_s is an estimate of charter harvest greater than 3 nautical miles from shore. Our estimate of θ_s came from the average of the annual ratio of Charter Logbook reported harvest in groundfish statistical areas 515938 and 515939 between 2006 and 2014:

$$\theta_s = \sum_y \frac{L_{515938sy}}{L_{515938sy} + L_{515939sy}}$$

Figure 1 shows that groundfish statistical areas 515938 and 515939 heavily overlap salmon statistical areas 221040, 221050, 221060 and 221070 providing a reasonable proxy for the distribution of harvest with respect to distance from shore for each species. This approach assumes that guided and unguided fisheries have equal proportions of harvest in federal waters.

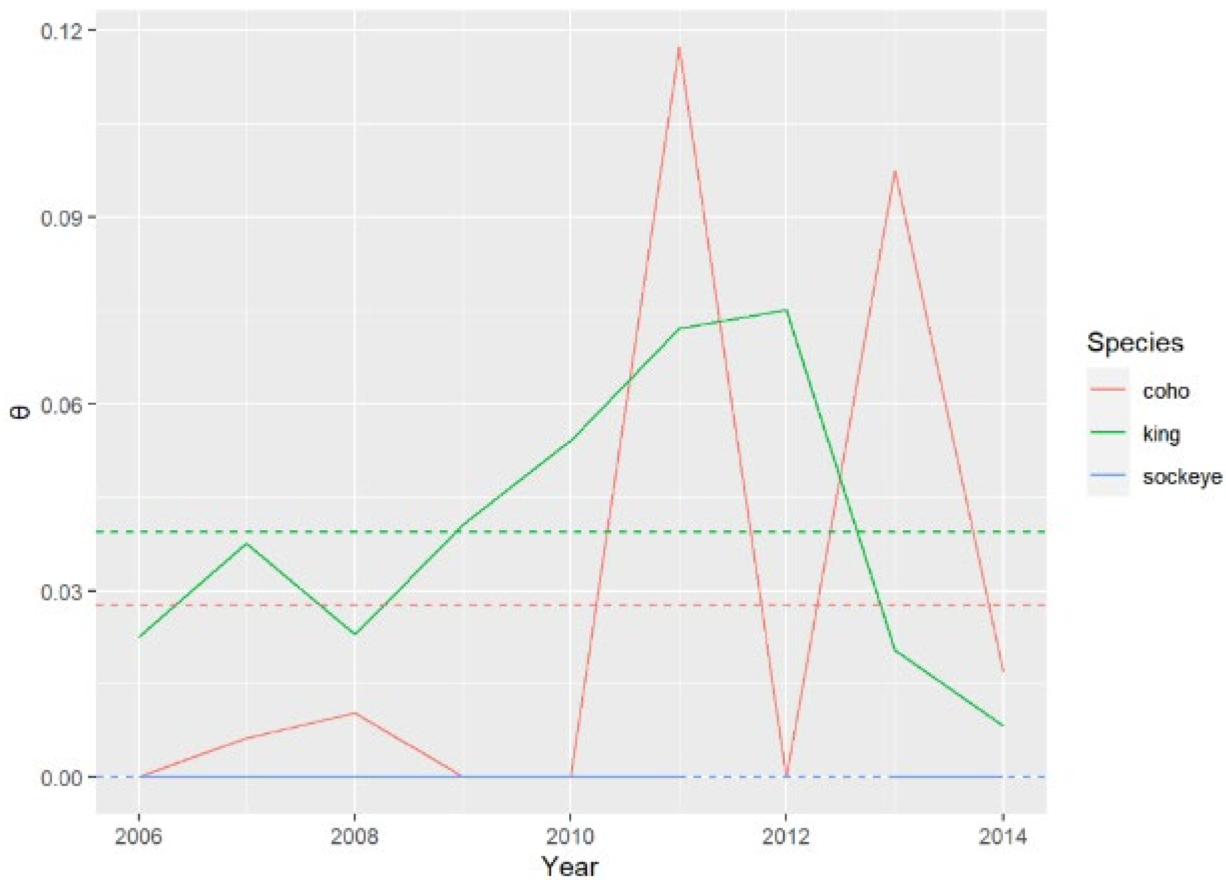

Figure 3. Percent of harvest reported greater than 3 miles from shore as a fraction of the total reported harvest in groundfish statistical area 515938 and 515939 by species and year, 2006-2014. The mean percentage for each species is shown as a dotted line and was used in the analysis.

Annual harvest in in the UCI EEZ for years 2015 and later (H_{sy}) was estimated as:

$$H_{sy} = \frac{H_{Csy}}{\phi_{sy}}$$

where ϕ_{sy} is the ratio of charter harvest from boats and total harvest from boats from the SWHS for species s in year y. Statewide harvest survey estimates for 2022 are not available at this time and the mean ratio from 2015-2021 was used in proxy.

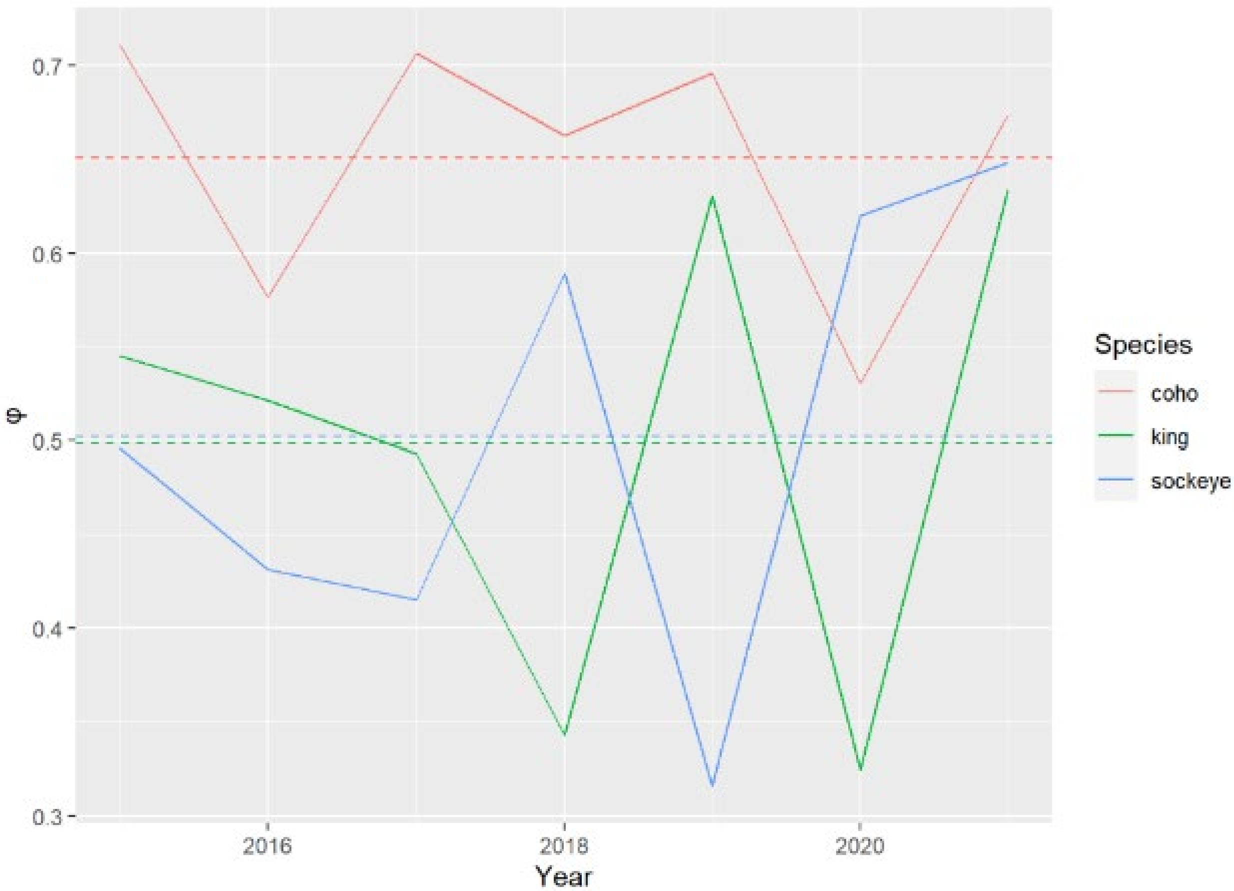

Figure 4. Percent of SWHS estimated harvest in salt waters North of Bluff Point attributed to Charter anglers by species and year, 2015-2021. The mean percentage for each species is shown as a dotted line and was used in the analysis for the 2022 season.

Results

Table 1.- Estimated Harvest within the Upper Cook Inlet EEZ, 2015–2022.

Year	coho	king	sockeye
2015	15	59	0
2016	3	60	0
2017	13	71	0
2018	12	125	0
2019	5	28	3
2020	0	36	0
2021	0	30	0
2022	0	14	0